

## **BIMM 121- Laboratory in Microbiology Course Syllabus**

**Instructor:** Giorgia Pirino, Ph.D.

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*Please include BIMM121 your full name, ID, and IA name in all emails to Dr. Pirino*

**Office:** H&SS 1145F

**Office Hours:** Thursdays, 10:00-11:00AM in Pacific Hall 3501. You are encouraged to take advantage of office hours. Office hours function as a relaxed forum to ask questions and discuss course content. Please present your questions regarding the course material in person, not by email. I cannot guarantee an answer to your email, unless it is an urgent issue. *Office Hours will start in week 1.*

**Instructional Assistants:** Aaron Angerstein ([aangerst@ucsd.edu](mailto:aangerst@ucsd.edu)) & Daniel Tyler ([datyler@ucsd.edu](mailto:datyler@ucsd.edu))

### **Course Time and Location**

Lecture: Tuesday & Thursday, 12:30-1:50 PM in CSB 004;

Lab B01: Tuesday & Thursday, 2:30PM-6:20PM in York 2310;

Lab B02: Tuesday & Thursday, 2:30PM-6:20PM in York 2332.

### **Course Description**

This course is designed to illustrate processes central to microbiology and to familiarize students with skills required for handling, working with, and characterizing different microorganisms. Emphasis will be on sterile techniques, cultivation of different microorganisms, their morphological and biochemical characterization, their physiology, antibiotic susceptibility profiling, tools use for identifying unknown bacteria. At the end, students will be able to appreciate microbes' involvement in everyday life. Throughout the course, students will receive training in accurate data entry and analysis, scientific reasoning, and scientific writing.

### **Textbook**

Custom manual available through Cognella.

<b>Course Point Breakdown</b>	<b>Points</b>	<b>%</b>
Competency	70	7.7
Lab Notebook	58	6.4
Class Participation	40	4.4
<i>Class discussion (20 points)</i>		
<i>iClickers (20 points)</i>		
Homework	193	21.4
Quizzes	120	13.3
Midterms	419	46.5
<b>Total Points for the course</b>	<b>900</b>	<b>100</b>

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### Grading Scale

<b>Letter Grade</b>	<b>%</b>	<b>Letter Grade</b>	<b>%</b>
<b>A+</b>	<b>(99.0 - 100%)</b>	<b>A</b>	<b>(93.0-98.9%)</b>
<b>A-</b>	<b>(90.0 - 92.9%)</b>	<b>B+</b>	<b>(88.5 - 89.9%)</b>
<b>B</b>	<b>(83.0 - 88.4%)</b>	<b>B-</b>	<b>(80.0 - 82.9%)</b>
<b>C+</b>	<b>(78.5 - 79.9%)</b>	<b>C</b>	<b>(73.0 - 78.4%)</b>
<b>C-</b>	<b>(70.0 - 72.9%)</b>	<b>D</b>	<b>(60.0 - 69.9%)</b>
<b>F</b>	<b>(X &lt; 60%)</b>		

Final grades are calculated on a straight scale and they are not curved. IAs will alternate grading of quizzes and homework between the lab sections. If a midterm exam is graded by IAs, each IA will grade the same questions consistently for all the exams. This grading system allows fairness among the lab sections and usually excludes the need of normalizing final grades among lab sections.

### Regrade Requests:

All regrade requests should be submitted in writing *within 5 days* of receiving the graded material. Please check the regrade policy on TritonEd for more information.

### Equipment:

For this lab you will need to purchase:

- A lab notebook (bound notebook, regular or spiral bound). Carbon notebook not necessary. Loose-leaf binders not allowed
- A lab coat and proper lab attire. Failure to do so will consist in subtraction of points (at least 1 point per lab). No exceptions!

- Eye protection (safety glasses preferred, standard prescription eye glasses are not sufficient) must be worn all the times while in the lab, unless otherwise instructed
- A Sharpie permanent marker pen, preferably fine point (not extra fine or regular; avoid red)

### Attendance and Absences:

1. Your attendance is required at EVERY lab and through the entire lab period, until all the experimental work for the day is completed.
2. Absences will NOT be treated lightly. Attendance in the lab is **mandatory**. The labs are set up for groups of two or more and your absence will place an unnecessary burden on your partner. *There are no make up labs and you will not be allowed in the lab on non-lab days or in the other Micro lab sections*, although you may be asked to make up the work from the day you missed.
3. Documentation will be required for all unavoidable absences.
4. If you are likely to have interviews for graduate school, etc., please schedule them on non-lab days or take the lab in a different quarter. These absences will be considered unexcused
5. All absences without prior notification/permission and the appropriate paperwork will be considered unauthorized.
6. **50-point penalty** for the first unauthorized, unexplained absence from the lab. If there is a second such absence, you will be asked to drop the course or will be given an F.
7. If you are ill on a lab day or have an emergency, e-mail instructor, IA, and lab partner before the start of the lab. If you are ill enough to miss lab, you must go to the student health center and provide documentation of your illness *within* the same day. No retroactive documentation will be accepted after 24 hours of missing a lab.
8. You need to inform both the IA and the instructor of any proposed absence as well as your team members. Only the instructor can decide whether or not the reason for an absence is sufficient to call it an authorized absence.

### Reading for the lab

#### *Reading ahead of the course:*

I will assume that you all have a basic understanding of, and reasonably good memory of the following from lower division bio or from high school. If you don't remember, you may wish to read ahead:

- Scientific Method: brush up on this concept – there are several online sites, including Wikipedia, that do a good job of explaining dependent, independent, and controlled variables as well as the difference between a control experiment and a regular experiment.

- Definition of microbes and an understanding of the different groups of microbes (e.g. bacteria, fungi). You are not required to memorize all the names – you should, however, have at least a basic idea as to the types of organisms included in each category
- Eukaryotic vs. prokaryotic cells differences
- Metabolic pathways
- Metric system

*Reading during the course:*

- Read the chapters before you come to lecture. After week I will post guidelines to reading the chapters in the folder under “Readings” on TritonEd
- When you are in the classroom, I will go over the basics as required, any fundamental concepts that you do find or might find difficult, that are important, or that are particularly exciting or newsworthy (sometimes lectures won’t be synchronized with the lab, therefore, it is necessary to read ahead before going to lab)
- Then you will go to lab and actually see all those tests and concepts in action.
- Then go back and quickly reread the material in light of the lecture and lab work and you will find that it becomes very clear since you are already familiar with most of it.

As often as possible, I will give you questions/problems to think about that should apply the concepts you learned in class. Thinking about and attempting to answer these questions and participating in any classroom/lab discussion is the best practice you can have for midterms, lab reports, and practicing science in general.

### **Lab Performance and Lab Participation (Competency)**

In addition to quizzes, midterms, lab reports and homework assignments, student evaluations will be based on the following criteria:

1. Lab techniques will be evaluated in class. These competency tests will be unannounced.
2. Lab workshop participation

Subjective student evaluations will be based on the following criteria:

1. Pre-lab preparation
2. Careful management of lab procedures (e.g., sterile technique, proper waste disposal, experimental procedures, dilutions, etc.)
3. Ability to adapt to unforeseen procedural changes
4. Caliber of thinking before asking questions
5. Scientific approach (e.g., proper use of notebooks, controls, experimental design)
6. Accuracy

7. Independence
8. Safety consciousness, including proper PPE
9. General neatness in lab

Please note: **You will be expected to get into the habit of methodical, well-planned and organized work by the mid-term. This will help you with the experiments in the second half of the course.**

### **Notebook**

A spiral bound or composition notebook is OK. All notebooks should have a table of contents and should be handwritten so on the first lab day leave several blank pages at the beginning of your notebook. Number your pages. Entries should be made in chronological order and EVERY day. Each day's entries on each experiment should begin with a brief (1 – 2 sentences) summary of work done on the same experiment the previous day. Consult Appendix V in your lab manual. *Notebook checks will be unannounced.*

#### *How to organize your notebook*

- **Table of contents** – update everyday – leave at least 4-5 pages for updating
- Start a new page each day for each new experiment– NO EXCEPTIONS!
- NEVER skip pages. Do not fill in data retroactively.
- It is best to start a new experiment on a new page.
- Help the reader follow the thread of an experiment from one day to another. When you resume the experiment, write “continued from page \_\_\_\_.” Then go back to where you last left off and write “continued on page \_\_\_\_.”

Each experiment should have:

- \* **Purpose of experiment**
  - only necessary once, at the beginning of an experiment
- \* **Procedure**
  - Outline or page from which protocol was taken
  - Note any changes
  - Note who did which part of the procedure – who inoculated controls, what temperature, conditions, etc
  - Note which organisms you used – name and species of the controls, etc
  - Errors
- \* **Observations**
  - Write – in detail
  - Draw – enlarged, labeled, and including as much detail as possible (examples will be provided)

- Questions and connections
- \* **Conclusion or summary**
  - If you just started an experiment, you may not have conclusions to write yet, and it is OK. You must include conclusions after looking at results.
  - Answer any questions in the manual or that were raised in class (this part should be started in the lab and completed at home)
  - Number your pages

### Midterms

There will be 3 midterm exams throughout the course (see schedule). Midterm exams will consist mostly in short answer-questions with an emphasis on lab topics. Students may use the lecture slides, guidelines posted on TritonEd, and lab manual as a guide to see what topics to focus for the three exams. Midterm exams require understanding of a topic and ability to apply them, not just memorization. *In order to pass the course, students must have a 66% average grade for the three midterm exams.*

### Homework and Lab report Deadlines and Submission:

1. A hard copy of your homework is due in the first 5 minutes of the lab period of the day on which your report is due. **All homework assignments submitted more than 10 minutes after start of lab are automatically late and lose 10% of the points. Any homework submitted within 24 hours from the deadline, past the end of lab, would lose 50% of the points. No homework will be accepted after the second calendar day.**
2. There is only one lab paper and it is due the Tuesday of finals week. Any lab paper turned within one day late will lose 50% of the points. Any lab paper turned in more than one day late will not be graded. This policy apply to any assignment in the course
3. In addition to the hard copy of some assignments/report, you are required to submit an electronic copy to Turnitin.com. A link to the e-submission website will be provided on Ted. **Failure to submit onto Turnitin.com by the deadline will results in 0 (zero points) recorded for that report.** It is your responsibility to verify that your submission has been successful. Check the deadline of the Turnitin.com submission and make sure you adhere to it. Students agree that by taking this course all required papers would be subject to review for textual similarity by Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers; student names will never be stored in the Turnitin database. Use of the Turnitin.com service is subject to the terms of use agreement posted on the Turnitin.com site.

## Assignments

Homework# (HM)	Description	Due date	Points
HM 0	Scientific method activity	first day of lab	20
HM 1	Online Library Tutorial	Thu Oct 4 @11:59PM	17
HM 2	Simple dilutions	Thu Oct 11 Lab	20
HM 3	Growth curve	Tue Oct 23 Lab	33
HM 4	Complex dilutions	Thu Nov 1 Lab	23
HM 5	Unknown organism analysis	Tue Nov 20 Lab	100
<b>Total</b>			<b>193</b>

## Midterm Exams

Midterm 1 (in lecture): Tue Oct 16

Midterm 2- Physiology (in lecture): Tue Nov 6

Midterm 2 - Dilutions (in lab): Thu Nov 8

Midterm 3 (in lab): Thu Dec 6

## Quizzes

**Quizzes are pop quizzes.** They will be held without prior notice in the first 15-20 minutes of the lab section. Please come on time since you will not be given extra time if you are late. Bring a calculator, unless otherwise instructed. We will have 6 quizzes, each worth 20 points, for a total of 120 points. An extra quiz will be offered to make up for any missed quizzes since there will be no make up quizzes. Students who have already taken all 6 quizzes may also choose to take the extra quiz and drop the lowest score of the 7 total quizzes.

Quizzes will focus on the experiments that you will be performing in the lab on that day and the required readings (this includes experiments not already performed and/or experiments started but not finished in the previous lab). On TritonEd you will find documents to help you focus on what is important per each topic.

## Extra credit opportunities

Description	Due date	Points
Extra Credit (EC) Pre course safety survey	Sep 27 8AM	3
Yogurt worksheet	TBA Lab	10
Extra Credit (EC) Post course safety survey	Dec 8 11:59PM	3

## Class Participation

Participation in class is very important. The classroom should be active all week, not just during class hours. Student class participation should incorporate responses to their peers, their

opinions, pertinent information regarding subjects covered in class, from microbiology topics that students have read, and examples from their experience. The distinguishing feature of a well done class discussion might include an objective and critical analysis of lecture notes, reading assignments and what you have experienced. Students should seat next to their team members during lecture to facilitate discussion. Class participation points will be assigned via 2 ways: iClickers and class discussion (see below).

### *Class Discussion*

Students will receive points for participating, which implies discussion within their team and other classmates, NOT for giving a correct answer. In the spirit of scholarly discussion, the instructor expects responses and viewpoints that agree and disagree with others as long as they apply to the topic and are respectful. In our learning model, the heart of active learning occurs through discussions that help students test their ideas, reinforce what they have learned, and share resources with others in the class. Students **who participate in discussion** (see above) **and are present for 85%** of the lectures will receive full credit.

### *iClickers*

To facilitate class discussion, we will use iClickers during lecture. Students will receive points for clicking, NOT for giving a correct answer. Students who participate in iClickers and are present (clicking) for at least 85% of the lectures will receive full credit.

We will start recording iClickers participation in week 1. iClickers are available for purchase at the UCSD bookstore. Once you have purchased your Clicker, you can register it on TritonEd – go to the tools section and look for the iClicker registration link. I strongly recommend the i>Clicker 2 as it is very convenient. Older versions of i>Clicker are acceptable if you already have one, but you may need to reset your clicker every time it goes into sleep mode. **Do NOT count on sharing a clicker with another student in the same quarter as the software only records scores for one student, even if both of you are in different classes. After registration, your iClicker is linked to your name on the class roster. Therefore, sharing iClickers is illegal.**

### **Regrade Requests:**

All regrade requests should be submitted in writing within 5 days of receiving the graded material. Please check the regrade policy on TritonEd for more information. The final paper won't have a regrade, since it won't be given back to students.

### **Course Website/TritonEd**

This course is on TritonEd (<https://triton.ed.ucsd.edu>) and should automatically appear on your TritonEd account as soon as you register for the class. We will use TritonEd to post information on experiments, exams, schedules, readings and practice material, experimental data, report guidelines, etc. This website will also be used to post any announcements that pertain to the entire class. Please check the site regularly and update yourself on the information provided.



## **University Policy on Integrity of Scholarship**

The principle of honesty must be upheld if the integrity of scholarship is to be maintained by an academic community. The University expects that both faculty and students will honor this principle and in so doing protect the validity of University grading. This means that all academic work will be done by the student to whom it is assigned, without unauthorized aid of any kind. Instructors, for their part, will exercise care in planning and supervising academic work, so that honest effort will be encouraged.

### **Student Responsibility:**

Students are expected to complete the course in compliance with the instructor's standards. No student shall engage in any activity that involves attempting to receive a grade by means other than honest effort; for example:

- No student shall knowingly procure, provide, or accept any unauthorized material that contains questions or answers to any examination or assignment to be given at a subsequent time.
- No student shall complete, in part or in total, any examination, or assignment for another person.
- No student shall knowingly allow any examination or assignment to be completed, in part or in total, for himself or herself by another person.
- No student shall plagiarize or copy the work of another person or internet sources and submit it as his or her own work.
- **If any work is plagiarized from that of another student, both students will be reported to the Office of Academic Integrity, even if one of the students has graduated already. Remember that most graduate schools check the undergraduate records for any indications of dishonesty before awarding a degree.**
- No student shall alter/forged graded class assignments or examinations and then resubmit them for regrading.
- No student shall submit substantially the same material in more than one course without prior authorization.

**Please sign the online pledge to UCSD academic integrity through the following link: <https://academicintegrity.ucsd.edu/forms/form-pledge.html>**

**The link is also available through TritonEd, under the academic integrity's folder. After completing the pledge, you will receive a confirmation email. Please forward it to your IA.**

### **Accommodations/Special needs**

Anyone who has any special needs associated with health or other issues that affect your ability to take this class or that require any special accommodation should tell me on or before the first day of lab. Such special needs include allergies, immune challenges, pregnancy, or any other situations that might affect your safe functioning in this lab. Please do not hesitate to bring any

questions or issues to our notice. Our primary concern is your safety in this lab. If you have any questions or doubts, please feel free to contact me or to ask the Student Informational Services.

***Final Notes***

*Every technician/researcher who works in a lab is expected to come to the lab prepared, with a thorough understanding of the experiments they are about to conduct. This is basic lab competence, and to do otherwise would be negligence. It requires advance study, before arriving in the lab. Nearly all the students in this class are graduating in June. Think of this as “on the job training!”.*

***Note:*** *Just coming to lab does not ensure that you will get a passing grade in the class. You must hand in all assignments and get a passing score (70%, cumulative) on those assignments to get a C- in the class. You will not pass the course if the combined score for your three midterm exams is less than 66%.*

# BIMM121 SCHEDULE OF EXPERIMENTS - FALL 2018

	<b>WEEK 0</b>
	<b>LAB 1</b>
	Thursday, September 27, 2018
	<b>BEFORE CLASS</b>
<input type="radio"/>	mandatory DOB safety training
<input type="radio"/>	BIMM121 course survey
<input type="radio"/>	scientific method chapter
	<b>IN LAB</b>
	<b>INTRODUCTION</b>
<input type="radio"/>	safety video - 30 minutes
<input type="radio"/>	registration, attendance
<input type="radio"/>	integrity agreement
<input type="radio"/>	safety lecture & responsibility agreement
<input type="radio"/>	introductory remarks
	<b>START NEW EXERCISE</b>
<input type="radio"/>	sterile technique: swab mixed culture on agar plates
	<b>COMPLETE TODAY</b>
<input type="radio"/>	use of pipettes - demo & exercise
<input type="radio"/>	scientific method in class work
	<b>WEEK 1</b>
	<b>LAB 2</b>
	Tuesday, October 02, 2018
	<b>BEFORE CLASS</b>
<input type="radio"/>	aseptic technique video
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
<input type="radio"/>	sterile technique mixed culture - observe results
	<b>START NEW EXERCISE</b>
<input type="radio"/>	sterile technique streak & spread plates - demo & exercise using mixed culture
	<b>COMPLETE TODAY</b>
→	microscopy
<input type="radio"/>	IA demo & play videos: parts, focus & cleaning
<input type="radio"/>	learn how to draw using prepared stained slides
<input type="radio"/>	clean your microscope - IA will check
	<b>LAB 3</b>
	Thursday, October 04, 2018
	<b>BEFORE CLASS</b>
<input type="radio"/>	microscope calibration video
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
<input type="radio"/>	sterile technique streak & spread: observe results (self & peer evaluation)
	<b>COMPLETE TODAY</b>
→	microscopy
<input type="radio"/>	IA demo & play video: calibration
<input type="radio"/>	students perform microscope calibration
<input type="radio"/>	complete examination of prepared slides
<input type="radio"/>	evaluation of recorded drawings
<input type="radio"/>	clean your microscope - IA will check
	<b>START NEW EXERCISE</b>
<input type="radio"/>	receive unknown organisms & inoculate unknown organisms on TSS
<input type="radio"/>	IA responsible for unknown incubation
	<b>WEEK 2</b>
	<b>LAB 4</b>
	Tuesday, October 09, 2018
	<b>BEFORE CLASS</b>
→	dilutions videos:
<input type="radio"/>	terms & definitions
<input type="radio"/>	simple
<input type="radio"/>	mixture
	<b>IN LAB</b>
	<b>COMPLETE TODAY</b>
→	microscopy staining - perform in the following order:

# BIMM121 SCHEDULE OF EXPERIMENTS - FALL 2018

<input type="radio"/>	IA demo: smear preparation
<input type="radio"/>	smear, simple stain
<input type="radio"/>	smear, Gram positive and negative controls
<input type="radio"/>	smear, Gram positive and negative controls, and unknown organism on TSS lab 3
<input type="radio"/>	clean your microscope - IA will check
	<b>START NEW EXERCISE</b>
<input type="radio"/>	inoculate NSM controls only
	<b>OBSERVATIONS ONLY</b>
<input type="radio"/>	selective and differential media - MacConkey, Levine EMB, and Colilert
	<b>LAB 5</b>
	Thursday, October 11, 2018
	<b>BEFORE CLASS</b>
→	dilutions videos:
<input type="radio"/>	multistep series
<input type="radio"/>	multistep serial
<input type="radio"/>	working with microbes
	<b>IN LAB</b>
	<b>COMPLETE TODAY</b>
→	microscopy - phase contrast:
<input type="radio"/>	IA - demo wet mount & play video: phase contrast
<input type="radio"/>	view, identify & measure listed eukaryotes, bacteria and mixed cultures
	<b>COMPLETE FROM PREVIOUS LAB</b>
<input type="radio"/>	endospore test - phase contrast microscopy and simple stain of NSM controls
	<b>START NEW EXERCISE</b>
→	characterizing the unknown organism:
<input type="radio"/>	wet mount & phase microscopy
<input type="radio"/>	inoculate streak plates and broth cultures for temperature preference
<input type="radio"/>	IA - responsible for incubation
<input type="radio"/>	clean your microscope - IA will check
	<b>WEEK 3</b>
	<b>LAB 6</b>
	Tuesday, October 16, 2018
	<b>Midterm 1 in lecture</b>
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	confirm temperature preference - perform the following for both temperatures:
<input type="radio"/>	observe streak plates
<input type="radio"/>	take OD measurements
<input type="radio"/>	wet mounts
	<b>COMPLETE TODAY</b>
→	measuring microbial growth:
<input type="radio"/>	direct count on hemocytometer
<input type="radio"/>	spectrophotometry
<input type="radio"/>	counting viable cells using plating
<input type="radio"/>	clean your microscope - IA will check
	<b>START NEW EXERCISE</b>
→	characterizing the unknown organism:
<input type="radio"/>	streak TSS with unknown and incubate at optimum temperature
	<b>LAB 7</b>
	Thursday, October 18, 2018
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	characterizing the unknown organism:
<input type="radio"/>	sticky test
<input type="radio"/>	confirm Gram characteristic today
	<b>COMPLETE TODAY</b>
<input type="radio"/>	growth curve experiment with <i>Vibrio natriegens</i>
	<b>START NEW EXERCISE</b>
→	characterizing the unknown organism:
<input type="radio"/>	inoculate Macconkey agar
<input type="radio"/>	begin genus chart today (assign genera to members of group)
	<b>WEEK 4</b>

# BIMM121 SCHEDULE OF EXPERIMENTS - FALL 2018

	<b>LAB 8</b>
	Tuesday, October 23, 2018
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
<input type="radio"/>	MacConkey
	<b>START NEW EXERCISE</b>
→	characterizing the unknown organism - macronutrient use - inoculate:
<input type="radio"/>	starch plate
<input type="radio"/>	skim milk plate
<input type="radio"/>	gelatin deep
<input type="radio"/>	rhodamine plate
<input type="radio"/>	blood agar plate
	<b>REFRESH</b>
<input type="radio"/>	streak TSS with <i>Pseudomonas aeruginosa</i> from control rack
	<b>WORKSHOP</b>
	last 3 hours at <b>computer lab</b> - topics to be determined by instructor
	<b>LAB 9</b>
	Thursday, October 25, 2018
	<b>BEFORE CLASS</b>
<input type="radio"/>	Kligler video part 1
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	characterizing the unknown organism - macronutrient use - observe results:
<input type="radio"/>	starch plate
<input type="radio"/>	skim milk plate
<input type="radio"/>	gelatin deep
<input type="radio"/>	rhodamine plate
<input type="radio"/>	blood agar plate
	<b>START NEW EXERCISE</b>
→	characterizing the unknown organism - endospore test - inoculate:
<input type="radio"/>	NSM slant with unknown
<input type="radio"/>	IA only: inoculate NSM controls: <i>B. sphaericus</i> , <i>L. plantarum</i> , <i>B. thuringiensis</i>
→	characterizing the unknown organism - energy production- inoculate:
<input type="radio"/>	acid & gas from sugar fermentation
<input type="radio"/>	methyl red & Voges-Proskauer
	<b>DISCUSSION &amp; LEARNING TIME</b>
	60 to 90 minutes
	<b>WEEK 5</b>
	<b>LAB 10</b>
	Tuesday, October 30, 2018
	<b>BEFORE CLASS</b>
<input type="radio"/>	Kligler video part 2
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	characterizing the unknown organism - endospore test - observe results:
<input type="radio"/>	wet mount
<input type="radio"/>	clean your microscope - IA will check
→	characterizing the unknown organism - energy production - observe results:
<input type="radio"/>	acid & gas from sugar fermentation
<input type="radio"/>	methyl red & Voges-Proskauer
	<b>START NEW EXERCISE</b>
→	characterizing the unknown organism - energy production aerobic vs. anaerobic - inoculate:
<input type="radio"/>	Kligler iron deep
<input type="radio"/>	thioglycolate fluid
	Kligler pre-test?
<input type="radio"/>	IA: schedule students to come check Kligler & thioglycolate at 18-24h incubation observation
	<b>REFRESH</b>
→	streak on TSA plate:
<input type="radio"/>	unknown organism
→	streak on TSS tube:
<input type="radio"/>	<i>E. coli</i>
<input type="radio"/>	<i>P. fluorescens</i>

# BIMM121 SCHEDULE OF EXPERIMENTS - FALL 2018

<input type="radio"/>	<i>E. faecalis</i>
<input type="radio"/>	<i>S. epidermidis</i>
→	IA only - streak on TSS tube:
<input type="radio"/>	<i>P. aeruginosa</i>
<b>LAB 11</b>	
Thursday, November 01, 2018	
<b>BEFORE CLASS</b>	
<input type="radio"/>	Kligler video - complete
<b>IN LAB</b>	
<b>COMPLETE FROM PREVIOUS LAB</b>	
→	characterizing the unknown organism - energy production aerobic vs. anaerobic - observe results:
<input type="radio"/>	cytochrome C test
<input type="radio"/>	catalase test
<input type="radio"/>	Kligler
<input type="radio"/>	thioglycolate
<b>START NEW EXERCISE</b>	
→	characterizing the unknown organism - energy production aerobic vs. anaerobic - inoculate:
<input type="radio"/>	nitrate broth
→	characterizing the unknown organism - motility - inoculate:
<input type="radio"/>	motility plate
<input type="radio"/>	TSA plate
<input type="radio"/>	T-soy soft deep tube
<b>REFRESH</b>	
→	streak on TSS tube:
<input type="radio"/>	unknown organism
<input type="radio"/>	<i>E.aerogenes</i>
<input type="radio"/>	<i>P.vulgaris</i>
→	IA only - streak on TSS tube:
<input type="radio"/>	<i>E. coli</i>
<b>DISCUSSION &amp; LEARNING TIME</b>	
60 to 90 minutes	
<b>WEEK 6</b>	
<b>LAB 12</b>	
Tuesday, November 06, 2018	
<b>Midterm 2 (Physiology. no math) in lecture</b>	
<b>BEFORE CLASS</b>	
<input type="radio"/>	regular reading
<b>IN LAB</b>	
<b>COMPLETE FROM PREVIOUS LAB</b>	
→	characterizing the unknown organism - motility - observe results:
<input type="radio"/>	observe plates and deep
<input type="radio"/>	wet mount of controls and unknown
→	characterizing the unknown organism - energy production aerobic vs. anaerobic - observe results:
<input type="radio"/>	nitrate reduction
<b>START NEW EXERCISE</b>	
→	characterizing the unknown organism - special metabolic functions - inoculate:
<input type="radio"/>	indole
<input type="radio"/>	urease
<input type="radio"/>	citrate
<input type="radio"/>	complete all genus charts
<b>DISCUSSION &amp; LEARNING TIME</b>	
60 to 90 minutes	
<b>LAB 13</b>	
Thursday, November 08, 2018	
<b>IN LAB</b>	
<b>Midterm 2 (math only)</b>	
<b>COMPLETE FROM PREVIOUS LAB</b>	
→	characterizing the unknown organism - special metabolic functions - observe results:
<input type="radio"/>	indole
<input type="radio"/>	urease
<input type="radio"/>	citrate

# BIMM121 SCHEDULE OF EXPERIMENTS - FALL 2018

→	characterizing the unknown organism:
<input type="radio"/>	begin/inoculate any repeat tests - get approval & materials from IA
<input type="radio"/>	IA check all genus charts
	<b>WEEK 7</b>
	<b>LAB 14</b>
	Tuesday, November 13, 2018
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	characterizing the unknown organism:
<input type="radio"/>	complete all repeat tests
→	nitrogen fixation:
<input type="radio"/>	wet mount - check for heterocysts in Anabaena
<input type="radio"/>	Rhizobium & nodule - symbiotic nitrogen fixation
	<b>START NEW EXERCISE</b>
<input type="radio"/>	extreme conditions - observations
	<b>DISCUSSION &amp; LEARNING TIME</b>
	extreme conditions discussion
	<b>LAB 15</b>
	Thursday, November 15, 2018
	<b>IN LAB</b>
	<b>START NEW EXERCISE</b>
→	antibiotic producers:
<input type="radio"/>	spread target organisms & putative antibiotic producers
	<b>COMPUTER LAB</b>
→	create elimination flow chart for genus & species
<input type="radio"/>	genus flow chart - 75 minutes
<input type="radio"/>	species trial and eval - 30 minutes
	<b>WEEK 8</b>
	<b>LAB 16</b>
	Tuesday, November 20, 2018
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	antibiotic production:
<input type="radio"/>	evaluate zones of inhibition
	<b>START NEW EXERCISE</b>
→	evaluation of antibiotics by Kirby Bauer:
<input type="radio"/>	spread plates with target organisms and apply/place selected antibiotic discs
→	yogurt:
<input type="radio"/>	introduction - design experimental conditions
	<b>DISCUSSION &amp; LEARNING TIME</b>
	<b>No LAB</b>
	Thursday, November 22, 2018
	<b>THANKSGIVING HOLYDAY</b>
	<b>WEEK 9</b>
	<b>LAB 17</b>
	Tuesday, November 27, 2018
	<b>BEFORE CLASS</b>
<input type="radio"/>	transposon mutagenesis reading and video
	<b>IN LAB</b>
	<b>COMPLETE FROM PREVIOUS LAB</b>
	evaluation of antibiotics by Kirby Bauer method:
<input type="radio"/>	measure ZOI, identify any resistant colonies
	<b>START NEW EXERCISE</b>
→	transposon mutagenesis
<input type="radio"/>	set up conjugation of <i>E. coli</i> with <i>Serratia</i> or <i>Citrobacter</i>

# BIMM121 SCHEDULE OF EXPERIMENTS - FALL 2018

→	yogurt - perform in the following order:
<input type="radio"/>	measure pH of uninoculated milk and starter culture
<input type="radio"/>	inoculate control and experimental milk with starter culture
<input type="radio"/>	check pH, thickness of inoculated samples before incubation
<input type="radio"/>	incubate under desire conditions
<input type="radio"/>	check pH, thickness of samples at 3-hour incubation point
<input type="radio"/>	reincubate under desire temperature overnight
	<b>REFRESH</b>
→	streak on TSS tube:
<input type="radio"/>	<i>Staphylococcus epidermidis</i> - to be used as Gram staining (yogurt) control next lab
	<b>DISCUSSION &amp; LEARNING TIME</b>
	<b>LAB 18</b>
	Thursday, November 29, 2018
	<b>CONTINUE FROM PREVIOUS LAB</b>
→	transposon mutagenesis
<input type="radio"/>	dilution and plating of exconjugants for selection and counter selection
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	yogurt
<input type="radio"/>	measure pH
<input type="radio"/>	Gram stain commercial yogurt/starter culture and experimental samples
	<b>WEEK 10</b>
	<b>LAB 19</b>
	Tuesday, December 04, 2018
	<b>COMPLETE FROM PREVIOUS LAB</b>
→	transposon mutagenesis:
<input type="radio"/>	count colonies and calculate transposition efficiency
	<b>COMPLETE TODAY</b>
<input type="radio"/>	lab clean up and check out - follow instructions on hand-out
<input type="radio"/>	send lab coat to be decontaminated
	<b>LAB 20</b>
	Thursday, December 06, 2018
	<b>Midterm 3 during regular lab hours (first 2.5 hours)</b>