

BIOLOGY 3470W
GENERAL MICROBIOLOGY

4 CREDIT HOURS
SPRING 2018

LECTURE SECTION 01 9:00 – 9:50 AM, MWF, LEE DRAIN BLD, RM 216, CRN 20312
LAB SECTION 03 M 12:00 – 2:50 PM, LDB 119D, CRN 23749
LAB SECTION 04 M 3:00 – 5:50 PM, LDB 119D, CRN 23751
LAB SECTION 05 M 6:00 – 8:50 PM, LDB 119D, CRN 23752
LAB SECTION 06 W 12:00 – 2:50 PM, LDB 119D, CRN 23753
LAB SECTION 07 W 3:00 – 5:50 PM, LDB 119D, CRN 23754

Course Instructor: Aaron Lynne, Ph.D.
Department of Biological Sciences
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Office Hours are MWF 10:00-11:00 or by appointment (best)
Email is the surest way to reach me to set an appointment

Course Description: This required upper-division majors course provides broad exposure to the field of Microbiology, focusing mainly on bacteriology (brief introduction to virology, parasitology, and mycology). 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 a very active format. Also included will be some exposure to environmental microbiology, public health, and virology.

Course objectives:

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 microbiology
5. acquire basic laboratory skills in microbiology, especially bacterial identification

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 within the next decade. 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 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 use 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.

Required Course Texts: *Microbiology: An Evolving Science*, 4th Ed., Slonczewski and Foster, Norton Publishing. *General Microbiology 3470 Laboratory Manual*, Aaron Lynne, Matthew Breuer, Dawn Burns, Keli King, Lauren Smith, Sam Houston State University, is available at Eagle Graphics (1304 Sam Houston Ave #B).

Optional Course Text: *A Photographic Atlas for the Microbiology Laboratory*, 4th Ed. Leboffe and Pierce. Morton Publishing. While not required, I highly recommend using this atlas. The photos will help interpret results in lab.

Attendance and Expectations: As a University faculty member, I will provide my knowledge and expertise and try to give 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 due to an unexcused absence 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 written or 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 with class discussion, 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. Make outlines of chapters in the book, we will do some examples as part of the course.

Course evaluation: This course has two components, lecture and lab.

LECTURE 4 exams (100 pts)

LAB 33% quizzes (about 10 quizzes worth 10 points each) + 33% written exam (100 pts) + 33% final project (100 pts).

For the lab component, we will have approx 11 weekly quizzes worth 10 pts each (110 pts total) with the lowest quiz dropped. The written comprehensive exam is worth 100 points. The metaproject is also worth 100 points.

Students with Disabilities Policy

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance should visit with the Office of Services for Students with Disabilities located in the Counseling Center. NOTE: no accommodation can be made until you register with the Counseling Center.

Course Calendar:

The course schedule will be on Blackboard, updated frequently. The material listed on a date is the subject covered during that class period. Read the assigned material **before** the class (subject to quiz).

Exam Schedule

Exam 1 – Feb 14

Exam 2 –Mar 7

Exam 3 – April 11

Final Exam – Final's Week

Potential Topics

Chapter 1: Microbial Life

Chapter 2: Observing the Microbial Cell

Chapter 3: Cell Structure and Function

Chapter 4: Bacterial Culture, Growth, and Development

Chapter 5: Environmental Influences and Control of Microbial Growth

Chapter 6: Virus Structure and Function

Chapter 7: Genomes and Chromosomes

Chapter 8: Transcription, Translation, and Bioinformatics

Chapter 9: Gene Transfer, Mutations, and Genome Evolution

Chapter 10: Molecular Regulation

Chapter 13-15: Metabolism

Chapter 16: Food and Industrial Microbiology

Chapter 17: Origins and Evolution

Chapter 21: Microbial Ecology

Chapter 23-24: Immunology

Chapter 25: Microbial Pathogenesis

Chapter 26: Microbial Diseases

Chapter 27: Antimicrobial Chemotherapy

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.
- ✓ 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.