

Biochemistry Laboratory II
CHEM 320

Spring 2011

Instructor: Kelli M. Slunt
Office: Jepson 337 654-1406 kslunt@umw.edu
Office Hours: 1 – 3 pm M 8:30 – 9:30 am R
12 – 1 pm W* 12:30 – 1:30 pm R
and by appointment
*occasionally may have to move this office hour due to CHEM 453 Seminar meeting on a Wednesday at noon

Meeting Time 9:30 am – 12:30 pm R, Jepson 210

Course Materials Slunt, K. Biochemistry Laboratory Manual, Kendall Hunt Publishing, 2009
approved safety goggles and laboratory coat
laboratory notebook with carbonless duplication
calculator with scientific notation
access to the internet

Course Description

This laboratory course (along with CHEM 319) is designed to demonstrate and teach the techniques utilized in the biochemical sciences. This semester will focus on experiments involving identification of carbohydrates, partial purification of biological materials, chromatography, enzyme kinetics, and DNA manipulation.

After completing the course, a student should be able to

- Build on the initial laboratory skills developed in CHEM 319
- Conduct experiments on isolation and characterization of biological mixtures
- Design and conduct a biochemical experiment
- Work with peers to conduct biochemical investigations

The course is designated as writing intensive. It is important that students learn to communicate in written fashion such that peers in the field can understand the scientific findings and conclusions addressed in the paper. In the course assignments, you will be expected to communicate in the same style used by biochemists in industry, academic, or government settings.

Expectations of Students

- 1) Students may not work on experiments outside of laboratory time (9:30 am until 12:30 pm on Thursdays) 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. Slunt, 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 intercollegiate athletic event, etc., you should inform the instructor as soon as possible.

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. This work is solely to carry out the procedures and collect the data. Students must analyze the data individually and write an independent laboratory report.

Grading

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

Pre-laboratory notebook pages and project proposal	20%
Individual Laboratory Grades (Notebook grade, Experimental summary grade, and lab report grade)	60%
Final Report – Project formal lab report	20%

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) notebook – there are two components of the notebook: 1) pre-laboratory page(s) due at the start of the laboratory period and 2) notebook pages completed during and after the laboratory experiment
- 2) 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

- 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 reference for the experiment
 - 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. 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. – should not exceed two pages of the notebook
 - answers to pre-laboratory questions in the laboratory manual
- 3) 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:
 - date
 - notes about any changes in the procedure completed
 - data and observations
 - complete data analysis – calculations when appropriate – if chart, graphs, excel is used a reference to these programs should be indicated in the notebook and a hardcopy of the appropriate graphs are attached to the copy of the notebook pages
 - answer to questions in the laboratory manual
 - 4) experimental summary – after each experiment you will write an abstract for the experiment and annotated bibliography. This abstract should follow the guidelines for meeting abstracts as designated by the American Chemical Society:
portal.acs.org/portal/fileFetch/C/CNBP_022956/doc/CNBP_022956.doc. Your abstract should contain the title of the experiment, your name and a maximum 150 word summary of the experiment conducted. You will submit this abstract electronically by email to Dr. Slunt by the start of the next laboratory period.

- 5) Laboratory report – in order to receive practice and feedback on writing a formal laboratory report, prior to the final project, you will select one experiment and write a formal laboratory report on that experiment. This report will be graded instead of the notebook pages and experimental summary. Therefore, you will still need to keep a notebook during the experiment but will not be required to write the experimental summary and answer the questions in the notebook. Instead you will write a formal laboratory report for the experiment following the guidelines in the lab manual (chapter 1), those listed on the ACS website http://portal.acs.org/portal/fileFetch/C/CTP_005606/pdf/CTP_005606.pdf, and in guidelines for authors from the *Biochemistry* journal (<http://pubs.acs.org.ezproxy.umw.edu:2048/page/bichaw/submission/authors.html>).

The formal report should follow the templates for general use (not the one for rapid reports) posted on the *Biochemistry* journal website. Most journal articles undergo extensive peer review and editing before publication. Your formal reports will be graded by the instructor in a similar manner as the review process. The instructor will provide the following:

- a brief summary of the report present
- comments about how the author could improve the manuscript
- a rating:
 - acceptable for publication*
 - needs minor revision before acceptance*
 - needs major revision before acceptance*
 - not suitable for publication*

a grade

An *acceptable* paper is one in which the science is presented in a comprehensible manner and contains minor errors or editorial changes. Papers with a rating of *acceptable for publication* may not be resubmitted and will receive the indicated grade.

The paper (not the final paper associate with the project) receiving ratings other than *acceptable* may be revised and resubmitted for publication. This is what frequently happens during the peer-review process. You may resubmit an individual report up to three times. The following grading scale will be used to determine the final grade on the report:

Number of resubmissions	Final Grade
0	Grade
Paper resubmitted once	Grade x 0.95
Paper resubmitted twice	Grade x 0.90
Paper resubmitted three times	Grade x 0.80

When an author resubmits a paper, he/she considers the comments of the reviewer(s) and revises the manuscript in light of the criticisms. Upon resubmission, the author writes a cover letter to the editor explaining the changes to the manuscript and how the author addressed the reviewer's comments/criticisms. Students submitting a revision must provide a cover letter along with the revised manuscript electronically one week after the reviewed manuscript was returned to the student.

- 6) final report – due by **11 am on April 26, 2011** – formal laboratory report of your project – more details will follow later in the semester

Due Dates and Extensions

All notebook pages and experimental summaries (or the formal report) are due **one week (by 9:30 am) after the completion of an experiment**. Late notebook pages and reports will receive a grade of zero. Each student is allowed a one week extension on **one** experiment's notebook pages provided that the student has submitted a written request for the extension. The written request is due one week (by 9:30 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, prelaboratory 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, laboratory reports, 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.

Tentative Laboratory Schedule

Assignments are due one week after the completion of the laboratory work is completed.

Date	Laboratory Topic
1/13	Course introduction
1/20	Due – 9:30 am – Pre-laboratory Assignment for Experiment 16 Experiment 16 – Salting out of Proteins
1/27	Experiment 16 – Salting out of Proteins
2/3	Due – 9:30 am – Pre-laboratory Assignment for Experiment 17 and Notebook Pages/Experimental Summary for Experiment 16 Experiment 17 – Extraction and Characterization of Vegetable DNA (Note the change in source of DNA)
2/10	Due – 9:30 am – Pre-laboratory Assignment for Experiment 9 and Notebook Pages/Experimental Summary for Experiment 17 Experiment 9 - NMR Spectroscopy of Biological Molecules
2/17	Due – 9:30 am – Pre-laboratory Assignment for Experiment 19 and Notebook Pages/Experimental Summary for Experiment 9 Experiment 19 – Gel Filtration Chromatography of Proteins
2/24	Experiment 19 – Gel Filtration Chromatography of Proteins
3/3	<i>Spring Break</i>
3/10	Due – 9:30 am – Notebook Pages/Experimental Summary for Experiment 19 Project planning
3/17	Due – 9:30 am – Pre-laboratory Assignment for Experiment 20 and Project Proposal (one per group) Experiment 20 – Isolation and Characterization of Myoglobin from Hamburger
3/24	Experiment 20 – Isolation and Characterization of Myoglobin from Hamburger
3/31	Experiment 20 – Isolation and Characterization of Myoglobin from Hamburger and Project
4/7	Due – 9:30 am – Notebook Pages/Experimental Summary for Experiment 20 Project
4/14	Project
4/21	Project
4/26	FINAL - Literature Assignment due by 11 am