

# Undergraduate Lab @ Berkeley

## Computational Biology

University of California, Berkeley | Fall 2021

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**Units & Grading Option:** 2 units, P/NP

**Website:** <https://ulab.berkeley.edu/labs/compbio>

**Faculty Sponsor:** Professor John Huelsenbeck

**Facilitators:**

- Ashish Ramesh - [ashishramesh@berkeley.edu](mailto:ashishramesh@berkeley.edu)
- Reet Mishra - [reet.mishra@berkeley.edu](mailto:reet.mishra@berkeley.edu)

**Course Overview**

**Purpose & Goals**

Undergraduate research can be one of the most transformative and fruitful experiences at Berkeley. However, many students feel they lack the knowledge, experience, or resources to get started. ULAB is a student-run research program built to remedy this issue by helping students from all backgrounds and skill levels get their foot in the door.

The purpose of this two-semester course in computational biology is to give undergraduates an opportunity to gain fundamental research skills, explore relevant background knowledge, and conduct their own research project in groups. Our goal is to help students feel confident and prepared to seek out on-campus opportunities in the exciting field of computational biology.

**Prerequisites**

Students must have an interest in the study and techniques of computational biology and an enthusiasm to learn and collaborate with peers. No prior research or lab experience is required. It is recommended that students have taken, or be currently taking, at least one introductory biology, data science, or computer science course, although this is not required.

**Course Structure**

The course will meet **Tu/Th 7-8 PM PDT in-person**. Tuesday meetings will be used for presentations and workshops, while Thursday meetings are reserved for project group meetings. Class participation will be recorded through weekly checkoffs. Students will receive a checkoff grade from mentors confirming active participation during group meetings. A maximum of 2 unexcused absences is allowed, though accommodations can be made for extenuating circumstances (please get in contact with board members for this). We expect students enrolled in the fall semester to also enroll in the spring semester, and will not be accepting new students in the spring semester.

## **Assignments**

There will be 4 major categories of assignments: weekly mentor checkoffs, workshop modules, project proposal, and the final project presentation.

Through our workshop modules, we hope to create a collaborative atmosphere in which students can learn about various topics in computational biology and discuss their understandings with their peers and mentors. We want to further this education by allowing students to apply their knowledge to a research project of their own choice and use the skills learned in modules to work on their project. The project proposal will help students to create and design the workflow of an idea they have, and mentors will be open for brainstorming sessions before as well. The final project presentation (second semester) will allow students to learn how to collaborate with their team in the duration of the project, and also communicate their findings which is an essential skill for research and beyond.

Mentors for each group will conduct weekly checkoffs for students based on participation and contribution. Additionally, the final project proposal's grading policies are highlighted below.

## **Materials**

The primary books/readings for this course will include premade modules which will be available through the ULAB website and bCourses page. They will cover fundamental research skills, basic topics within Computational Biology, programming, and data analysis and statistics.

## **Grading Policies**

Grades will be assigned based on the following weights:

Weekly Modules/Assignments	30%
Meetings & Participation	30%
Project Proposal	10%
Final Project	30%

Students will need a weighted final grade of at least 70% to earn a passing (P) grade. Incompletes may be given in exceptional circumstances.

Weekly modules will be graded on effort and completion. Modules will typically be due by Monday at 11:59PM after they are released. No credit is awarded for late assignments. We'll send out reminders before each assignment is due. The project proposal and final project will be graded on effort and a predetermined rubric.

## **Disabled Student's Program Accommodations**

Students with special needs may receive accommodations via the DSP Program. Please contact the ULAB Computational Biology director before the start of instruction with an accommodation letter.

### Student's Code of Conduct

We expect students to abide by the Berkeley honor code: “As a member of the UC Berkeley community, I act with honesty, integrity, and respect for others.” Cheating, plagiarism, and other forms of misconduct may result in a failing grade and/or further disciplinary action. More information can be found [here](#).

### Tentative Weekly Schedule:

Week of:	Topic(s) Covered	Team Timeline	Assignment
08/25	-	-	-
08/30	-	-	-
09/06	Introduction to Computational Biology	Meet your team!	Module: Intro. Computational Biology
09/13	Research Literacy	Brainstorming	Module: Understanding Figures in Papers
09/20	Current Research in Comp. Bio.	Brainstorming	
09/27	Programming Basics	Research Topic	Module: Programming Basics
10/04	Introduction to Statistics & Data Analysis	Research Topic	
10/11	Conducting a Research Project	Design Project	Module: Statistics and Data Analysis
10/18	Special Topics: Sequencing Technologies & Sequence Data	Design Project	
10/25	Special Topics: Human Genetic Variation	Gather Data Sources	Module: Working with Sequence Data
11/01	Special Topics: Phylogenetics & Evolution	Begin Project Proposal	
11/08	Special Topics: -omics Data Analysis	<i>Academic Holiday</i>	Module: Special Topics
11/15	Project Proposal		
11/22	Computational Biology Opportunities on Campus	<i>Thanksgiving Holiday</i>	<b>Project Proposal Rough Draft (due 11/29)</b>
11/29	Project Feedback Week		
12/06 (RRR)	<b>Final Project Proposal Due (due 12/06)</b>		