BIBC 103: Biochemical Techniques Summer Session 2, 2020

Instructor: Goran Bozinovic, Ph.D.
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Office Hours: by appointment *via* Zoom

Lecture: Tue-Fri 11 am -12:20 pm
Log in to "live" lecture *via* Zoom:
Link:
https://ucsd.zoom.us/j/97839483961?pwd=VXIuNDAwQ2NsSHV0UDV2K296b05Tdz09
Meeting ID: 978 3948 3961
Password: **043575**

Labs: Tue-Fri 1-3 pm

Section / Lab	Zoom Link	Instructional Assistant	Email
Tu, Wed	https://ucsd.zoom.us/j/96453955554?pwd=RHVVMzhZSVQ1WkIkRUR1VVByazhiQT09 Password: August	**Neya Suresh**	nsureshk@ucsd.edu
Thu, Fri	https://ucsd.zoom.us/j/98876763496?pwd=V05BcjdSL0hHNVI4R043bXB6SEY4Zz09 **Password**: **098162**	**Erika Barth**	eibarth@ucsd.edu

Lab Sections Virtual Lab Participation: Regardless of your Section enrollment (A01 or A02), please use the respective Zoom links for Tuesday and Thursday to join the virtual Labs. Neya will teach Tuesday and Wednesday labs and Erika will teach Thursday and Friday Labs for all students throughout the quarter. Both IAs and the instructor will be available to answer questions during virtual lab sessions.

Course Objectives:
This course will introduce various laboratory techniques used in biochemistry and molecular biology. These will include methods for purifying proteins, expressing recombinant proteins in bacterial cells, and analyzing biological molecules by electrophoresis, Western blotting, and enzyme activity assays. Laboratory work will consist of three multi-day projects, as well as some smaller, single-day experiments. The importance of good experimental design, including the use of appropriate controls, will be highlighted in all experiments. Also, as this is an introductory lab course, all lab work will emphasize the learning of basic lab skills (including dilutions, good pipetting technique, and basic statistical analysis) and good lab practices (such as good notebook keeping).

Lectures will be held live *via* Zoom beginning Tuesday, August 4th @ 11AM. You can access the Zoom lecture log-in on Canvas or by using the link above. Lectures will be held during the time listed in the schedule of classes, and recordings of each Zoom lecture and .pdf lecture slides will be available throughout the quarter on Canvas. You are highly encouraged to attend "live" lectures as they will be interactive, you will be able to ask to questions / participate in discussion and the material covered often goes beyond the laboratory manual information.

Virtual Laboratory Sections will also begin on Tuesday, August 4th @ 1PM via Zoom. During the virtual labs you will work on experimental designs and protocols outlined in the laboratory manual, perform calculations, data analysis and bioinformatics modules that will help you master the course material. The log-in information to access the virtual lab sections will be updated shortly.
Online Classroom and Virtual Lab Zoom Etiquette: Keep your line muted during classes unless the Instructor / IA calls on you to ask a question. If you have a question, please use the "raise hand" function under the "participants" tab. Enabling your video is optional during lectures. Zoom etiquette for section discussions/labs are up to the discretion of your IA.

- Make sure your line is muted unless you are prompted to ask a question.
- Asking questions: Please ask questions! Student discussion during lectures is vital to course effectiveness. Use the "Raise Hand" option on zoom to notify me that you have a question. Lectures will be "paused" periodically to allow for your questions and/or clarification
- We may not have an opportunity for traditional class discussions on an online platform. If you have a comment or question, please be considerate of class time. To make sure all the questions are addressed, the last 10-15' of each lecture will be reserved for review and discussion.

Materials Required for lab everyday:
1) Biochemical Techniques Lab Manual (available from the Bookstore)
2) Calculator

Assignments	**Due Dates:**
Weekly Notebook Summary	Friday by 5PM – Week 2, 3, 4
Take-Home Quizzes	Monday (by midnight, Canvas Submission) Week 1, 2, 3, 4
Bioinformatics Module	Wednesday, Sept 2nd by midnight
Lab Report – FGF2:	Thursday, Sept 4th (by midnight via TurnItIn - CANVAS)
Manuscript Group Presentation	Thursday, Sept 4th and Friday, Sept 5th via Zoom

Course Requirements and Grading: Your final grade for the class will be calculated using the following criteria:

Lab Report	120
Bioinformatics – PyMOL Protein Structure Project	20
Take-Home Quizzes	120
Lab Notebook	20
Manuscript group presentation	40
Total Points	**320**

% Point Cutoffs for Grade Assignments: (cutoffs may be lowered at the instructor's discretion)

>92	A	78-79	C+
90-91	A-	72-77	C
88-89	B+	70-71	C-
82-87	B	60-69	D
80-81	B-	<60	F

Course Web Site:
Many of the course materials are available only through the course website CANVAS (https://canvas.ucsd.edu). All students will need to be able to access this site. Once you are enrolled in the class you will have access to the site using your ACS username and password. Be sure to check the course website frequently for announcements and updates on assignments. Items such as lab report guidelines and image files of gels and other data will be provided through the website. The 'Additional Materials' folder contains additional background material for some of the experiments. Use the Discussion Board to ask questions on material from lecture or lab. The IAs will check the Discussion Board daily to answer questions, but students are encouraged to answer questions also. This is a handy resource for last minute questions that come up during late night studying for an exam.

Lab Manual and Quizzes: It is important to carefully read the pertinent sections of the lab manual before joining virtual labs via Zoom. The experiments will "proceed" smoothly, and you will learn more if you have read through the procedure and understand why and what you are doing. To emphasize the importance of reading the lab manual before virtual labs, there will be four scheduled quizzes at the beginning of lab.

Virtual Lab Attendance Policies:
Lab Sections Virtual Lab Participation: Regardless of your Section enrollment (A01 or A02), please use the respective Zoom links for Tuesday / Wednesday and Thursday/Friday to join the virtual Labs. Neya will teach Tuesday labs and Erika will teach Thursday Labs for all student throughout the quarter. Both IAs and the instructor will be available to answer questions during virtual lab sessions.

Participating in virtual lab sessions is mandatory. If you are more than 10 minutes late logging in to e-lab, or you leave the lab meeting before your group is finished, you will be counted as absent for the day. An unexcused absence will result in 10 points being deducted from the associated lab report. 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.**
Participation: everyone is expected to be an active participant in every experimental procedure. Failure to make a meaningful contribution towards "completing" the laboratory experiment/activity will result in points being deducted from the laboratory report score.

Turning in Lab Reports:
We will be using the "Turnitin" *via* CANVAS for lab reports. Lab reports submitted to the TritonEd / Turnitin site do not need to have graphs, tables, or attachments, but you may include them if it is easier. Lab reports must be submitted before midnight of the due date, and an electronic copy of the report including all text, tables, graphs, attachments, or anything else called for in the lab report guidelines must be emailed to your IA using the same deadline. Lab reports not emailed and not submitted to CANVAS by the end of the day will be considered one-day late. Ten points will be deducted for each working day that the lab reports are late (hard copy and Turnitin.com). Students agree that by taking this course all required papers will be subject to review for textual similarity by Turnitin for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com 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.com site.
*Detailed lab report guidelines will be posted on CANVAS two weeks after the course starts.

Take-Home Quizzes: There will be FOUR take-home quizzes this session. Each quiz will be available on CANVAS on Friday by 5PM of Weeks 1-4. Your work is due on the following Monday, by 11:59:59 PM. You must show your work to earn credit. Late submission will not be accepted.

FGF2 Lab Report: Guidelines, rubrics, and due dates for the lab report will be posted on Canvas. The goal of the report is to practice presenting and summarizing results and constructing scientific arguments (what you can conclude, evidence to support, and providing reasoning biological/molecular/experimental explanations or hypotheses) in the form of a short journal article. A draft will be submitted for IA review, and then a final version. Check course schedule on Canvas for due dates.

Technique / Manuscript Group Presentation: Toward the end of the course assigned groups of four students will choose a biochemical / molecular biology technique or peer-reviewed journal article to research, summarize, and present. The purpose is to explore other techniques that are typically used in molecular biology research, understand how the technique works and can be used, and communicate your understanding in an oral presentation (delivered by video conferencing). The format is a 10-12-minute presentation, and 3 minutes for Q&A. The groups list and presentation schedule will be posted at the end of Week 3.

Lab notebooks: Each student will maintain an individual digital lab notebook (.docx) that you will use for the session. Compete and organized lab notebook entries are a critical part of effective work in a research lab. We expect students to practice good lab notebook entry habits. Please consult the lab manual for what we expect in the lab notebooks. **Lab notebook entries will be checked weekly** and scored for various components: pre-lab work which often includes a summaries and predictions, in-lab work such as data analysis and discussion of data, and drawing conclusions in the form of an argument: claims, data to support claims, and explanations in the form of a biological or procedural mechanism, troubleshooting results when necessary.

Academic Integrity

Cheating will not be tolerated. The administrative policy on Academic Dishonesty outlined by UCSD will be followed. Students caught cheating during an exam or quiz will be given a "zero" for that assignment. A report will also be filed with the Academic Integrity Coordinator. Cheating includes (but is not limited to) plagiarism and making use of forbidden materials during the test. Tampering with graded exams will result in a failing grade for that exam.

During laboratory sessions, student cooperation and collaboration is highly encouraged. This includes discussion of experimental data with fellow students during lab hours. After the virtual laboratory session is over, however, you are required to work on your own. ***Each student must submit an independently written and independently thought-out data analysis for each lab report / homework assignment.***

It is NOT acceptable to use any old lab reports to assist you in any way. If you happen to be in possession of old copies of lab reports for this class, it is best that you do not even look at them, since they could unintentionally influence the way that you write your own report. If we discover that you have used an old lab report in any way, you will automatically receive a "zero" for that lab report, and you might be reported to the Academic Integrity Coordinator.

While your lab reports will be returned to you, you are NOT permitted to share them with anyone for any reason. If we find that you have shared your lab report with anyone, you will be reported to the Academic Integrity Coordinator, even if you have already completed the class. You are required to read, understand, and sign the "BIBC103 Integrity Policy" which governs the way the academic work in this class is completed.

Virtual Lab Schedule:

Week	Dates	Experiment/Activity	Lab Manual Chapter
1	Tu, 8.4	Safety orientation and waste streams, introduction to equipment, pipetting and dilution skills	Lab 1 and pages 1 – 12
	We 8.5	Introduction to SDS-PAGE	Lab 2
	Th 8.6	LDH 1: Initial purification of LDH from crude homogenate: centrifugation, ammonium sulfate precipitations; prepare size exclusion column	Lab 3
	Fri 8.7	LDH 2: Affinity chromatography Quiz 1 – Due on Monday by Midnight	Lab 4
2	Tu 8.11	LDH 3: Size exclusion chromatography	Lab 5
	We 8.12	LDH 4: Activity assays; Bradford protein assays	Lab 6
	Th 8.13	LDH 6: SDS-PAGE of LDH purification fractions	Lab 8
	Fr 8.14	LDH 5: Native gel electrophoresis of LDH with activity stain; Lab Notebook due by 5PM Quiz 2 – Due on Monday by Midnight	Lab 7
3	Tu 8.18	Fibroblast Growth Factor (FGF) Signaling: Develop hypotheses to explain data in lab manual and design experiments to test	Lab 9B
	We 8.19	FGF 2: Prepare Samples for Western blot and ELISA	Lab 9B
	Th 8.20	FGF 3: Erk Western blot—SDS PAGE and electroblotting	Lab 10
	Fr 8.21	FGF 4: Erk Western blot—Immunodetection; Lab Notebook due by 5PM Quiz 3 – Due on Monday by Midnight	Lab 11
4	Tu 8.24	FGF 5: ELISA for phospholipase C activity;	Lab 12
	We 8.25	FGF 6: Work up ELISA data, create figures for lab report	Lab 12
	Th 8.26	Bioinformatics 1: Investigation of an unknown melanoma gene	Lab 19 part A
	Fr 8.27	Bioinformatics 2: Modeling protein structures Lab Notebook due by 5PM FGF Lab Report Draft due by Midnight Quiz 4 – Due on Monday by Midnight	Lab 19 B – D
5	Tu 9.1	Work on PyMOL project, Manuscript presentation and FGF2 Lab Report	
	We 9.2	PyMOL Project Due by midnight	
	Th 9.3	Journal Club – Group Manuscript / Techniques Presentation FGF Signaling Lab Report Due	
	Fr 9.4	Journal Club – Group Manuscript / Techniques Presentation	