

BIOLOGY 3470

GENERAL MICROBIOLOGY

4 CREDIT HOURS (INCLUDES LAB)

SPRING 2017

LECTURE 10:00-10:50 AM, MWF, LEE DRAIN BLD, RM 207 CRN 21376

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Office Hours are by appointment.
Email is the surest way to reach me to set an appointment.

About me: I attended Atlanta High School (graduating class of 129) in Atlanta, Texas, close to Texarkana. I received a Bachelor of Science in Biochemistry from Texas A&M University, then earned a Ph.D. in Biochemistry from Baylor College of Medicine in Houston, working on protein folding and aggregation. I did a three-year postdoctoral fellowship at the National Institutes of Health, in Bethesda, Maryland in the Tuberculosis Research Laboratory, then taught for five years at UT-El Paso. My current research is focused on the mucosal microbiomes of animals. I also have research on the effectiveness of active learning in the classroom. I came to Sam Houston State University in the summer of 2005.

Course Description: This required course for BIOL and BMED majors provides broad exposure to the field of microbiology, focusing mainly on bacteriology (with a brief introduction to virology, parasitology, and mycology). Courses on parasitology, medical microbiology, virology, and immunology are available at SHSU following up on this general course. The major topics include growth of microorganisms, bacterial structure, physiology, and biochemistry, along with infections, treatments, and basic immunology. The laboratory component will teach the basics of culture and identification of bacteria, and microbial ecology, with an exploratory format. Also included will be some exposure to environmental microbiology, public health, and virology.

Course objectives:

Students in this class will...

1. learn the major terms and concepts of microbiology
2. understand the major structures in bacteria and their functions
3. gain a working understanding of bacterial physiology and morphology
4. understand the basics of medical and environmental microbiology
5. acquire basic laboratory skills in microbiology, especially bacterial identification
6. gain an appreciation of the field of microbiology; its history, advances, & applications
7. develop critical thinking skills related to experimental design, interpretation of scientific data and theories, and studies in microbiology and the biomedical field

The major concepts for an undergraduate course in microbiology have been stated by the American Society for Microbiology curriculum guidelines, available at <http://asm.org/index.php/education/undergraduate-faculty/29-education/undergraduate-faculty/213-asms-curriculum-recommendations-introductory-course-in-microbiology1> My approach in science education is concept-based learning, as opposed to memorizing a large volume of facts. There are several reasons for this. First, a number of those “facts” will be altered, eliminated, or replaced with continuing scientific discovery. As new discoveries occur, it is the nature of science to alter our understanding. Thus, you are not learning exactly how a cell works, you are learning our current best understanding of how a cell works, which will inevitably change over time and be improved. Second, if you just memorize a bunch of details, you will forget most of it quickly unless you apply that knowledge somehow. Third, in the rapidly advancing field of microbiology, you will encounter a large volume of new information in the future. If you have a strong grasp of the basic concepts of the field, then you can fit these new ideas into your web of knowledge. While a number of basic facts and terms must be memorized, we will focus on learning and applying major concepts in this course. The major learning strategies in the laboratory portion of the course are experiential, exploratory, and inquiry-based learning, which are explained in the lab manual.

Required Course Texts:

Microbiology: An Evolving Science, 4th Ed., by Slonczewski and Foster, published by Norton. The bookstore on campus should have the 3-hole punch looseleaf version (ISBN 978-0-393-61500-5, available direct from Norton online for \$144-but confirm when you can get a copy, this version is releasing just now).

Required for the lab is *Microbiology 3470 Laboratory Manual* is available from Eagle Graphics, at 1304 Sam Houston Ave (<http://www.eaglegraphicsink.com>). This is a loose leaf version, so purchase a three-ring binder to hold it (1.5 or 2 in diameter suggested). This is version 4.0, and has significantly changed from previous semesters. This custom manual is produced for especially this course, so is not available elsewhere. Proceeds from the sale of this manual go to the Departmental student scholarship funds to assist future generations of students in having an affordable education.

Optional for the laboratory is *A Photographic Atlas for the Microbiology Laboratory*, 4th Edition (3rd edition is fine as well), by Leboffe and Pierce, from Morton Publishing Company. Students who are visual learners have found this atlas very helpful in the lab for knowing what to expect for experimental tests and procedures. The custom lab manual does not have elaborate pictures, to keep costs down. Copies of this should be available in the on-campus bookstore.

NOTE: I place lecture notes, assignments, readings, and host a discussion board and online exam review all in Blackboard. So, access the course site often (daily). The course schedule is continuously updated. If you do not know how to use BB, use the online tutorials. Be sure and set your notifications for the course to what you prefer (email and/or text messages, etc).

Attendance and Expectations: As a University faculty member, I will provide my knowledge and expertise and will generate a supportive educational environment. As University students, I expect you to behave professionally (cell phones off in class, prompt attendance, respect to other

students, etc). Exam material is primarily from lectures and in-class discussions, thus if you miss class you will suffer. Lecture attendance is expected and important. If something does cause you to miss class, I do not require any notification, but I expect you to be proactive and obtain lecture notes from a trusted colleague. If you are unsure how to take notes or want to improve your technique, then check the study tips I have posted on Blackboard, or participate in the study skills workshops provided by the SAM Center. If you miss an exam or quiz without notifying me in advance I do not provide a makeup. If you do notify me in advance (at least 24 hrs) and provide verification, and I accept your absence (official University activity or medical), then I reserve the right to give oral exams for makeup. I want you to learn and enjoy this course, however, that decision is up to you. The more you put in, the more you get out.

How to do well: With an intense science course such as this, you must study and keep up as you go along. Studying the day before the exam only is inadequate. You must read the book before lecture, take notes in lecture, and go over those notes after lecture, preferably with a study group. In lecture and class discussions, as well as the examinations, I assume that you have read the textbook. If my lectures seem too fast or “over your head,” then read the text more carefully. My job is not to discuss every detail in the textbook, but instead to explain the important concepts clearly. We will make outlines of chapters in the book as part of this course.

Course evaluation: This course has two components, lecture and lab, combined into one overall four-hour course grade.

LAB weekly quizzes = one-third
In-class comprehensive exam = one-third
MetaProject pairs written report = one-third

LECTURE 4 exams (125 pts each) = 500 pts
5 projects and activities (20 pts each) = 100 pts
10 chapter reading quizzes (10 pts each) = 100 pts

The lab component is 30% of your overall grade and the lecture component is 70%.

What about extra credit?

Yes, it is built into the system at several levels. First, the lowest quiz grade in lab is automatically dropped. Second, if earn a score of 10 for all of the reading quizzes (and they can be completed as many times as you like before a certain due date), then you get 10 bonus points. Third, projects that are well written and go above and beyond the minimum required can receive bonus points as well.

No grades are curved, you get exactly what you earn, thus everyone can get an A. Quizzes to help you make sure you understood the textbook chapters will be online in Blackboard. There will be eight active learning projects (take-home and in-class), given to enhance understanding of course topics. Course grade is the typical breakdown of A (100-90%), B (89-80%), C (79-70%), D (69-60%), or F (59% and below). There is no extra credit beyond what is listed above.

For official University guidelines and policies related to students with disabilities, academic dishonesty, visitors in the classroom, and religious holidays, see <http://www.shsu.edu/syllabus/>
Course Calendar:

The course schedule will be on Blackboard, updated daily. The material listed on a date is the subject covered during that class period. Read the assigned material **before** the class (subject to quiz). Online exam reviews will also be on Blackboard, and lab assignments as well.

Advice for success:

- ✓ Listen carefully in class and take extensive notes. Organize the notes when you get home, that same day if possible when the material is fresh in your mind. If you have trouble listening, then record the lecture and listen again later.
- ✓ Whenever possible, ask questions in class. Feel free to post questions on the Blackboard discussion board, or to email me, or to come visit my office. I enjoy seeing you learn.
- ✓ Join a study group with other motivated students. You can teach each other and learn from each other. With different backgrounds, you can fill in the gaps in each other's knowledge.
- ✓ Read the textbook carefully, not like you read a newspaper. Make an outline of the chapter, note important terms, and summarize sections in your own words. This will not only prepare you for the quizzes, but dramatically enhance your learning from the textbook, which was specifically selected for students with little microbiology background.
- ✓ Study in advance with your group, don't cram. Even if you manage to obtain a decent grade, information crammed in at the last minute usually is lost fast from memory. Since the concepts in this course naturally are comprehensive and build on each other, that would be bad.
- ✓ Join the online study session before each exam. Study in advance, then use the online session to ask any last questions or clear up any misconceptions.