

# **BIMM 121, Laboratory in Microbiology, Winter 2016**

**Instructor:** Dr. Gabriela Ring, [gring@ucsd.edu](mailto:gring@ucsd.edu)

**Office hours:** Check calendar on TED for weekly office hour, or make an appointment.

**Office Location:** The Humanities and Social Sciences building (H&SS) 1145LB

**Lecture:** Tu/Th 8:00 – 9:20 am Center 214

**Lab:** Tu/Th 9:30 am – 1:30 pm or W/F 9:00 am – 1:00 pm  
York 2310, York 2332

**Instructor Assistants (IAs):**

A01	York 2310	Allen Washington	<a href="mailto:a1washin@ucsd.edu">a1washin@ucsd.edu</a>
A02	York 2332	Cassidy Huang	<a href="mailto:yuh019@ucsd.edu">yuh019@ucsd.edu</a>
A03	York 2310	Elian Lee	<a href="mailto:xylee@ucsd.edu">xylee@ucsd.edu</a>
A04	York 2332	Brian Tieu	<a href="mailto:bptieu@ucsd.edu">bptieu@ucsd.edu</a>

**Course Structure:**

This course will introduce you to the fundamentals of microbiology and allow you to explore the many ways in which microbes affect and are used in the world. We begin the course with a foundation in basic techniques such as sterile techniques, microscopy, methods of quantitating microbes, and preparing and examining stained slides. The remaining duration of the course will comprise two main units: a comprehensive look at bacterial physiology and the use of microbes in various aspects of our lives. Each of these units comprises several multi-day experiments and there will be considerable overlap in the execution, methodology, and analysis of data from each of these units. Throughout the course, you will also receive training in accurate data entry and analysis, scientific reasoning, and in clear and concise scientific writing.

**Required Materials (needed by the first lab, bring to lab each day):**

1. Lab Manual
2. Lab coat – must be to the knees
3. Eye protection (you may wear either safety glasses or goggles, but standard prescription eye glasses are not sufficient).
4. Lab notebook with carbon copies (bookstore or Grove general store)
5. Fine point Sharpie for labeling – get a dark color
6. Calculator – you cannot use a cell phone in lab!
7. Long pants and close-toed shoes are required in lab at all times – no skin on feet or legs should be showing
8. No eating and drinking in the lab

### **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, including workshops, discussions, learning times.
2. Absences will NOT be treated lightly. 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.
5. You need to inform both the IA and the instructor of any proposed absence. Only the instructor can decide whether or not the reason for an absence is sufficient to call it an authorized absence.
6. All absences without prior notification/permission from the instructor (not the IA) and the appropriate paperwork will be considered unauthorized.
7. **70-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.
8. If you are ill on a lab day or have an emergency, e-mail or call (instructor and IA) before the start of the lab. It is not sufficient to contact your IA alone as your IA does not have the authority to excuse your absence. If you are ill enough to miss lab you must go to the student health center and provide documentation of your illness.
9. Tardiness in lab will impact your grade. You may miss a quiz. You will also miss important announcements and instructions. This puts an undue burden on your partner.

### **Before you start this course:**

It is assumed that before coming to this course, you already have a working knowledge of the topics listed below. If these are fuzzy, or fading in your memory, it would be a good idea to review them before class. We will assume you already know this material.

- general categories of microbes and their definitions and characteristics
  - eukaryotic
    - protists (algae, protozoa)
    - fungi
  - prokaryotic
    - bacteria and Archaea
- general cell structure
- basic biochemistry (glycolysis, TCA cycle, electron transport chain, photosynthesis, redox equations)
- central dogma of biology
- understanding of the scientific method
  - variables

- controls
- experimental arm and control arm of an experiment
- Background articles are posted in the “study aids” folder on TED.
- There is also a review in the lab manual.
- using Excel spreadsheets
  - calculating simple values such as totals, averages, and standard deviation
  - using data from the spreadsheet to create charts with error bars

### **Reading for the course:**

All required reading for the course is in the lab manual. You are responsible for reading ALL the assigned material in the manual, BEFORE the day when you will do the relevant experiments. Beyond reading the material, you are expected to STUDY it enough to have a good working understanding of the experiments BEFORE coming to class! The assigned material for each week is listed in the table of contents in the manual.

- READ THE CHAPTERS BEFORE YOU COME TO LECTURE AND LAB!
- 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.
- 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.

### **Course Website on Ted:**

We will use TED to post announcements, syllabus, lectures, homework, calendar, experiment data, etc. Please check the site regularly and familiarize yourself with the information provided.

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

A portion of your grade will be based on participation in the lab, workshops, and computer labs. Lab techniques will also be evaluated in lab. Your attitude, cooperation with others, conscientiousness, work ethic, techniques and skill in the lab will contribute to your grade.

Subjective student evaluations will be based on the following criteria:

1. Pre-lab preparation
2. Technical skill and careful management of lab procedures (e.g. sterile technique, microscopy, experimental procedures, judicious use of reagents, proper storage of cultures, proper waste disposal, etc.)
3. Paying attention during instructions/introductions
4. Ability to adapt to unforeseen procedural changes
5. Taking care of university property (properly cleaning/storing microscope, consistently locking your locker, etc.)
6. Being responsive to correction
7. Caliber of thinking before asking questions
8. Scientific approach (e.g., proper use of notebooks, controls, experimental design)

9. Accuracy
10. Independence and initiative
11. Safety consciousness
12. Organization and general neatness in lab
13. Contribution to your group and cooperation with classmates
14. Integrity

**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.*

### **Clickers:**

This lab will introduce you to new material and concepts. To increase the depth of your understanding and to give you practice in applying these concepts, we will discuss these concepts from different perspectives in class. Over the last few years, student feedback has shown that class participation has a very positive impact on performance in lab reports and midterms.

We will be using Clickers in class as part of the learning process and to help students stay on top of the concepts and their applications. Participation in the lecture discussion is worth 5.5% of your grade and requires that you click in at least 75% of the time in each lecture for at least 75% of the lectures. Clickers are available for purchase at the UCSD bookstore. Once you have purchased your Clicker, you can register it on Ted.

### **Lab Notebook:**

Periodically the IA's will collect the carbons from your notebooks, without prior notice. They will also check your table of contents. So keep your notebooks up to date!

#### **General guidelines**

- Notebook must be bound and have carbons.
- Pages should be numbered.
- Notebook must have a table of contents. On the first lab day leave several blank pages at the beginning of your notebook.
- If spiral bound, *the fringe must be cut off the carbon copies before submitting them for grading.*
- Use pen only, no pencil, no white-out
- Start a new page every day
- Every page must
  - be dated
  - include experiment topic at the top
- Notebook must be clear, organized, complete
- Handwriting must be legible
- Entries should be made in chronological order and EVERY day. Notes must be made continuously ("stream of consciousness writing"), in real time, filling all the space. No retroactive entries.
- Do not leave blank spaces to fill in later. If you have a space left over at the bottom of a page that you will not use, draw an X through the blank space.

For each experiment include (an experiment may continue over several lab days)

1. Purpose of experiment (once, at the start of the experiment)
2. Procedure
  - a. Outline the procedure, or reference the page in the lab manual where one may find the procedure.
  - b. Note any changes in the procedure.
  - c. Note who did which part (inoculated controls, etc.).
  - d. Note which organisms were used (by genus and species), including the names of the control organisms!
  - e. Record any errors in the procedure.
  - f. All calculations must be recorded. All numbers must include units.
3. Observations
  - a. Describe everything you observe, especially anything odd or unexpected.
  - b. All observations must be recorded in real time, not filled in retroactively.
  - c. Draw what you observe, if that will help more effectively represent the data. Drawings of organisms in the microscope must include the magnification and bear some resemblance to what you actually saw!
  - d. Note any questions or connections which come to your mind.
4. Conclusion or summary
  - a. Note your conclusion at the end of each experiment (or major portion of an experiment).
  - b. Answer any questions that are raised in the lab manual.

### **Assignment Deadlines and Submission Policies:**

1. A hard copy of your homework is due in the first 10 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 the next calendar day would lose 50% of the points. No homework will be accepted after the second calendar day.**
2. In addition to the hard copy, sometimes you will be required to submit an electronic copy to Turnitin.com by the due date. A link to the e-submission website will be provided on Ted. Failure to submit on Turnitin.com will result in 0 (zero points) recorded for that homework/report. Additional points may be taken for late electronic submissions.

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. Use of the Turnitin.com service is subject to the terms of use agreement posted on the Turnitin.com site.

3. Although you will be doing the experiments and collecting data with partners, you must hand in your own homework and paper, *written in your own words*. **Copying someone else's lab paper or homework is cheating.**

### Grading Scheme:

Evaluation criterion	Points
iClicker	55
Lab notebook checks	42
Competency	70
Homework 1-6	225
Quizzes	108
Midterms	420
Concept analysis paper	80
<b>Total Possible</b>	<b>1000</b>

HW#	Description	Due date	Points
EC1	Pre-course safety survey	Tue, Jan 5, 8am	(3)
1	Library tutorial	Thu, Jan 7	23
2	Dilutions	Tue/Wed, Jan 19/20	15
3	Growth curve	Tue/Wed, Feb 2/3	27
4	Scientific Method	Tue/Wed, Feb 9/10	37
5	Dilution	Tue/Wed, Feb 16/17	20
6	Unknown analysis	Tue/Wed, Mar 1/2	103
EC2	Post-course safety survey	Mon, Mar 7	(3)
<b>Total</b>			<b>225</b>

### Other important dates:

- Midterm 1 (in lecture): Tue, Jan 26
- Midterm 2 (in lecture): Thu, Feb 18
- Midterm 3 (in lab): Thu/Fri, Mar 10/11
- Concept analysis paper (check with IA for delivery instructions):  
Mon, Mar 14 (A01/A02)  
Tue, Mar 15 (A03/A04)

### Quizzes:

Will be held in the first 10-15 min of lab. Please come on time since you will not be given extra time if you are late. We will have 6 quizzes each worth 18 points for a total of 108 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.

Quiz 1: Tue/Wed, Jan 12/13  
Quiz 2: Tue/Wed, Jan 19/20  
Quiz 3: Thu/Fri, Jan 28/29  
Quiz 4: Thu/Fri, Feb 4/5  
Quiz 5: Thu/Fri, Feb 11/12  
Quiz 6: Thu/Fri, Feb 25/26

Extra quiz: Thu/Fri, Mar 3/4

**Most Likely Grade Distribution:**

A = 90% - 100%

B = 80% - 89.9%

C = 70% - 79.9%

D = 60% - 69.9%

F = below 60%

**You must get at least a C- to pass the course.**

**Regrade Requests:**

All regrade requests should be submitted in writing within one week of receiving the graded material.

**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 his 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 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 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.

Your homework and paper for the class must be independently written, *i.e.* **your own ideas in your own words**. While discussion of data among lab partners is encouraged, each student must independently complete all text, references, figures, graphs, and tables. The submission of homework or papers by lab partners that contain shared work is forbidden. *Both* students will be held accountable. The exception is when a figure or table contains the raw data that is supplied to each member of the group (e.g. absorption spectra or colony counts). In this case the labeling of that figure must be done independently.

**Because all quizzes, exams, homework and the paper are required for satisfactory completion of this course, any student caught cheating on a quiz, exam, homework or paper will be given a failing grade for the course and referred to the Office of Academic Integrity for administrative discipline.**