

Biochemistry Laboratory I

CHE 482L / BIO 482L

FALL 2007

Time: T 9:25 - 12:25
Location: SC 366
Instructor: Dr. Stefan Paula
SC 445
572-6552
paulas1@nku.edu
Office hours: W 1:00 – 3:00
F 12:00 – 2:00
or by appointment

Requirements: Laboratory Record Book that makes copies
Fundamentals of Biochemistry: Life at the Molecular Level
2nd Edition, by Voet & Voet & Pratt (recommended)
Pre/Corequisite: CHE/BIO 482

Course description:

Students will learn commonly used laboratory techniques in biochemistry. They will receive training in the use of modern equipment for experimentation and of computer software for data analysis. Students will prepare professional reports on each experiment performed.

Departmental Student Learning Outcomes Relevant for this Course:

- explain the major concepts and experimental findings in the chemical sciences
- demonstrate the ability to carry out experimental protocols using modern instrumentation and methods
- utilize critical thinking skills to apply concept knowledge and adapt experimental techniques to: a) form and test hypotheses and b) solve scientific problems
- compile, critically evaluate, and interpret scientific information and data
- effectively communicate scientific information through written and oral means
- evaluate the relationships between chemistry and mathematics, physics, biology, and other disciplines and between chemistry and society
- apply effective group strategies to solve scientific problems
- apply computer technology and other technologies in the comprehension, interpretation, and presentation of the chemical sciences

Additional Learning Objectives:

- work effectively in groups
 - All experiments will be conducted in *groups of two students*.
- come well prepared to complete an assigned task
 - Students are expected to come to the laboratory prepared to complete a given experiment. This requires reading the appropriate sections of the manual (available on Blackboard) and completing the pre-laboratory assignments *beforehand*.
- keep good records of work done in the laboratory
 - Students need to keep good records of their work in a notebook that makes copies. These copies must be turned in each day *before leaving the laboratory* and are part of the report grade.
- use computer software for data analysis and preparation of reports
 - Spreadsheet programs such as Excel, Kaleidagraph, and Graphical Analysis will be used throughout this course for data analysis. Reports will be prepared and submitted *electronically* using a word processing program such as Word.

Time:

The experiments are designed so that they are easily finished in the laboratory period if students are properly prepared. There will be *no make-ups* for missed experiments. Time for work outside normal laboratory times will only be allowed for catch-up due to equipment limitations.

Safety:

For safety reasons, everyone is required to wear *goggles* and *closed-toed shoes* in the laboratory (no exceptions). This includes times when you and your partner may not be actively doing experimental work but other people in the laboratory are.

Notebook:

Students must keep a laboratory notebook which makes copies (available in the bookstore) to keep track of pre-laboratory lectures, performed procedures, data collected, and initial interpretations of data. These notebooks should reflect the ability to document what you do IN the laboratory, not what you remember to write down AFTER the laboratory. Your notes should be well-organized and need to be easily followed. They also need to contain *completely* all important data, procedures, etc. You will turn in the copies of your daily notebook BEFORE you leave laboratory each day. The copies will be graded according to how completely your *methods*, your *observations*, and your *data* are recorded. They will be turned back to you with each graded laboratory report. The scores of the laboratory sheets will be integrated into the laboratory report grade. Further information on proper notebook-keeping can be found in the manual (Blackboard).

Reports:

All laboratory reports will be formal reports. A complete description of what is expected of a laboratory report will be available in the manual (Blackboard).

Although experiments will be conducted in pairs, each student will *independently* prepare a laboratory report with the gathered data. If two identical reports from two partners working together are turned in, only one report will be graded and each partner will receive half the score of the graded report. Laboratory reports are *due via email attachment (no hardcopies) at 10:00 pm* on the days listed on the schedule.

LATE LABORATORY REPORTS WILL NOT BE ACCEPTED.

The value of each report varies depending on the length and level of difficulty of the experiment. These values are listed on the schedule of experiments. The final report grade will reflect:

- how clearly and accurately the data are presented
- the accuracy of the determination of an unknown
- how well the experiment is analyzed in the discussion
- how well the laboratory notebook sheets are prepared
- how correctly grammar is used
- how well the introduction and methods are presented
- the overall appearance of the report
- the proper citation of outside sources

Questions regarding grading of reports, homework, quizzes, and the final must be submitted to the instructor *within one week* after the work has been returned to students.

Homework:

The *pre-laboratory questions* associated with each experiment (except for experiment 1) are considered homework. You should have answered these questions *prior to* the first day of each new experiment because they are designed to prepare you for the experiments so that you can complete the experiment within the laboratory period. Before each new experiment, you will be given a *short quiz* with questions similar to the pre-laboratory questions (see below).

The homework questions are to be turned as an appendix to the laboratory report and will be part of your grade.

Quizzes and Exam:

With the exception of the first experiment, there will be a *short quiz prior to each new experiment*. Each quiz will be worth 5 points. Quiz questions will be very similar to the pre-laboratory problems (see above). In addition, there may be unannounced quizzes if students start coming to the laboratory late. At the end of the semester, there will be a *comprehensive final* covering the procedures and theories learned in laboratory.

Grading:

The final grade will be determined from the scores obtained for laboratory reports, class participation, quizzes, and the final exam.

Items	Points	Grade scale
Reports (includes notebook and homework)	425 points	A = 90 % -100 %
Final exam	75 points	B = 80 % - 89%
Participation	15 points	C = 70 % - 79 %
Quizzes	≥ 25 points	D = 60 % - 69 %
Total	≥ 540 points	F = 0 % - 59 %

The last day to drop the course without a grade is 09/10/07, the last day to drop with a W is 10/29/07.

The date of final exam is Tuesday, December 11, 10:10 - 12:10 pm.

TENTATIVE LABORATORY SCHEDULE, 2007

Date	Experiment	Topic	Reports due
8/21	1, data analysis	analysis of optical absorbance data	
8/28	2, buffers	buffer exploration, pH meter	
9/4	2, buffers	preparation of buffers	report #1 (25 points)
9/11	2, buffers	preparation of buffers	
9/18	3, pNPP	absorbance of pNPP	report #2 (75 points)
9/25	3, pNPP	pH dependence of pNPP absorbance	
10/2	4, protein concentration	Bradford assay	report #3 (50 points)
10/9	4, protein concentration	Bradford assay	
10/16	Fall Break	lab closed	
10/23	4, protein concentration	UV absorbance of proteins	
10/30	5, protein size	size exclusion chromatography	report #4 (75 points)
11/6	5, protein size	size exclusion chromatography, SDS PAGE	
11/13	5, protein size	SDS PAGE	
11/20	6, enzyme kinetics	determination of optimum assay conditions	report #5 (100 points)
11/27	6, enzyme kinetics	Michaelis Menten kinetics	
12/4	6, enzyme kinetics	inhibitor study	
12/9			report #6 (100 points)
12/11	---	FINAL EXAM: 10:10-12:10	

Policies of the Department of Chemistry at Northern Kentucky University

- All items on syllabi are subject to change by the instructor.
- Students are responsible for reading and understanding all items on the syllabi. Any items not understood must be brought to the attention of the instructor within the first two weeks of class.
- The work you will do in any course is subject to the Student Honor Code. The Honor Code is a commitment to the highest degree of ethical integrity in academic conduct, a commitment that, individually and collectively, the students of Northern Kentucky University will not lie, cheat, or plagiarize to gain an academic advantage over fellow students or avoid academic requirements.
- Cheating will not be tolerated. In accordance with the Code of Student Rights and Responsibilities, faculty members have the right to determine actions to be taken when a student is caught cheating.
- Faculty members reserve the right to dismiss or to have removed a disruptive student from their classrooms.
- Students with disabilities who require accommodations (Academic adjustments, auxiliary aids or services) for this course must register with the Disability Services Office. Please contact the Disability Service Office immediately in the University Center, Suite 320 or call 859/572/6373 for more information. Verification of your disability is required in the Disability Services Office for you to receive reasonable academic accommodations.
- A C or better is required in this course to enter CHE 483L.