

BIOL 220 – Fall 2017
2 credits
The University of Tennessee

Lecture: Mondays and Wednesdays 9:05-9:55 am, WLS M307
Instructor: Dr. Elizabeth Fozo (efozo@utk.edu)
Office Hours (location): **Fridays, 9:00-10:00 am, WLS M307**
Thursdays, 2:30-3:30 pm, Walters Life Sciences, F323
Other meetings by appointment

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

BIOL 220 is an introductory survey course in microbiology. It 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, 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. Upon completion of the course students should possess a broad overview of the many disciplines that encompass the field of microbiology as well as a strong 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 of microorganisms in 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 to be successful in this course

As this is a lecture-dependent course, we recommend taking notes about what we emphasize in class. **You will not be able to do well in this course if you simply read the course materials from Canvas and do not come to lectures. We will be covering EXTENSIVE amounts of information. DO NOT leave your reading assignments until the night BEFORE the exam!** 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.

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 begin to understand the material. I strongly suggest that you re-write and re-organize your notes (BY HAND) after every class meeting. Do your notes make sense? If not, come to office hours or schedule an appointment. If you do not understand something, ASK! Ask questions in class; come to office hours/schedule meetings with me to go over material if you are confused.

Slides are used as talking points, to illustrate more complex figures, and for providing correct spelling of organisms, diseases, etc. They are meant as accessories to the notes that are written on the board. **In other words, downloading the slides and “studying the slides,” is not enough to be successful in the course.**

Below is the planned topic outline: note that this is subject to change!

Date	Day	Chapter	Topic
8/23	Wed	1	Course Overview and the History of Microbiology
8/28	Mon	2-3	Observing the Microbial Cell
8/30	Wed	3-4	Microbial Cell Structure & Function
9/1	Fri		Last day to drop without a “W”
9/4	Mon		Labor Day, no Classes
9/7	Wed	4	Bacterial Culture, Growth and Development
9/11	Monday	5	Environmental Influences and Control of Microbial Growth
9/13	Wed	6	Virus Structure and Function
9/18	Monday	13	Energetics and Catabolism
9/20	Wed	13	Exam I: material for exam 1 will include up to viruses only (energetics will be on Exam II)
9/25	Mon	13	Energetics and Catabolism II
9/27	Wed	14	Respiration, Lithotrophy and Photolysis
10/2	Mon	14	Respiration, Lithotrophy and Photolysis
10/4	Wed	15	Biosynthesis
10/9	Mon	15-16	Applications of microbes
10/11	Wed		Exam II (begins with energetics)
10/16	Mon	16	Food and Industrial Microbiology
10/18	Wed	17	Origins and Genome Evolution
10/23	Mon	17	Origins and Genome Evolution
10/25	Wed	18,19,20	Microbial Diversity
10/30	Mon	21	Microbial Ecology

11/1	Wed	21	Microbial Ecology
11/6	Mon	22	Biogeochemistry
11/8	Wed		Exam III
11/13	Mon	10	Molecular Recognition
11/14	Tues		Last day to withdraw with a "W"
11/15	Wed	23	The Innate Immune Response
11/20	Mon	24	The Adaptive Immune Response
11/22	Wed	25	Microbial Pathogenesis/Disease
11/27	Mon	26	Microbial Pathogenesis/Disease
11/29	Wed	27	Antimicrobial Therapy
12/4	Mon		Make-up day
12/11	Mon		FINAL EXAM: 8:00-10:00 am

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.**"

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 Canvas, 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 me for detailed information on the additional requirements.

Support for learning

REQUIRED Texts and Materials: *Microbiology: An Evolving Science, 4th^d 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 CANVAS. 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 "BIOL220" 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 at LEAST 50% of the lectures or they will receive an F for the course.**
- There are a total of lectures; students must attend a minimum of 13 lectures, or he/she will receive an F for the course.
- Class attendance will be monitored through the Clicker quizzes.

Grades:

- 4 exams, each worth 100 points (details below).
- Clicker quizzes, totaling 50 points (details below).
- Online quizzes, totaling 50 points (details below).
- Total points: 500 points.
- *Note that no individual extra credit will be given for this course.*

Exams:

- There will be four, in-class, closed-book examinations, each totaling 100 points. The exams will

consist of 70% multiple choice, 10% a mixture of more complex multiple choice (more than one answer may be correct) and fill-in the blanks, and 20% will consist of 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 cannot 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 all assigned readings, links on Canvas, and handouts. Questions may consist of a combination of multiple choice, true/false, matching, short answers and labeling of diagrams. Some questions will require that you answer in complete sentences. Note that we will also ask some synthesis questions that will probe your broader understanding of the materials discussed.
- **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.
- Exam scores will be posted at the class website on Canvas at Online@UT. The first three exams will be given during the regular class period while the fourth exam will be given as your final on **December 11 from 8-10 am.**
- Computation of a student’s final class grade is based on the total number of points from the four exams and additional credit from in-class quizzes (500 points possible).
- Be aware that **No Individual Extra Credit** will be available for this class.

Personal Response Systems (Clicker) quizzes:

- This course will use the TurningPoint Cloud personal response system for in-class attendance and quizzes. Be sure to check the UTK OIT webpage (<https://oit.utk.edu/instructional/tools/clickers/Pages/default.aspx>) for important updates on using this technology.
- 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 a classmates’ clicker is PLAGIARISM! .
- 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 almost 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. *During the course of the semester, there will be **60 points** available in the form of Clicker Questions. Each individual will be able to earn a **maximum of 50 points** toward their final grade.* 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.

On-line Canvas quizzes:

- There will be 8 timed, on-line quizzes offered through our Canvas course site, each totaling 6.25 pts.

- **As with all course related activities, the honor code applies to taking on-line quizzes. Having another student take your quiz, or taking a quiz for another student, is considered a violation of the Honor Code.**
- 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.
- During Friday office hours, I will review the online quizzes as well as any other questions.

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.

Missing an Exam and Making up a Missed Exam:

- **Illness or Emergency:** If you have an emergency or illness on the exam 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.

Guidelines to determine your overall final grade in the course:

Final class average based on 500 points Total your points, divide by 500 then multiply by 100	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 statement that each student agrees to when applying to the University:

“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.”
(University of Tennessee Student Code of Conduct)

Depending on the offense, 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.

You should be familiar with the requisites of academic honesty and what constitutes academic dishonesty as outlined in the UT’s Hilltopics (hilltopics.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://bannersb.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!

Additional tips for success

- **Be present** – attend all your classes– every activity in a class was included intentionally to help you learn and is therefore an important part of success in the class!
- **Be a participant** – engage in learning in class, work with your peers to understand material, take notes in class, ask questions
- **Be perceptive** – your instructor provides clues to success via the content they focus on, activities they have you do, hints they drop in class, and the way they test. Use these cues to be successful in THAT class (which may be different from how to be successful in another class!)
- **Be prepared** – do your homework, take notes on readings (not just highlight them), try to understand things before you go into lecture class
- **Be proactive** – go to office hours, stick to a regular weekly or daily study schedule (don't cram), form a study group (THAT STUDIES!)
- **Be purposeful** – remember your goals for attending college, make adjustments when things don't go right and don't give up

Biggest mistakes

- **Forgetting that meaningful learning takes effort** (it is creating new neural connections in your brain... of course it is hard!)
- **Thinking that intelligence is fixed** (intelligence has no limit and can always be increased over time)
- **Not changing course approach after not doing well on a quiz or exam** (see fixed intelligence above; students give up because decide they “aren't good at XX”)
- **Using passive study approaches versus active testing of knowledge** (re-reading notes or highlighting doesn't build neural connections; studies show that re-writing, re-organizing, and testing yourself are the most effective ways to learn)
- **Studying for memorization instead of application** (many high school courses test for memorization (regurgitation of information) while college exams ask students to apply information to a new problem – this requires a different way of studying (see above!))
- **Thinking that grades in high school determine grades in college** (see above; the ways you are tested will be different, so your studying has to be different; it is basically a clean slate for your GPA)
- **Assuming that multi-tasking in class is no big deal** (every time you switch to a new task requires a pause in brain function, which means you can't re-capture what you missed; plus, your brain literally cannot process two streams of information at one time (no matter how awesome you think you are at it))
- **Being too afraid to ask for help from peers or teachers** (seeing an idea from a different perspective can be the key to understanding)
- **Thinking that college won't be a struggle sometimes** (everyone struggles to reach their potential; that effort is valuable and worth the effort.
- **Thinking that because you are a “senior” student or a major in a “hard” discipline, that BIO 220 is easy.** Every student, regardless of background, will need to devote time and effort in order to be successful in this course. Do not rest on your laurels or you will be disappointed.