BIO 220 – Spring 2018
2 credits
The University of Tennessee

Lecture: Tuesdays & Thursdays 11:10AM to 12:25PM, SERF 307

Lecture Instructor:
Karen Lloyd, Ph.D. (klloyd@utk.edu) please include "BIO 220" in the subject line!

Office Hours (location):
Wednesdays, 10:15-11:15 am; Thursdays, 9:00-10:00 am, SERF 618
Please let me know in advance if you plan to come

Course Description: Fundamental concepts in microbiology: structure and function of microbial cells; roles of microbes in nature and society; microbial diseases and immunity.

BIO 220 is an introductory survey course in microbiology. We will cover a wide number of topics so students can gain an understanding and appreciation for the many sub-disciplines of science that are found under the umbrella of microbiology. The first part of the course covers basic foundation principles such as the structure, physiology, metabolism, and genetics of microorganisms. As lectures progress, we will discuss the diversity of the microbial world, learn how microorganisms control biogeochemical cycles, can cause diseases, and can be exploited for biotechnological applications.

An understanding of the molecular biology and physiology of microorganisms has led to many important advances in the fields of biotechnology, the production of pharmaceuticals, food science, agriculture, biofuels, disease prevention and treatment in plants, animals and humans to name just a few relevant topics. When you complete this course, we hope you will have gained a broad overview of the many disciplines that encompass the field of microbiology as well as a good understanding of the fundamentals of disciplines in microbiology.

Course Learning Objectives

By the end of this course, the student will be able to:

- Explain the relationships between the structure of a microbial cell and its functional components, as well as the principles of microbial metabolism and regulation of gene expression.
- Discuss the relevance of genetic exchange among microorganisms for adaptation and evolution.
- Recognize different groups of microorganisms and distinguish microorganisms based on their lifestyles.
- Outline physical and chemical methods that are used to control the growth of microorganisms.
- Gain an appreciation for nonspecific as well as specific body defense mechanisms and how these defenses work to help prevent infection.
- Explain the role that microorganisms for biogeochemical cycling of the major elements on Earth.
- Outline approaches to study microbial community structure and function.
- Formulate principles and practices that are employed in the field of epidemiology to protect populations.

Biology Degree Learning Objectives

This course satisfies a requirement within the Biological Sciences degree curriculum. As such, we strive explain the ***five big ideas (FBIs)*** in biology as they relate to microbiology.

1. **Evolution**: Populations of organisms and their cellular components have changed over time through both selective and non-selective evolutionary processes.
2. **Structure and Function**: All living systems (organisms, ecosystems, etc.) are made of structural components whose arrangement determines the function of the systems.
3. **Information Flow and Storage**: Information (DNA, for example) and signals are used and exchanged within and among organisms to direct their functioning.
4. **Transformations of Energy and Matter**: All living things acquire, use, and release and cycle matter and energy for cellular / organismal functioning.

5. **Systems**: Living systems are interconnected, and they interact and influence each other on multiple levels.

How you will learn the material

As this is a lecture-dependent course, I recommend taking notes about what I emphasize in class. You will not be able to do well in this course if you simply read the course materials from Blackboard and do not come to lectures. **I recommend that you attend every lecture and that you write out notes by hand; writing by hand makes far more neuronal connections than typing, and that will help you understand the material.** It is **imperative** that you stay on-top of your readings and studying. There will be far too much material to digest if you wait to the last minute to read and/or study. I strongly suggest that you review your notes, re-writing and re-organizing them after every class meeting. As I pose questions to the whole class during lecture, try to formulate an answer in your mind, even if you don't plan on answering out loud. Please raise your hand if you need clarification or have a question during lecture. Slides are used as talking points, to illustrate more complex figures, and for providing correct spelling of organisms, etc. They are meant as accessories to the notes that are written on the board.

Date	Day	Readings	Topic
			Section 1 – Microbiology Basics and Structure
1/11	Thurs	1.1-1.6, 18.1, 19.1, 20.1	1. Course Overview and the History and Microbial Diversity
1/16	Tues	2.1; pgs. 51-57; 3.1-3.3	2. Observing the Microbial Cell (Last day to drop without a "W")
1/18	Thurs	3.4-3.7; 3.2	3. Microbial Cell Structure & Function
1/23	Tues	4.1-4.3; pgs. 141-143; 4.6-4.7	4. Bacterial Culture, Growth and Development
1/25	Thurs	5.1-5.8	5. Environmental Influences and Control of Microbial Growth
1/30	Tues	10.1; 10.4; 10.6-10.8	6. Molecular Recognition
2/1	Tues		**Exam I (Karen in Montana)**
			Section 2 – Human-Microbe Interactions
2/6	Thurs	16.1-16.6	7. Food and Industrial Microbiology
2/8	Thurs	23.1-23.3	8. Human microbiota/immune system overview
2/13	Tues	23.3-23.7	9. Nonspecific host defenses
2/15	Thurs	24.1-24.4	10. Adaptive immune response
2/16			Last day to drop with a "W"
2/20	Tues	25.1-25.2; 25.6	11. Microbial pathogenesis
2/22	Thurs	27.1-27.2; 27.4-27.5	12. Antimicrobial Therapy
2/27	Tues	6.1-6.2; pgs. 208-218	13. Virus Structure and Function
3/1	Thurs		**Exam II**
			Section 3-Evolution, Biodiversity, and Ecology
3/6	Tues	17.1-17.6	14. Origins and Genome Evolution
3/8	Thurs	17.1-17.6	15. Origins and Genome Evolution
3/13	Tues	20.1-20.6	16. Eukaryotic Diversity
3/15	Thurs		**No Class, Spring Break**
3/20	Tues		**No Class, Spring Break**
3/22	Thurs	21.1-21.7	17. Microbial Ecology
3/27	Tues	21.1-21.7	18. Biogeochemistry

3/29	Thurs	15.5; 22.1-22.6	19. Biogeochemistry
4/3	Tues		**Exam III**
			Section 4 – Energy and Metabolism
4/5	Thurs	13.2-13.6;	20. Energetics and Catabolism
4/10	Tues	13.2-13.6;	21. Energetics and Catabolism
4/12	Thurs		Catch-up day
4/17	Tues	14.1-14.3	22. Respiration, Lithotrophy and Photoslysis
4/19	Thurs	14.4-14.6	23. Respiration, Lithotrophy and Photoslysis
4/24	Tues	15.1-15.3; 15.5-15.6	24. Biosynthesis
4/26	Thurs	15-16	25. Applications of microbes
5/6	Friday		**Final exam 12:30 PM- 2:30 PM**

As per the registrar's website: "Final exams must be given during the final exam period at the scheduled time, although alternative uses of the scheduled exam period may be designated by the instructor. Students are not required to take more than two written exams on any day. The instructor(s) of the last non-departmental exam(s) on that day must reschedule the student's exam during the exam period. ***It is the obligation of students with such conflicts to make appropriate arrangements with the instructor at least two weeks prior to the end of classes."***

01/22/2016: Last Day to Drop without a "W"
04/05/16: Last Day to Drop with a "W"

Changes to the syllabus

The instructor has the right to revise/alter any part of the syllabus. If any changes occur, students will be notified immediately via Blackboard, group email and in-class announcements.

Technology: During exams and quizzes, any electronic device seen on your desk or within sight will result in a grade of zero.

Honors-by-Contract: Any student interested in taking this course via honors-by-contract should contact the instructor for detailed information on the additional requirements.

Support for learning

REQUIRED Texts and Materials: *Microbiology: An Evolving Science, 3rd ed. Slonczewski JL, Foster JW.* W. W. Norton & Co. *The Hardcopy version of this textbook is available from the UT Bookstore. Electronic versions are available from the publisher's website at reduced cost. Please refer to publisher's website for specific information on available formats and cost structure (http://www.nortonebooks.com/)*

Course website: Go to "Online@UT" to login to Blackboard. This site will be used regularly for communication and posting lecture syllabus, extra readings, assignments, course grades, etc.

Communications:

- You need to regularly check your UTK e-mail account for announcements related to this course.
- Email is an excellent way to communicate with me, but I will not respond to emails that do not require a response. For example, make-up exam policies, dates, and times are indicated on the syllabus.
- All emails must have "BIO 220" in the subject line.
- If you need to meet and can't make office hours, please use your UTK e-mail (spam filters may exclude other addresses) to schedule a meeting.

Study Rooms:

417 Hesler is a quiet study room for majors in Biology. It can also be reserved for group study.

There is also a student study room in Neyland Biology Annex, room 103.

Assessment of your learning

Class attendance:

- **Students must attend 50% of the lectures or they will receive an F for the course.**
- Class attendance will be monitored through the daily Clicker quizzes.

Grades:

- 4 exams, each worth 100 points (details below).
- Clicker Quizzes, totaling 50 points (details below)
- Online quizzes: 25 points (details below)
- Microbe of the day: 25 points
- Total points: 500 points.
- *Note that no individual extra credit will be given for this course outside of what each instructor may offer to the entire class.*

Clicker quizzes:

- Quizzes will be based on all readings and lecture materials covered up to that class period; they will be reflective of the types of questions that will appear on the exams.
- Quizzes are CLOSED BOOK; cheating will not be tolerated. Use of electronic devices, discussion with a neighbor or viewing ANY notes/textbooks, etc., will result automatically in a grade "Zero" for the quiz. A second incident of improper conduct will result in the grade "F" for the entire course.
- **Using another student's clicker along with your own will be considered a violation University of Tennessee Honor Code and will be treated appropriately! It is not worth the risk, please do not do it!**
- Clicker quizzes will be given every class period.
- Clicker grading will be based on 50% for attendance, and 50% for correct answers. For example, if you attend the class and log in for the quiz and get no correct answers, you will obtain 50% of the points possible for that day. If you attend and answer every question correct, you receive 100% of the points. Quiz grades will be uploaded within 24 hours of their administration and students will have 24 hours after their posting to report missing scores or defects in quizzes in person via appointment.

Exams:

- There will be three, in-class, closed-book examinations, each totaling 100 points. The exams will consist of 80% multiple choice and 20% short "thought questions. The use of review sheets and electronic devices (cell phones, PDA's, etc.) are strictly prohibited during exams and must be stowed out of sight during the entire exam period.
- The Final Exam will be cumulative (i.e. you can not forget what you have learned earlier in the semester, but you will not have to know it in a high level of detail); however, the focus will be on the materials discussed after the third exam (i.e., the last set of lectures).
- Exam questions will be based on the materials discussed in class, provided in the pertinent textbook chapters, and in online quizzes.
- Cheating on exams, quizzes, or homework assignments will not be tolerated. Improper conduct will automatically result in a grade "zero" for the exam, quiz or assignment. A second incident of improper conduct will result in the grade "F" for the entire class and referral to the Office of Student Judicial Affairs.
- All exam questions and answer sheets will be collected by the instructor for individual student course documentation.
- Computation of a student's final class grade is based on the total number of points from the four exams and additional credit from assignments and quizzes (500 points possible).
- Be aware that *No Individual Extra Credit* will be available for this class outside of what each instructor may offer to the entire class.

Grading Questions, Concerns, Comments

Questions regarding ANY grade in this course (whether quiz or test) will be handled ONLY via an in person meeting. Grading issues will not be handled via email or phone. If you have a

question/concern/comment, you must either come to office hours or schedule an appointment to discuss the issue face-to-face with the instructor. **You will have two weeks from when the tests/quizzes are given back to the class to raise a concern. No issues will be dealt with after two weeks.**

Missing an Exam or Quiz and Making up a Missed Exam:

- Illness or Emergency: If you have an emergency or illness on the exam (or quiz) day, you should notify the instructor by phone or email no later than the day of the exam. *Failure to contact the instructor within 24 hours of the missed regularly scheduled exam will result in an assigned grade of zero for this exam* (unless there are extreme extenuating circumstances, such as hospitalization or death in your immediate family).
- It is your responsibility to make every effort to take each exam at its regularly scheduled time. Only students with valid, **documented** excuses will be allowed to take a make up exam and this will be done at the instructor's discretion within one week of the regularly scheduled exam that the student has missed.
- It is the student's responsibility to notify the instructor that they have missed an exam so appropriate steps may be taken for a make-up exam if appropriate.
- If you anticipate missing an exam date due to a UT sanctioned event or scheduled interviews with professional schools, you need to notify the instructor at least one week prior to the exam so that a make-up exam can be scheduled.
- *Make up or early exams will consist of short answer and/or essay questions*.
- Excused absences from an exam include: severe personal illness, a death in the immediate family, jury duty, car accident or personal injury, military service or a UT sanctioned event for which UT personnel have requested in writing that the student be absent from the classroom on the scheduled exam day. Verifiable documentation (i.e. note from a physician, etc.) will be required.
- There will be no opportunity to make up a missed clicker quiz as the two lowest grades will be dropped.

Guidelines to determine your overall final grade in the course:

Final class average based on 475 points Total your points, divide by 4.75	**Grade assigned and turned in to the Registrar will be:**
Greater than or equal to 92	**A**
89-91	**A-**
86-88	**B+**
82-85	**B**
79-81	**B-**
76-78	**C+**
71-75	**C**
68-70	**C-**
60-67	**D**
Below 60	**F**

Academic integrity:

Academic dishonesty of any sort will not be tolerated. Plagiarism includes the copying of phrases, portions of sentences or the main ideas from ANYONE (including a classmate) on ANY work submitted for a grade (exams, assignments, quizzes, etc). Academic dishonesty also includes assisting other students on quizzes or exams.

You are expected to abide by The University of Tennessee honor statement in Biology and in all of your university activities as pledged in the honor code:

"An essential feature of the University of Tennessee, Knoxville, is a commitment to maintaining an atmosphere of intellectual integrity and academic honesty. As a student of the University, I pledge that I will neither knowingly give nor receive any inappropriate assistance in academic work, thus affirming my own personal commitment to honor and integrity."

(*2014-2015 Undergraduate Catalog*)

Depending on the offence, penalties for academic dishonesty range from a minimum of a zero for the assignment, to an F for the course, to the filing of formal academic dishonesty charges seeking dismissal from The University of Tennessee. These choices are at the discretion of the instructor, and can occur in either the lecture or the lab portion of the class.

You should be familiar with the requisites of academic honesty and what constitutes academic dishonesty as outlined in the UT Undergraduate Catalog (http://catalog.utk.edu/).

Other information

Disability Services: It is the responsibility of the student to bring the instructor all appropriate disability forms for signature no later than 1 week prior to an exam if you desire to take your exam outside of the classroom at a UT Approved Disability Center. This will ensure that the exam is hand-delivered to the UT approved test site in a timely fashion. If you need course adaptations or accommodations because of a documented disability, please contact me privately to discuss your needs. If you have questions or concerns about disabilities or emergency information to share, please contact Disability Services: 2227 Dunford Hall; 974-6807; Email: ods@utk.edu; Website: http://ods.utk.edu/).

Academic Assistance:

Tutoring: The Division of Biology does not offer tutoring services. Contact the Student Success Center and the Academic Support Unit of The Office of Minority Student Affairs for information about tutoring opportunities.

- **Student Success Center:** The comprehensive source for information, services, and resources to assist your success at UT: http://studentsuccess.utk.edu
    - 812 Volunteer Boulevard, Greve Hall, room 324
    - 865 974-6641, Email: studentsuccess@utk.edu

Technical Assistance:

Blackboard, clickers, or general information technology assistance:

- Help Desk: 865 974 9900 (M – F, 8:00 – 5:00)
- OIT Walk-In Help Desk: Commons, 2nd floor Hodges Library
- Turning Technologies (clickers): 866 746 3015

Counseling Center: http://counselingcenter.utk.edu/

1800 Volunteer Boulevard
865 974-2196, Email: counselingcenter@utk.edu

OTHER RESOURCES FOR STUDENTS:

- One Stop: http://onestop.utk.edu (start here for any question you have)
- Undergraduate Catalogs: http://catalog.utk.edu (Listing of academic programs, courses, and policies)
- Hilltopics: http://dos.utk.edu/hilltopics (Campus and academic policies, procedures and standards of conduct)
- Course Timetable: https://bannerssb.utk.edu/kbanpr/bwckschd.p_disp_dyn_sched (Schedule of classes)
- Academic Planning: http://www.utk.edu/advising (Advising resources, course requirements, and major guides)
- Library: http://www.lib.utk.edu (Access to library resources, databases, course reserves, and services)
- Career Services: http://career.utk.edu (Career counseling and resources; HIRE-A-VOL job search system)

Classroom etiquette
Please turn off your cell phones when in class. Also, be respectful of others and do not distract those around you. If you are using your computer to take notes, please use it for that purpose only when in class!