

## **BIOLOGY 5110-L11C: Biochemistry Lab Spring 2018**

**Lab Times:** Mon-Fri, 9:00am-1:00 pm

**Lab Room:** 128 Dedman Life Sciences Building

**Credits:** 1 credit, 4 lab hours per day

**Meeting Dates:** Thursday, May 16<sup>th</sup> – Friday, May 31<sup>st</sup>

**Final Exam:** Friday, May 31<sup>st</sup>

Visit our **Canvas page** for announcements, course schedule, lecture slides, recordings and other resources. <https://smu.instructure.com/>

### **PROFESSOR**

- Alejandro D'Brot
- Best way to get in touch with me is to message me through Canvas.
- Email: [adbrot@smu.edu](mailto:adbrot@smu.edu) but I respond faster through Canvas.
- Phone: 214-768-2848
- Office: Room 239 Dedman Life Sciences Building
- Office hours: MWF, 1:00-2:00 pm. Sign up through Canvas.

### **COURSE DESCRIPTION:**

Eleven engaging 4-hour lab sessions during the May term. Prerequisites: BIOL1401, 1402. Prerequisite OR corequisite: BIOL/CHEM 5310. If CHEM 5110 is counted toward a chemistry major or minor, it cannot be counted toward a biological sciences major or minor.

### **COURSE OBJECTIVES:**

This course focuses primarily on familiarizing students with laboratory techniques in biochemistry, including separation, quantification, analysis, and identification of proteins, lipids, and nucleic acids. This course is recommended for students interested in health professions.

### **GRADING:**

Lab notebook	50%
(Pre-lab	10%)
(Results	20%)
(Discussion	20%)
Final Exam	30%
Quizzes	10%
Participation	10%
Total:	100%

Notes about graded materials:

- **Lab notebook:** Students will keep a lab notebook with entries for each lab session. Each entry consists of a pre-lab assignment, results and discussion. The notebook entry will be due the following week unless specified otherwise. See “Lab Notebook” below for more information.  
Each entry is a total of 20pts:
  - **Pre-lab assignments (4pts):** The first three components of the notebook are considered the pre-lab: the objective, a flow chart and a summarized protocol. The pre-lab will help students prepare for each lab session. Not bringing in a pre-lab to class results in a zero for that session’s pre-lab. See “Notebook” for more info.
  - **Results (8pts):** Students will include their results in their notebooks, as well as data analysis if applicable. See “Notebook” for more info.
  - **Discussion (8pts):** Students will summarize and discuss their results and answer guided questions from the lab manual. See “Notebook” for more info.
- **Final Exam:** An open note exam consisting of 8 problem-solving questions. Students will be expected to analyze data, make predictions, design experiments to test hypotheses and demonstrate mastery of the biochemical and laboratory concepts presented in the course.
- **Weekly Quizzes:** A take-home quiz consisting of 2-5 short answer questions will be picked up before leaving each lab session, completed at home and turned in at the beginning of the following lab session. The lowest quiz grade will be dropped. Failure to turn in a quiz will result in a zero both for the quiz and for your professional conduct for that session.
- **Participation:** Students are expected to be fully prepared for lab and fully engaged during lab. Failure to bring a pre-lab, not wearing proper lab attire, not participating during lab or being disruptive will result in loss of professional conduct points for that week.

#### GRADING SCALE:

	<b>A</b> 94 – 100	<b>A-</b> 90 – 93
<b>B+</b> 87 – 89	<b>B</b> 84 – 86	<b>B-</b> 80 – 83
<b>C+</b> 77 – 79	<b>C</b> 74 – 76	<b>C-</b> 70 – 73
<b>D+</b> 67 – 79	<b>D</b> 64 – 66	<b>D-</b> 60 – 63
<b>F</b> 0 – 59		

#### REQUIRED TEXTS:

- A PDF of the lab manual can be found on Canvas. It is not necessary to print out the manual.
- Lab notebooks will be written using [Benchling.com](https://www.benchling.com), a digital notebook resource. More details will be provided during the first session.

## COURSE SCHEDULE:

Session	Day	Date	Topic	Experiment
1	Thurs	May 16th	Course Introduction / Identifying GM foods	DNA Isolation and PCR
2	Fri	May 17th	Identifying GM foods	DNA gel electrophoresis
3	Mon	May 20th	Quantifying Proteins	BCA Assay
4	Tues	May 21st	Purifying Proteins	Size-Exclusion Chromatography
5	Wed	May 22nd	Separating and Visualizing Proteins	SDS-PAGE
6	Thurs	May 23rd	Separating and Visualizing Proteins	Western Blotting
7	Fri	May 24th	Quantifying Proteins	ELISA
8	Mon	May 27th	<b>Memorial day!</b>	-
9	Tues	May 28th	Quantifying Lipids	Competitive Progesterone ELISA
10	Wed	May 29th	Quantifying Lipids	Cholesterol Assay
11	Thurs	May 30th	Enzymatic Assays	HRP Activity Assay
12	Fri	May 31st	<b>Final Exam</b>	-

## STUDENT LEARNING OUTCOMES:

As described by the University Curriculum, after successfully completing this course, students will be able to:

- Collect, organize, and analyze data from a variety of sources
- Test hypotheses and make recommendations and predictions based on results
- Communicate and represent quantitative information and results
- In addition, students who succeed in this course will be prepared to:
- Understand biochemistry laboratory procedures and principles
- Perform technically challenging experimental techniques
- Keep cogent and detailed notes in a laboratory setting so that experiments can be formally recorded, reported, and used for future experimental design
- Work in a professional research laboratory in preparation for professional/graduate school student and/or a science, tech, engineering or medical (STEM) career

## LAB NOTEBOOK:

Students will keep a lab notebook with entries for each lab session. Each entry consists of a pre-lab assignment, updates and notes taken during lab, results and discussion.

Lab notebooks will be kept on [Benchling.com](https://www.benchling.com), a digital notebook resource. More information will be provided during our first session.

Each lab session entry will consist of the following five components. See the example provided for the first session.

1. **Objective** (part of pre-lab). What are you trying to accomplish and how? Mention the sample/samples being used and the specific assay/experiment being performed.
2. **Workflow** (part of pre-lab). Make a 3-5 step flow-chart of the procedure for that day's lab. You can use arrows or bullet points. The purpose of the flowchart is for you to get a big-picture perspective of the experiment being performed.

3. **Summarized protocol** (part of pre-lab). Summarize the procedure from the lab manual. Use short hand and include all relevant details such as volumes, weights, times, voltage, etc. During the experiment, write down any changes to the original procedure in a different color next to the respective step.
4. **Results.** Provide the results of the experiment followed by a summary of the results. The experiment results should be in the appropriate format: labeled images of DNA gels and Western blots or printed tables with values from plate reader. Make sure images of gels or protein blots have all wells labeled with their respective samples.
5. **Discussion.** Summarize and discuss the results of the experiment. Did you accomplish your objective? Make sure to mention positive or negative controls in your discussion. If the experiment did not work, what will you do differently next time?

## **COURSE GUIDELINES (MUST READ!):**

### **Before class:**

- **Read over the lab for the week.** On time. This is your main responsibility. This is the first step to acing this course.
- **Do background reading** outlined in each lab session. Your Cell Biology or Biochemistry textbook is the preferred source, but secondary sources like Wikipedia will also do.
- **Complete pre-lab assignment.** Details can be found at the end of each lab session in the Lab Manual. Pre-labs are written in your lab notebook.

### **During class:**

- **Turn in last week's quiz.** The previous week's quizzes will be turned in at the beginning of lab.
- **Participate.** Teaching labs like this one are designed to give each student practical experience in experimental procedures and data analysis. Failure to participate will result in loss of professional conduct points.
- **Take notes.** You are expected to take notes in your Lab Notebook of any changes to experimental procedure and experimental results.
- Use of **cell phones** is prohibited during experiments.

### **After class:**

- **Complete results and discussion.**
- **Complete the weekly quiz.** Quizzes will be picked up before you leave the week's lab and completed before the next lab period.

### **Lab attire and conduct:**

- Students must wear **closed-toed shoes** and **pants**.
- **Long hair must be securely tied back** away from face and chest.
- **Safety glasses** must be worn at all times. No exceptions allowed.
- **No food or drink allowed** in lab.

### Attendance and absences:

- Attendance is **mandatory**. More than **one unexcused absence** will put you in jeopardy of being administratively dropped from the class.
- **Official excused absences** consist of illness with a doctor's note, death in the family, a university-sponsored activity or observance of a religious holiday. You must notify me **at least one week in advance and I must approve of the absence** for you to be excused. Absences due to university sponsored events must have **written verification** from the coach, faculty or staff member in charge of the event. See "Religious Observance" and "Excused absences for university extracurricular activities" for more information.

### Make up exams:

- The **final exam cannot be rescheduled** except for in the case of an official excused absence. You must notify me **at least one week in advance and I must approve of the absence**. The re-scheduled final exam will be taken prior to the original final exam date.

### PROFESSIONAL CONDUCT:

Students are expected to carefully and thoughtfully set up and carry out experiments as part of a functioning team, ask for help if needed, and follow lab safety guidelines as if working in a professional research laboratory.

Each lab session is worth 10 professional conduct points. Unexcused absences, failure to participate, failure to complete pre-labs or failure to turn in quizzes will result in loss of professional conduct points for that lab session. Furthermore, behaviors such as being late to lab, excessive talking and/or joking, internet surfing and/or using personal devices, bringing snacks or drinks to work areas, and any other activity that could interfere with the work flow will result in a loss of professional conduct points for that lab session. Failure to adhere to the SMU Honor Code will result in an F at the discretion of the professor

Your professor reserves the right to drop you from the course if unprofessional conduct continues after counseling and grade reduction.

### HONOR CODE:

You will be expected to follow the [SMU Honor Code](#) throughout this course. Intellectual integrity and academic honesty are fundamental to the process of learning and of evaluating academic performance. Maintaining them is the responsibility of all members of an educational institution. **Plagiarism, copying and cheating will result in a loss of all professional conduct points for the semester.** The professor reserves the right to drop the student from the course for violating the honor code.

### **DISABILITY ACCOMMODATIONS:**

Students needing academic accommodations for a disability must first be registered with Disability Accommodations & Success Strategies (DASS) to verify the disability and to establish eligibility for accommodations. Students may visit <http://www.smu.edu/alec/dass.asp> or call 214-768-1470 or to begin the process. Once registered, students should then schedule an appointment with the professor to make appropriate arrangements. See University Policy No. 2.4.

### **RELIGIOUS OBSERVANCE:**

Religiously observant students wishing to be absent on holidays that require missing class should **notify their professors in writing at the beginning of the semester**, and should discuss with them, in advance, acceptable ways of making up any work missed because of the absence. See University Policy No. 1.9.

### **EXCUSED ABSENCES FOR UNIVERSITY EXTRACURRICULAR ACTIVITIES:**

Students participating in an officially sanctioned, scheduled University extracurricular activity should be given the opportunity to make up class assignments or other graded assignments missed as a result of their participation. It is the responsibility of the student to make arrangements with the instructor prior to any missed scheduled examination or other missed assignment for making up the work. See University Undergraduate Catalogue.