

Northeastern University Online College of Professional Studies Course Syllabus

BIO 4525: Cell Biology and Introductory Biochemistry Lab
Spring 2012, 12-week term
April 9 – June 30, 2012
Wednesday Nights, 5:50pm – 7:50pm
705 Behrakis

Instructor Name: Dr. Adam Sowalsky
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Required Text(s)/Software/Tools:

- Cell Biology/Biochemistry: A Laboratory Manual by Gail S. Begley. Department of Biology at Northeastern University
- Any bound lab notebook with numbered, duplicate pages (such as one from Hayden-McNeil)
- Ballpoint pens
- USB thumb drive highly recommended

Course Prerequisites

BIO 4250, Cell Biology 2; BIO 4610, Biochemistry 2

Course Description

Offers students an opportunity to learn modern research laboratory techniques in cell biology, molecular biology, and biochemistry. Topics of study include whole cell types; extracellular matrix and the cellular skeleton; cell membrane processes; cell fractionation; isolation of cellular organelles, nucleic acids, and cellular protein separation; DNA mapping; spectrophotometry; peptide mapping and sequencing; enzyme kinetics; and extraction, separation, and isolation techniques.

Course Outcomes

By the end of this course, students will have the opportunity to:

- Describe physical and chemical attributes of DNA
- Use bulk separation techniques including physical disruption, filtration, centrifugation, and differential solubility
- Extract DNA
- Analyze DNA
- Use restriction enzymes
- Separate DNA by agarose gel electrophoresis
- Create a standard curve
- Use restriction mapping to identify DNA fragments
- Predict protein structure
- Use proteomics tools to determine the evolution of conserved domains in proteins
- Determine the concentration of proteins in solution using a protein concentration assay and a standard curve
- Determine the velocity, activity, and specific activity of an enzyme using enzyme assays
- Apply the principles of enzyme kinetics to laboratory practice
- Measure the concentration of proteins on a spectrophotometer
- Separate proteins by using SDS-PAGE
- Apply the principles of SDS-PAGE to size and charge determination of a protein
- Separate molecules on a column

- Apply the principles of column chromatography to infer properties about an unknown molecule
- Choose the correct type of column to use for a particular application
- Estimate molecular weights of unknown molecules
- Keep proper records in a laboratory notebook
- Write in a scientific format
- Properly use and cite scientific literature

Course Methodology

Each week, you will be expected to:

1. Review the week's learning objectives.
2. Complete all assigned readings.
3. Complete all lab projects for the week.
4. Complete and submit all assignments by the due dates.

Grading/Evaluation Standards

A complete document describing the grading guidelines is posted on Blackboard. Briefly, your grade is based on your lab reports (80%) and quizzes (20%). The seven lab reports have point values distributed as follows:

Lab 1 – Chromatin: 20 points
 Lab 2 – Restriction analysis: 55 points
 Lab 3 – Bioinformatics: 25 points
 Lab 4 – Protein concentration: 35 points
 Lab 5 – Kinetics: 55 points
 Lab 6 – SDS-PAGE: 20 points
 Lab 7 – Column chromatography: 20 points
 Sum of lab reports: 230 points

For each class session from April 11 to June 13, including the first day, a quiz will be administered at the start of class. Each quiz is worth 2% of your final grade, for a total possible value of 20% of your final grade.

Class Schedule / Topical Outline

Week	Dates	Topic	Assignments
1	April 11	Isolation of Chromatin Lab	
2	April 18	Restriction Digestion Lab	Chromatin Lab report due at beginning of class
3	April 25	Review of Restriction Analysis	Rough draft of Restriction Analysis lab due at beginning of class
4	May 2	Bioinformatics Lab	Restriction Digest Lab report due at beginning of class
5	May 9	Determination of Protein Concentration Lab	Bioinformatics Lab report due at beginning of class
6	May 16	Introduction to Enzyme Kinetics and pre-lab	Protein Concentration Lab report due at beginning of class
7	May 23	Enzyme Kinetics Lab	

8	May 30	Analysis of Enzyme Kinetics Data	Rough draft of enzyme kinetics lab due at beginning of class
9	June 6	Separation of Proteins by SDS-PAGE Lab	Final lab report of enzyme kinetics due at beginning of class
10	June 13	Column Chromatography Lab	SDS Lab Report due at beginning of class
11	June 20		Column Chromatography lab report due
12	June 27	No Lab	

Rules and Guidelines

Complete documents regarding the rules and guidelines for this class are posted on the course site on Blackboard. Your compliance with these rules ensures fairness and safety for everyone. A summary of the rules is listed below:

Safety

- No eating and drinking in the lab!
- Wear closed-toed shoes (no sandals or flip-flops), otherwise you will NOT be allowed to attend the lab! This will result in a "0" for that lab.

Attendance

- Attendance is mandatory. If you do not attend lab you will automatically receive a "0" for that lab. There are no make-ups.
- If you miss lab, it is your responsibility to contact me immediately (if that's not possible then within 24-48 hrs)
- An absence may be excused based on proper notification to me, relevance of the reason for missing lab (e.g. significant health issues that can be documented) and proper documentation, but this is decided on a case-by-case basis. You will then get a chance to write a lab report. However, because conducting the experiments is part of the lab report grade, you may lose credit for being absent. Doctor's notes and other documentation need to be submitted within 1 week of the lab missed.

Courtesy

- Clean up your bench, push your chair in and wash your hands before leaving lab.
- Students need to be on time – and each student's participation will be taken into account when calculating final grades.
- You are responsible for all material covered during lab, even if you are late or absent.
- Be prepared for lab. You need to read over the experiment before coming to lab so that you are knowledgeable and organized while performing each experiment. Again, your preparedness will be considered when calculating final lab grades.

Quizzes

- A short quiz will be administered every lab session at 5:50 pm. These are an opportunity to show that you are prepared for lab.
- If you are late for class you will receive a "0" for that quiz – no exceptions.

Lab Reports

- Lab Reports: Need to be handed in on time. Submit a copy on Blackboard (using Turnitin) before class, and a paper copy needs to be submitted by the beginning of the lab. A printout of your Turnitin confirmation should be stapled to your paper copy. Late lab reports (late to Turnitin and late on paper) lose 10% per day.
- If you have problems with the material ask questions during lab time. Other students may have the same questions and then everyone will benefit.

- Listen carefully to the instructions given as they will be helpful for conducting the experiments as well as the writing of your reports. You might only hear these instructions only once, so pay close attention and take notes!
- The duplicate copy of your lab notebook notes from the lab must be included with your lab report. In order for the duplicate pages to be legible, all notes must be taken with a ballpoint pen (no rollerball pens or pencils). If you make a mistake in your notebook, cross it out once and make a correction.

Special Accommodations

Any student who requires any special accommodation or attention (documentation required, e.g. from Disability Resource Center, Athletic Dept, WeCare) or has specific health issues that affect their performance needs to let me know (in person or by email) by the first day of class. After April 11, no accommodations or (grade) adjustments will be made.

Academic Integrity Policy

The University views academic dishonesty as one of the most serious offenses that a student can commit while in college and imposes appropriate punitive sanctions on violators. Here are some examples of academic dishonesty. While this is not an all-inclusive list, we hope this will help you to understand some of the things instructors look for. The following is excerpted from the University's policy on academic integrity; the complete policy is available in the Student Handbook. The Student Handbook is available on the CPS [Student Resources page](#) > Policies and Forms.

Cheating – intentionally using or attempting to use unauthorized materials, information or study aids in an academic exercise

Fabrication – intentional and unauthorized falsification, misrepresentation, or invention of any data, or citation in an academic exercise

Plagiarism – intentionally representing the words, ideas, or data of another as one's own in any academic exercise without providing proper citation

Unauthorized collaboration – instances when students submit individual academic works that are substantially similar to one another; while several students may have the same source material, the analysis, interpretation, and reporting of the data must be each individual's independent work.

Participation in academically dishonest activities – any action taken by a student with the intent of gaining an unfair advantage

Facilitating academic dishonesty – intentionally or knowingly helping or attempting to violate any provision of this policy

For more information on Academic Integrity, including examples, please refer to the Student Handbook, pages 9-11.

Northeastern University Online Policies and Procedures

For comprehensive information please go to <http://www.cps.neu.edu/online/>

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