University of Mary Washington

Department of Chemistry

CHEM 319: Biochemistry I Lab
Fall 2019
Sections 1 & 2

Instructor: Dr. Randall D. Reif
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Office Hours:

Monday	1:30-3:30 PM
Wednesday	1:30-3:30 PM
Thursday	2:00-3:00 PM

Other times by appointment.
I also have an open door policy-drop by anytime my door is open!

Class Times: Section 1: 9:30 AM – 12:15 PM T, Jepson 416
Section 2: 12:30 AM – 3:15 PM T, Jepson 416

Required Course Materials

1.) Slunt, K. Biochemistry Laboratory Manual, Kendall Hunt Publishing: Dubuque, IA, 2009
2.) Approved Safety Goggles and Laboratory coat
3.) Laboratory notebook with carbonless duplication
4.) Calculator with scientific notation
5.) Access to Canvas
6.) *Recommended:* Hofmann, A. Scientific Writing and Communication Papers, Proposals, and Presentations. Oxford University Press, 3rd edition. 2016
7.) *Recommended:* Strunk, W and White, E.B. The Elements of Style. Longman, 4th Edition. 1999.

Course Prerequisites

This course requires a grade of C or better in CHEM 212.

Course Description

This laboratory course (in addition to CHEM 320) is designed to demonstrate and teach the techniques utilized in the biochemical sciences. This semester will focus on experiments utilized to characterize the four major classes of macromolecules. CHEM 320 will focus on chromatography, purification of biological materials and DNA manipulation.

After completing the course, a student should be able to

- Conduct experiments studying the characteristics of each of the macromolecular classes

- Understand the principles of spectroscopy, kinetics, electrophoresis and chromatography as applied to biochemical analysis
- Work with peers to conduct biochemical investigations
- Read the biochemical literature

Course Learning Outcomes

This course will:

1. Help students develop a satisfactory knowledge base for upper level students in Biochemistry
2. Allow students to demonstrate proficiency in Biochemical Laboratory Techniques
3. Enhance student ability to find, interpret, and communicate peer reviewed original research
4. Prepare students for advanced study in graduate/professional school or employment in a chemistry-related field
5. Enhance student ability to interpret and solve chemical problems (critical thinking skills)

Writing Intensive Learning Outcomes

1. **(Ideas):** Students will demonstrate satisfactory knowledge of the varying strategies to convey arguments, main ideas, and support/evidence.

2. **(Organization):** Students will demonstrate satisfactory knowledge of the varying patterns of composition organization and development

3. **(Rhetorical Situation):** Students will demonstrate satisfactory knowledge of the audience, the role of the writer, and rhetorical strategies.

4. **(Editing):** Students will demonstrate satisfactory knowledge of writing conventions and correctness.

Expectations of Students

1) Students may not work on experiments outside of laboratory time (9:30 am until 3:15 pm on Tuesdays) *without the explicit permission of the instructor* and may not work in the laboratory alone.

2) Each student is required to complete a pre-laboratory exercise for each experiment. Details of these assignments follow in this syllabus.

3) Besides unknown samples and any solutions already prepared and available, the students will prepare all solutions themselves. You will need to include descriptions of how the solutions will be prepared, amounts needed, etc. in your pre-laboratory plan.

4) All experimentation, laboratory planning, data discussion must be completed *individually*. You may consult the literature or Dr. Reif, but you may not seek assistance from any other faculty member (including other disciplines) or student.

Attendance

Attendance in the laboratory is mandatory. **Unexcused absences from laboratory cannot be made up**. **MORE THAN ONE UNEXCUSED LABORATORY ABSENCE WILL RESULT IN FAILURE OF THE COURSE.** Excused absences may be made-up, if possible, at the discretion of the instructor. If you have to miss a laboratory due to an **emergency** or if you expect to be absent due to an interview, intercollegiate athletic event, etc., you should inform the instructor as soon as possible to schedule a make-up.

It is also imperative that you be on time for the laboratory. The pre-lab lectures cover important safety and procedural information. If an individual is repeatedly tardy, a **five-point deduction** will occur for each instance or the student will not be permitted to perform the experiment.

It is absolutely critical that you respect the dangers inherent in laboratory space**. If I feel your behavior is seriously unsafe to either you or your classmates, you will be asked to leave immediately and will receive a zero for that day's effort.**

Be sure to bring the laboratory manual, scientific duplication notebook, a blue or black pen, and calculator to each experiment. You are required to have goggles and laboratory coats for each experiment. Failure to bring the appropriate materials to the laboratory may result in a penalty to your grade.

You will be working in pairs to complete the experiments. Your group assignments will rotate for each experiment and will be announced at the start of the laboratory period. This work is solely to carry out the procedures and collect the data. Students must write the pre-laboratory assignment, analyze the data individually, and write an independent lab notebook.

Grading

The grade in the course will be based on the following scale:

Pre-laboratory notebook pages	20%
Post-lab Report	30%
Lab Report Sections	25%
Final Laboratory Report	25%

A mid-semester report of unsatisfactory (U) will be reported if you have a C- or below in the course at the midpoint of the semester.

Assignments

There are several different assignments throughout the semester:

1) Pre-laboratory notebook page(s) – the following assignment should be completed in the carbonless notebook pages and a copy of these pages are due at the start of the laboratory – NOTE – if you do not turn in the notebook pre-laboratory assignment at the start of the laboratory period you will not complete the lab and it will count as an unexcused absence.

   The pre-laboratory pages should include and **should not exceed two to three pages** of the notebook
   - a **title** of the experiment – in your own words
   - a **purpose** for the experiment – briefly summarize in your own words the procedure/goal – should not exceed two or three sentences
   - a complete **reference** for the experiment using ACS style
   - **procedural flowchart** or outline – the flowchart should be **no more than one page**. The flowchart should provide a summary of the experiment to be performed. DO NOT rewrite the procedure from the experimental handout/lab manual. This is your opportunity to think about what you will be doing and rewrite it in a way that covers the steps in a simplified manner.
   - answers to **pre-laboratory questions** in the laboratory manual

2) Post-Lab Reports -- One week after the completion of an experiment, you will turn in a typed post-lab report that contains the following sections:
   - **Results and Data**: Any tables, graphs, or figures that represent the **results** of the experiment. These should be referred to when answering the Post-lab Questions
   - **Sample Calculations:** This includes an *example* of each *type* of calculation done in order to obtain the results for an experiment. You do not need to include every single calculation if the same type of calculation was repeated multiple times. The calculations can be typed or hand written in this section.
   - **Post-lab Questions:** This section contains the answers to all of the questions found in the laboratory manual at the end of each experiment. The answers should be detailed and well thought out. They should refer to the Data and/or calculations when appropriate. If scientific information that is not common knowledge is used in your answer, you should provide a reference for where the information can be found. Hint: your lab manual is a great source of information for answering these questions.
   - **Notebook pages:** Notebook pages for the experiment should follow the guidelines in the laboratory manual (chapter 1). You will turn in the duplicate pages of your notebook at the start of the next laboratory experiment. At the conclusion of each laboratory day, the instructor will initial each page. Your notebook pages should include the following:
     - Name, title of experiment, and date
     - notes about any changes in the procedure completed
     - data and observations recorded during the experiment

Writing Assignments

1) Dissection of a Biochemistry Paper- Due on the 2nd lab period, students will choose a Biochemistry Primary Literature article (recommended Journal: *Biochemistry* published by

the American Chemical Society and available at: http://pubs.acs.org/journal/bichaw) to "dissect".

a. The article should contain separate sections for Results and Discussion
b. Understanding of the Article topic/subject is not required
c. Students will read each section of the article and write a 1-2 page paper about what information is presented in each section and HOW that information is formatted. It is important to note trends such as how figures and tables are numbered, whether subheadings are used in the section, what topics are presented in what order, etc.) the more detailed the analysis of the article, the better.

2) Lab Report Sections- Each experiment will have a section of a lab report (abstract, introduction, etc) that will be turned in the following week along with the lab notebook pages. The section that will be written with each experiment is listed on the tentative schedule but IS SUBJECT TO CHANGE. The report sections will be graded, and returned to the student. On October 22nd, students will be expected to bring revised versions of those sections to class so that a peer review activity can take place. Students will read and offer feedback to each other's sections after which up to TWO of those sections can be revised and turned in to be regraded. The new grade on those sections will replace the original grade.

3) Final Laboratory Report – for the final 5-week lab at the end of the semester, students will write a full lab report using what was learned from writing the lab report sections throughout the semester. A 1st draft of this report will be due on the second-to-last week of lab for comments from the instructor. During the final class meeting, a 2nd draft of the reports will be peer reviewed by students in the class. This will allow for the revision of the Final Lab Reports. More details for this assignment will follow later in the semester.

Due Dates and Extensions

All notebook pages and lab report sections are due **one week (by 9:15am or 12:30pm) after the completion of an experiment**. Late post-lab reports will receive a grade of zero. Pre-laboratory assignments will not be accepted and will result in an unexcused absence from the laboratory. Each student is allowed a one week extension on **one** experiment's post-lab reports provided that the student has submitted a written request for the extension. The written request is due one week (by 11:00 am) after the completion of the experiment.

Honor System

Although you will be working as groups to complete the experiments, all assignments must be completed individually. You may not collaborate on the data analysis, pre-laboratory assignments, or notebook write-ups. Any assignment for which you will receive a grade must be completed individually and pledged as your own work. This includes notebook pages, literature assignments, etc. The honor pledge must be written in full: I *hereby declare upon my word of honor that I have neither given nor received unauthorized help on this work. (Signature)*

Alteration of data or copying data from another individual is an honor offense. You may discuss how to do the calculations with other students or get help from the instructor, but your final report must be your own work.

Office of Disability Services

The Office of Disability Services has been designated by the University as the primary office to guide, counsel, and assist students with disabilities. If you receive services through that office and require accommodations for this class, please make an appointment with me as soon as possible to discuss your approved accommodation needs. Bring your accommodation letter with you to the appointment. I will hold any information you share with me in the strictest confidence unless you give me permission to do otherwise. If you need accommodations, (note taking assistance, extended time for tests, etc.), I would be happy to refer you to the Office of Disability Services. They will require appropriate documentation of a disability. Their phone number is 540-654-1266.

Title IX

University of Mary Washington faculty are committed to supporting students and upholding the University's *Policy on Sexual and Gender Based Harassment and Other Forms of Interpersonal Violence*. Under Title IX and this Policy, discrimination based upon sex or gender is prohibited. If you experience an incident of sex or gender-based discrimination, we encourage you to report it. ***While you may talk to me, understand that as a "Responsible Employee" of the University, I MUST report to UMW's Title IX Coordinator what you share***. If you wish to speak to someone confidentially, please contact the below confidential resources. They can connect you with support services and help you explore your options.

Resources
-Stefanie Lucas-Waverly
Title IX Coordinator
540-654-5656
slucaswa@umw.edu
-Crystal Rawls
Title IX Deputy for Students
Area Coordinator
540-654-1801
crawls@umw.edu

Confidential Resources
-Talley Center for Counselling Services
LeeHall 106
-Student Health Center
Lee Hall 112
-Empowerhouse
540-373-9373
-RCASA
540-371-1666

Course Recording Policy

To ensure the free and open discussion of ideas, students may not record classroom lectures, discussion and/or activities without the advance written permission of the instructor, and any such recording properly approved in advance can be used solely for the student's own private use. Students who wish to record lectures or class activities for study purposes must inform the faculty member first. Students with approved accommodations from the Office of Disability

Resources permitting the recording of class meetings must present the accommodation letter to the instructor in advance of any recording being done. On any days when classes will be recorded, the instructor will notify all students in advance. Distribution or sale of class recordings is prohibited without the written permission of the instructor and other students who are recorded. Distribution without permission is a violation of educational privacy law. This policy is consistent with UMW's Policy on Recording Class and Distribution of Course Materials.

Safety Information:

Safe lab practices are expected of you. There are potential risks, such as exposure to hazardous chemicals and minor injuries (e.g., cuts and burns). During the first week of the semester, the safety rules will be presented and reviewed. To participate in this course, each student must sign a statement (last page of the syllabus) in which they acknowledge the risks associated with the course and agree to follow all safety rules and to assume responsibility for their actions in the laboratory.

Contacts in the Event of an Emergency:
Emergency Number: 4444 (from any UMW phone)
Campus Police (From a cell phone): (540) 654-4444/1025

In the event of fire, fire alarm activation or release of hazardous materials:
• Immediately leave the building and assemble in designated assembly point.
• **Do not re-enter the building or leave the assembly site until advised for any reason**.

In the event of Severe Weather or Natural Disaster's:
• Remain inside the building. Do not enter a building during an earthquake.
• Practice **Drop** to ground, **Cover** head and neck, and **Hold on** to shelter for earthquakes.

In the event of Critical Stress Situations (Violence, Active Shooter):
• Practice **Run, Hide, Fight.**
• **Run** or escape from building
• **Hide** if not possible to escape.
• **Fight** as a last resort.

Tentative Laboratory Schedule (All dates are subject to change)

Date	Laboratory Topic
8/27	Course introduction, Liquid measurements exercise **Lab Section: Dissection of a Biochemistry Paper**
9/3	Experiment 3 – Preparation of a Multiple Component Solution **Lab Section: Experimental (Materials and Methods)**
9/10	Experiment 4 – Ionic Properties of Amino Acids and Peptides **Lab Section: Results**
9/17	Experiment 5 – Spectrophotometric Studies of Proteins – Week 1
9/24	Experiment 5 – Spectrophotometric Studies of Proteins – Week 2 **Lab Section: Introduction and References**
10/1	Experiment 6 – Spectrophotometric Studies of Nucleic Acids in Solution **Lab Section: Abstract**
10/8	Experiments 13 and 14 – Electrophoresis of Proteins **Lab Section: Discussion**
10/15	Fall Break!! No Lab!
10/22	Lab Report Writing Peer-Commentary Activity (Bring Revised Lab Report Sections to Lab)
10/29	Tyrosinase Enzyme Kinetics – Week 1
11/5	Tyrosinase Enzyme Kinetics - Week 2
11/12	Tyrosinase Enzyme Kinetics - Week 3
11/19	Tyrosinase Enzyme Kinetics - Week 4
11/26	Tyrosinase Enzyme Kinetics – Week 5 **1st Draft of Final Lab Report (Due IN Lab)**
12/3	Peer-Review Activity for Final Lab Reports Laboratory wrap-up/clean-up **2nd Draft of Final Lab Report (Due IN Lab)**
	Full Lab Report Due: Section 1: December 10, 2019 by 8:30 am **Section 2: December 10, 2019 by 12:30 pm**

I have read and am accountable for all information in the Chemistry 319 Syllabus. I am also accountable for all information, both written and verbal, communicated in the class. I am accountable for information transmitted to me via electronic mail (e-mail) and posted on Canvas.

Signed:_____ Date:_____

FERPA Waiver

Name : _____

I give permission for graded assignments bearing my name and grade to be placed in the front of a classroom for retrieval.

Signature: _____

I do not wish to have my graded assignments placed in front of a classroom and will retrieve my papers in Dr. Reif's office.

Signature: _____