

BIBC 103 BIOCHEMICAL TECHNIQUES

FALL 2020 COURSE SYLLABUS

Instructor: Lara Soowal, Ph.D.
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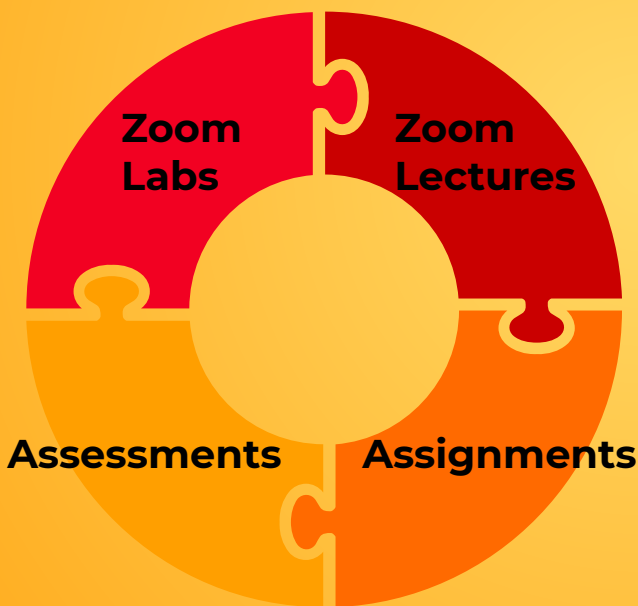
Instructional Assistants:
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CLASS TIMES:



Tuesdays and Thursdays
9:30 lecture, then we will
take a short break before
starting lab. Most days, we
should be done by 1:00.

THE PARTS OF OUR CLASS:



Assignments: This refers to the work that you will do both in and out of lab, such as lab reports, data analysis, and presentations. Some assignments will be individual, and some will be completed with your lab partners.

Zoom Lecture: These will be synchronous (presented live). Attendance is not mandatory, but is highly encouraged. Use the Zoom LTI PRO link on our Canvas page. Lectures will be recorded to allow review.

Zoom Labs: These will be synchronous, and attendance is mandatory. You will spend some of the time as a whole class, and some of the time working in a breakout room with your lab partners. Your enthusiastic participation is critical to your success. Labs are not recorded.

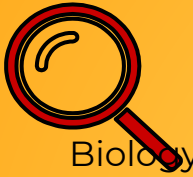
Assessments: There will be a weekly quiz worth 25 points every Thursday (time and format TBD), week 2 through week 10 (9 total). You may drop the lowest score (200 points total).

WHAT YOU'LL NEED:

- An internet connection and device to log on to Zoom meetings through Canvas
- Camera and microphone, the better to see and hear you with, my dears
- The BIBC 103 lab manual, which will be available as a downloadable ebook from our Canvas page
- Patience, good humor, and more patience (please?)



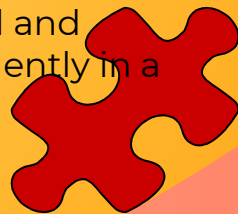
COURSE OBJECTIVES:



Biology is not just a series of accepted facts. Our knowledge is constantly being updated by new discoveries, and by challenging what we think we know. Memorizing a set of facts is not the way to understand biology. It is as important to understand HOW we make biological discoveries (the process) as it is to understand what those discoveries are (the facts).

This course is designed to develop the skills needed to interpret data from experiments in order to answer questions about biological systems, and to design experiments to ask new questions. You will be introduced to experimental methods used in biochemistry and molecular biology, with an emphasis on those techniques used to study proteins. The laboratory work will consist of two big multi-week projects and some shorter side projects. The lab work will emphasize the analytical and quantitative reasoning skills that are essential to work independently in a biochemistry lab.

COURSE POLICIES:



Attendance on Zoom at each lab session is mandatory. An unexcused absence will result in 10 points being deducted. If you know that you need to miss a lab session, discuss this with the instructor (not the IA, they are not authorized to give you permission) to see if it will be possible to make up the lab session or excuse you from the lab with no consequences. Please bring this to the instructor's attention as soon as you know that it will be an issue. **Only the instructor can excuse an absence. Two unexcused absences will result in the student failing the course.**

Regrades for written work will be handled on a case-by-case basis. Discuss your concerns with your IA, and if you are still not satisfied, submit the report to me within 1 week of receiving the graded report. I will regrade the entire report, and record that new score.

COURSE ORGANIZATION (THE MODULES):

- **Module 1:** Quantifying Concentration of Solutions; Spectrophotometry (side project/lab introduction)
- **Module 2:** Electrophoresis and SDS-PAGE; Identify unknown fluorescent proteins (side project)
- **Module 3:** Design enzyme purification strategy and compare to the strategy of purifying lactate dehydrogenase (LDH), the enzyme purified in our hands-on version of the lab (multi-week project)
- **Module 4:** Analysis of fibroblast growth factor (FGF) signaling in NIH 3T3 cells (multi-week project)

CLASS SCHEDULE (TENTATIVE):



Week	Day	Activity
1	10/6	Organize groups; Module 1: Lab 1 part E calculations
	10/8	Module 2: Calculations for preparing electrophoresis samples (Lab 2 part C, table for step 2); Determine unknown fluorescent proteins
2	10/13	Module 2 continued
	10/15	Module 3: Choose enzyme to purify; determine initial centrifugation steps and compare to LDH
3	10/20	Module 3: Design affinity chromatography (AC) purification; compare to LDH AC purification
	10/22	Module 3: Determine LDH isozymes from native gel electrophoresis; look up amino acid sequence and predicted isoelectric point of your chosen enzyme
4	10/27	Module 3: Design size exclusion chromatography (SEC) purification for your enzyme; compare to LDH SEC purification; design ion exchange chromatography (IEC) to separate LDH isozymes; design IEC for your enzyme
	10/29	Module 3: Analyze LDH enzyme activity and Bradford assay data to create LDH Purification Table
5	11/3	Module 3: Design enzyme activity assay for your enzyme; work on overall purification strategy
	11/5	Module 4: Interpret data from Lab 9B part B; come up with experimental questions
6	11/10	Module 4: Form hypothesis based on data; predict possible outcomes; design Western blot and ELISA experiments to test
	11/12	Veteran's Day holiday, no labs
7	11/17	Module 4: Receive Western blot data; interpret
	11/19	Module 4: Receive ELISA data; interpret
8	11/24	Module 4: work on lab report
	11/26	Thanksgiving holiday, no labs
9	12/1	Module 4: work on proposal presentations
	12/3	Module 4: work on proposal presentations
10	12/8	Module 4: group presentations
	12/10	Module 4: group presentations

GRADE DETERMINATION



AVAILABLE POINTS:

Activity	Value
Assessments/Quizzes (9 total, keep the top 8 scores)	200
Lab Activities	200
Assignment 1: LDH Purification Table	150
Assignment 2: Design an Enzyme Purification Strategy	100
Assignment 3: FGF Signaling Lab Report	250
Assignment 4: FGF Research Proposal Group Presentation	100
TOTAL POINTS	1000

LETTER GRADE BREAKDOWN:

(Cutoff values may be lowered at instructor's discretion.)

910-1000	A	790-799	C+
900-909	A-	705-789	C
890-899	B+	695-704	C-
810-889	B	600-694	D
800-809	B-	0-599	F



ACADEMIC INTEGRITY:

With the exception of the group presentation and lab activities, all work in this course (all quizzes and assignments 1-3) must be completed on your own. During the quizzes, you may use your lab manual and any notes you have taken, but you may not communicate with other students or use the internet.

Assignments 1-3 will be submitted through Canvas, and are due by the end of the day (11:59 PM Pacific time) on the due date. Ten points will be deducted for each day that the lab report is late. Be sure that all work you submit is your own, original work. Do not use old lab reports or share your work with any current or future students.

Students agree that by taking this course all required papers will be subject to review for textual similarity by Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin reference database solely for the purpose of detecting plagiarism of such papers. Use of the Turnitin service is subject to the terms of use agreement posted on the Turnitin site.