UCSD BIMM 121: Microbiology Lab Lab Schedule Winter 2021

Professor: **Dr. Brooke Pickett** Professor contact: bpickett@ucsd.edu Office Hours: F 10-12 via OH zoom link

Lab Lecture: asynchronous Lab: TR 3:00 – 5:50 via Zoom

Quarter start: 1/4/21 Quarter end: 3/12/21 IAs: Allyssa Strohm, Section A01, astrohm@ucsd.edu Janneca Ames, Section A02, j1ames@ucsd.edu

<u>Course Description</u>: Learn how to use scientific literature, how to design microbial experiments, and how to analyze data, including bioinformatic analysis of microbial genomes. This course will not include in-person experiments; however we will still be learning fundamental and real skills required for microbiology. Students will be held to the same expectations as previous quarters. Please keep in mind that this is a non-traditional online lab course that has just recently been developed – **we all need to be patient and understanding with each other** as we navigate our way through this course. We're in this together, so if you have any issues or concerns, please let me know right away.

<u>Required Materials</u>: computer, internet access, zoom access with a mic, and lab notebook (any kind). You will need a computer or laptop to interact with cloud computing resources online. The operating system (mac/linux/unix/pc) does not matter, but mobile devices will not be sufficient for the bioinformatics work. 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>: students will complete the prelab portion of the lab manual and watch the asynchronous lab lecture before coming to class, then we will have a live lab session. Each lab lecture covers the important concepts and background information needed to accomplish that day's lab tasks. Lectures will be asynchronous, with recordings posted to CANVAS well before lab. The live lab session will be held on zoom. You will work in small groups to complete each day's lab task. Keep in mind that lab attendance is required – you must attend the lab section you are officially enrolled in. There will be lab quizzes, lab notebook assignments, weekly discussions, and three lab reports.

LAB 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. This schedule will be changed a bit and will be updated before the course begins.

| Week Date Lab Topic (Tuesday) Lab Topic (Thursday) |
|--|
|--|

| 1 | Jan 5, 7 | Lab Lecture: course structure, intro to microbes (cont.), culturing, biofilms | Lecture: strains, model organism, experimental evolution, microcosms | |
|----|-------------|--|---|--|
| | | Lab: introductions, dilutions | Lab: discuss paper, write biofilm proposal | |
| | 1 10 14 | | | |
| 2 | Jan 12, 14 | Lecture: colony morphology, other ways to ID microbes (gram staining), aseptic technique | Lecture: announce winning proposal, three ways to measure culture density, spread plates, dilutions to calculate density | |
| | | Lab: biofilm proposal evaluation | Lah, dianag migragan sidaa | |
| 3 | Jap 19, 21 | Lacture: sorial dilutions microcosm | Lab: discuss microcosm video | |
| 3 | Jan 19, 21 | pictures morphotype frequency | fermentation tests great plate count | |
| | | pictures, morphotype nequency | anomaly, 16S | |
| | | Lab: serial dilution activity | | |
| | | | Lab: count colonies, calculate cfu/mL | |
| 4 | Jan 26, 28 | Lecture: microbiomes, Sanger | Lecture: strain isolation, Illumina | |
| | | sequencing, PCR | sequencing | |
| | | | | |
| | F104 | Lab: microbiome paper discussion | Lab: microbes@home proposal | |
| 5 | Feb 2, 4 | Lecture: microbes in food, | CPISPR t tests | |
| | | Termentation, yogurt | CRISER, t-tests | |
| | | Lab: microbes@home. cloud | Lab: vogurt CRISPR 1 – spacer stats | |
| | | computing connection (pre-lab) | | |
| | | | | |
| | | Due: Microbes as Models Report | | |
| 6 | Feb 9, 11 | Lecture: CRISPR-Cas Finder, BLAST | Lecture: gut microbiome, HGT | |
| | | Lab: yogurt CRISPR 2 – spacer finder | Lab: HGT 1 – BLAST CRISPR array | |
| 7 | Feb 16, 18 | Lecture: lytic and lysogenic phage, | Lecture: cloud computing, command | |
| | | prophage, viral taxa | line | |
| | | | | |
| | | Lab: HGT 2 – BLAST phage genes | Lab: Unix tutorial (prelab), copy | |
| 8 | Fab 22 25 | Lecture: resequencing Illumina | Lacture manning mutations mutations | |
| 0 | 100 20, 20 | sequencing, paired end reads, quality | in SBW25 | |
| | | scores | | |
| | | | Lab: breseq, discuss results | |
| | | Lab: fastqc, filter | - | |
| | | | Due: Microbes as Food Report | |
| 9 | March 2, 4 | Lecture: amplicon vs. whole genome next-gen sequencing, QIIME formats | Lecture: diversity metrics, PCA | |
| | | | Lab: QIIME 2 | |
| | | Lab: QIIME 1 | | |
| 10 | March 9, 11 | Lecture: wrap-up | Lecture: optional office hours | |
| | | Lab: QIIME 3 | Lab: home catch up/buffer day | |
| | | | Due: Bioinformatics Report | |

GRADING CRITERIA AND SCALE

The grading scale for the course is standard (see second table below). Unless it becomes necessary, the course will not be curved and the grades will not be rounded.

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

| Letter | Percent | GPA |
|--------|---------|-----|
| A+ | 97-100 | 4.0 |
| А | 93-97 | 4.0 |
| A- | 90-93 | 3.7 |
| B+ | 87-90 | 3.3 |
| В | 83-87 | 3.0 |
| B- | 80-83 | 2.7 |
| C+ | 77-80 | 2.3 |
| C | 73-77 | 2.0 |
| C- | 70-73 | 1.7 |
| D | 60-70 | 1.0 |
| F | <60 | 0 |

LAB QUIZZES

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

LAB REPORTS

Every student is expected to have a lab notebook (can be any kind of notebook) to record lab activities and background information. 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 Important Files. There will be three lab reports and *your lowest scoring report will be dropped*. Specific directions for each report will be announced in class and posted on CANVAS under the Assignments tab.

LAB NOTEBOOK

Students will complete a Googledoc lab notebook entry for every lab session (so 2 per week). Each one will be worth 10pts, with 2pts attributed to attendance. The template for these notebook assignments can be found under "Important Files" on the CANVAS homepage. **Lab notebook assignments will be started the day before lab by completing the prelab section of the lab manual.** 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. *Every week you are required to make two posts*, 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?" will not earn points. Your questions should relate (loose connections are fine) to something we covered in the course that week. Posts must be made by 11:59 PM on Fridays.

CHECKLIST

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

- □ Watch lab lecture recording before each lab
- Do prelab assignment before each lab
- □ Make sure Googledoc notebook is up to date
- □ Make two discussion posts each week
- □ Answer quiz questions by every Monday at 5pm
- □ Check if any lab reports are due

EXTRA CREDIT

Extra credit are points given out for doing something above and beyond what is required. There are five 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.

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: 1) lab quizzes are open notes and taken at home, 2) the lowest quiz, notebook, and report grade will be dropped, and 3) 5pts of extra credit are available. Students should not expect or ask for COVID-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.

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. Students cannot ask for accommodations retroactively. A complete list of student resources can be found on the CANVAS homepage.

Office for Students with Disabilities (OSD) - https://osd.ucsd.edu/

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:

https://wellness.ucsd.edu/CAPS/services/Pages/Appointments.aspx.

Teaching + Learning Commons - https://commons.ucsd.edu/students/academic%20support.html 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.

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 <u>tutoring</u> or special classes
- 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
- 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 I go, instead of all at once and studying in a place that is relaxing or familiar
- Making a routine for me that was adding a few questions to my study guide right after each lecture. Routine tends to decrease stress.
- Having breakfast and water (no coffee) right before the 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

CHEATING

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 and the incident will be reported to the Dean of Students Services, Director of Student Life, Director of Admissions and Records, and the Dean of Natural Sciences. In the case of more egregious offenses, a grade of "F" in the course may be assigned (regardless of the student's average) as per College and department policies. <u>Please don't risk your GPA and/or future career by cheating.</u>

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