

INTRODUCTION TO THE MICROBIOLOGY LABORATORY

Overall Objectives of the Microbiology Laboratory

Welcome to Microbiology! In this portion of the course, we will explore the central roles of microorganisms in nature and in our daily lives. In this process of discovery, we will become adept with standard microbiological techniques that will allow us to investigate the structure and physiology of microorganisms. The various sub-disciplines of Microbiology including Bacterial Genetics, Bacteriology, Immunology, and Environmental and Applied Microbiology will be introduced.

The objectives over the course of the semester are to...

- become proficient in laboratory skills and safety protocols.
- learn to follow experimental procedures.
- apply the scientific method: formulate testable questions/hypotheses, predict expected results, make careful observations, collect and analyze/interpret data, and draw appropriate conclusions.
- begin to gain proficiency in scientific writing (laboratory reports and notebook entries)
- embark in active learning opportunities in the laboratory.
- demonstrate good lab citizenry and the ability to work with others.
- have Fun!!!

The Microbiology Laboratory Manual, Photographic Atlas, Course Web Site and WyoCourses

The experiments to be conducted in the General Microbiology Laboratory are outlined in this manual. Students may also purchase *A Photographic Atlas for the Microbiology Laboratory* by Michael J. Leboffe and Burton E. Pierce. This atlas includes concise descriptions and color photographs of numerous biochemical tests, stains, and other procedures that are pertinent to most of the labs that we will perform throughout the course. It is a **VALUABLE RESOURCE** if referred to regularly.

At the beginning of every lab procedure, the TA or instructor will provide a lecture which will include pertinent background information, tips on how to perform various laboratory procedures, and other important instructions. The lecture notes and any additional course information or visual aides will be posted on the course web site at: http://www.uwyo.edu/molb2210_lab/

For each lab there will be a corresponding pre-lab assignment. This assignment will be submitted on eCompanion prior to each lab period. In order to complete this pre-lab, it will be necessary to preview the lab using The Virtual Edge, accessible through the above website or found directly at the following link: http://www.uwyo.edu/virtual_edge/index.htm

Microscopes

In this lab we will use Olympus Biological Microscopes. These are better than average teaching microscopes and are very expensive, each costs over \$2,000. **Handle it with extreme care!** The **KEY** to having a microscope work well is to keep it clean. To eliminate the most common source of frustration in microscopy, be sure to **CLEAN** the ocular and objective lenses with lens paper **BEFORE** and **AFTER** the lab session. Clean up any oil spills immediately and properly store the microscope with a cover. In using the microscope always follow the appropriate procedure as described in LABS 1 and 2.

General Information

Section # _____	Office / Office Hours:	Phone:	E-mail:
Teaching Assistant: _____			
Faculty Supervisor: _____			

Grading Policy

Skill Tests #1:	30
Skill Tests #2:	20
Virtual Edge Pre-lab Exercises (24 at 2.5 pts each)	60
Assignments/Lab Reports:	
Unknown Press Release	5
Dilution Problems	10
Pipetman tutorial	5
Gram Stain Report	15
Unknown Hypotheses, References and ID plan	15
Unknown Report	20
Notebook:	20

Laboratory Total **200 points**

- Extra credit opportunities (worth a total of 5 points) will be provided throughout the semester.
- Five percentage points will be deducted for everyday that an assignment is submitted late. Assignments more than one week late will not be graded. One late assignment may be submitted up to one week late without deduction using the late coupon found in the appendix.
- The grade for General Microbiology is based on a total of 800 points (600 from lecture, 200 from lab).

Required Lab Supplies

Lab coat (There is a limited supply of lab coats in the lab. Lab coats can also be purchased at the bookstore.)
Safety glasses (supplied in lab)

Optional Lab Supplies

Colored pencils/pens
3 x 5 cards (a file box is a handy way to store your cards)

Absentee Policy

Attendance in lab is mandatory. If, due to circumstances beyond your control, you have to miss a lab, you **must** contact your T.A. or professor prior to the absence. **Unexcused absences will not be accepted.** One unexcused absence will result in the loss of 5 points and two unexcused absences will result in an automatic F in the course. Up to three excused absences will be universally allowed. Additional excused absences must be University-sponsored. All missed labs must be made up during open lab hours within 10 days of the lab missed. Labs not made up in this time frame will be considered unexcused.

Learning Tips

- To get the most out of the laboratory, **preview** the scheduled exercise(s) **before** the lab. Not only will this allow you to perform the required pre-lab exercises but it will allow you to be more productive and efficient in the lab. It will also facilitate a better understanding of the material.
- **Be thorough!** Many of the exercises performed in this lab require several days to complete. Generally, each lab period will involve finishing the previous exercise and then starting another. Therefore, it is imperative that you complete each lab by recording all of the results (especially for large group projects), and answering the questions for each lab before starting with the next lab exercise.

- **Use the resources provided on the lab website!** Summaries, reviews and supplemental materials can be found here! In studying for quizzes and lab practical exams, you may find it useful to prepare **index cards**. These may help you review specific microorganisms, microbiological tests, and procedures.

Laboratory Safety

- Lab coats and safety glasses must be worn at all times while in the laboratory. Regular prescription glasses are generally not made with safety glass and thus safety glasses must be worn over the top of these glasses at all times. Safety glass checks will be made throughout the semester and students without their glasses will lose 2 points.
- Only the materials pertinent to lab work, such as a lab manual/notebook, and other lab materials, should be brought to your workspace. All other items such as coats, books, and bags should be stored on the shelves provided for this purpose.
- No eating, drinking or smoking in the lab.
- Know lab safety procedures and the location of the first aid kit, eyewash, and fire extinguisher.
- All culture material should be handled as if it were potentially harmful.
- Be very careful with Bunsen burners. Avoid wearing loose clothing that may be exposed beneath a lab coat and thus provide potential fuel for the flame. Burners should be turned off when not in use.
- Long hair must be tied back while in the laboratory. Long pants and closed toed shoes are suggested.
- The chemical compounds used to stain bacteria can be irritating to the skin and some are potential carcinogens. The use of gloves when performing staining procedures will help minimize exposure.
- Dispose of materials as instructed. Do not carelessly throw materials in wastebaskets or sinks; biohazard waste containers are available.
- Report any accident or injury immediately to the laboratory instructor so that prompt action can be taken.
- After each lab, WASH your hands before leaving the laboratory.
- The surfaces of lab benches are washed with disinfectant and rinsed with water twice a day by the teaching assistants and instructor.
- If you have any allergies, chemical sensitivities or if you are pregnant or think you may become pregnant, please identify yourself to the instructor. If, for any of these reasons (or others), you believe that your safety is compromised in the lab, we will make alternative arrangements for completion of this portion of the course.

Maintaining a Laboratory notebook

The lab notebook is a permanent, bound record of your work. Ideally it will last for many, many years and allow you to review the procedures exactly as they were performed on the day they were performed. Thus:

- A permanent, black ballpoint pen should be used to make entries.
- All entries should be made immediately. Do not trust your memory.
- Entries should be legible and numbers and symbols should be unambiguous.
- The active voice should be used to clearly indicate who did the work.
- If you make a mistake, use a single line to mark off the mistake and initial.
- For a very thorough, informative coverage of the laboratory notebook please access: Kanare, H.M. (1984) *Writing the Laboratory Notebook*. American Chemical Society. This text is available through the University of Wyoming Library's digital sources.