Bioengineering 115: Cell Biology for Engineers

Fall 2016 Syllabus

To me, that's the beauty of science: to know that you will never know everything, but you never stop wanting to, that when you learn something, for a second you feel crazy smart, and then stupid all over again as new questions come tumbling in. It's an urge that never dies, a game that never ends.
-Robert Krulwich

Course Title: Cell Biology Laboratory for Engineers

Course Credit: 4 units

Course Format: 2 hours of lecture on Mondays and 4 hours of lab per week on Tu/Th/F.

Prerequisites: MCB 102, 110 or 130 or equivalent *recommended* (or consent of instructor)

Grading: Letter

Textbook: None. Lab protocols are available on bspace.

Instructors: **Hayley J. Lam**; hayleylam@berkeley.edu

Mondays 11am-Noon & Tuesdays, 2-3pm in 416 HMMB or by appointment

Irina Conboy; iconboy@berkeley.edu

Tuesdays and Thursdays 4-5pm in B108B Stanley

GSIs: Phillip Kang (Thursday lab); phil.kang@berkeley.edu

George Lin (Friday lab); glin32@berkeley.edu

Important Dates:
Project proposal presentation: Monday, October 31st during lecture
Project final presentations: Thursday, December 8th from 2-5PM, 177 Stanley
Project paper due: Monday, December 12th @2PM

Course Description:
A conceptual and practical understanding of cell and tissue biology is vital for careers in medicine, bio/medtech, and beyond. Students will be introduced to cell biology techniques as applied to cells and tissues including immunofluorescence, image analysis, protein quantification, protein expression, gene expression, and cell culture. The course culminates with a group project which will synthesize literature review, experimental design, implementation, troubleshooting, and analysis of results.

Course Goals:

- To introduce a variety of basic cellular biology laboratory techniques, and develop a conceptual and theoretical understanding of the reliability and limitations of these tools.
- To support students in developing a research question, defining project goals and designing experiments that can be addressed within the constraints of the course.
- To engage students in applying their knowledge and research to others in professional activities such as presentations and papers.

Student Learning Objectives

Students will gain an understanding of:

- Laboratory safety issues
- Appropriate methods for documenting laboratory procedures
- Phase contrast microscopy
- Fluorescent microscopy
- Image processing
- Cell culture
- Protein quantification, SDS-PAGE, and Western blotting
- Isolation and quantification of mRNA from cells
- RT-PCR
- Data analysis
- Experimental design

Grading Scheme

COURSE COMPONENT	% OF GRADE
Quizzes	
Weekly Quizzes	40%
Participation	
Weekly Attendance and Participation	10%
Lab Notebook and Homework	10%
Class Project	
Project Proposal & Experimental Plan	5%
Project Presentation	5%
Project Paper	30%
TOTAL	**100%**

Class Policies

Absences: Please notify me by the second week of classes for any planned absences, or in advance of class due to illness. Active participation in both the lecture and laboratory is essential. Any material that is missed will be the responsibility of the student.

When a quiz is missed due to illness, grad or med school interviews, or extraordinary circumstances, alternate arrangements can be made at my discretion. Typically those missed quizzes will simply not be counted toward your final grade.

Quiz regrades must be submitted in writing. Attach a note to the quiz briefly describing the issue.

Students with disabilities: Please see me as soon as possible if you need particular accommodations, and we will work out the necessary arrangements.

Please take note of UC Berkeley's Code of Student Conduct. Plagiarism or cheating will not be tolerated. While it is expected that students will consult with each other on homework, labs and the projects, outright copying is not allowed. Collaboration, on the other hand, is encouraged.