

Course Syllabus
BIO 247
Introduction to Applied Microbiology
Spring 2008

Location: LDB 126

Instructor: Harold F. Foerster, PhD

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Office: LDB 126

Office Hours: TuTh 9:30 - 11:00, or by appointment.

Textbook: Microbiology, 9th ed., Tolora, Funke, Case; Pearson/Benjamin Cummings.

Supplemental textbook: Milestones in Microbiology, translated and edited, Thomas B. Brock, held in reserve, University library or available through the American Society for Microbiology.

Laboratory Manual: Laboratory Exercises in Microbiology; Harold F. Foerster, Todd P. Primm, revised 2006. The laboratory manual must be purchased in the Departmental office, Room 300.

Course Description: The course is one-semester, is sophomore - junior level, and has a lecture-laboratory format. The lecture section of the course is divided into four units, each unit will be followed by an exam designed to match the format of an 883 Scantron form. The laboratory section of the course is designed to compliment the lecture section and provides opportunities for intensive hands-on-experiences in the handling and cultivation of microorganisms. The laboratory emphasizes: a.) The value and use of staining procedures, e.g., gram, acid-fast, endospore, capsule, b.) Biochemical testing, using both individual tests and integrated diagnostic systems, e.g., API20E, and c.) The carrying out of assigned experiments with the collection of experimental results as directed by the laboratory instructor(s).

The course provides an introduction in microbiology with emphasis on the bacteria. Studies as late as the 1960's revealed some basic difference in cellular organization among living organisms which led to the separation of cell types into either prokaryotic or eukaryotic. Structural/organizational details pertaining to these two cell types will be addressed. The following is a poignant and fitting 1970 quote by R.Y. Stainer, E. Adelberg and M. Douderoff, "The numerous and fundamental differences between eukaryotic and prokaryotic organisms....have been fully recognized only in the past few years. In fact, this basic divergence in cellular structure which separates the bacteria and the blue-green "algae" (cyanobacteria) from all other cellular organisms, probably represents the greatest single evolutionary discontinuity to be found in the present-day living world."

Numerous important, indeed essential roles of microorganisms in the origin and maintenance of life on earth will be addressed. The ability of bacteria to avail themselves of atmospheric nitrogen via biological nitrogen fixation will be examined both in the classroom and in the laboratory. This important biochemical process is carried out by a number of free-living soil and aquatic bacteria but also by bacteria that live in symbiotic associations with plant and animal hosts. Plants and animals lacking these bacterial symbionts cannot fix nitrogen biologically!

Students will also be introduced to microbes responsible for and involved in additional metabolic processes that are uniquely bacterial or to which bacteria make major contributions. These involve nitrification, denitrification, oxygenic and nonoxygenic photosynthesis, aerobic respiration, anaerobic respiration, and fermentative metabolism.

The manner in which bacteria affect health will be examined. Reactions of the body to disease causing pathogenic bacteria and the principles of immunity and chemotherapy are considered. While the emphasis is focused on prokaryotic bacteria, eukaryotic fungi and protists, plus viruses, viroids and prions are included.

Attention will also be given the bacteria as, a.) Means of cleaning up environmental pollution via bioremediation, b.) As major contributors to the “new biology”, i.e., molecular biology, biotechnology, bioengineering, and c.) As inexpensive but powerful tools for basic research.

Grading Policy: The grade a student receives will be based on performances on exams given during the semester. Exams will include 8-10 short unannounced quizzes. Unannounced quizzes may not be made up! However, the two lowest scores, including any quiz missed due to an EXCUSED absence, will not be included in deriving the average grade. The average grade earned on all quizzes given, minus two, will account for 20% of the semester grade.

The remaining 80% of the student’s grade can be earned on 4 major announced exams, including the final exam, given at approximately equal intervals during the semester. Each of the major exams has a value of 20%. Major announced exams must be taken on Scantron Form No. 883 using a carbon (lead) pencil.

Major announced exams can be made up without penalty, provided the student gives prompt acceptable reason for not taking the exam on the announced date. The student is expected to take the initiative in working out the details regarding a make-up exam.

A student will earn a letter grade in the course based on the overall numerical average plus any upward adjustment (curve) given that class. Letter grades, with or without (see below) adjustment, will be earned on the basis of the following grading schedule:

90 - 100 = A
80 - 89 = B
70 - 79 = C
60 - 69 = D
Less than 60 = F

Attendance: Regular and punctual class attendance is expected of each student. Class attendance records will be maintained. A student that accumulates more than three UNEXCUSED absences during the semester, for which no explanation is given, becomes ineligible for grade adjustment and will receive a semester grade, minus any adjustment, based on the schedule above.

STUDENT ABSENCES ON RELIGIOUS HOLY DAYS POLICY

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence.

University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). This request must be made in the first fifteen days of the semester or the first seven days of a summer session in which the absence(s) will occur. The instructor will complete a form notifying the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.

DISABLED STUDENT POLICY

It is the policy of Sam Houston State University that no otherwise qualified disabled individual shall, solely by reason of his/her handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any academic or Student Life program or activity. Disabled students may request help with academically related problems stemming from individual disabilities from their instructors, school/department chair, or by contacting the Chair of the Committee for Continuing Assistance for Disabled Students and Director of the Counseling Center, Lee Drain Annex, or by calling (936) 294-1720.