UCSD BIMM 121: Microbiology Lab Lab Schedule Winter 2022 Quarter start: **1/03/22** Quarter end: 3/11/22

Professor: **Dr. Brooke Pickett** Professor contact: bpickett@ucsd.edu Office Hour: F, 11:30pm – 12:30pm, H&SS 1145B

<u>Overview:</u> Welcome! In this class, we'll be using techniques in microbial physiology, microbial genomics, microbial evolution, and microbial ecology to explore the role of microbes in health, industry, and the environment. Inquiry-based experiments will cover the fundamentals of both working with live microscopic organisms at the bench and bioinformatically analyzing their genomes at the computer. I know transitioning to fully in-person classes can be stressful, so let's keep that in mind and make sure to treat each other with patience and understanding. We're in this together, so if you have any issues or concerns, please let me know right away.

### COURSE MEETING TIMES

The first six weeks of class will be online (and synchronous) via the Zoom links in CANVAS, while the rest of the course will be in-person. Please look closely at the following course meeting times and the more detailed lab schedule in this syllabus.

Lab Lecture:

Section	Day	Time	Room
All	TuTh	12:30pm – 1:50pm	Sequo 147

Lab Meeting:

Section	Day	Time	Room	IA	IA Email
B01	TuTh	3:00 – 5:50pm	Tata 2101	Hannah Nonoguchi	hnonoguc@ucsd.edu
B02	TuTh	3:00 – 5:50pm	Tata 2102	Jenny Lu	jel368@ucsd.edu

## **COURSE DESCRIPTION**

<u>Required Materials</u>: physical lab manual from the bookstore - ISBN # 978-1-5339-2390-5 (if it says Fall 2020 edition, that's fine). You'll also need PPE (lab coat, safety glasses), a lab notebook (any kind), access to Zoom, and CANVAS access. If you do not have access to a computer, please see "student resources" on our CANVAS page to request a loaner.

<u>Course Structure</u>: Each lab lecture covers the important concepts and background information needed to accomplish that day's lab tasks. During lab, you will work in small groups and then answer questions regarding each lab's accomplishments. **Lab attendance is required** and will contribute to your grade (you must attend the lab section you are officially enrolled in). There will be lab quizzes, weekly discussion posts, notebook assignments, and three lab reports. The first three weeks of lab class may also include pre-labs.

# DETAILED COURSE SCHEDULE

Below is the <u>tentative</u> lab schedule; i.e. lab schedule may be a little ahead or behind track as the course progresses. The course schedule is composed of several topics: biofilm experiment, yogurt and CRISPR, lab basics, biofilm experiment DNA library prep, and genomic data analysis. We will not be completing the lab modules in the order that is presented in the lab manual (ex. A1, A2, A3, etc.), but rather the order presented in the below schedule. Remote days: *blue*.

Week	Dates	Tuesday	Thursday
1	Jan 4, 6	Lab Lecture: intro to microbes, scientific literature, culturing, biofilms	Lab Lecture: biofilm evolution, Rainey and Travisano, proposal goals
			Lab: discuss paper, write proposal
2	Jan 11, 13	fermentation, yogurt	of CRISPR, t-tests
	10	Lab: sampling, cloud computing connection (pre-lab)	Lab: spacer stats (from instance)
<b>J</b> an 18, 20 <b>Lab Lecture:</b> CRISPR-Cas Find		<b>Lab Lecture:</b> CRISPR-Cas Finder, BLAST	Lab Lecture: gut microbiome, HGT
		Lab: find and BLAST spacers	Lab: BLAST CRISPR array for HGT
4	Jan 25, 27	Lab Lecture: serial dilutions, microcosm pictures, morphotype frequency	Lab lecture: metabolic categories, fermentation tests, great plate count anomaly, 16S
		Lab: serial dilution activity	Lab: counting, cfu/mL calculations
5	Feb 1, 3	<b>Lab Lecture:</b> Unix intro, file navigation	Lab Lecture: resequencing
		Lab: Unix tutorial	Lab: breseq (with old data)
6 Feb 8, 2		<b>Lab Lecture:</b> common mutations in SBW25	<b>Lab Lecture:</b> intro to QIIME2, DADA2, diversity metrics
		Lab: research resequencing results	Lab: presentations
7	Feb 15,	<b>Lab Lecture:</b> micropipettes, cultures, culturing, inoculations, aseptic technique	<b>Lab Lecture:</b> streak plate, examining cultures, microscope videomaking your own slides
	17	<b>Lab:</b> BASICS 1 (micropipetting), A1 (surface swabbing and plating), A2 (inoculating a test tube with sterile technique), safety	Lab: A3 (streak plate of A2), examine cultures, BASICS2 (microscopy with prepared slides)

		Lab Lecture: protists	Lab Lecture: intro to growth
8	Feb 22, 24		experiment
		Lab: observe streak plate, BASICS3	<b>Lab:</b> H1 (set up photosynthetic microbe growth tests)
	March 1	Lab Lecture: TBD	Lab Lecture: TBD
9	3	Lab: H2 (measure growth)	Lab: H3 (measure growth)
	March 8.	Lab Lecture: TBD	Lab Lecture: TBD
10	10	Lab: H4, presentation prep	Lab: presentations

## GRADING CRITERIA AND SCALE

The grading scale for the course is standard (see second table below). The course will not be curved and the final grades will not be rounded. For example, this means a grade of 89.9% will not be rounded up to a 90%.

Assessment	Points
Quizzes (10, 15pts)	150
Lab Reports (3, 40pts)	120
Lab Notebooks (~17, 10pts)	170
Discussion (9, 5pts)	45
Extra Credit	3
Total for Course	485

Letter	Percent	GPA
A+	96-100	4.0
А	94-95	4.0
A-	90-93	3.7
B+	86-89	3.3
В	84-85	3.0
B-	80-83	2.7
C+	76-79	2.3
С	74-75	2.0
C-	70-73	1.7
D	60-69	1.0
F	<60	0

#### QUIZZES

Quizzes will be given once a week and cover material from the week's lectures and labs. Quizzes are available on CANVAS from Friday 5pm – Monday 5pm and can be taken any time within that window. Quizzes are opennote, contain 15 questions, and must be completed within 30min of opening. At the end of the quarter, <u>your</u> <u>lowest quiz grade will be dropped</u>. There are no make-up quizzes (unless you have a doctor's note).

#### LAB REPORTS

Every student is expected to have a notebook (can be any kind of notebook) to record lab activities and background information during lab. This notebook will be essential in writing your lab reports throughout the semester. Guidelines regarding how to write a lab report are posted on CANVAS under the module "Lab Reports". There will be three lab reports, <u>none of the lab report grades will be dropped</u>. The third lab report will be a group report – if a group member does not complete their allotted work as per the confidential group evaluation sheets, that group member will receive a <u>point penalty of 30%</u> on their report 3 grade.

### LAB NOTEBOOK

Students will complete a Googledoc lab notebook entry for every lab session (so 2 per week). Lab notebook assignments will be started the day before lab by completing the prelab section of the lab manual. Each assignment will be worth 10pts, with 2pts attributed to participation. Students must be present in lab in order to receive any notebook assignment points for that day. The rest of the notebook assignment will be completed during lab. Lab notebook entries should be completed by the end of the day on lab days (you should be able to complete them by the end of lab, but we wanted to give you some wiggle room). Notebooks will be checked once a week by the IA, at a time of their choosing, which means notebooks must be kept up to date. The lowest lab notebook score will be dropped at the end of the quarter.

#### DISCUSSION

The CANVAS discussion forum is a key learning tool for this course. It is driven by your curiosity and will help you make connections between what we learn in class and the real world. <u>Every week you are required to make two posts</u>, at least one of which must be a response (the other can be a question or a response). Your questions should be insightful and curious in order to earn points, asking a simple "googleable" question like "what is agar?" or questions regarding class assignments will not earn points. In addition, answers to questions should not be guesses, but <u>backed up by relevant literature</u> (only journal articles, books) with a link to the reference. Your questions should relate (loose connections are fine) to something we covered in the course that week. <u>Posts must be made by 11:59pm on Fridays</u>. At the end of the quarter, <u>your lowest discussion grade will be dropped</u>.

#### **EXTRA CREDIT**

Extra credit are points given out for doing something above and beyond what is required. There are three points of possible extra credit in this course. Asking for extra credit points beyond this or asking for added points to boost your grade is inappropriate and not in line with the ethics of academia; any requests of this nature will be dismissed.

#### CHECKLIST

Below is a helpful checklist that students can follow each week to make sure they are up to date on all tasks:

- □ Attend lecture and lab each week
- □ Answer prelab notebook questions before lab
- □ Answer in-lab notebook questions during lab
- □ Make two discussion posts each week by Friday at midnight
- □ Answer quiz questions by every Monday at 5pm
- □ Check if any lab reports are due

## **COURSE POLICIES**

Below you will find the class policies regarding attendance, late assignments, extra credit, accommodations, and cheating.

#### ATTENDANCE

<u>Lecture attendance</u>: lecture attendance is necessary in order to understand the labs and assignments. Students who are feeling sick, or who are COVID-positive, can watch the lab lecture podcast (via the "Media Gallery" tab in CANVAS).

<u>Lab attendance</u>: lab attendance is required. Lab work will include wet lab procedures and therefore cannot be completed remotely. Students who are feeling sick, or who are COVID-positive, can complete a make-up writing assignment after notifying their professor/IA that they will not be attending lab. The make-up assignment must be completed on time, or the lab will be counted as a missed lab. The following guidelines apply to lab absences:

*Unexcused lab absences:* will result in no lab question points for that day. Unexcused absences include: 1) not completing a make-up assignment on time if a lab is not attended, 2) missing lab without first notifying the professor or IA, 3) arriving to lab 15min late or more, 4) leaving lab with 15min or more remaining, 5) not participating during lab, 6) lab absences due to scheduling conflicts (other coursework, vacations, planned meetings, etc.), or 7) attending a lab section the student is not registered for. **If a student is marked as absent for 3 lab sessions and/or misses four lab quizzes, they must drop the course** as too much information has been missed. If a student refuses to drop the course, they will receive an automatic grade of "F" in the course after the drop deadline has passed.

*Excused lab absences:* will result in the student being able to make up lab question points for that day (if applicable) and checking in with their group to get the information they'll need for the next lab. Excused absences include feeling sick, being COVID-positive, having COVID symptoms, unexpected occurrences, or events out of the student's control. Students must let Dr. Pickett and their IA know of any excused absences **ahead of time** (this excludes medical emergencies).

<u>Attendance and COVID</u>: **DO NOT** attend lecture/lab if you are feeling sick, have been in contact with a COVIDpositive person, or are COVID-positive – please protect your fellow students, IAs, and professors. As stated above, lecture can be completed remotely, and lab can be substituted with a make-up assignment without any penalties.

<u>Add/drop deadlines</u>: Deadlines are different for lab courses than lecture courses. Students who drop a biology lab class after the end of the **second class meeting** will be assigned a "W" – so please make sure to drop the class by the end of the first day if you are planning to drop. Additional details: <u>http://biology.ucsd.edu/go/ug-labs</u>.

#### LATE ASSIGNMENTS

Late assignments/quizzes/reports are **not accepted** unless there is a doctor's note, a prior request for accommodations, or existing accommodations.

#### COVID-SPECIFIC ACCOMODATIONS

In light of the stressful environment in which this class is taking place, there are a few accommodations added to this course: quizzes are open-note, the lowest quiz and discussion grade will be dropped, 3.6pts of low-pressure points are available, and 3pts of extra credit are available. Students should not expect or ask for quarantine-specific accommodations in addition to these. This course, despite the added hurtles, must be equivalent in rigor and scope as those given in previous semesters.

#### SAFETY TRAINING

Enrolled and waitlisted students must successfully complete the Biology Lab Safety Training and Assessment before the first lab session: <u>https://biolabclass-safetyquiz.ucsd.edu/introduction</u>. Please note that courses offered by other departments (Chemistry, for example) may have additional safety training requirements. Students are not allowed into the lab for the second lab session unless they have successfully passed the safety assessment. Instructors need to enforce this policy without exception. Please make sure to always follow the waste disposal guidelines provided during lab and in the lab manual.

### LEARNING OUTCOMES (LOs)

- 1. Appreciate the structure, physiology, and diversity of microorganisms.
- 2. Appreciate interactions of microbes with other organisms.
- 3. Appreciate interactions of microbes with their environment.
- 4. Detect and interpret evidence of microbial evolution.
- 5. Isolate, identify, grow, and quantitate microorganisms.
- 6. Execute laboratory tasks using aseptic technique.
- 7. Plan an experiment from a general outline of research objectives.
- 8. Analyze and interpret experimental data to draw accurate and statistically sound conclusions.
- 9. Communicate scientific research its justification, methods, and findings effectively.
- 10. Recognize unknowns in microbiology
- 11. Value the relevance of microbiology today

#### ACADEMIC INTEGRITY

Honesty is primarily the responsibility of each student. The College considers cheating to be a voluntary act for which there may be a reason, but for which there is no acceptable excuse. It is important to understand that collaborative learning is considered cheating unless specifically allowed for by the professor. The term cheating includes but is not limited to plagiarism, receiving or knowingly supplying unauthorized information, using unauthorized material or sources, changing an answer after work has been graded and presenting it as improperly graded, illegally accessing confidential information through a computer, taking an examination for another student or having another student take an examination for you, and forging or altering grade documents. In any act of academic dishonesty, the student will automatically receive a zero on that test or assignment (the grade received as a result of an academic integrity violation stays calculated into the student's GPA even if the student retakes the class). There will also be an AI Administrative Fee of \$50 (posted to student account), mandatory AI Training, at least one Disciplinary Action, and possibly other actions per the professional judgement of the Appropriate Administrative Authority (AAA). Discipline may include probation, suspension (from a Quarter to Two Years), or dismissal. <u>Please don't risk your GPA and/or future career by cheating.</u>

## COVID-RELATED FAQs

### 1. Why is there only one remote option for this course?

Students who have a documented need for accommodation either because of travel restrictions or because of health restrictions have already been identified and this data has been shared with the appropriate academic programs. To the extent that we have capacity, programs and faculty have tried to accommodate students needing remote instruction for Fall. *To operate programs in both in-person and remote modalities increases demands on university infrastructure, and our ability to do so is limited.* While individual students may express a preference for additional remote offerings, *we do not have the instructional or operational capacity to simultaneously deliver all or most courses in both* 

*in-person and remote formats.* Students who have an accommodation need must work with the Office for Students with Disabilities (OSD) to have their accommodation reviewed and documented.

2. What accommodations are there for students who are sick/unable to join an in-person class? As stated under the "Attendance Policy" students can choose to watch the lab lecture recording rather than attend the lecture in-person. If a student misses lab, there will be a make-up assignment. Please see the "Attendance Policy" portion of the syllabus.

### 3. What happens if another student in the class tests positive for COVID?

When a student tests positive for COVID, the contact tracing team immediately takes over. The student will need to quarantine for up to 10 days. The contact tracing team will determine if others were exposed through contact with the infected individual, and if so, they will be contacted and advised to be tested. If all protocols are followed (including vaccine mandates and masking), being in a room with an infected individual does not automatically qualify as exposure. To date, no exposure events have been traced back to in-class activities at UCSD.

#### 4. What should I do if I feel sick?

Complete the symptom screener and if needed, get tested for COVID. Do not come to campus unless given the all-clear.

#### 5. What happens if the professor/IA tests positive for COVID?

The professor/IA will quarantine for 10 days and the contact tracing team will determine if others were exposed. If the professor were to quarantine, instruction would be remote for the quarantine period and a substitute professor may be provided.

#### 6. What rules do the professor/IA/students have to follow in the classroom?

Wearing two cloth masks or one KN95/N95 mask is required at all times, regardless of vaccination status. No eating or drinking is allowed in class, regardless of whether the class is indoor or outdoor. The only exception from this rule is short hydration breaks for instructors while lecturing. Social distancing restrictions have been lifted, but physical contact should be limited where possible. The full masking policy is posted on the UCSD website: <u>https://adminrecords.ucsd.edu/PPM/docs/516-30.html? ga=2.168746281.923449004.1631056456-1539867882.1625773689</u>.

7. Can we eat/drink in the classrooms?

No, but instructors may take hydration breaks while lecturing. Students should step outside to hydrate, if needed, during class and break times.

8. How have classrooms been prepared for a safe return, and what safeguards are in place? Facilities Management has provided extensive information on their activities preparing classrooms and other facilities for individuals to return to campus. More information about the specifics related to air filtration in classrooms and campus buildings, as well as cleaning protocols and more can be found on their COVID-19 information page (Facilities Management Response to the COVID-19 Pandemic (ucsd.edu)).

## **RESOURCES FOR STUDENTS**

If a student is struggling, it is **their responsibility to seek out help and let the professor know of their circumstances before assignments/quizzes are to take place.** <u>Students cannot ask for accommodations</u> <u>retroactively</u>. A complete list of student resources can be found on the CANVAS homepage.

- Teaching + Learning Commons (<u>https://commons.ucsd.edu/students/academic%20support.html</u>) Made up of six unique, but integrated hubs, The Teaching + Learning Commons provides comprehensive academic support for students. Includes tutoring, writing help, learning strategy workshops, and study groups.
- 2. The Writing and Critical Expression Hub (<u>http://commons.ucsd.edu/students/writing/index.html</u>) provides support for undergraduates working on course papers, i.e. laboratory reports and the research proposal, as well as other independent writing projects. Writing mentors can help at any stage of the writing process, from brainstorming to final polishing. The Writing and Critical Expression Hub offers: one-onone writing tutoring by appointment; supportive and in-depth conversations about writing, the writing process, and writing skills; help with every stage in the writing process, walk-in tutoring; and workshops on writing.
- 3. *Office for Students with Disabilities (OSD)* (<u>https://osd.ucsd.edu/</u>) Assists students with documented disabilities (psychological, psychiatric, learning, attention, chronic health, physical, vision, hearing, brain injury) to provide accommodations in classrooms and labs. OSD is a great resource if you think you may have test anxiety due to an underlying condition that interferes with the ability to learn, focus, or concentrate. In many cases, students are entitled to assistance with test taking, such as extra time to complete a test, testing in a less distracting room or having questions read aloud. Their mission is to offer quality programs and services that empower students with disabilities to access and engage in educational activities at the College. Please notify your instructor immediately if you require special health or disability accommodations.
- Counseling and Psychological Services (CAPS) UCSD counseling services are still open during quarantine. This is an amazing resource for coping with anxiety and stress issues. For first-time appointments, you can now go directly to MyStudentChart.ucsd.edu and book an appointment online. The CAPS website is: <u>https://wellness.ucsd.edu/CAPS/services/Pages/Appointments.aspx</u>.
- 5. The Office for the Prevention of Harassment & Discrimination (OPHD) Provides assistance to students, faculty, and staff regarding reports of bias, harassment, and discrimination. OPHD is the UC San Diego Title IX office. Title IX of the Education Amendments of 1972 is the federal law that prohibits sex discrimination in educational institutions that are recipients of federal funds. Students have the right to an educational environment that is free from harassment and discrimination. Students have options for reporting incidents of sexual violence and sexual harassment. Sexual violence includes sexual assault, dating violence, domestic violence, and stalking. Information about reporting options may be obtained at OPHD at 858-534-8298, ophd@ucsd.edu, or http://ophd.ucsd.edu. Students may receive confidential assistance at CARE at the Sexual Assault Resource Center at 858-534-5793, sarc@ucsd.edu, or http://care.ucsd.edu, or Counseling and Psychological Services (CAPS) at 858-534-3755 or http://caps.ucsd.edu. Students may feel more comfortable discussing their particular concern with a trusted employee. This may be a student affairs staff member, a faculty member, a department chair, or other university official. These individuals have an obligation to report incidents of sexual violence and sexual harassment to OPHD. This does not necessarily mean that a formal complaint will be filed. If you find yourself in an uncomfortable situation, ask for help. The university is committed to upholding policies regarding nondiscrimination, sexual violence, and sexual harassment.

# OTHER TIPS

### College Survival Skills

- Keep a calendar of all exam/assignment due dates and appointments
- Plan on spending two to three hours of studying for every hour of class
- Be on time to class, ask questions when needed, and participate
- Take notes in class and review them often
- Complete all assignments on time
- Take advantage of services on campus to help you succeed such as tutoring
- Arrange for needed accommodations early in the term
- Visit the ACCESS office for assistance, questions, counseling, and class selection they are here to help
- Plan time to eat, sleep and have some fun
- Attend office hours if you have questions or concerns
- If trouble arises, seek assistance as soon as possible

### Coping Skills for Test Anxiety

- Breathing techniques or holding something small to fidget with (like a hair band)
- Reframing thoughts: believing in yourself and remembering this is just one exam
- Doing the hardest questions (like short answer) first so you can relax a little bit
- Studying as you go, instead of all at once
- Studying in a place that is relaxing or familiar
- Making a routine maybe adding a few questions to a study guide right after each lecture. Routine tends to decrease stress.
- Having breakfast and water (no coffee) right before a test

#### Self-Advocacy Tips

- Understand my disability and learn ways to compensate
- Learn how to explain my disability and needs to others
- Learn how to ask for appropriate accommodations
- Learn that it is OK to use appropriate accommodations
- Identify my strengths and weaknesses
- Learn that it is OK to ask for help
- Express my needs clearly to all college employees, especially the ACCESS staff and my instructors, early in the term
- Take responsibility and develop independence in coordinating your services
- Meet with instructors when needed

\*\*\* This syllabus is subject to change. Any changes will be announced in class and on CANVAS. Students will be responsible for all changes.