GENERAL INFORMATION

The purpose of this laboratory course is to introduce you to a sampling of the morphologically and physiologically diverse members of the Prokaryotes. The emphasis is on the enrichment, purification, and identification of organisms taken from natural habitats, but we will also explore genetic phenomena using model bacteria. The Bacteria and Archaea domains are so vast and diverse that you can study only a miniscule portion of the organisms and their isolation techniques in a one-term course. We will not study, fungi, algae, protozoans, slime molds, nor a number of other microbial groups. Each deserves its own course.

Format

Microbiology (Bi330) is a required pre- or co-requisite for *Microbiology Lab*. If a student withdraws from Bi330, they must withdraw from Bi331. Students failing to do so will be dropped from Bi331 upon our request to the Registrar.

A lecture for the laboratory is scheduled for 9:00-9:50 am on Mondays. In the lecture background information and technical suggestions will be given. Though attendance won't be taken, you are expected to attend these lectures so that you will be prepared when you arrive at your lab. The goal with the Monday lectures is to maximize your time working in the lab, and so introductions and overviews won't routinely be given in the lab. If you miss the lectures you will likely be unprepared to perform that weeks exercises.

Laboratories meet twice each week for up to 2½ hours each session. Many sessions will not last the full time, though during some weeks you will have additional lab work outside of your normal section time. The laboratory will be open about 8-5, Monday through Friday. You may work in the lab at any time except when there is another class in session. However, you must attend your regularly scheduled lab section.

You will need a notebook in addition to this manual for this course. The notebook can be of any type that suits you. The idea is that you will take detailed notes about your results and observations throughout the term.

We will begin most sessions with a brief introduction about the work to be done that day, and then commence with the general exercises or enrichments. We will do three types of exercises: general exercises, enrichments, and projects. General exercises will be done by all students at the same time, and are designed to introduce you to some of the commonly used techniques in the many branches of microbiology. The enrichments are for the concentration or isolation of specific groups of microorganisms from mixed populations; all students will perform these, but once begun, the enrichments won't require coordinated efforts by the entire class. The projects are larger scale experiments that will take from 1 to 4 weeks each to complete; three of these are group (2-4 students) projects that, once begun, will require group members to coordinate daily or weekly tasks.

Assignments and grading
Grades will be assigned on points earned out of a possible 400 based upon the following criteria:

5-minute quizzes (55 points [5 points each]). There will be a short quiz at the beginning of each of the labs in which new exercises will be performed (except for the first lab). The questions will cover the procedures and background found for those exercises in the lab manual. The purpose of these quizzes is to motivate you to read the material before arriving in lab.

Lab exams (100 points [50 points each]). There will be 2 exams during lab lecture. These are intended to test your knowledge of the techniques we use and of the physiological, ecological, and biochemical characteristics of the organisms that we study. No makeup exams will be given unless prior arrangements are made, or a valid medical or travel excuse is provided.

Lab practical final exam (70 points). During the 10th week you will take a lab practical exam. Grading will be based upon your ability to perform some of the standard microbiological techniques, and to analyze results from isolations and tests that were previously done in the lab.

Worksheets (80 points [10 points each]). Short worksheets will be required for 8 of the general exercises. Due dates will be listed in the schedule.

Identification of 2 unknowns (30 points [10 points each; 10 points for key]). You will be given a mixture of 2 species from bacterial groups that we will have studied, and your task will be to purify and identify them to the species level based upon an identification key of your design. You will submit a copy of your key during week 5 when you receive your unknowns.

Abstracts (50 points [25 points each]). You and your lab partner will together write abstracts for the two extended lab projects (Genetic analysis of prodigiosin biosynthesis; The nitrogen cycle in a biological filter). Details will be provided during the term.

Discretionary (15 points). This will be based upon participation, group cooperation, workstation cleanup, punctuality,etc.

Attendance. You are expected to attend all labs. If you are more than 15 minutes late for your lab, you will be counted as absent. One absence will be excused, but additional absences will incur a penalty of 10 points per absence. You will be allowed to attend a different section to make up one absence during the term if there is space in another section, and this must be arranged in advance. However, many of the projects are done in groups, and you will thus be responsible for completing those projects with those group members.

Safety

Most of the organisms with which we will work are non-pathogenic. However, you should take precautions that you would use as if you are working with known pathogens—one is never completely certain what an enrichment will yield from a heterogeneous source. Wash your hands frequently, don't put your hands to your face when handling materials, and don't pipette by mouth. The chemicals and stains that we routinely use in the microbiology laboratory are not particularly toxic, but, again, use due caution. Lab coats are not required, though we recommend that you use one or some other such covering while working in the lab. Invariably there are spills of stains, and these will permanently stain clothes. Open-toed shoes are not allowed in the lab. Absolutely NO FOOD, DRINK, OR GUM is allowed in the lab.

In some cases we will be using organisms that are considered to be opportunistic pathogens (members of the normal microflora that are *capable* of initiating an infectious process but normally do not). In those exercises you will be given specific instructions for their handling, which include but are not limited to the use of gloves, wiping down lab benches with disinfectant at the end of the exercise, and disposal of all supplies that come in contact with the organisms into autoclave bags.

Perhaps the greatest constant danger in the microbiology lab is the use of gas (Bunsen) burners. Long hair should be tied up or back, and clothing should not be excessively loose.