COURSE WEB SITE
http://ic.ucsc.edu/~ottemann/metx119l/

LOCATION AND TIMES
Mandatory Discussion Section: M 9:30-10:40, Earth & Marine Sciences B214
Laboratory Sessions: M/W 1-4, 223 and 229 Thiman Labs

INSTRUCTOR
Professor Karen Ottemann ottemann@ucsc.edu Phone: 831-459-3482
Office: 454 Physical Sciences Office Hours: Friday 8:30-10:30 or by appointment

TEACHING ASSISTANTS
• Annah Rolig arolig at ucsc.edu Office Hour: Tuesday 9:30-10:30 in 459 PSB
• Will Sause wsause at ucsc.edu Office Hour: Thursday 12-1 in 459 PSB

LABORATORY HANDOUTS/LECTURE NOTES/RESOURCES
• All handouts are available in pdf formats and can be downloaded from the course website. (http://ic.ucsc.edu/~ottemann/metx119l/)
• All materials must be printed before coming to class

COURSE OVERVIEW AND GOALS
Microbiology laboratory provides a basic foundation in laboratory skills that are used in areas as diverse as basic research, food microbiology, clinical diagnostics and pharmaceuticals production.

Each lab exercise begins with a pre-lab. You will complete this after reading the exercise description. On some days you will have two pre-labs. Each exercise will end with either an assignment or a lab report to complete. Assignments are detailed on the web site.

In this course, you will learn:
• How to keep materials sterile
• How to work safely with pathogens
• The rationale and choice of appropriate microbiological media and test systems
• Standard microbiology lab techniques such as serial dilutions, plating, isolating single colonies, using pipettes, basic calculations, microscopy and recording observations
• How to isolate and sequence DNA and compare to existing databases
• To gather and process experimental data, interpret observations, solve problems and report findings
• To draw inferences from observations
• Terms, facts, concepts, and theories of microbiology
• To work productively with others
• To follow scientific protocols safely and efficiently
• To write scientifically

COURSE WORK AND GRADING

Overall grading is based on the following breakdown:

<table>
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<th>1. Laboratory Reports (100 points each):</th>
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<tr>
<td>• Microbial contamination of food</td>
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<td>• Strain characterization</td>
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<td>200 points total</td>
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<td>2. Assignments (9 total assignments) 15 points each</td>
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<td>3. Notebook</td>
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<td>4. Lab Practical Exam</td>
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<td>5. Group Project Presentation and write up</td>
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<td>a. Presentation in class (50 points)</td>
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<td>b. Written portion (50 points)</td>
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1. ASSIGNMENTS
Each exercise has a set of assigned questions designed to teach scientific writing and data presentation. In some cases, the answers will be incorporated into your Lab Reports. Assignments are due generally 1 week following the end of that particular exercise. Exact due dates are listed on the web site in the Exercises/Due Dates page.

2. LABORATORY REPORTS
Lab reports will be written up in the format of a typical scientific research article. Each will contain these sections (1) Introduction and Hypothesis for the experiment; (2) Materials and Methods; (3) Results; (4) Discussion of results; (5) References.

All lab reports must be typed and double-spaced. You should use 1 inch margins and times 12 point font. Tables, figures and graphs, unless otherwise specified, must be computer generated and labeled completely. A minimum number of references must be included with each laboratory report/research article.

Specific guidelines will be given in advance of each report. Effective scientific writing is one of the most important skills that you can develop—we strongly encourage that you write your reports up to show them to your instructor and/or TA for comments before the due date. In addition, the first lab report will be returned to you for revision that you will hand in. You will be expected to utilize comments from previous lab reports to improve the subsequent ones; in other words, please don’t make the same mistakes twice.

3. NOTEBOOK
You will need a three ring binder and dividers that separate each lab exercise for your notebook. Place a copy of the exercise instructions at the beginning of each section, and then follow that with your written description of what you did, using regular binder paper.

Include the following:
• A date on each page.
• Number the pages as in 1-1, 1-2, for exercise 1 page 1 etc.
• Start with the prelab information. This should basically be your first page (see below) that will be date, title, purpose or goal of the experiment and a list of the methods you will use.
• Next will come your methods. It is best to write these out, even if you do exactly what was printed in the exercise, as it will greatly help your understanding. For very detailed steps, you can refer to the exercise by page number. Also include what you actually did—any modifications that you made.
• Next section should be Results and observations.
• Finally, you should provide a Conclusion at the end of each exercise.
• You can include graphs, tables, photos, and sketches by taping them to the page. Figures should be dated.

The notebook will be graded on a 1-5 scale of poor (with lots of information missing, 1) to excellent (every thing listed above present, 5). Your notebook will be inspected three times throughout the quarter, unannounced, so please keep it up to date!

4. PRE-LAB WRITE-UPS
Before you can start an experiment you just read it! To help document that you did this, you will write a Prelaboratory Write-Up, that will comprise the ~ first page of your notebook for that exercise. The format should include:
• Title of the lab exercise
• Purpose or goals of the exercise
• Methods (a list without details is sufficient)

The TA or Instructor will verify the completeness of pre-lab write-up at the start of the lab session. Please have your pre-lab write-up ready at the beginning of class. The prelab can be used as the first page for that particular experiment.
You will not be allowed to start an experiment until your pre-lab write-up is approved

5. LAB PRACTICAL
A practical exam covering several microbial techniques will be administered at the end of the course. It will cover proper use and execution of the various techniques you learned in the course. The details will be discussed in class.

6. GROUP PROJECT
Part way through the course you will form a group of 4 classmates and develop a project based on the techniques you have learned. Your group will synthesize a one-page short proposal on the topic and outline the work to be conducted. This will be read and critiqued by the instructor, and eventually approved. After that, you will have the remainder of the quarter to work on your project collecting data and making observations. The lab will be available during regular hours, 8-5, Monday-Friday. Each group will present their findings in two ways. The first will be in a group presentation of ~ 15 min. per group where each group member will present various aspects of the project (e.g. introduction, methods, results, etc.). This will require teamwork, delegation, compromise, and cooperation. The second will be an individual written description of the methods used. We will discuss the specifics during the lab discussion sections.

7. ATTENDANCE
Prompt attendance of lab sections is imperative. Unexcused absences, or arriving late, will seriously affect your letter grade and will be noted in your narrative evaluation.
You will be excused from lab for the following reasons:

- Sickness or injury on the day of, or immediately prior to, the lab session.
- Death, serious illness, or other catastrophic event in the immediate family.
- Jury duty; written documentation required.
- Days of religious observance as recognized by University policy.

You will not be excused for:

- Intramural or intercollegiate athletic events
- Social or travel events.
- Car trouble, broken alarm clock, etc., etc.

Policy on missing exam: To receive credit for this course, you must take the lab practical. If you need to miss this exam for a legitimate reason (illness, accompanied by medical doctor's note, or death in the immediate family), you must notify Professor Ottemann at least 24 hours in advance of the exam to schedule a make up before the end of the quarter.

Policy on late of missing assignments/reports: Items turned in late will receive an automatic 50% deduction in point value. We will not accept anything that is turned in more than 3 days late.

REFERENCE MATERIAL
Texts: You should utilize your microbiology textbook as a reference, or if you don’t have it anymore, use one that is on reserve at the library (Brock Biology of Microorganisms and Microbial Life 2nd Edition) of the excellent on-line free text called Todars Microbiology, at http://www.textbookofbacteriology.net/

Scientific literature. Successful lab reports will require you to investigate more deeply the subjects presented in the course. This investigating will require library research and citation of scientific research collected from journal articles. Pubmed is the primary literature databases used by research scientists. Google searching can get you some useful information. However, websites should be used with caution. Exceptions might be made when referencing Kenyon Micro Wiki, CDC, FDA, NIH, or EPA publications.