BILD 4: Introductory Biology Lab | Spring 2015 | UC San Diego

This course aims to develop an understanding for research in biology through inquiry-based laboratory experiments. We will work in teams to collect, analyze, and present original research data while learning laboratory methods common to a variety of biological disciplines. Data collected in this course will contribute to an on-going research project on microbiomes at the Scripps Coastal Reserve on campus.

Goals of the course

- Engage in the research process early in their college career
- Connect with resources on campus, e.g. library, writing center, faculty research groups
- Provide a collaborative environment to learn foundational skills and lab techniques

Major components of the course

- Laboratory: Engage in a research project on soil microbiomes on campus
- Lecture: Learn biological concepts and principles related to the laboratory research project
- Project: Write and present research proposals on hypothetical projects

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Lecture: Tuesday 5:00-6:20 pm in HSS 1330
Laboratory: Wednesday 12:00-3:00 pm or 4:00-7:00 pm in York 4124A
Office Hours: Wednesday 10:00-11:50 am in York 4124A or by appointment

Grading

There are four components of grading in this course: participation (20%), papers (20%), project (20%), and quizzes (20%). Because different people may excel in different aspects in this course, the higher two components out of the laboratory report, project, or quiz component for each individual will be scaled to 30% instead of 20%.

In general, the grading scheme is as follows but may be adjusted to improve everyone's grades if necessary: A+/A/A- at above 90%, B+/B/B- at 80-90%, C+/C/C- at 70-80%, D at 60-70%, and F at under 60%. This course is not graded on a curve (i.e. 20% of students getting A, B, C, and such), and thus, the ability to do well in the course is not dependent on others doing poorly.

Participation: Active participation both in lectures and in the laboratory is essential to learning in this course. There will be many participation items, including pre-class and pre-lab assignments, in-class discussions, in-lab activities, and lab notebooks. Participation will be graded for thoughtful completion, and 80% participation items (rounded up to whole items) will be counted.

Papers: Two papers will be written in teams in the format of journal articles from research journals. We will use the Saltman Quarterly articles (to be posted on TED) as a guide. The first paper (5%) is one page, and the second paper (15%) is four pages.

Project: The project will be a research proposal written collaboratively in teams. Each team will identify a topic to study hypothetically and propose experiments to investigate that topic using the methods

learned in the course. The proposal will be presented in poster format at a poster fair, and the presentation will be graded as a team effort (20%).

Quizzes: Quizzes will be done individually. They are open resources (e.g. notes and books but not electronic equipment) and cumulative but will focus on the most recent material. Quiz questions will challenge you to apply your understanding in new contexts by solving problems. There will be 2 short quizzes (25 minute) and 1 long quiz (75 minutes) that count as 3 short quizzes. Out of 5 quiz equivalents, the top 4 quiz grades (5% each) will be counted.

Learning in this course
This course is designed to be a collaborative environment for everyone to learn together and construct a shared understanding of the material. Therefore, active participation both in class and in the laboratory is expected. To encourage collaboration, many activities, including laboratory work and the project, will be done in teams, and grades will not be assigned on a curve.

Instead of memorization, we will focus on developing an understanding of fundamental concepts and ideas as they apply to different examples. Therefore, quizzes will include questions that are based on solving problems in new contexts and will be open resources, e.g. notes and books but not electronic equipment. However, quizzes are individual work, and you are not allowed to communicate with other people on quizzes.

Laboratory attendance
Attendance in laboratory is required. Missing two laboratory sessions, except in the case of a documented short-term illness or serious documented family emergency, will automatically results in an F grade. Please also be on time for laboratory sessions, as instructional assistants go over the experiments at the beginning of each session. Two late attendance will be counted as one absence.

Laboratory safety
Safety precautions are crucial in the laboratory setting. As such, appropriate personal protective equipment (PPE), including laboratory coats that cover to the knees, UV-blocking safety glasses or googles, long pants or equivalent, and closed-toe and closed-heel shoes, are required.

Academic integrity (https://students.ucsd.edu/academics/academic-integrity/index.html)
Integrity of scholarship is essential for an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University intellectual work. For students, this means that all academic work will be done by the individual(s) to whom it is assigned, without unauthorized aid of any kind.

Assignments and quizzes
No late participation items will be accepted, and no make-up quizzes will be offered, as only up to 80% of these grades are counted. No late assignments will be accepted, except in the case of a documented short-term illness or serious documented family emergency.

Clickers
Participation in lectures will be mainly through clicker questions, and quizzes will be given as multiple-choice questions on clickers to facilitate grading. To participate in lectures and take quizzes, you must have an i>clicker 2 (the newest version of i>clicker) and have it registered on TED.

Library guide (http://ucsd.libguides.com/bild4)
A specific library guide has been designed for our course. This websites serves as the starting point for navigating library resources that support our needs in completing major assignments.

Podcast (http://podcast.ucsd.edu/)
Lectures will be recorded and available online as videos as a resource for review. However, attendance and participation are highly encouraged. Please see participation in the grading section for more details.

Inclusion and accessibility (http://disabilities.ucsd.edu)
Any student with a disability is welcome to contact us early in the quarter to work out reasonable accommodations to support your success in this course. Students requesting accommodations for this course due to a disability must provide a current Authorization for Accommodation (AFA) letter issued by the Office for Students with Disabilities (OSD), which is located in University Center 202 behind Center Hall. Students are required to present their AFA letters to faculty and to the OSD Liaison in the Division of Biological Sciences in advance so that accommodations may be arranged. For further information, contact the OSD at 858-534-4382 or osd@ucsd.edu.

Calendar
A general outline for the course is available below. More specific details for each week, including reading and pre-lecture and pre-lab assignments, will be provided on TED and in class. We may also adjust the schedule as necessary, while still focusing on the core concepts and ideas of the course.

Week	Lecture	Laboratory	Major assignments
1: March 30	• BILD 4 introduction • Microbiomes	• Laboratory safety • Error analysis	
2: April 6	• Forms of biodiversity • Ecoplate introduction	• Scripps Coastal Reserve • Soil and ecoplate	
3: April 13	• Measuring biodiversity • Ecoplate analysis	• Ecoplate analysis • Data presentation	• Paper 1 (11:59 pm on 4/19)
4: April 20	• Quiz 1 • 16S rDNA sequences	• Genomic DNA prep • Asking questions	
5: April 27	• DNA replication • PCR	• PCR • Gel electrophoresis	
6: May 4	• Recombinant DNA • Biotechnology	• Ligation • Transformation	
7: May 11	• Quiz 2 • DNA sequencing	• Colony selection	
8: May 18	• Sequence alignment • Bioinformatics	• Sequence analysis • Data presentation	• Paper 2 (11:59 pm on 5/24)
9: May 25	• Research opportunities	• Designing posters	• Poster (11:59 pm on 5/31)
10: June 1	• Quiz 3-5	• Poster presentation	
Exam week	• No final exam		