

Biology 250 Laboratory Syllabus
Spring 2012

Instructor: Dr. Fernanda Burke

Office: Bradley 222

Office Hours: M: 10am-11am, T: 11am-1pm, W: 10am-11am, or anytime you can find me in my office or in the labs (Bradley 201, 202, or 208)

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Lab: Tuesday, 1pm-4pm, Bradley 202, Section 115

Objective: This is an introductory course to microorganisms, including fungi, bacteria, archaeobacteria, and viruses. The course will focus on the structure, metabolism, and pathogenesis of microbes. Topics covered in the course will include diversity and ecology of microorganisms, the metabolic processes, the differences in eukaryotes, eubacteria, and archaeobacteria, the virus infection process, infectious diseases, anti-microbial agents in chemotherapy, and to some extent antigen-antibody relationships.

Learning Outcomes:

- By the end of the course, the student will have the ability to:
- explain microbial diversity (both in terms of species and metabolic diversity).
 - explain the ecological and pathogenic capabilities of microorganisms.
 - compare and contrast eukaryotic versus prokaryotic organisms.
 - describe briefly the major metabolic pathways microbial organisms may utilize.
 - evaluate microbial control methods and assess their effectiveness against the different groups of infectious agents.
 - apply research skills in lab through library research and written assignments.
 - apply the scientific process and knowledge of physiological and morphological procedures learned during lab to help identify an unknown bacterium. Specifically students will choose and perform tests as well as analyze results.
 - demonstrate correct microbiological technique during lab exercises, including aseptic technique, proper handling of cultures, and interpretation of results.
 - present and assess data acquired during the unknown experiment in a written report as well as a Powerpoint presentation.

Text(s): Golonka, A.M. 2010-2011. *Laboratory Exercises for BIOL L250L Microbiology*. Biol L250L, Summer I Semester. University of South Carolina-Lancaster, SC.

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Attendance Policy:

Classroom attendance and participation are required in this course. Not only are you expected to arrive on time to class, but you are also expected to stay for the entire class period, participate in classroom discussion, ask questions, and periodically present or lead discussions on assigned special topics.

According to the *USC Academic Bulletin*, “absence from more than 10 percent of the scheduled class sessions, whether excused or unexcused, is excessive and the instructor may choose to exact a grade penalty for such absences.” Please note that USC makes no distinction between “excused” and “unexcused” absences. Being more than 10 minutes late to class or leaving class early will count as an absence. Thus, if a student misses more than **1 labs**, his or her final grade in the lab course will be dropped one letter grade. Continual tardiness may also result in a drop in a student’s grade.

Students are responsible for any work or assignments missed during absences. If a quiz is missed during lecture, the student will receive a zero for that quiz. If homework is turned in a day late or after lab or lecture begins, the final grade on that homework will be dropped one letter grade.

Laboratory Exercises:

Laboratory discussion and participation is an important part of understanding microbiological techniques and learning about the microorganisms in hands-on experiments that will provide you with marketable skills. Attendance and cooperation are a part of your laboratory grade (see attendance policy below and your lab safety contract in your lab manual). The instructor bases this grade on not only your attendance, but also on your laboratory techniques (slides, cultures, etc.) and your cooperation within a group situation. Because there are opportunistic pathogens used in the laboratory experiments, pay attention to warnings and safety precautions your instructor may give you.

Students are expected to attend the lab sections they signed up for at the appointed times. Tardiness of more than 10 minutes will count as an absence. You are allowed to miss 1 lab before your grade will be affected. There is no way to make up the hands-on part of the lab.

Homework: There will be 4 homework assignments. Each of the assignments is due at the beginning of class period. If homework is turned in a day late or after papers have been collected, the final grade on that homework will be dropped one letter. Written assignments will be based on laboratory material and may include diagrams, flowcharts, tables of results, and questions from either the end of the labs or thought provoking questions.

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Quizzes: Quizzes will be conducted at the beginning of lab session; typically in the first 10 minutes of lab. If you are tardy, you will only have the remainder of the 10 minutes to finish your quiz (i.e., if you are 5 minutes late, you only have 5 minutes to take the quiz). If you arrive after the quiz has been turned in, you will receive a 0 for that quiz; no exceptions!

Presentation: There will be 1 presentation based on your unknown work. You will need to find out information on the ability of your identified organism to cause disease (see lab manual). Presentations will be relatively short, about 8 minutes in length (5 minutes presentation, 3 minute question and answer session with your classmates).

Classroom

Behavior: Cell phones, pagers, and other similar devices are to be turned off or placed in silent mode during class; this includes lab and lecture time. Disrespectful and disruptive behavior will NOT be tolerated in class. Students should act as responsible citizens at all times, in lab, lecture, and outside the classroom. Students who do not act responsibly will be asked to leave the classroom or lab.

**Plagiarism/
Cheating:**

Please review USCL's policy on plagiarism and cheating in the *Student Handbook*. If a student is caught plagiarizing or cheating, at the minimum the student will receive a 0 on that assignment. Depending on the degree of plagiarism and/or cheating, the student may receive an F in the course and possibly have to face the USC Lancaster Academic Affairs Committee and possible suspension from the university. A handout will be given out about plagiarism, paraphrasing, and quoting.

Lab Safety: Students are required to wear a lab coat during lab, at all times, no exception. Lab coats are to remain in lab during the semester. Lab coats may be purchased in Lancaster at Walmart (some are available, you may have to search or ask for them) or at the Uniform Shoppe in Lancaster (113 S. Wylie Street). There may be other options available to you in other cities. If you cannot purchase a lab coat, a large men's white button-down long-sleeved shirt is also appropriate.

Eye glasses will be available to check out, are required personal protection in lab, and must remain in lab at all times. Please wear the glasses at all times while in lab to protect your eyes from culture or media splash.

A safety contract is found in the lab manual and must be signed by the second lab class or you will be asked to remove yourself from lab.

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Statement for Students with Any Immune System Concerns:

Many of the species we use (approximately 50%) are considered either opportunistic pathogens or pathogenic. This means that, even though they may occur in or on our bodies and are members of our normal microflora, given the right circumstances (e.g., a compromised immune system, a point of entry to the body such as cuts or scrapes, or post-surgery conditions), these microorganisms may abnormally spread, multiply, and cause disease. A compromised immune system does not just mean HIV, but includes periods when your body is dealing with the common cold, changes in diet, stress, or chemotherapy. If you have any reason to be concerned about taking this course, please talk with your doctor prior to enrolling in this course and participating in the laboratory procedures.

If you do not have a compromised immune system and are concerned for minor reasons (such as cuts, scrapes, or a cold), be cautious and wear gloves in lab. No one will fault you for being careful. Even benign microbes may evolve pathogenicity, so treat all microorganisms as potential pathogens and follow lab safety protocols.

Handheld

Devices: Cell phones, iPods, PDAs, walkmans, and any other handheld device are prohibited during lab time and usage may result in a grade drop. If you know you have an important call coming (e.g., due to family emergency), let the microbiology staff know and give the lab's phone number in case of an emergency. Do you really want potential pathogens on your handheld device and then near your face?

Grading: Your final grade in this laboratory course will be based on the following:

Presentation	20%
Quizzes	25%
Homework	30%
Unknown Reports	25%

Grade Scale:	90-100	A	70-76	C
	87-89	B+	67-69	D+
	80-86	B	60-66	D
	77-79	C+	Below 60	F

Dates to

Remember: Jan 13: Last day to drop a class without a grade of "W"
Jan 16: MLK Jr. Day—NO CLASS
Jan 30: Last day to order a diploma
Feb 27: Last day to drop a class without a grade of "WF"
Mar 4-11: Spring Break—NO CLASS
Apr 23: Last day of classes
Apr 24: Reading day

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Lab starts **Tuesday, January 17th** at regularly scheduled lab times.
Staple this table to back of your lab manual for easy usage.

Date	Week	Subject	Lab #
Jan 17	1	Laboratory Check In & Laboratory Safety Contract Microscope Use and care Slide Preparation and Simple Stain	3 4
Jan 24	2	Staining Techniques: Gram typing and KOH, Endospores & Capsules Ubiquity Experiment <i>Assignment 1: End of Lab Questions, pp. 46-48</i>	7 2A
Jan 31	3	Aseptic Transfer and Isolation of Pure Culture Bacterial Motility: Stabs Ubiquity Experiment concluded	5 6A 2A
Feb 7	4	Bacterial Motility Effects of Environment on Growth Selective and Differential Media <i>Assignment 1 Due: Lab Questions</i>	6 9 10A,C,D
Feb 14	5	Enumeration of Microorganisms Selective and Differential Media (finish + Demo 10B) Effects of Environment on Growth Concluded <i>Assignment 2: Enumeration & Coliform Questions</i>	8 10 9 Handout
Feb 21	6	Bacterial Metabolism – Enzyme Assays Bacterial Metabolism – Pathways Enumeration of Microorganisms Concluded	13 14 8
Feb 28	7	Bacterial Metabolism – Enzymes (Demo 13D & I) Bacterial Metabolism – Pathways (Demo 14B) Developing and Using a Diagnostic Key <i>Assignment 2 Due: Enumeration & Coliform Qs</i> <i>Assignment 3: Dichotomous Key Using Trait Tables</i>	13 14 16
Mar 6	---	Spring Break—NO LABS	---
Mar 13	8	Microbial Death: Disinfection and Antisepsis Death of Kitchen Bacteria Identification of Unknown Bacteria – Gram staining, microscopic and culture characteristics, set up 2 tests based on Gram Stain <i>Assignment 3 Due: Dichotomous Key</i>	11 12 17
Mar 20	9	Simulated Epidemic Antibiotic Sensitivity Microbial Death Concluded Death of Kitchen Bacteria concluded Unknown – set up 2 more tests	18 15 11 17
Mar 27	10	Clinical Microbiology Finish Up Unknowns – Set up Tests (if needed) Antibiotic Sensitivity Concluded Simulated Epidemic Concluded Lab Practical Review (optional)	19 17 15 18
Apr 3	11	Work with lab partners on presentation – ASC computer room in Medford Library	---
Apr 10	12	Unknown Presentations	---
Apr 17	13	<i>Assignment 4 Due: Unknowns Report</i> Cleanup Lab	---