

BIMM 121: MICROBIOLOGY LABORATORY

WELCOME TO MICROBIOLOGY LABORATORY. HERE 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.

LECTURE, SEQUO 147, T+H 2-3:20
LAB, TATA 2101+2102, W+F, 1-3:50

INSTRUCTOR DR. KATHERINE PETRIE



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DID YOU KNOW UCSD HAS CORE SKILLS FOR ALL STUDENTS TO MASTER? HERE ARE SOME OF THEM.

WHAT THIS COURSE WILL ENABLE YOU TO DO:

LEARNING OUTCOMES AKA LO'S

BY THE END OF THE COURSE YOU'LL BE ABLE TO:

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

GOALS FOR
BIO MAJORS

GOALS FOR
ALL STUDENTS

UNDERSTAND BIOTIC AND PHYSICAL INTERACTIONS

UNDERSTAND EVOLUTION AND DIVERSITY

USE CONTEMPORARY BIOLOGICAL RESEARCH TECHNIQUES AND QUANTITATIVE APPROACHES TO ANALYZE RESULTS

QUANTITATIVE REASONING

Critical Thinking

Construct reasonable hypotheses to explain biological phenomena

Written + Oral Communication

Information Literacy

Recognize the interactions between biology and society

HOW WILL YOU
DEMONSTRATE THAT
YOU ACCOMPLISHED
THE 11 LO'S?

ASSESSMENTS AND BASIS FOR FINAL GRADE:

ASSESSMENT	WEIGHT
IN-LECTURE CLICKER QUESTIONS	15 %
NOTEBOOK CHECKS	6 %
PRACTICAL	2 %
EFFECTIVE PARAPHRASING HOMEWORK	2 %
MICROBIAL ZOO	5%
MICROBES + HEALTH LAB REPORT	20 %
MICROBES + INDUSTRY LAB REPORT	10 %
MICROBES + ENVIRONMENT PRESENTATION	5 %
MIDTERM EXAM	15 %
FINAL EXAM	20 %

FOR REPORT
GUIDELINES + RUBRICS,
STAY TUNED TO
TRITON ED!

NO BELL CURVE:
YOU WON'T BE
COMPETING
AGAINST
EACH OTHER!

GRADING SCALE

97-100	A+	(4.0)
93-97.	A	(4.0)
90-93	A-	(3.7)
87-90	B+	(3.3)
83-87	B	(3.0)
80-83	B-	(2.7)
77-80	C+	(2.3)
73-77	C	(2.0)
70-73	C-	(1.7)
60-70	D	(1.0)
<60	F	(0)

MATERIALS NEEDED TO SUCCEED:

A CLICKER: FOR LECTURE, YOU ARE REQUIRED TO HAVE AND BRING AN i>clicker THAT IS REGISTERED VIA CANVAS..

CANVAS: LAB PROTOCOLS, GRADES, AND OTHER COURSE INFORMATION WILL BE POSTED ON CANVAS, SO MAKE SURE YOU CAN ACCESS IT VIA COURSEFINDER.UCSD.EDU.

PPE: A LAB COAT THAT YOU ONLY USE FOR THIS CLASS THAT EXTENDS TO YOUR KNEES, SAFETY GLASSES (REGULAR PRESCRIPTION GLASSES AREN'T SUFFICIENT).

LAB NOTEBOOK: BOUND STYLE, PREFERABLY WITH CARBONS.

SOMETHING TO TAKE NOTES WITH DURING LECTURE: LECTURES WILL BE PODCAST, BUT RESEARCH SHOWS THAT PEN + PAPER NOTE-TAKING WHERE YOU ORGANIZE, SUMMARIZE AND REPHRASE KEY IDEAS IS ONE OF THE BEST STRATEGIES TO HELP YOU LEARN NEW INFORMATION. EVEN IF YOU CHOOSE NOT TO TAKE NOTES IN CLASS; THINK ABOUT DOING IT FROM THE PODCASTS WHILE STUDYING.

HOW TO SUCCEED IN THIS CLASS:

DAILY CLICKER QUESTIONS (15% OF GRADE)

IN EVERY LECTURE, THERE WILL BE CLICKER QUESTIONS OF TWO TYPES:

LECTURES WILL START WITH A BRIEF CLICKER 'QUIZ' ON THE BASIC DETAILS FOR THE UPCOMING LAB. IF YOU'VE READ THE LAB MANUAL PAGES FOR THE NEXT LAB SESSION, YOU SHOULD BE ABLE TO ANSWER THESE QUESTIONS. AFTER THAT, THERE WILL BE CLICKER QUESTIONS THOUGHOUT THE LECTURE THAT WILL CHALLENGE YOU TO APPLY WHAT YOU'VE JUST LEARNED.. FOR THIS SECOND TYPE, YOU WILL USUALLY HAVE THE OPPORTUNITY TO COLLABORATE WITH YOUR NEIGHBORS.

EVERY DAY YOU WILL HAVE THE OPPORTUNITY TO EARN:

2 PARTICIPATION POINTS (SUBMIT ANSWER TO 75% OF ALL QUESTIONS FOR 2 PTS, ELSE GET 0)
3 PERFORMANCE POINTS (GET 1 PT FOR EVERY CORRECTLY ANSWERED QUESTION)

THERE ARE USUALLY MORE THAN 3 CLICKER QUESTIONS PER CLASS, SO EVEN IF YOU GET SOME WRONG YOU MAY STILL GET FULL POINTS, AND...

...YOU CAN MAKE UP ONE POINT BY SUBMITTING A 'MUDDIEST POINT' ON CANVAS BEFORE THE NEXT CLASS (LIMIT = 1 PT). CHECK OFTEN TO MAKE SURE YOUR CLICKERS ARE BEING RECORDED.

IF YOU MISS LECTURE....

IF YOU MISS LECTURE, OR IF YOUR CLICKER IS HAVING TECHNICAL DIFFICULTIES, YOU MAY NOT MAKE UP THE QUESTIONS. HOWEVER WE'LL DROP YOUR LOWEST 3 CLICKER DAYS.

IF YOU MISS THE MIDTERM, YOUR FINAL WILL BE WORTH A BIGGER % OF YOUR GRADE TO COMPENSATE. IF YOU MISS THE FINAL, YOU MAY BE ELIGIBLE FOR AN INCOMPLETE.

USE THESE DROPS WISELY: IT'S BETTER TO SAVE THEM FOR THE UNEXPECTED.

IF YOU MISS LAB...

YOU MUST LET DR. PETRIE, YOUR IA, + YOUR GROUP KNOW AHEAD OF TIME. YOU WILL STILL BE RESPONSIBLE FOR UNDERSTANDING THE MATERIAL YOU MISSED AND SUBMITTING ASSIGNMENTS ON TIME. IN THE CASE OF REPEATED ABSENCES, YOU MAY BE ASKED TO PROVIDE DOCUMENTATION OF YOUR EXCUSE. ABSENCES DUE TO SCHEDULING CONFLICTS (OTHER COURSEWORK, VACATIONS, BEYONCE CONCERTS, ETC) WILL NOT BE EXCUSED AND EACH WILL RESULT IN A GRADE PENALTY (1 % OFF OVERALL GRADE).

IF HEALTH OR FAMILY EMERGENCIES RESULT IN HAVING TO MISS MORE THAN THE ALLOWED DROPS, SEE DR. PETRIE TO DISCUSS THE POSSIBILITY OF AN "INCOMPLETE". PER UCSD POLICY, YOU MUST BE IN GOOD STANDING BEFORE CLASS IS MISSED TO BE ELIGIBLE.

NOTEBOOK CHECKS (6% OF GRADE)

THERE WILL BE PERIODIC IN-LAB CHECKS OF YOUR LABORATORY NOTEBOOK. THE GUIDELINES FOR HOW TO KEEP YOUR NOTEBOOKS ARE IN THE LAB MANUAL. ONE THING THAT WILL HELP YOU ENSURE YOU GET FULL CREDIT IS TO ANSWER ALL QUESTIONS LISTED IN THE LAB MANUAL.

INCLUSIVITY:

EVERYONE WILL COME TO THIS COURSE WITH DIFFERENT BACKGROUNDS, KNOWLEDGE, AND PERSPECTIVES. WE WANT TO CREATE A CLASSROOM CULTURE THAT RESPECTS AND REVELS IN THIS HUMAN DIVERSITY. IF YOU HAVE ANY CONCERNs RELATED TO INCLUSIVITY OR FEEL YOUR IDENTITIES (RACE, GENDER, SEXUALITY, RELIGION, ABILITY, ETC) ARE NOT BEING HONORED, PLEASE LET US KNOW! ACCOMMODATIONS CAN BE MADE FOR STUDENTS WITH A LETTER FROM THE OSD. FOR MORE INFORMATION ON CAMPUS + COMMUNITY RESOURCES, CHECK TRITON ED.

ACADEMIC INTEGRITY:

AN INCLUSIVE ENVIRONMENT IS ONE WHERE EVERYONE HAS AN EQUAL OPPORTUNITY TO SUCCEED. ACADEMIC DISHONESTY (INCLUDING, BUT NOT LIMITED TO: CHEATING, PLAGIARIZING, ANSWERING WITH SOMEONE ELSE'S CLICKER) FRACTURES THE PLAYING FIELD, BY GIVING SOME STUDENTS AN UNFAIR ADVANTAGE. ASSIGNMENTS WILL BE MONITORED VIA TURN-IT-IN, AND STUDENTS FOUND TO HAVE COMMITTED ACADEMIC DISHONESTY WILL BE REFERRED TO THE UCSD ACADEMIC INTEGRITY OFFICE AND MAY RECEIVE A FAILING GRADE FOR THE COURSE.

REGRADE REQUESTS:

WE ALL MAKE MISTAKES. IF YOU THINK YOUR HOMEWORK, WORKSHEET, REPORT, OR EXAM WAS GRADED IN ERROR, SUBMIT A REQUEST BY EMAIL TO DR. PETRIE WITHIN 7 DAYS OF RECEIVING YOUR GRADE. INCLUDE A WRITTEN DESCRIPTION OF THE ERROR, INCLUDING WHICH QUESTION YOU ARE CONCERNED ABOUT AND WHY YOU THINK THE GRADE IS MISTAKEN. NO IN-PERSON REQUESTS WILL BE CONSIDERED. THE REGRADE OPTION IS TO SAFEGUARD YOU FROM GENUINE MISTAKES IN GRADING; THERE IS NO GUARANTEE YOUR SCORE WILL GO UP.

WE'RE WORKING TO IMPROVE YOUR EDUCATIONAL EXPERIENCE:

DID YOU KNOW THAT YOU CAN BE PART OF A RESEARCH STUDY IN THIS CLASS?



NO! NOT LIKE THAT! INSTEAD, DURING THIS CLASS, I'LL BE WORKING TO FIGURE OUT THE MOST EFFECTIVE TEACHING METHODS FOR YOUR LEARNING. THIS MEANS YOU MIGHT DO SURVEYS AND PROVIDE FEEDBACK. FOR MORE INFORMATION, PLEASE READ THE OPT-OUT FORM ON THE COURSE WEBSITE.

MICROBES AND HEALTH**MICROBES AND INDUSTRY****MICROBES AND THE ENVIRONMENT**

WEEK 0/1

H LECT. (9/26): INTRO TO COURSE

F LAB. (9/27): LAB 1

T LECT. (10/1): CULTURES, COLOCIES, + MICROSCOPY

W LAB. (10/2): LAB 2

H LECT. (10/3): DILUTIONS

F LAB. (10/4): LAB 3

PLEASE REMEMBER THAT YOUR WORK IN LECTURE (CLICKERS) WILL BE GRADED, SO BE SURE TO SHOW UP!

WEEK 2.

T LECT. (10/8): BIOFILM EVOLUTION

W LAB. (10/9): LAB 4

H LECT. (10/10): MICROBIAL DIVERSITY - PHYSIOLOGY, GRAM STAIN

F LAB. (10/11): LAB 5

PARAPHRASING HW
DUE 10/4!

PARAPHRASING HW
REVISIONS DUE 10/11!

WEEK 3.

T LECT. (10/15): MICROBIAL DIVERSITY - GENOMES

W LAB. (10/16): LAB 6, LAB PRACTICAL

H LECT. (10/17): ILLUMINA SEQUENCING

F LAB. (10/18): LAB 7

THE LAB PRACTICAL IS A GRADED OBSERVATION OF YOUR LAB SKILLS. MAKE SURE YOU GET IN LOTS OF PRACTICE BY SHARING THE WORK WITH YOUR PARTNER IN WEEKS 1+2. WHILE YOU'RE WAITING YOUR TURN, YOU CAN WORK ON YOUR MICROBIAL ZOO.

PRACTICAL! 10/16

WEEK 4.

MICROBES AND HEALTHT LECT. (10/22): (MORE) ILLUMINA
SEQUENCING

W LAB. (10/23): LAB 8

H LECT. (10/24): MIDTERM!!!!

**MIDTERM
10/24!**

WEEK 5.

**BIOFILM LAB PART 1 DUE
MON 10/28 11:59 PM****MICROBES AND INDUSTRY**

F LAB. (10/25): LAB 9

WEEK 6.

T LECT. (11/5): DISCUSS TAPE STA-
TION RESULTS, PLAN POOLW LAB. (11/6): POOL +SUBMIT ILLU-
MINA SEQUENCING**MICROBES AND
THE ENVIRONMENT**SEE CLASS
WEBSITE FOR
LAB REPORT
GUIDLINES!.T LECT. (10/29): FERMENTATION +
DIFFERENTIAL IDENTIFICATION

W LAB. (10/30): LAB 10

H LECT. (10/31): NATURAL CRISPR

F LAB. (11/1): LAB 11

W LAB. (11/6): LAB 12

H LECT. (11/7): PCR, KNOWN CRISPER
LOCI IN L.A.B

F LAB. (11/8): LAB 13

WEEK 7.

MICROBES AND HEALTH**MICROBES AND INDUSTRY**

T LECT. (11/12): SANGER SEQUENCING

W LAB. (11/13): LAB 14

F LAB. (11/15): LAB 15

MICROBES AND THE ENVIRONMENT

H LECT. (11/14): PHOTOSYNTHESIS AND TOLERANCE TO CHANGE

F LAB. (11/15): LAB 15

WEEK 8.

W LAB. (11/20): LAB 16

H LECT. (11/21): FINAL!!!!

F LAB. (11/22): LAB 17

↑
FINAL!

T LECT. (11/19): BLAST, CRISPRS AND THE MICROBIOME

W LAB. (11/20): LAB 16

H LECT. (11/21): FINAL!!!!

F LAB. (11/22): LAB 17

↑
FINAL!

W LAB. (11/20): LAB 16

H LECT. (11/21): FINAL!!!!

F LAB. (11/22): LAB 17

↑
FINAL!

WEEK 9.

MONDAY DROP-IN LAB: (11/25): LAB 18
NO LECTURE OR LAB TUES-DAY-FRIDAY. HAPPY THANKSGIVING!**YOGURT LAB REPORT DUE
TUES 11/26 11:59 PM**MONDAY DROP-IN LAB: (11/25): LAB 18
NO LECTURE OR LAB TUES-DAY-FRIDAY. HAPPY THANKSGIVING!

MICROBES AND HEALTH**MICROBES AND INDUSTRY**

WEEK 10.

T LECT. (12/3): ANALYZING ILLUMINA
SEQUENCE DATA

W LAB. (12/4): LAB 19

F LAB. (12/6): LAB 20

**MICROBES AND
THE ENVIRONMENT**

H LECT. (12/5): PRESENTATIONS!!

