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Lab: North Life Sciences (NLS) room 424

Lab Manual: The laboratory manual for this course is available online via Blackboard. A supplemental lab manual by Harley is available at the bookstore. The supplemental lab manual is not required, but you may find it useful. Additional required lab supplies are available at the campus bookstore. Before coming to each lab, you should check the BlackBoard site for supplemental materials.

Safety: Some of the lab exercises use potentially toxic chemicals and cultures of living microorganisms that could cause infections if mishandled. In addition, some experiments involve growth of soil microorganisms that may be allergenic. You will be taught specific procedures that allow the safe use of these materials. We require that all students consistently follow these procedures to assure the safety of everyone in the laboratory.

Although the microbes used in this course can be handled safely by otherwise healthy individuals, they should be avoided if you have certain medical conditions. *If you have an allergy to fungi/molds or to specific chemicals/detergents, if you are (or might be) pregnant, or if you have a weakened immune system, please discuss this with the instructor on the first day of class.*

General Laboratory Rules: All students will be required to observe the laboratory rules described in the lab manual. In addition, the following rules must be observed.

1. Closed toe shoes must be worn at all times in the laboratory.
2. No bicycles, roller skates, skateboards, or children may be brought into the lab.
3. Book bags, coats, etc may be placed under the lab benches during the lab. Purses or wallets should not be stored in the hall lockers.
4. Cell phones may not be used in the laboratory. Set your phone to vibrate mode if you must be available via cell phone for a potential emergency.
5. Anything that is placed in a common facility (incubators, refrigerators, water baths, etc) or anything that must be stored until the next lab period must be labeled. Always mark plates on the back (not the lids) with your initials, your lab section, the date, and relevant experimental data.
6. Lab coats must be autoclaved before they leave the 4th floor.
7. Immediately report any lost keys to the Microbiology Prep Room staff in LS 418A.

Lab Grades: A total of 300 points will be assigned to the lab grade. The points will be distributed as follows:

Pre- and post-lab questions	120 pt
Problem sets	50 pt
Dilutions =	15 pt
Growth =	10 pt
Physiology =	15 pt
MOI =	10 pt
Lab notebook (5 x 5 points each)	25 pt
Lab reports	
Identification of unknown bacteria report	40 pt
Bacterial genetics report	35 pt
Lab performance (see below)	30 pt

Attendance: Learning laboratory skills demands active participation. Students are expected to attend all lab sessions, and to participate throughout the lab period. TAs will record any absences, tardiness, or premature departures. Regular attendance for the complete lab period is required for a passing grade.

If you miss six or more labs, you will FAIL the lab. Because the lab is an essential part of this course, failing the lab will result in failing the entire course. Exceptions will ONLY be made if you have special health problems or are in the military reserves and are called to military duty – in both cases documentation is required, and the make-up labs must be arranged with the instructor and completed in a timely manner.

Because the laboratory exercises depend upon growth of living microorganisms, at times it will be necessary for you to come into the lab outside of regularly scheduled class times to examine cultures. This will be most common during the last half of the semester.

Lab Notebook: Keeping a thorough lab notebook is an essential part of scientific research. Each student must maintain a lab notebook. Your notebook should be legible and thorough enough for someone else to read and understand exactly what you did. Your lab notebook must include all data and observations for each exercise. Protocols and tables for results should be written in your notebook before coming to the lab. Results and conclusions should be written in the notebook during the lab. Keep any notes from your TA's lecture separate from the exercises. The notebooks will be graded periodically without advance warning over the course of the semester, so it is essential to keep your notebook up-to-date at all times. Lab notebooks will be collected at the end of the semester.

The following rules are designed to ensure an accurate and detailed record of your laboratory results.

1. Include a running table of contents so experimental results can be looked up quickly and easily. Update the table of contents each time you begin a new experiment.
2. Write your name and the date at the top of each page.
3. Each experiment should include the following sections:
 - a. Purpose. Begin with a short explanation of the goals of the experiment.
 - b. Procedure. Include a detailed description of what you actually did. Provide sufficient detail so someone could repeat the experiment exactly the way you did it. Procedures obtained

- from other sources (e.g. the lab manual) can simply be referenced in your notebook, but you should specify any changes or differences between the procedure and what you did in the lab. Show all calculations and indicate how any dilutions were done. Do not count on your memory -- write all observations in your notebook while you are doing the experiment!
- c. **Results.** Include the actual raw data in your notebook as well as any plots or calculations based on the data. Show any equations used for your calculations.
 - d. **Conclusions.** Include a brief summary of the conclusions. Did the controls work? What do the results mean?
4. Errors should be crossed out with a single line so they remain readable. Do not erase or scratch out errors or tear pages out of your notebook. When an error is made, include a comment on what went wrong and what you would do differently if the experiment was repeated. This will allow you to figure out what actually happened even a long time after you did the experiment.
 5. Tape any attachments (e.g., photographs, print-outs, or graphs) directly into the notebook. All attachments should include the date and details about how they were obtained (e.g. how long a photograph was exposed, the settings of the spectrophotometer, etc.).

Pre- and Post-lab Questions: To ensure that you are properly prepared for the lab, several questions will precede each experiment. To get credit, these questions should be answered prior to coming to the lab and your answers must be turned in to your TA **before** the lab begins. In addition, one of the points of doing the experiments is to think about what the experiment means, not simply to follow it like a "cookbook". Therefore, a set of questions and problems are included following each experiment. Answers to the questions and problems (showing all calculations) should be answered after completing the lab exercise, and turned in at the beginning of the following lab. Some of these questions and problems will be similar to questions on BIOL 350 lecture exams. You must answer all questions on your own and in your own words – copying from other students is cheating; copying from websites or from books is plagiarism.

Laboratory Reports: Because scientific writing is an essential aspect of microbiology, a formal write-up of three of the laboratory exercises will be required. The lab reports will cover two different topics: (i) identification of unknown bacteria, and (ii) genetics.

Guidelines for writing the lab reports are available on the course website. These guidelines also provide details on how the lab reports will be graded. If you would like more help with preparing the lab reports, check out the book *Successful Lab Reports, A Manual for Science Students* by Lobban and Schefter (on reserve in the SDSU Library).

Lab reports are due at the beginning of the lab period indicated on the Lab Schedule. It is the student's responsibility to keep backup files and to produce a paper copy of the file in time to meet the deadlines. (Excuses such as "the computer erased my file" and "the printer wouldn't work" will not be accepted.) Any reports turned in late will be reduced by 10% of the total points for each 24 hr period or portion of 24 hr period (including weekends) past the due date.

Laboratory performance: Each student will be evaluated on laboratory performance. Criteria evaluated will include proper care of lab equipment, observation of safety rules, participation, attention to experimental detail, and consideration for others working in the lab. In addition, failure to turn in any of the major projects will result in loss of all of the Laboratory performance points.