

GENERAL MICROBIOLOGY BIOL 310

Spring Semester 2016

Lecture: 9:55--11:10 am TR

Dr. Susan J. Morrison

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Microbiology Lab: Med Univ. of SC, SC School of Pharmacy Bldg (280 Calhoun St) Room 402

Lab Instructors: Ms. Tracy Hirsch (Sections 1, 2, 3, 5, 6 Tuesday, Wed 11:30 am-2:30 pm section), Thursday

Phone messages for lab instructor: 953-5504 (Biology Office) to leave message

Dr. Susan Morrison (Section 4 , Wednesday 2:30-5:30 pm)

Mailboxes(mail goes *below* the name) : Biology Office, SSMB 2nd floor [Note that I don't pick up my mail daily in SSMB, so if there is any urgency, please deliver it to HWWE. In HWWE, it should be slid under my office door (if it isn't too thick) OR placed in a secondary mailbox in HWWE Room 304 (except door is usually locked).

SCOPE OF COURSE--CATALOG DESCRIPTION

An introduction to the microbial world with special emphasis on bacteria. Topics include cellular structures, bacterial metabolism, microbial genetics, bacterial growth and its control, virology and the epidemiology and pathogenicity of disease-producing microorganisms. The laboratory emphasizes proper handling techniques, identification methods, & properties of microorganisms.

COURSE OBJECTIVES

At the completion of this course, a student should:

IN LECTURE

1. be able to integrate prerequisite knowledge of basic chemistry and college-level mathematics with the study of microorganisms;
2. be able to identify and explain the basic concepts of microbiology and describe the properties of microorganisms (primarily bacteria and viruses), including: (a) cell structure, function and growth; (b) methods of growing and studying microbes; (c) metabolism; (d) genetics and molecular biology; (e) factors affecting microbial growth and survival, including environmental and chemical agents; (f) the major groups of bacteria; (g) the role of microorganisms in daily life, including such topics as human health and disease, food, and/or biogeochemical cycling; and (h) the major groups of bacteria and their characteristics;
3. be able to define, understand, use, and spell and pronounce correctly the basic vocabulary of microbiology;
4. be able to summarize the historical development of microbiology and to explain the contributions of microbes in modern day events;
5. display the ability to apply factual knowledge to new situations, such as interpretation of results, analysis of current news events, or understanding of a phenomenon;
6. be able to apply critical thinking skills to the subject of microbiology and its applications.

IN LABORATORY

1. display the ability to work with Class I microorganisms safely and correctly in laboratory;
2. display the ability to perform basic microbiology laboratory techniques (including stains, dilutions, streak plates, microscopy, media preparation, biochemical tests);
3. display the ability to explain the theoretical basis of the tests, procedures and the observed microbial activity;
4. be able to state the key characteristics of the groups of bacteria used in lab;
5. display the ability to identify bacteria, including culture isolation and maintenance, laboratory analysis, use of references and reporting of results using professional (American Society for Microbiology) journal format

TEXT: In lieu of *requiring* you to purchase a specific text, there is a list of possible text books. You may choose to purchase any one of these from a discount source, borrow one from someone else, use a next-to-the-last edition (rather than the current one), and/or use an online source (such as the free textbook by Todar). Several different texts are on reserve in the library under my name.

COURSE PACK (required): at SAS-E-Ink (219 Calhoun St) (*Bring appropriate part to every lecture & lab class.*)

Suggestions for making more effective use of the course pack:

- a. **get some dividers and split into sections** corresponding with the major topic areas: Intro & History; Medical Intro; Microscopy & Cell Structures; Nutrition & Metabolism; Growth & Environment; DNA, RNA, Protein & Regulation; Viruses; Genetics; other
- b. provide **additional 3-hole paper** for notes too extensive to fit on the printed pages
- c. **develop your own additional pages** to help you study, e.g. charts comparing two things or references to specific pages or topics in the text
- d. **use the coursepack as a means to *reduce* your note taking, *not* as a substitute** for taking notes, for reading a text or for attending lecture
- e. **use a new copy** to get the full benefit.

RECOMMENDED BOOKS (Optional):

1. *Control of Communicable Diseases Manual*, 20th edition, December 2014. David Heymann, editor. American Public Health Association. 746 pp.
2. Borror, Donald J. *Dictionary of Word Roots and Combining Forms* (or similar sources)
3. Campbell, Neil A., & Jane B. Reece. *Biology*. Current or earlier editions. [the BIOL 111-112-211 lecture text; this introductory biology text or comparable text books will be a useful reference for basic concepts in biology]

Some additional books may be found in the non-text book section of the college bookstore. These include:

Oshinsky, David M. 2005. *Polio: An American Story* Oxford University Press 352 pp. [Winner, 2006 Pulitzer Prize for History]

deKruif, Paul, and F. Gonzalez-Crussi. 1926, 2002. *Microbe Hunters* Harcourt 357 pp. [a classic]

Preston, Richard. 1994. *The Hot Zone* (about Ebola) & 2002. *The Demon in the Freezer* (about smallpox) [Both are best-selling, non-technical, non-fiction books. You should critique as a microbiologist.]

Books by Laurie Garrett

LABORATORY MANUAL (required): Pearson Custom Biology Lab Manual for Microbiology BIOL 310 at College of Charleston [derived from Cappuccino, James G. & Natalie Sherman. 2011. Microbiology--A Laboratory Manual, 9th ed. San Francisco, CA: Pearson Education, Inc., Benjamin/ Cummings Publishing Company, Inc. 545 pp].

i-CLICKERS may be employed. You will receive instructions.

OAKS *may* be used for class information, announcements and other material related to the class. If we are using it, you should check it regularly.

OFFICE HOURS I will be available immediately following lecture on most Tuesdays (11:15 am-noon) & Thursdays (11:15 am-noon), as well as most Wednesdays from 10:30 to 11:30 am. You are encouraged to see me at these times *or* to arrange an appointment. Additional hours &/or review sessions will be announced for critical times in the semester. If I am available, I will also be happy to meet with you on a walk-in basis. Please introduce yourself by full name each time you come to see me to help me learn all of your names. Feel free to call ahead to be sure I am in before you trek from Main Campus to Harbor Walk.

TRANSIT to/from class is a challenge that we are adapting to. Since Harbor Walk courses are off-set by 30 minutes, you should have no problem reaching class on time. Options include bicycling, walking or the DASH shuttle. To reach MUSC, you will need to ride two different shuttles or ride half-way & walk the other. There is a bike rack between 2 buildings just west of 280 Calhoun.

E-Mails If you send me an **e-mail**, please lead off the subject with the words "CLASS" or "MICRO." I get inundated daily with e-mails and am less likely to overlook your message with this word displayed prominently. Please remember that I can send confidential information only to your official College of Charleston e-mail account or MUSC e-mail account.

A TENTATIVE **LECTURE SEQUENCE** is attached. It is highly beneficial to read the corresponding text material before each topic is covered in lecture and to also familiarize yourself with what is in the course packet.

PREREQUISITES for this course are BIOL 111, 111L, 112, 112L and 211 and One Year of Chemistry. "One Year of Chemistry" means you must have already completed, with passing grades, CHEM 101-101L-102-102L or CHEM 111-111L-112-112L, or the equivalent. For transfer students, the course must have transferred to the CofC as equivalent to the above. BIOL 305 is a prerequisite or corequisite, although CHEM 231 can be substituted for BIOL 211 & 305. Biology also requires MATH 250 Statistics as a prerequisite to all of its upper-level classes.

ATTENDANCE at all lectures is expected and can be an important factor in your class performance; roll will be taken regularly though not necessarily every time. Signing someone else's name or permitting someone else to sign your name is a violation of the Honor Code. An excessive number of unexcused absences from lecture (excessive = more than 2 in lecture) or from lab (one = excessive in lab) constitutes grounds for dismissal from class and assignment of a grade of WA (equivalent to an F) or voiding eligibility for bonus/project/score adjustment points. Roll will also be taken in laboratory where no unexcused absences are permitted. Official absence notices are handled by the Absence Memo Office, located in the white house at the corner of Glebe & George Streets (67 George Street) next to the Stern Center. If you will be absent on official college business, please provide documentation in advance. The usefulness of the coursepack will be sharply reduced if you aren't present in lecture, since it serves to make note-taking easier, not replace the lecture.

Please make every effort to be on time. Leaving the end seats vacant will help accommodate anyone who does come late. Once class has begun, you are expected to remain seated unless you have a genuine emergency. Please do not bring food to class; beverages will be disregarded as long as they aren't spilled and aren't heard. Electronic devices such as cell phones and smart pads may not be used. Texting and similar activities during class are forbidden. Laptops or netbooks may be used only for note-taking during class. Also, be sure there will be no audible signals from cell phones or other devices.

IF you have a DISABILITY that qualifies you for academic accommodations, please provide a letter from Disability Services at the beginning of the semester. I will be happy to discuss your situation in my office. For more information regarding accommodations, please contact the Office of Disability Services at (843)-953-1431, stop by their office in Lightsey Center Room 104 &/or refer to their web site at <http://www.cofc.edu/~cds/> Any SNAP student must turn in their envelope at least 48 hours before the scheduled test.

The **deadline for WITHDRAWAL** from the course with a grade of "W" is **Friday March 18, 2016**. In accordance with College regulations, withdrawal from the course after that date will be permitted only under dire and unpredictable circumstances, such as sudden serious illness (see "Withdrawal from Courses" in the Undergraduate Catalog). [Note that this deadline is after Express II begins, so if you need an Express II course to replace a dropped class, you will need to make your decision before the **W** date.]

You will be expected to do a variety of **mathematical calculations** in this class, including use of exponents and logarithms. The computations are simple enough that CALCULATORS should *not* be necessary for most of the calculations you will do in this class (lecture or lab). Programmed and/or wireless-compatible calculators are not acceptable on lecture tests. Very inexpensive scientific calculators, can be found at the major office supply stores or general stores. If you bring a calculator, it is your responsibility to know how to use it.

The **LABORATORY SCHEDULE is in your course pack**. Come to the first lab and all other labs prepared. This semester, **labs begin on January 12--14**, the first week of classes. The FIRST TWO lab weeks, where many basic techniques are introduced, are *critical* for your success in lab. There is a zero tolerance policy for unexcused absences. You do not receive separate credit or grade for lab; instead, your lab grade comprises almost 25% of the grade for the entire course. **You must sign a safety statement for lab, and then observe the safety rules** which are extensive.

All students are expected to **attend lab at their assigned lab time**. There is limited space for additional students in most lab sections. If you cannot attend at your scheduled time, you must get permission in advance for each time you need to come to a different lab and you must have a reason the instructor deems valid.

NAMETAGS: MUSC requires all of its faculty, staff, students & contractors to wear nametags. Be sure you have your ID available at all times in case you are asked to show it. If you want a holder to clip on your lab coat, we can issue one.

All students are expected to be very familiar with and to adhere to **THE HONOR SYSTEM OF THE COLLEGE OF CHARLESTON**. In this class, removal of a test or copies of test questions from the classroom is a violation of the Honor Code. Anyone who shares contents of tests from prior semesters with someone in the class or anyone who uses this material for study for a test is also in violation of the Honor Code. Material from other sources must be properly attributed. Work *claimed* as your own (e.g. for mini-projects, posters, unknown report) must be your own work. Plagiarism is unacceptable.

FINAL GRADE DETERMINATION:

Three one-hour tests (130 points each)	390 points
Mini-projects for lecture	30
Final examination	200
Laboratory	200
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	820 points total

GRADING SCALE:

93-100%	A Superior	(762.5---820 points)
90-92.9%	A-	(738.0---762.4 points)
87-89.9%	B+ Very Good	(713.5---737.9 points)
82-86.9%	B Good	(672.5---713.4 points)
80-81.9%	B-	(656.0---672.4 points)
77-79.9%	C+ Fair	(631.5---655.9 points)
73-76.9%	C Acceptable	(598.5---631.4 points)
-----Grades below C do not transfer-----		
71-72.9%	C-	(582.0---598.4 points)
69-70.9%	D+	(566.0---581.9 points)
66-68.9%	D Barely acceptable	(541.0 ---565.9 points)
≤65.9%	F	less than 541 points

QUESTIONS about semester tests and assignments must be addressed *no later than* the start of the final exam.

There will be three (3) full-period TESTS based on lectures, text and assigned reading. Tests are *tentatively* scheduled for the following dates:

February 11 (Thursday)
March 17 (Thursday)
April 14 (Thursday)

Make-up tests will be given only if your absence from an examination is due to illness certified by a physician's excuse or, at the discretion of the instructor, to a documented occurrence beyond your control. You must notify the instructor in advance when possible or immediately after a missed test; if you can't reach me personally, you should send an e-mail and/or leave a voice message. Scheduling of the make-up test will be determined by the instructor, and must be at the earliest possible opportunity. Make-up tests must be taken *before* the graded test is shown to other students (except in extraordinary circumstances).

Tests & other assignments will usually be reviewed in class. Tests must be returned & will be kept on file by the instructor. If you are absent, it is your responsibility to examine your test during office hours or to arrange an appointment. There will be blocks of scheduled times for you to review your old tests prior to the final exam.

The **FINAL EXAMINATION** will be cumulative and will be an objective test (with the likely exception of the bonus questions). Final exams are scheduled for April 23—29, 2016; the **final exam** for this class (9:55 TR) is scheduled for **8:00—11:00 am on Tuesday, April 26, 2016**. [The acceptable reasons for moving the time of a final exam are clearly defined---3 exams in a 24-hour period or two conflicting exams). Changing the time of an exam requires approval by the department chair and possibly others who must sign the form.

SOME OTHER IMPORTANT DATES---Subjective to Change

Lab Test #1	Tues-Thurs, February 16-18, 2016
Unknown Reports Due for Lab	Tues-Thurs, March 22-24, 2016, Start of lab
Pathogen Posters (Lab)	Tues-Thurs, March 29-31, 2016
Mini-projects Due for Lecture	Friday, April 1, 2016, 5:00 pm***
	[all turned in at same time in packet]
Cumulative Lab Test #2	Tues-Thurs, April 5-7, 2016*

*For lab test #2 only, you may take yours with an *earlier* section.

[***Please don't wait until the last minute! All of these should be done as you go along.]

See lab schedule for other lab dates.

CODE OF ETHICS: The following statement is derived from the Code of Ethics of the American Society for Microbiology (to which Dr. Morrison belongs) and a statement by the ASM Council Policy Committee.

The American Society for Microbiology is dedicated to the utilization of microbiological sciences for the promotion of human welfare and for the accumulation of knowledge. This long-standing position of the Society affirms that microbiologists will work for the proper and beneficent application of science and will discourage any use of microbes contrary to the welfare of humankind. Bioterrorism violates the fundamental principles expressed in the Code of Ethics of the society and is abhorrent to the ASM and its members.

THE HONOR SYSTEM OF THE COLLEGE OF CHARLESTON

PREAMBLE: The Honor System of the College of Charleston is intended to promote and protect an atmosphere of trust and fairness in the classroom and in the conduct of daily life. Students at the College of Charleston are bound by honor and by their acceptance of admission to the College to abide by the codes and to report violations. Faculty members are equally required to report violations of the Honor Code or Code of Conduct.

As members of the College community, students are expected to evidence a high standard of personal conduct and to respect the rights of other students, faculty, staff members, community neighbors and visitors on campus. Students are also expected to adhere to all federal, state and local laws.

Alleged violations of the Honor Code or Code of Conduct which are not admitted by the student will be heard by the honor board, a body composed of students, faculty and staff members. A student who admits to a violation of the Code of Conduct may elect to have the violation adjudicated by the Office of Student Affairs, a disciplinary panel, or by a full honor board. A student who admits to a violation of the Honor Code may elect to have the violation adjudicated by a disciplinary panel or by a full honor board.

The Honor Code at the College of Charleston specifically forbids: Lying; Cheating or Attempted cheating; Stealing or Attempted stealing; and Plagiarism. Plagiarism is

>The verbatim repetition, without acknowledgment, of the writings of another author. All significant phrases, clauses, or passages taken directly from source material must be enclosed in quotation marks and acknowledged either in the text itself or in footnotes/endnotes.

>Borrowing without acknowledging the source.

>Paraphrasing the thoughts of another writer without acknowledgment.

>Allowing any other persons or organization to prepare work which one then submits as his/her own.

PENALTIES FOR VIOLATIONS OF THE HONOR CODE:

Penalties for violations of the Honor Code range up to and include expulsion from the College. Attempted cheating, attempted stealing, and the knowing possession of stolen property shall be subject to the same punishment as the other offenses. Because the potential penalties for an Honor Code violation are extremely serious, all students should be thoroughly familiar with the definitions and be guided by them.

from College of Charleston Student Handbook: A Guide to Civil and Honorable Conduct. Students are referred to the Student Affairs web site for the full Honor Code, Student Code of Conduct and the Classroom Code of Conduct and related information.

8/22/2015/sjm

MICROBIOLOGY LABORATORY BIOL 310L

LAB: Medical University of South Carolina School of Pharmacy Bldg Room 402

Laboratory Instructors: Ms. Tracy Hirsch (Sections 1, 2, 3, 5, 6)

Dr. Susan Morrison (Section 4)

1. You are **REQUIRED to PROVIDE** the following items for use in lab:

- Black marking pen with waterproof ink, e.g. a "**Sharpie**" (wide tip and/or narrow tip)
- Three-ring binder to hold supplemental laboratory materials and coursepack pages
- a bound composition book (Ms. Hirsch only)
- Safety goggles (for use when doing designated procedures)
- **Laboratory Coat** (required by the School of Sciences & Math). It will protect your clothing from accidental contamination which, if it occurs, will require that your clothing be decontaminated) and prevent the transport of microorganisms out of the lab on your clothing. It will also protect your clothing against the stains, disinfectants and reagents used in lab.
- **Disposable laboratory gloves** (non-latex)

You may also want/need to bring:

- an inexpensive, flexible, six-inch ruler with metric scale
- a 3-gallon plastic zipper bag to hold your lab coat if the one-gallon size isn't big enough
- plastic zipper sandwich or storage bags to protect your laptop, i-pad or cell phone from contamination if you use it to record results. [Of course, it will be put away and not used for anything except for lab procedures.]

2. The COURSE PACK contains supplemental materials for laboratory as well as for lecture and is **required**.

The LABORATORY MANUAL is a Pearson Custom Manual derived from *Microbiology: A Laboratory Manual* 9th edition by J. G. Cappuccino and Natalie Sherman, 2010. ISBN 978-1-256-59627-1.

- Please write your name in ink on the outer edge and inside the front cover.
- Hint: Use a highlighter to mark the section headings in the Table of Contents (e.g. Basic Lab Techniques....., Microscopy, Bacterial Staining)

Used lab books are **not** acceptable, unless the results and questions sections are mark-free.

Students repeating the course should see their lab instructor for the procedure to follow.

The lab coursepack & supplemental materials should be placed in an inexpensive, three-ring notebook for this lab class to keep them all together.

Your lab manual and notebook should be completed as you do the work in class and should be written so that it can serve as a future reference for you.

Keep your lab book UP-TO-DATE. Place the results directly into the manual as you do the work and answer the questions as you go along.

Lab books will be examined in class at unannounced times and/or at the end of the semester. Its grade will be based on pop spot-checks and possibly on a timed, pre-announced open book quiz given during lecture or lab. Your success on the lab tests and on this quiz will correspond with the accuracy, completeness, scientific understanding, organization and presentation of your results, and the responses to questions.

In addition to the questions for exercises which you do, you are also responsible for questions in exercises listed as "reading only," for the questions and results for exercises done as demonstrations, and for exercises from handouts as well as from the lab book.

3. Read and understand the laboratory exercises in your manual and/or your coursepack before coming to lab.
4. Three DRAWERS will be provided at each lab station. One will be used as the "room temperature incubator." One will have the shared equipment (e.g. lens paper, bibulous paper, inoculating loop, inoculating needle, staining bowl & u-rod, wax pencil). The third drawer will be used to store individual items, e.g. each person will have a separate slide box. You can also put in an envelope with such items as a marker or gloves or goggles. The drawers will not be locked.

Instructions about lab coats will be provided.

5. ATTENDANCE in laboratory is required and roll will be taken. Laboratories are scheduled for three (3) hours. You will attend the assigned lab section and use the same lab station and microscope throughout the semester.

In addition to the regularly scheduled lab periods, it will be necessary for you to come in a few other times to read experimental results or continue exercises. Plan accordingly. See the lab schedule for more information on which experiments require follow-up and at what interval. In addition, you may wish to repeat stains or microscopy of your unknown culture. For reasons of safety, working in the lab in the evenings or on weekends will be restricted to specified times, which will be announced and require the presence of an instructor. You should not work in the lab alone, even during the day. The building is locked after 6:00 pm.

If you come into the lab to do follow-up when another section is in progress, you should avoid disrupting the class. Specific bench stations will be designated to use at these times.

All students are expected to attend lab at their assigned lab time. There is limited space for additional students in most lab sections. If you cannot attend at your scheduled time, you must get permission in advance for each time you need to come at a different time.

6. Each student will be expected, 3-4 times during the semester, as scheduled, to assist with laboratory clean-up in addition to routine duties or experimental work. (In effect, you are washing your own glassware just as you do in Chemistry lab, except that everything must be sterilized before it can be washed.)

Each person is also expected to keep his/her work area clean and organized and aid in maintaining the rest of the lab. Please push your lab stool under the bench when it is not in use.

Students may also volunteer to help with preparation of media and other materials for lab.

7. Information on LAB SAFETY is provided in several forms: a section in the coursepack, the safety rules of the School of Sciences & Math, and notes in your lab manual. Each student is required to become thoroughly familiar with this information, to use safe practices and common sense in lab at all times, and to accept responsibility for personal safety and the well-being of everyone in lab. All students are required to sign a statement agreeing to comply with all safety rules before they may participate in laboratory. A pop quiz covering safety may be given at any time.

We will follow the safety guidelines of the School of Sciences & Math (SSM). However, there may be situations when we deviate because the rules were written for a chemistry lab and may not be appropriate for a Microbiology lab. For example, SSM says you must wear long sleeves but does not state that they must be tight around the wrist. However, unless you are using caustic chemicals, long sleeves pose a hazard around open flames and cultures. In addition, it is not possible to properly wash your hands and lower arms to rid them of microbes when wearing long sleeves.

8. The LABORATORY GRADE will comprise approximately 24.5% of the grade for the entire course. It, in turn, will be determined as follows:

Midterm; Final--closed book (28% + 30%)	58.0%	of lab grade
Lab Manual/Notebook	5.0 %	“ “ “
Unknown Culture Identification and Report	17.0%	“ “ “
		<i>(8.5% for the identification; a separate 8.5% for the report)</i>
Skills Tests (Aseptic Technique, Streak Plate)	7.5%	of lab grade
Pathogen Poster (group project)	7.5%	“ “ “
Attendance, Participation, Safety, Care of equipment	5.0%	

SAFETY PROCEDURES

MICROBIOLOGY LABORATORY (BIO310L)

There are two main objectives to the *special* procedures employed in microbiology laboratories:

(a) to prevent contamination, i.e. the introduction of unwanted organisms into the cultures and supplies being used; and,

(b) to protect those people working in the lab---you, your colleagues, the instructors, maintenance personnel, etc.---from possible infection by an organism.

The microorganisms you will be working with are usually not highly virulent, but *all* microorganisms are potential pathogens and should be treated with respect. It is wise to develop careful habits no matter what the organism. The following guidelines should help you meet this goal.

Additional safety procedures address the fact that we are using chemicals, glassware, heat and flame.

PERSONAL BEHAVIOR, ATTIRE, POSSESSIONS & RISK FACTORS

1. Concentrate on your lab work. Conversations not relevant to the work you are doing must be kept to a minimum. Cell phones, texting, etc., are not permitted.

If you use electronics to take pictures of results, you must have the device covered with a sealed plastic bag. That bag should be discarded when you leave the room. If we know the device is contaminated, it will need to be decontaminated which will likely destroy it (no matter what its cost). If you unknowingly get it contaminated, you run the risk of exposing your face and mouth to the microbe. Best advice: don't use your electronics in lab. Instead record results the old-fashioned way.

2. Do not eat, drink, or chew gum in the lab. Containers of food or beverage must be secured within your book bag before you enter the lab and not placed on the counter or on the floor outside the laboratory entrance.
3. Do not apply make-up or smoke in lab. Pencils, pens, labels, fingers, or other objects should never be placed in your mouth while in lab. Keep your hands away from your face.
4. A lab coat is required to protect you and your clothing from accidental spills of cultures, stains and chemicals. Preferably, this clothing should be worn in and not removed from the laboratory. However, if it is carried out of the lab, it should be kept in a plastic zipper bag. Lab coats should be laundered separately, using bleach in addition to detergent.
5. Come to the laboratory properly dressed---never with bare feet, "flip-flops," unstable high heels or loose clothing. Acceptable shoes are closed toe with no perforations. Long hair must be tied back so it does not catch fire in a burner or fall into sterile media or culture media. False fingernails ignite easily and should never be worn in lab. Hair spray is highly flammable! Loose sleeves/clothing must be restrained under your lab coat.

MICROBIOLOGY LAB SAFETY

6. Books, purses, coats, etc., not in use must be placed out of the way---not on the lab bench, shelf above the bench, or side benches. You should use the large cupboard under your bench for all items not in use in the lab.
7. Working in the lab in the evenings and on weekends will be limited to those times when the instructor is present in the building or when special arrangements have been made. Under no condition may a student work in lab at night or on weekends unless the instructor opens the lab for this purpose. Students performing lab procedures should not work alone in the laboratory.
8. Contact lens wearers should consult their ophthalmologist or optometrist for instructions. [CDC guidelines require anyone wearing contact lenses to wear goggles or a face shield.] Be aware that trace amounts of stains on fingers can be transferred to soft lenses & that soft lenses absorb chemicals, including vapors. Be especially careful to follow sterilization procedures recommended.
9. Fabrics, especially cotton, can burn if exposed to the heat of flame. Fabrics with a fuzzy surface or open weave are more easily ignited. Use of fabric softeners increases the flammability of such fabrics. Therefore, choose your lab attire carefully, even that which is under a lab coat.
10. Clothing worn in the microbiology laboratory should not be subsequently worn in a facility where there are compromised hosts, such as a hospital, clinic or nursing home. It should also not be worn in an area of public food preparation.
11. Safety goggles should be worn for certain procedures, specifically those involving handling of hot liquids (e.g. boiling agar), caustic chemicals or heated slides. [See the note above re: contact lenses.] Obviously, goggles can't be worn when you are doing microscopy.
12. Children, unless permission has been granted, or pets are not allowed in the laboratory.
13. Students at high-risk for infection (e.g. persons with uncontrolled diabetes, those with a suppressed immune system, someone on steroids or chemotherapy), or those in whom an infection could be especially devastating (e.g. severely impaired kidneys) should (a) preferably notify the instructor, and (b) seek and receive permission of their physician. Students with potential life-threatening chemical sensitivities or medical conditions are required by the SSM policy to wear MedicAlert identification.

YOUR WORK AREA

14. Wipe off the counter with disinfectant before and after your lab work, always. A surface should also be decontaminated at any other time you feel it may have become contaminated.
15. All reagents, dyes and stains, cultures, equipment and lab benches must be returned to the proper place at the end of each lab period. However, during lab, you should place the tray of stains *on* your bench (not on the shelf) to avoid reaching over the flames.
16. Work over the lab bench, not over the floor or your lap.

MICROBIOLOGY LAB SAFETY

17. Equipment, including storage racks, which contains cultures should be handled in a safe manner, so as to minimize the chance of accidents.
18. Several areas of the laboratory are "off-limits" unless you have the specific permission of the instructor. These include the drawers, cupboards, and supplies in the Prep Lab, the refrigerators, and the shelves labeled with the instructor's name in the walk-in incubator.
19. Turn the gas burner down or off when it is not in use during the lab period. Double check to be sure the gas is turned off at the end of the lab period.
Always turns the burner off at the gas jet; never turn it off at the burner.
Do not push the burner under the shelf or over the red line.
Avoid reaching over a lit burner.
In the event of a power outage, be sure your gas jet is off. When power is restored, the gas will come on.
If gas burns from a leak in the burner or tubing, turn off the gas.

OOPS!

20. Keep cuts, open wounds or rashes covered. Report any injuries, no matter how minor, incurred in lab to the instructor.
21. Avoid spilling cultures!!! But, if you accidentally spill a culture on yourself, the bench, the floor, or elsewhere:
 - (a) always notify the instructor;
 - (b) wear gloves for the clean-up;
 - (c) place paper toweling on the spill to absorb it;
 - (d) never touch broken glassware with your fingers;
 - (e) without letting your hands touch the absorbed liquid, place the paper towel in the proper container for sterilization (not in the waste basket);
 - (f) disinfect the area thoroughly with disinfectant. This includes letting the disinfectant stay on the spill area for at least ten minutes.
 - (g) Discard the gloves. Wash your hands with disinfectant and soap. Do not touch anything else, including water faucets, with your contaminated hands. [Ask someone to turn the water on for you.]Remember to not spread contamination. For example, don't place a tube with culture spilled on the outside back in a rack where it could contaminate the rack and the hands of the next person.
22. Spills of reagents and stains should be cleaned using paper towels, followed by a thorough rinsing with water. For large spills or spills with hazardous liquids, notify the instructor.
23. Broken glass, if uncontaminated, should be placed in the container labeled "broken glass" in the Prep Lab. If it is contaminated, it should be safely contained before autoclaving.
24. Know where the First Aid Kit is and what to do in case of fire.

STANDARD PRACTICES

25. Before coming to lab, read each exercise and familiarize yourself with the principles, methods, and specific safety precautions. By doing so, you will lessen the chances of an accident and enable you to use your time more efficiently.
26. All cultures in the incubators or refrigerator must be labeled, with your name (no initials), identity of culture, and date. Include additional information as needed. Label tubes and plates before inoculating them to help avoid confusion and spills.
27. Learn and practice the proper procedure for flaming an inoculating loop or needle. Begin flaming at the handle end and move slowly toward the loop. Flame completely; reduce aerosol production.
28. Do not mouth pipette. Pipette bulbs and manual pipettors are provided for your use.
29. Pick up test tubes by the glass tube, not by the cap, to avoid dropping the tube. Don't tilt test tubes beyond a 45° angle. The plastic caps do not prevent leakage.
30. Cultures are never to be taken from the laboratory.
31. Wash your hands before leaving lab at any time. Also wash your hands after cleaning up spills or anytime you suspect they may have become contaminated. Since bar soaps may become contaminated, you should use liquid or powder soap.
32. Dispose of all cultures, glassware, plastic-ware, pipettes and other supplies in the manner described by your instructor. **There is usually a special container (labeled) for almost every type of item.**
 - An area in the back of the lab has been set aside for contaminated tubes and plates.
 - Tubes should be sorted as directed and placed upright in racks. Care should be taken that nothing can spill. Supplies and media which have been used for culturing bacteria, fungi or viruses must be autoclaved before discarding or washing. Only supplies and equipment which have not been in direct contact with bacteria and fungi can be washed and stored without sterilization.
 - Tape should be removed before placing materials in the discard area

SUMMARY

33. Use common sense and good safety practices in everything you do in lab, whether it is specifically stated here or not.
34. Each student must become familiar with all safety rules and must abide by them to remain in the laboratory. Listed below are additional specific safety hazards.

SALIVA, BLOOD, TEARS, URINE & OTHER BODILY SECRETIONS & EXCRETIONS

It is highly unlikely we will work with any of these fluids. However, if we do:

- a. Work only with your own body fluids.
- b. Wear gloves and safety goggles.
- c. Discard all contaminated items in specially designated containers and heed any precautions named by the instructor.
- d. Wash hands immediately if contaminated with blood or other fluids and always at the end of a procedure.
- e. Follow above guidelines for safe handling of microorganisms.

FIRST AID

- a. For serious injuries, notify Public Safety to reach our campus emergency responders
If using campus phone, call: 3-5611 for an emergency
If using cell phone, call: (843) 953-5611 for an emergency
- b. Report all accidents, no matter how small, immediately to the instructor.
- c. For spills in or near the eyes, use the eyewash.
- d. For large spills on your person, use the sink and drench hose.
- e. For heat burns, the affected part should be chilled with ice as soon as possible and kept chilled, but the ice should not be placed directly on the skin.

FIRE

Your response to a fire will differ depending on how large the fire is, the substance which is burning, and immediate danger to persons. Not all eventualities can be listed here.

- a. If gas burns from a leak in the burner or tubing, turn off the gas.
- b. If you have a smoldering sleeve, run water on the fabric.
- c. If you have a very small fire, the best way to put it out is to smother it with a towel or book (not your hand) or the fire blanket. Smother the fire quickly. In some cases (e.g. burning paper or wood), water may be appropriate. Smother an alcohol fire.
- d. If a larger fire occurs, such as in a waste basket or sink, use a fire extinguisher.
- e. If a person is on fire, use the fire blanket.
- f. In case of a large fire involving the lab itself (or a fire alarm), the room and building should be evacuated:

MICROBIOLOGY LAB SAFETY

To evacuate:

1. Turn off all gas burners and unplug accessible electrical equipment.
2. Leave the room in an orderly manner, proceed down the stairs (either next to Room 200-to left when you leave our lab) or across from Rooms 203-204-to right), and immediately exit the building. Move away from the building.
3. **In the event of a fire or other reason the building must be evacuated, please assemble outside the building at a designated location so that your instructor can take roll to determine if anyone is still in the building. This class will congregate _____
Please do not wander off.**

NATURAL DISASTERS

Hurricane: In the likelihood of a hurricane, you may be asked by your instructor to assist in securing the lab to lessen the risk of cultures being spread and minimize damage to equipment and supplies caused by wind and rain if a window breaks and the inevitable leaky ceilings.

Earthquake: Turn off your gas jet and get under your lab desk during the temblor.

OTHER EMERGENCIES

Information and directions will be issued by the campus via several conduits, including Cougar Alert, e-mail, and postings.

Rev. 8/2015 sjm

COLLEGE of CHARLESTON

SCHOOL OF SCIENCES
AND MATHEMATICS

SAFETY POLICY AND PROCEDURES

The School of Sciences and Mathematics of the College of Charleston understands that the safety of our students, staff and faculty is of paramount importance. Engendering a safety culture is an important part of our mission in teaching and doing science. Each department, course of instruction, or research lab may require higher standards or procedures. The policies and procedures set forth below are understood to be minimum requirements across our departments.

In this document, the term “laboratory” is meant for a work space/facility where chemicals, biological agents, or equipment is used for research and/or instruction.

No one (student, staff, faculty, or visitor) will be allowed in a laboratory (teaching or research) to perform experiments or where experiments may be in progress unless these regulations are followed.

Students dismissed from a teaching lab due to violations of the safety procedures will not be allowed to re-enter the laboratory until authorized to do so by their supervisor (instructor) and, in the case of research laboratories, by the department chair or designee. Any course work missed because of a violation of these guidelines cannot be made up at another time (or by an extension of the lab period) and will be treated as an unexcused absence.

1. You are responsible for knowing the biological, chemical, electrical, ergonomic, mechanical, and physical hazards associated with the equipment and materials that are being utilized in the laboratory. Listen to all instructions and ask questions about that which you do not understand.
2. Know the location of safety equipment: telephones, emergency shower, eyewash, fire extinguisher, fire alarm pull.
3. Know the appropriate emergency response procedures. If there is an injury or emergency, call 953-5611.
4. Do not work alone in the laboratory if you are working with hazardous materials or equipment.
5. Use hazardous chemicals, equipment, and biological agents only as directed and for their intended purpose.
6. Do not engage in horseplay, pranks or other acts of mischief while in lab.
7. Drinking, eating, and application of cosmetics is forbidden in laboratories where chemicals or biohazards are present. Smoking is forbidden in all College buildings.
8. Appropriate personal protective equipment shall be worn. The dress code for laboratory work when using chemicals, biological or physical hazards, or when instructed to do so by the laboratory supervisor is as follows:
 - a) Wear safety glasses or goggles at all times.
 - b) No exposed skin on arms, legs or torso.
 - c) Wear lab coats or other approved protective garments.
 - d) Wear gloves or other personal protective equipment (PPE) as directed by the instructor or mandated by prudent practices based on the chemicals being handled. If in doubt, wear appropriate gloves. Latex is not permitted. Avoid cross-contamination.
 - e) Remove PPE (gloves and lab coat) when exiting the laboratory.
 - f) Wash your hands, even if gloves were used, before leaving a lab where you did any lab work.

- g) Closed toe shoes are required. The heel and top of foot must be covered. High heeled shoes, sandals, and perforated shoes are not permitted.
- h) Confine long hair and loose clothing.

9. Inspect equipment or apparatus for damage before adding chemical reagents or biological samples or energizing electrical equipment. Do not use damaged equipment.

10. Never remove chemicals, biological samples, or laboratory equipment from a lab without proper authorization.

11. Presume that all chemicals and biological samples used in the laboratory are hazardous for you and the environment, unless instructed otherwise.

12. Never leave an experiment unattended unless proper safety precautions are in place.

13. Read all labels on chemicals twice before using them in the lab. Read all instructions twice for the operation of any equipment or machinery.

14. Properly and safely dispose of all waste materials.

15. Treat sharps and broken glassware containers carefully.

a) Broken glass should be disposed of in properly marked safety containers. All sharps (needles, razor blades, etc.) used for any purpose must be disposed of in specially labeled SHARPS containers.

b) Do not place contaminated glass in the broken glassware container. Consult your supervisor.

c) Waste chemicals and contaminated PPE should be discarded as directed.

16. When using a reagent, replace the lid immediately. Never return unused reagents to stock bottles. Take only the amount needed for your experiment.

17. All chemicals and biological samples/media are to be disposed of in appropriately labeled containers. Specific instructions for each material will be provided. Pay attention to waste container labels before adding the material to be discarded.

18. Use good personal hygiene. Keep your hands and face clean. Wash hands thoroughly with soap and water after handling any chemical or biological agent.

19. Keep the work area clean and uncluttered with chemicals and equipment. Clean up the work area on completion of an operation or an experiment. Before leaving the laboratory, you are responsible for making sure your lab area is clean and organized.

20. Never store a chemical or biological specimen in an unlabeled container.

20. Always have your College of Charleston identification and insurance information with you when working in a laboratory. MedicAlert identification must be worn if you have any potential life-threatening chemical sensitivities or medical conditions.

21. Report any accident or injury, however minor, to your teaching assistant, instructor, or lab supervisor immediately. An accident report form must be completed and forwarded to the department chair, dean, and to the Director of Environmental Health and Safety.

If you have questions/concerns about safety in the lab please first consult your instructor. If these are not answered, please see the department chair. Finally, you may consult the director of Environmental Health and Safety, Randy Beaver at 3-6802 or beaverr@cofc.edu

Adopted: March 7, 2012

CougarAlert

The College of Charleston has an agreement with the Blackboard Connect Inc. [formerly The NTI Group, Inc. (NTI)] to use its Connect-ED communication software to provide an emergency notification system that is capable of reaching students, faculty, staff and parents within minutes of a campus crisis. This system is called **CougarAlert**.

Information for Students

The CougarAlert emergency notification system will contact up to six phone numbers for the student. Students may include family member numbers in their address and phone number information.

All students should log onto [MyCharleston](#) to review their address and telephone information and update as needed.

To access the address and telephone information, follow these steps:

1. Log on to [MyCharleston](#)
2. Click on the Academic Services tab
3. Click on the Banner Self-Service link in the third column
4. Click on the Personal Information link
5. Click on the Update Address and Phones and Cougar Alert link

The CougarAlert system will pull the phone number in the following order – cell phone with text messaging option, cell phone without text messaging option, residence hall room phone number, mailing phone number, home phone number, parent phone number and parent 2 phone number.

If you do not have one of these numbers in your student record, the system will select the next number on the list. To avoid issues related to timely communication of emergency messages to the proper places, every student must update his or her contact information in [MyCharleston](#) with current accurate information.

CougarAlert Display Information

When you receive an emergency message from the College of Charleston's CougarAlert System, the return e-mail address will be displayed as cougaralert@cofc.edu, and Caller ID will be displayed as 843.725.7246 (this is the College's Emergency Information Hotline).

Testing and Implementation

Testing will be conducted each semester to verify all systems are operating properly. The campus community will be notified via e-mail and web page postings when testing of the system will be conducted.

Blackboard Connect Software

[Blackboard Connect](#) is an emergency communication software that sends notification before, during and after an emergency. With this new system, the College will be able to communicate in many modes, including voice messages to home, work and cell phones; text messages to cell phones, PDAs and other devices; written messages to e-mail accounts; and messages to teletypewriters and telecommunication devices (TTY/TDD) for the hearing impaired. In combination with our existing communications methods and emergency response plans, this new notification system will significantly enhance the College of Charleston's ability to maintain a learning environment in which students are safe, secure and comfortable.

In an emergency, communications to the campus will be issued in the following priority order:

1. Message to the [Blackboard Connect](#) Emergency Notification System (phone and e-mail).
 2. Recorded message to the College's Emergency Information Hotline, 843.725.7246.
 3. Update to the Website.
 4. Printed update sheets to be distributed and posted on campus (if necessary).
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The CougarAlert system will only be used to notify you in the event of a campus crisis or emergency.