

Biology 3515/Chemistry 3515
Biological Chemistry Laboratory

Spring 2013
(Draft Syllabus, 23 August 2012)

Course Description and Objectives:

This course is intended for students who have taken Biology 3510/Chemistry 3510. The laboratory course will cover enzyme kinetics, methods of protein fractionation, and techniques for characterizing proteins. There will be a heavy emphasis on quantitative analysis and the use of computers for data collection, data analysis and molecular modeling. At the end of the course, students will have gained skills in modern biochemical laboratory techniques and methods for data analysis. They will also gain an improved understanding of the relationships between protein structure and function, particularly for enzymes.

Prerequisites:

Biology 3510 or Chemistry 3510

Instructor:

David P. Goldenberg
Office: 326A Aline Skaggs Biology Building
Telephone: 581-3885
E-mail: goldenberg@biology.utah.edu

I do not keep regular office hours, but I am happy to make appointments to meet with students individually or in groups. The best way to contact me is by e-mail.

Teaching Assistants: (To be announced)

Monday:
Tuesday:
Wednesday:
Thursday:

Web page:

A web site has been prepared for this course to provide a variety of information, including lecture and lab schedules. The web site can be found at:

<http://courses.biology.utah.edu/goldenberg/biol.3515>

Updated information will be posted periodically during the semester, and you should make a point of checking for updates before your lab session each week.

Lectures:

9:40 - 10:30 AM, Thursday, Location to be determined.

Regular class attendance is expected of all students. Although notes and slides from many of the lectures will be posted on the class web site, these should not be viewed as a substitute for attending class.

An audience response system (clickers) will be used to facilitate interactive learning during the lectures. Some responses will be graded and will count for 5% of the course grade. Clickers can be purchased from the University Campus Store and can be sold back to the store at the end of the semester. More information about the TurningPoint audience response system can be found at <http://ims.utah.edu/clicker>.

Text book:

There is no required text book for this course. There is, however, a *recommended* text entitled “Fundamental Laboratory Approaches for Biochemistry and Biotechnology” (2^{ed}), by A.J. Ninfa, D.P. Ballou and M. Benore. Copies of this text are available at the bookstore, and copies will be placed on reserve at Marriott Library. In addition, it may be helpful to review material from a standard biochemistry text, such as those by Berg, Tymoczko and Stryer or by Voet and Voet.

Laboratory manual:

A special manual, entitled “Laboratory Experiments in Biochemistry” has been prepared for this course and is available at the University bookstore.

Laboratory sessions:

The class will be divided into four laboratory sections, each meeting once a week on Mon., Tues., Wed. or Thurs. All sections will meet from 1:00 to 5:00 PM. Except as noted below, the laboratory sessions will be held in Room 140 in the South Biology Building.

Computer sessions:

During the weeks of 30 January and 6 February, the lab sessions will meet in Room 150 of the South Biology Building for computer sessions.

Safety Glasses

Some of the reagents you will be handling in the lab are quite caustic and can cause serious eye injury. **Safety glasses will be required for all laboratory sessions.** (Ordinary prescription glasses are adequate.)

Laboratory Notebooks:

All of your primary data should be kept in a laboratory notebook of the type with alternating carbon-copy pages. This will allow you to make a copy as you write. Each student should keep his or her own notebook. At the completion of each experiment, you will turn in the copy pages for that experiment, along with your summary report of the experiment.

Laboratory Reports:

For each of the six experiments, a summary report will be due approximately two weeks after the completion of the experiment. The due dates for the individual lab reports are indicated on the Laboratory Schedule. This report will include a compilation of all of the data collected and any data analysis. In addition, there is a set of problems for each experiment. In some cases, the report will also include some molecular modeling exercises. The results of the modeling exercises are to be turned in as computer files and will be submitted via the web. In addition, the carbon-copy pages from the laboratory notebook for the experiment must be turned in.

The work to be completed after the laboratory session, *i.e.* calculations and data interpretation, **must be typed.** Where they involve a great deal of math, the solutions to the problem sets may be handwritten, but must be clear. The computers in the laboratory all have a word processor installed, as do the computers in the Biology Department Computer Lab (in room 106 S. Biol.). The Computer Lab is open from 8:00 AM to 8:00 PM, Mon. - Fri. during the semester. The instructor reserves the right to refuse to grade lab reports in which portions are handwritten or otherwise difficult to read.

Reports turned in up to 1 day late will be accepted with a 10-point penalty. Reports turned in up to 7 days late will be accepted with a 20-point penalty. Reports will not be accepted after 7 days beyond the due date.

Although you will be working in groups of three in the laboratory, **each of you is responsible for writing your own reports**. You may certainly consult the instructor, the TAs or other students as you work. But, the actual work handed in, including graphs and computer files, must be your own. Any text must be clearly distinguishable from that of other students, and other sources must be properly cited. Text from other sources must be clearly identified by quotation marks. Furthermore, extensive quotations, even with proper citation, will not be considered satisfactory answers to questions. Copying and pasting does not demonstrate mastery of the material!

If two or more students turn in work that is identical, none will receive credit for it.

Additional information about the laboratory notebook and reports can be found on pp.3–5 of the laboratory manual.

Quizzes:

There will be three quizzes during the class periods on the following dates:

- Thursday, 7 February
- Thursday, 7 March
- Thursday, 18 April

Each of the first two quizzes will be about 25 minutes long and will cover material from the lectures and laboratory sessions since the previous quiz. The third quiz will be 50 minutes long and will be cumulative. This quiz will count twice as much as each of the other two.

Grades:

The course grade will be determined the laboratory reports, quizzes and in-class responses, weighted as follows:

- Laboratory reports: 75%
- Quizzes: 20%
- In class responses: 5%

The following represent maximum cutoffs for determining class letter grades:

- A: 90–100% (including A-)
- B: 80–89% (including B- and B+)
- C: 70–79% (including C- and C+)
- D: 60–69%
- E: < 60%

Depending on how things go, the grade cutoffs *may* be revised downwards, *i.e.* to make the grading more generous. The cutoffs will not be moved upwards to make the grading less generous.

Important Dates:

- Last day to drop (delete) classes: Wednesday, 16 January (No tuition penalty; class does not appear on record.)
- Last day to add classes: Monday, 22 January
- Last day to withdraw from classes: Friday, 1 March (No tuition refund, “W” appears on transcript.)

Expected Learning Outcomes

Students completing this course will enhance their theoretical and practical understanding of:

- Applications of pH and ionization equilibria in biochemistry.
- Applications of absorbance spectrophotometry in biochemistry.
- Methods of quantitative data analysis, especially curve fitting.
- Protein structure and molecular modeling, including the use of the computer program PyMOL.
- Mechanisms of enzyme catalysis and inhibition, particularly in proteases.
- Analysis of enzyme kinetic data.
- Principles and application of electrophoresis for characterizing proteins.
- Principles and application of chromatography for characterizing proteins.

Faculty and Student Responsibilities:

All students are expected to maintain professional behavior in the classroom setting, according to the Student Code, spelled out in the Student Handbook. Students have specific rights in the classroom as detailed in Article III of the Code. The Code also specifies proscribed conduct (Article XI) that involves cheating on tests, plagiarism, and/or collusion, as well as fraud, theft, etc. Students should read the Code carefully and know they are responsible for the content. According to Faculty Rules and Regulations, it is the faculty responsibility to enforce responsible classroom behaviors, beginning with verbal warnings and progressing to dismissal from class and a failing grade. Students have the right to appeal such action to the Student Behavior Committee.

Special Accommodations:

The University seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in this class, reasonable prior notice needs to be given to the instructor and to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD) to make arrangements for these accommodations. All written information in this course can be made available in alternative format with prior notification.

Final Note:

This syllabus is not a binding legal contract. It may be modified by the instructor when the student is given reasonable notice of the modification.