

## BIOL275L: Microbiology Laboratory Summer 2014 Course Syllabus

### Lecturer: Ms. Susan Schreier

Office: BS 051

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Phone: 410-455-1267

Office hours: make an appointment via email, or talk to me in lab

Course website: can be found through MyUMBC/Blackboard

### Graduate Teaching Assistant:

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### Times and Locations:

Lab will meet in BS 051:

Section 01: T/Th 1:00PM-5:00PM

Section 02: W/F 9:00AM-1:00PM

### Course Objectives:

In this course you will learn to implement and interpret many laboratory techniques used to isolate, describe, identify, and quantify microorganisms. Upon successful completion of this course, students will be able to:

- Properly prepare and view specimens for examination using light microscopy
- Use pure culture and selective techniques to enrich for and isolate microorganisms
- Use appropriate methods to identify microorganisms (media-based, biochemical, etc.)
- Estimate the number of microorganisms in a sample
- Use appropriate microbiological and molecular lab equipment and methods.
- Practice safe microbiology, using appropriate protective and emergency procedures
- Document and report on experimental protocols, results, and conclusions

**Pre-requisite / Co-requisite:** You must have completed BIOL275 with a "C" or be concurrently enrolled in BIOL275.

### Required Materials:

- Lab Manual: Leboffe, M.J., and Pierce, B.E. 2012. *Brief Microbiology: Laboratory Theory and Application*, 2<sup>nd</sup> edition. Morton Publishing. Englewood, Colorado.
- Laboratory notebook: **Bound** composition book *used for this lab only* (spiral notebooks or binders are **not** acceptable; pages should not be removable)
- Set of colored pencils

### **Important Information:**

1. Attendance in the lab is mandatory and will influence your final grade. Arrangement of make-up labs is very difficult!
2. This lab **may** require you to check cultures after they have incubated (*i.e.*, the next day).
3. Please observe all lab safety rules.
4. Please see to it that all lab materials are recycled or discarded immediately after you have completed your experiment. Clean up after yourself!
5. Please be a conservationist. Laboratory supplies are expensive, so be careful. Think first, then act.
6. You will be assigned a microscope for which you will be responsible. Use it with loving care and leave it cleaner than you found it. Record its number in your notebook.
7. All materials and media must be properly labeled. Nothing should leave your sight that is not labeled. Label the bottom (half containing agar) of petri dishes with your name (not initials), date, and contents of plate. Be sure to remove all media from the incubator at the appropriate time and discard them at the end of the experiment.
8. **Cell phones are NOT permitted in lab-ever!**

### **Assessments and Grading:**

**Quizzes (25%):** Lab quizzes including a lab safety rules quiz, will be given at the beginning of a lab period (see schedule for dates). The material covered on the quiz will include material from previous lab exercise(s) and also the current experiments. **If you arrive once the quiz has started you will only have the remaining amount of time to take the quiz.** No makeup quizzes will be given. The door to the lab will be locked after the quiz is distributed, and will be unlocked after the students present have finished it. Arriving too late to take a quiz results in a “0” for that quiz.

**Pre-Lab Assignments (10%):** There will be short, pre-lab quizzes on blackboard to ensure that you are prepared for the next day’s experiments.

**Note:** *there is no pre-lab for the first day of lab.*

**Lab Notebook (15%):** A standard, inexpensive, bound composition book: Your name and lab section should be written clearly on the outside of the notebook. The first page should be the table of contents. Pages following should be numbered. Each lab session entry should begin with the date and a title for that day’s exercises. While you are running the lab experiment, you will write down all data and calculations in your notebook. Loose sheets of paper (even in a binder) will not be allowed in the lab.

**Never come to lab without your notebook!**

Your lab notebook gives you an opportunity to develop a habit of properly documenting your laboratory activities. Accurate record keeping is important in most fields of work! In a research lab, it would be a permanent legal record of your work. Never erase mistakes or remove pages from your notebook; errors should simply be struck through. Notebooks enable you to go back and see everything you did because it is recorded as you actually did it. In healthcare, charting and recording data accurately is essential for monitoring a patient’s health and also for protecting the healthcare practitioner.

The following information for each experiment is required. It should be legible and organized enough so that years later someone would be able to repeat what you have done and also know why. These will be checked periodically.

Lab Notebook Guidelines: For each experiment, the following are required –

Date and Title of experiment (and number from lab manual)

Rationale - A short explanation of the *purpose* of the experiment (what is the lab about and why are you doing it?). This should be written **before** you come to lab.

Protocol - **Before the lab**, draw a flow chart of the day's experiment(s). Base your flow charts on the protocols listed in the lab manual. (incorporate the changes specified in the lead-of, as well as those stated by your instructor at the beginning of the lab session) As you do the experiment, check off the steps that you've performed (adding times, volumes, or other pertinent information). In almost every experiment you will be modifying the protocol slightly. Write the modifications next to the flowchart, whether they are by direction or by accident!

Data – Record your results here. Include drawings. Record colony numbers, phenotypes (size, shape, arrangement, margins, etc). Draw graphs if appropriate. Also note which results differ from what you expect. Record ALL observations. The data is to be recorded as you collect it. Most data fit nicely into tables. Set up the tables **before** you collect the data. Do not record your data on scrap paper and then transcribe it into the notebook! Set up any calculations you need next to the data.

Conclusions – Write a brief summary of the conclusions drawn. Compare experimental results to controls. What do your data tell you? Relate your results to the purpose of the experiment. Give possible explanations for unexpected results.

Your lab notebook is worth 15% of your grade. It will be checked periodically (unannounced) by your instructor, and collected near the end of the summer session.

**Unknown Identification and Lab Report (15%)** – You will be assigned an unknown organism. You will be responsible for setting up and interpreting the tests required to correctly identify the genus and species and reporting your results in a written lab report.

**Laboratory Practical Exam (30%)** – This exam will assess your knowledge of all lab procedures and assays. You will move from one lab station to another, answering questions and completing activities assigned. There will be no makeup for the lab practical exam.

**Lab citizenship (5%)** – Evaluation of your ability to follow lab instructions and safety rules, and to perform assignments properly, measures how you cooperate with others and master critical lab skills. **Attendance will be included in this grade.**

**\*\*Except in extraordinary circumstances, a satisfactory grade will not be issued to any student who has missed more than two lab days.**

### **Grading Scale:**

Final letter grades will be assigned according to the following scale:

≥ 90% = A

≥80%-89.9% = B

≥70%-79.9% =C

≥60%-69.9 = D

≤ 60%=F

### **Course Policies:**

**Attendance** – Attendance in this class is mandatory and will count as part of your final grade. You are expected to arrive on time and remain for the entire lab period (or until excused by your instructor). An unexcused absence will subtract from your grade. More than **two unexcused** absences from lab will result in a failing grade. In the case of a sudden illness, a family emergency, university-scheduled activity (athletes), or other unforeseen catastrophe, you must: 1) notify your instructor before class by email, and 2) provide documentation afterwards. For an **excused** absence, documentation supporting the reason for your absence must be presented to your instructor.

**Late Work** – No late work will be accepted. There are no makeups for missed quizzes, notebook checks, or the lab practical exam.

**Academic Integrity** - “By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.” Provost Office.

We agree wholeheartedly and will prosecute breaches of academic integrity to the fullest extent allowed.

**On making Microbiology Laboratory a more pleasant learning experience:** Here are a few suggestions and comments we have put together based on perceptions of instructors and students.

1. Any meaningful science laboratory will require that you spend non-lab time reading for the lab and writing lab reports/results.

Any good microbiology lab requires that the students check cultures after they have incubated (i.e., on subsequent days if necessary).

You may be expected to return to lab during unscheduled hours. The lab will be open and staffed for your convenience. We will post the hours.

2. You will be expected to have familiarized yourself with the day's lab exercise(s) **before** coming to lab. You should not expect the instructor to re-hash material described in the lab manual. It would also be a good idea to have read about the subject in your text.
3. The instructors may use the Socratic method in teaching. Don't be surprised if your instructor responds to your question with another question. We are encouraging you to become an independent and a self-reliant microbiologist.
4. Some labs don't "work". Such failures may be the result of the instructor and/or student prep error(s). We can all learn from such errors. They happen to professional microbiologist, too. We, and you, should try not to make the same error twice.