CHEM 465: Biochemistry Laboratory

Required Textbook: Modern Experimental Biochemistry, 3rd Edition by Rodney Boyer

Lab Manual: The lab manual is available on Blackboard—please print prior to the first experiment.

Laboratory Notebook: To successfully complete this course you will need to purchase a laboratory notebook that contains carbon copies, laboratory goggles, a black permanent ink pen, and a fine point permanent marker. You may want to also purchase a notebook for taking notes during reading assignments; however, any notes/references required for performing the experiment for the day must be written in the laboratory notebook.

***Course Pre-requisite**: Chem463 with a C or better is a pre- or co- requisite for this course*

Course Objective

In this course you will learn basic techniques use in biochemistry that are used frequently in research laboratories such as the identification of biomolecules by chromatography, enzyme kinetics, polymerase chain reaction, DNA gel electrophoresis, manipulation of recombinant DNA, and protein purification. These methodologies enable biochemists to probe the complex processes that enable cellular functions. Weekly laboratory reports will be required with the purpose of advancing your skills in data recording, reference retrieval, and critical analysis of results.

Grading

Lab Quizzes	15%
Laboratory Notebook (Carbon Copies)	10%
Lab Reports (1-5)	30%
Project Lab Report	20%
Midterm Exam	10%
Final Exam	15%

This course fulfills the requirement for a writing intensive course. In addition to content, your lab reports will also be graded based on clarity, style, and grammar. Your laboratory notebook will be graded for completion and clarity. Quizzes and exams are open notebook.

The following is a general grading guideline. The final percent ranges for letter grades are adjusted (if necessary) at the end of the semester and once all student grades have been tabulated.

93-100: A, 90-92: A-, 87-89: B+, 83-86: B, 80-82: B-, 77-79: C+, 73-76: C, etc.

GENERAL POLICIES

Lab Safety: General lab safety guidelines must be observed. Do not eat or drink in lab. No sandals, flip flops, or otherwise exposed feet are allowed. Long hair must be secured away from the face during experiments. Goggles and gloves are a way of life in lab. You will need to always wear them. If not properly dressed, you will not be allowed to participate in the laboratory exercise and will receive a zero for that lab. You must follow Chemistry Department guidelines, as outlined on the safety contract signed on the first day of lab.

Attendance: Please plan to be in the lab on time. Each lab will start with a short quiz that covers information derived from the assigned readings. If you arrive late to class you will miss the quiz and get a zero.

Attendance in laboratory is necessary in order to successfully complete this course. Should a serious circumstance (sickness/death in the family) arise that prevents you from coming to class or handing in a report, email me **immediately**. If you are absent when an assignment is due, you are still responsible for turning it in on time unless arrangements have been made with me in advance. Work conflicts, traffic, car problems, etc. are not excused absences. All excused absences are at the discretion of the instructor.

Preparation: It is important that you read the assigned reading, as quizzes will be taken from the readings. Moreover, you will be better prepared for the experiments. In your laboratory notebook (prior to class), you should outline the experiment title, experimental reference (i.e. Boyer and/or Born lab manual), purpose, and materials. Methods can be outlined and then you may note modifications on the day of the experiments. You may not simply print the procedure and tape it into your notebook.

Laboratory Notebook: Your laboratory notebook consists of raw data and observations. Many scientific discoveries have come about by accidental procedures, but they were always linked to excellent observational skills. Observe and write. At the end of class I will check your lab notebook and your work area. If I do not initial, you will not receive full credit for the procedure section of the laboratory notebook.

Formal Lab Reports: You will use your lab notebook to write a formal lab report. Guidelines will be provided on how to prepare both the mini-lab reports and the 6-week version. **While you may work with a partner in lab, you must write your lab report independently. Academic integrity is pivotal in the preparation of lab reports—if your lab report reads like that of your lab partner or another student, you will receive a zero on the report. No exceptions.**

Late Policy: Lab reports are due by the beginning of class. You will be given a due date for all reports. You will NOT be allowed to work on a previously due lab during class. Lab reports must be submitted via Blackboard. One letter grade will be deducted from your grade for late reports submitted within 24 hours after the deadline. For every subsequent day they are late, an additional letter grade will be deducted.

Technology in the Classroom: You may bring a laptop/tablet/etc. to class to enter data in graph generating software, however a pre-lab is still required. The Chemistry and Biochemistry Department at GMU will not be held liable for damage that may be incurred

during laboratory participation. The use of personal computers for non-laboratory related activities will result in a grade of zero for the report. (Smart)phone use in lab is not allowed.

Students with Disabilities: Students with physical or learning disabilities should the Office of Disability Services for specific information and assistance regarding their needs. If you have a documented disability that requires accommodation, you must meet with me in the first two weeks of class to discuss your accommodations and their implementation. Chemistry faculty and staff work cooperatively to assist students with disabilities with their educational objectives.

Snow/Cancellation: In the event the University is closed or delayed, please check your email for an announcement from the instructor with further instructions. It is possible that lab can still be completed even if there is a delay.

ACADEMIC INTEGRITY:

Cheating of any form is not tolerated in this course. All lab reports must be submitted via Blackboard. This e-copy will be submitted to a plagiarism detector. Any cases of plagiarism or cheating will be sent to the Office of Academic Integrity (oai.gmu.edu).

Protect yourself:

1. USE YOUR OWN WORDS.
2. CITE ALL REFERENCES.
3. DO NOT SHARE YOUR LAB REPORT WITH OTHERS.

Chem 465
Biochemistry Laboratory

Schedule of Labs

Week	Reading Assignment	Experiment	Due
1		Check-In/Intro	
2	p. 8-18, 29-38 top	Buffers	
3	p. 65-69, 303-308, 314(C)-318	Purification of TAGS/Fatty Acids	Buffers Report
4	p. 41-45	Bradford Assay	TAGS/Fatty Acids
5	p. 279-291	Enzyme Kinetics	Bradford
6		Writing Appointment	Kinetics Draft
7	Handout	Bioinformatics	Kinetics
8	*Spring Break*	*Take Home Midterm*	
9	Lab manual: project intro	PCR	Bioinformatics Midterm
10		Transformation	
11	p. 46, 193(B)-201, 399-404, 415-422	Plasmid DNA Purification	
12	122-126, 431-436	DNA Gel Electrophoresis/Restriction Digest	
13	70-78, 99-106	Protein Purification	
14	113-121	SDS- PAGE	
15		Final Exam	Project Lab Report