



Summer Studies

### **Biochemistry Laboratory—May 2013**

1 PM – 5 PM, room 128 Dedman Life Sciences

**Instructor:** Johannes Bauer

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**Office hours:** by appointment—please e-mail me times/days when you can meet

**Textbook and Supplies:** Biochemistry Lab Manual (2008) by E. Oberdörster. Laboratory Research Notebook, ISBN 0-8720-877-5—or other similar notebook (not loose-leaf). Lab coats and safety glasses are available in the lab for your use.

**Objective:** This course is designed to introduce students to some of the techniques used in experimental biochemistry. Emphasis will be placed on the isolation, identification, and analysis of proteins, lipids, and nucleic acids from various sources. Standard laboratory attire will be required, including closed-toed shoes and long pants, and when necessary, safety glasses and lab coat.

**Learning Outcomes:** Students will be able to explain the principles of key experimental techniques used in biochemical research.

- a. Describe the preparation of a buffer.
- b. Describe the use of primary antibodies in Biochemical Research.
- c. Describe the PCR method.
- d. Describe chromatography.
- e. Describe PAGE and agarose gel electrophoresis.

Students will be able to measure and plot scientific data.

- a. Calculate the volumes necessary to construct a dilution series.
- b. Accurately pipet a series of different volumes.
- c. Construct a standard curve to measure the amount of an unknown.
- d. Interpolate data from the standard curve.

Students will be able to analyze and interpret the results of standard biochemical experiments.

- a. Analyze the results of size-exclusion chromatography.
- b. Analyze the results of SDS-PAGE and Western blot.
- c. Analyze the results of a Bradford Protein Assay.
- d. Analyze the results of a PCR experiment.

**Grading:**

The course grade will be determined on the basis of the:

- pre-labs (14%),
- quizzes (45%),
- participation in the lab (14%, as defined below),

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Summer Studies

post-lab clean-up (7%),  
lab practical exam (20%)

Points will be deducted for non-participation in lab which includes (but is not limited to) making cell phone calls during lab, leaving the lab without permission, and wearing improper laboratory attire (shorts, sandals). Points will also be deducted if your lab partner(s) do all the work.

Each class period will begin with a short lecture, including specific instructions for that day's experiment. Students are expected to read the experimental material in advance and write up a pre-lab. This consists of :

Student's name and lab partner (s)  
Title and date of the experiment  
Objective (2-3 sentences)  
Methods (in flow-chart or bullet-point format  
Tables for recording data

**DO NOT COPY WHAT IS WRITTEN IN THIS LAB MANUAL—USE YOUR OWN WORDS!**

Pre-lab write-ups that are incomplete will receive zero credit. If you are late to lab and the lecture has already begun, you will receive zero credit for the pre-lab write-up.

During the class period, students should record the details of the experimental procedures, and the data that was collected. As part of the weekly quiz, students will be expected to tabulate their own data and present it in an organized, logical fashion in the form of a graph. The data analysis is never a group project—each student must work independently.

Since this course has very specialized labs, **it is not possible to have make-up labs**. If you will miss a lab due to University sponsored events, or any other reason (illness, job interviews), contact the professor as soon as possible to make arrangements **prior** to the scheduled lab. Arrangements will include presenting the pre-lab and taking the quiz so that you can earn those points for the lab. However, you will lose participation/clean-up credit for each lab that you miss unless the absence is due to a University sponsored event. If you do not contact the professor **prior** to the absence, you will receive no credit for pre-lab and will not be allowed to take the quiz. Absences due to illness will only be excused with a physician's note stating that you were too ill to participate in lab.

At the end of the semester, a lab practical exam will be given. The practical will include a timed component where each student must accomplish a skill learned in lab, such as loading samples into SDS-PAGE gels, pipetting, preparing a standard curve, dilutions, and other practical skills. The second part of the exam will be a written exam covering the techniques used during the semester. Review of the lab manual as well as the quizzes will aid in preparing for this section of the exam. Questions will be about methodology and the biochemistry of the labs we have performed this semester.

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Summer Studies

Honor Code: Intellectual integrity and academic honesty are fundamental to the process of learning and of evaluating academic performance. Maintaining them is the responsibility of all members of an educational institution. You will be required to sign and hand in an Honor Code statement and pledge prior to each exam.

Disability Accommodations: If you need academic accommodations for disability, you must first contact DASS to verify the disability and to establish eligibility for accommodations. Then you should schedule an appointment with the professor to make appropriate arrangements.

Religious Observance: Religiously observant students wishing to be absent on holidays that require missing class should notify their professors in writing at the BEGINNING of the class, no later than **May 17, 2013**, and should discuss with them, IN ADVANCE, acceptable ways of making up any work missed because of the absence.

Excused Absences for University Extracurricular Activities: Students participating in an officially sanctioned, scheduled University extracurricular activity will be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up their work.

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