

CHEM 455 - Biochemistry Laboratory Information

Course Instructors

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Teaching Assistants:

CHEM 455 AB1	18766	M W	2:00-4:50	Slogoff-Sevilla, Phillip	pslogo2@uic.edu	2214 SEL, 3-1991
CHEM 455 AB2	18767	T R	2:00-4:50	Chen, Xuejing	xchen45@uic.edu	2214 SEL, 3-1991
CHEM 455 AB3	18768	M W	8:00-10:50	Shim, Yoonjung	yshim5@uic.edu	2214 SEL, 3-1991
CHEM 455 AB4	18769	M W	11:00-1:50	Savushkin, Anthony	savush@uic.edu	2214 SEL, 3-1991
CHEM 455 AB5	24305	T R	8:00-10:50	Kurilova, Svetlana	skuril2@uic.edu	2223 SEL, 6-8158

Course objectives

Upon completion of the course students will be able to:

1. understand the principles of and proficiently perform basic molecular biology and biochemistry laboratory techniques
 2. use efficiently the basic biochemistry laboratory equipment
 3. prepare a professional quality scientific report
 4. use the basic molecular modeling/visualization programs and perform web-based protein and DNA database search and analysis
 5. design and perform experiments to elucidate the mechanism of protein function through structural analysis and mutagenesis
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Course description

The biochemistry laboratory, CHEM 455, meets twice weekly for three hours per session in room 2026 SEL, and once for one hour on Friday at 9:00 AM in SES 238. Attendance for all laboratory sessions and for the Friday lecture is mandatory and the nature of the laboratory experiments does **NOT ALLOW FOR MAKE-UP LABS**. All experimental work must be completed during the scheduled periods and students will not be permitted to stay late or to attend other laboratory sections to complete

unfinished work. Careful attention to detail is essential in order to successfully complete the experiments in a timely manner and it is the responsibility of the student to familiarize himself/herself with the material before the laboratory period. The student should read and study each experimental protocol thoroughly, understand the principle behind the experiment and the anticipated experimental results prior to performing the actual experiment. The course is representative of work in current biochemical research laboratories and experiments have been designed to introduce students to modern biochemical techniques, concepts, and instrumentation.

Textbook: No textbook is required; however, many handouts will be given and must be read for an understanding of the coursework. In addition, many references will be given to help you better understand the material.

Web page: The majority of course materials will be available on-line. To access the materials go to http://www.chem.uic.edu/course_sites.shtml

Laboratory notebooks: Each student is required to maintain a standard laboratory notebook with bound pages. A copy of the experimental data from your notebook should be attached to all lab reports as an appendix. The notebook will be checked frequently by your TA. Appropriate notebooks are available in the UIC bookstore.

Safety goggles: The State law requires that safety goggles be worn at all times during laboratory experiments. There are no exceptions to this rule. Safety glasses are not adequate, you must have goggles. You will need goggles starting the second laboratory period and will not be allowed to work in the laboratory without safety goggles.

Absences: The nature of the laboratories is not conducive to make-up labs. If you are absent with an excused absence, you may get data from your lab partner, providing that this is clearly acknowledged in the 'Discussion section' of your laboratory report. If you are absent with an unexcused absence, you will receive a zero for that lab. If you feel you will be absent on a day a lab report is due you must turn it in **the day before** it is due. In addition to absences, tardiness will not be tolerated. If you arrive more than 15 minutes after the period has begun, you will not be allowed to perform the lab nor take the quiz for that day. If you arrive while the quiz is in progress you may take it but will not be given additional time.

Lab Partners: Each student will be a member of a lab group of two, assigned by your TA. Lab partners should work together, obtaining data jointly and exchanging any different data that they may have collected, checking each other's calculations, etc. This is where the partnership ends; lab partners **should not work together when writing their lab reports.**

Lab Report Format

One of the important objectives of CHEM 455 is to give you experience in the preparation of professional quality laboratory reports which emulate manuscripts published in the primary biochemistry literature.

Laboratory reports must be **typed and printed** using a high-resolution printer. Reports are generally due the week following the experiment. However, your teaching assistant may assign due dates as deemed necessary during the course of the lab.

A laboratory report will have the following sections:

- * **Abstract:** The abstract should concisely state the problem, the experimental approach utilized, the results, and a conclusion.
- * **Introduction:** This section gives background information about the problem or issue at hand. The introduction can contain a brief literature review, which should describe previous research conducted on the problem/technique. This information should justify why you conducted the experiment. The introduction usually ends with a statement summarizing what you will show the reader as your report progresses.
- * **Materials and Methods:** This section should include subsections describing the materials used and the experimental procedures followed. The descriptions should be concise and **experimental data should not be included** in this section. Representative subsection headings may include some of the following: Materials, Enzyme assays, Enzyme purification, Statistical Methods.
- * **Results:** The results section includes your experimental results presented in **tabulated or figure format**, whichever is appropriate, accompanied by a **concise** description. You need not list all of your raw data (unless this seems appropriate) but you should show averages, experimental errors, calculations (with appropriate equations) etc. All graphs are to be computer generated and must have legends clearly describing the data presented.
- * **Discussion:** The discussion section of your laboratory report should be a description of your findings or conclusions. This should not take the form of comments such as *"this was a very good experiment ..."* or *"I learned to ..."* but should be a discussion of the principles involved in the experiment and any conclusions that you can make based on your data. Since laboratory reports differ from primary research articles, the discussion section may be rather short and comprehensive. You should discuss experimental errors or problems which occurred and should attempt to make a simple conclusion, i.e., *"... the data in Table 2 demonstrate that the experimental error in repetitive pipetting can be as large as $\pm 5\%$ with large-volume pipettes, and up to $\pm 23\%$*

when very small volumes are involved. The data suggest that repetitive pipetting of small volumes should be avoided."

* **References:** All lab reports will contain a minimum of TWO references – with the only exception being experiment 1 - pipette calibration. Reference material from primary journals should be cited in the text of your report using superscript numbers and should be collected following the discussion section modeled after the following format:

1. Jones, D. J., Smith, J. A., and Szcsepanski, N. A. (1993) *J. Biol. Chem.* **103**, 10068-73.

* **Appendix Material:** As an appendix, you should include a copy of your notes and data taken directly from your laboratory notebook. All calculations performed on your raw data should also be included as well as any other appropriate experimental materials. These sections should not be typed and should reflect your actual experimental work and analysis.

Grade Distribution

* **Lab Reports (30%):** There will be 7 experiments in the first half of the course, which will require a detailed laboratory report in journal format. These lab reports will be due one week after completion of the experiment. Late labs will only be accepted up to one week after they are due and will only be worth a maximum of 50%.

* **Final Lab Report (20%):** The second half of the course will be dedicated to an independent project, which mirrors typical scientific studies in today's cutting edge research. This part of the course will require a detailed journal style paper detailing the study. This report is due on Tuesday, November 30 (by 5 PM). It will NOT be accepted after this date.

* **Oral Presentation (10%):** During the final week of the course each student will give a 10-15 minute presentation on a topic of current interest in biochemistry and biotechnology.

* **Quizzes (10%):** There will be a number of quizzes, usually each week beginning the second week and continuing until the midterm. The quizzes will be based upon the lecture, handouts or laboratory experiments.

* **Exams (30%):** There will be a midterm exam and a final exam. The final exam will take place during finals week.