Biology 1320 Biology of Disease: Zombie Outbreak

Fall 2022

Professor: Dr. Stephanie Daugherty
sdaugherty@uttyler.edu
Office: BEP 107  phone: 903-566-7013
Office Hours: In person: T & Th 8-9:00, & as arranged

Scheduled meeting times: T and Th 9:30-10:50am
See printed calendar for plan

This course will introduce non-science majors to fundamental biology concepts using the model of zombie outbreaks {enzymes, cells, systems, pathogens, immune systems, epidemiology, and genetics}

Grades are earned by students based on student mastery of learning objectives, via assignments, activities, participation, and assessments.

Objectives:
1. Students will learn the difference between correlation and causation in scientific research, and understand how researchers and physicians design scientific experiments to elucidate the difference between correlation & causation. (“What’s making zombies?”)
2. Students will learn how cellular metabolism, energy requirements, and enzyme activity govern living cells & organisms. (“Dead vs. Alive”)
3. Students will learn some basics about how neurons function, how brain regions control different parts of the sensory and motor systems, and discuss the complexity of disease processes affecting specific brain functions (“Brainssss….”)
4. Students will learn how genes control protein function, and how hereditary disease occurs and can be treated (“Are they mutant zombies?”)
5. Students will learn how the environment plays a role in human health, and how stewardship of the environment protects human health (“Are they toxic zombies?”)
6. Students will learn about pathogens and how we treat the diseases they cause. They will learn the difference between bacteria and viruses, and how we treat them. They will also learn about natural selection and antibiotic resistance (“Are they contagious zombies?”)
7. Students will learn how the specific immune system works in general terms, and how vaccines work to protect individuals and populations (“Fighting zombies!”)
8. Students will synthesize what they have learned through guided experiments in the laboratory into a lab experiment of their own design and present a poster on the outcome.
9. Students will build a final project, a BETTER ZOMBIE STORY, that is more scientifically accurate than Hollywood versions, based upon the topics covered in the course.

Materials: Zombie Human Biology, Kendall Hunt Press, S. Fischer and C. Green. ISBN: 978-1-5249-0364-0. 2nd edition (1st edition will work just fine, the ebook version is half the cost and is also fine).

Some classes will occur in a microbiology laboratory (see calendar for those dates). This is to allow for some experiments on antibiotic resistance. Safety rules will be covered before the first bacterial lab experiment.

Class Policies in short:

Attendance at lecture activities is required

Follow all safety rules, especially during lab component

Respect your colleagues & instructors

Zero-Tolerance for Cheating & Plagiarism

Late work policy for uploaded documents: -10% each day for maximum 3 days

Late work policy for quizzes, videos, readings that close at certain time: email to ask for reopening; first one submit planner; rest penalized:
Max score 75% - 2nd
Max score 60% - 3rd … rest 0%

No unexcused absences for exams or activities.
Materials:

Required: textbook: Zombie Human Biology, Kendall Hunt Press, S. Fischer and C. Green. ISBN: 978-1-5249-0364-0. 2nd edition (1st edition will work just fine, the ebook version is half the cost and is also fine). One copy of the textbook is on hold at the UTT Library.

Online systems: Canvas (provided through University); Jupiter (provided through instructor as a free system we can use as a clicker/online quiz/etc); Instant feedback program (provided through instructor for activities)

Coursework: (grade weights may be adjusted during semester if unforeseen circumstances require)

Full list of assignments available on course calendar.

Online Quizzes: one a week, based on chapter readings and supplemental slides/lectures in class. (15% of grade)

Class Activities: designed to emphasize and explain major concepts (15% of final grade).

Attendance & Participation: attendance in lectures, in lab experiments, and class activities count towards final grade, as well as full participation in activities & experiments (15% of final grade)

Lab Experiments: a few classes over the semester will occur in the micro lab and will involve a few experiments. There will be results pages turned in to document student experiment & learning (results don’t matter as much as that you can accurately talk about experiment objective) (10% of final grade)

Lab Poster: students will work in pairs or individually to build a lab poster (given an example and help of professor) explaining results of one experiment (10% of grade)

Final Exam: will cover chapter reading & topics, review quizzes to study (15% of final grade)

Better Zombie Story: use science you have learned to write/design/describe a better zombie story, graded by rubric (20% of final grade).

UT Tyler grading policy (rounding 0.50 to next percent):
00-59.49% = F   59.5-69.49% = D   69.5-79.49% = C   79.5-89.49% = B   89.5-100% = A

Expectations of Students:

Students are expected to follow rules & wear PPE as determined by the instructor.

Students are expected to participate; keep track of, and complete assignments by due date, and attend required classes/zooms (send documentation of excused absences ahead of class to instructor).

Students are expected to follow University Policy and Academic Conduct requirements, including doing students’ own work, not cheating, not plagiarizing, and citing sources appropriately.

If you have an accommodation, email professor during the first week of class to check in.
Comportment: Students are expected to behave in accordance with University Policy and with safety regulations dictated by the instructor; and behave professionally to not create a disruptive learning environment for fellow students. Tobacco and nicotine products, including e-cigarettes, pose a distraction and potential medical risk to other students, and will not be used in lecture room or in lab.

Absence Policies:
Students are expected to attend required activity classes in person (or required zooms during Covid-19 online class if needed for safety, as designated by professor). These are posted on the calendar students receive at the beginning of the semester, and students are expected to make arrangements to attend required classes. Having to work is not an excused absence.

In the case of an excused absence, students must submit documentation and let the instructor know as soon as possible prior to the scheduled class.

Multiple absences require documentation through the Student Accessibility Resource office at saroffice@uttyler.edu (903-566-7079) for a plan to accommodate absences and prepare alternative work.

Missed Activities: students who notify the professor with an excused absence ahead of an exam day, complete with required documentation, may be accommodated ONCE with a make-up activity online within one week of the absence, which may or may not be in the same format as the scheduled activity (at the instructor’s discretion). If a student misses a class or activity without contacting the instructor ahead of the start of the class or exam, no make up activity or assignment need be offered.

Late Work & Make-Up Work: A single missed assignment may be made up by any student for full credit by submitting a semester planner that includes both due dates & planned times for working on assignments to the instructor by email (see example in lab book). A second missed assignment may be made up for a maximum of 75% by contacting the instructor within 2 days. Subsequent late assignments will earn 0%. For uploaded documents or projects, late penalty is -10% every 24 hours for a maximum of 3 days, after which a score of zero will be given.

Academic Integrity Policy: Student dishonesty in this class includes, but is not limited to: plagiarism or failure to cite sources, using another’s words/ideas and claiming as one’s own; use of automated programs to reword copied-and-pasted text to “avoid plagiarism”; turning in another person’s work as one’s own, no matter where it was obtained; signing in another student to attendance records; using or possessing, in lap or hand, an unauthorized (not-in-lockdown) device during an exam; otherwise cheating on an assignment or exam.

Any occurrence of academic dishonesty can result in a score of zero on an assignment, nullification of all extra credit done by the student, failure of the course, and reporting to the Office of Judicial Affairs.

NO EXTRA CREDIT will be offered at the end of semester as a grade adjustment, or to individual students. Extra credit assignments may be given to entire class during the semester, or may be offered for following safety protocols or clean up protocols.
Withdrawals & Incompletes: Make up assignments are provided at the instructor’s discretion, dependent upon the type of assignment, attendance, previous completed assignments, the student’s diligence about contacting the instructor quickly, and the amount of time elapsed since material was missed. Missing assignments may not be provided after 3 weeks or after an exam is given, depending upon whether materials are pertinent to the next exam. Please email the instructor as soon as possible regarding missed assignments, missed classes or zoom meetings, or required quarantines. Please follow up the email if an answer has not been received within 1 week.

If circumstances force a withdrawal from the class, please contact the registrar’s office to formally withdraw from the course by the required date and email your instructor to let them know. If you fail to submit the form on time, you will receive an F in the course. You are not automatically withdrawn if you stop attending classes; you must file the form.

Best Practices & Hints:
- Download slides for lecture videos before watching from the “Materials” section, where there is a dropbox folder with copies of slides to take notes on. You can print them on paper or leave them electronic and take notes on them.
- Keep up with Lecture Videos, answer questions as you watch them & at the end to receive credit.
- Online Quizzes are open for at least one week; open them early and review the questions, then use class slides, notes, videos & class readings to answer (answers are based on class materials, not outside sources).
- Attend required zooms or required classes to complete activities, which will be crucial for exams as well as counting for credit.
- Lecture Readings do count for credit (4%) but could be considered supplemental if you are short on time. These will be “due” on the day on the calendar, but will be reopened for you to read later if needed, although points won’t be counted after the due date.

READING IS NOT ENOUGH. PRACTICE TESTING IS CRITICAL. Our Review Materials are specifically designed to make self-testing or study-groups extremely easy. WE PRACTICE LONG ANSWERS for exams together in the activities or talk about them in videos, so be sure and pay attention to those!

INTERESTED IN MORE?
Biology books simplified: Biozone Biology https://www.thebiozone.com
The Great Influenza, by John M Barry.
<table>
<thead>
<tr>
<th>Lecture Objectives</th>
<th>Student Learning Goals</th>
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<tbody>
<tr>
<td>Scientific Method &amp; Reliable Information</td>
<td>Student will learn about reliable vs unreliable sources and the scientific method (compared to diagnostic thinking). Students will learn about the presentation of information graphically and some statistical analysis terms.</td>
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<tr>
<td>Dead or Alive?</td>
<td>Characteristics of living things will be explored, as well as some basic chemistry and molecular interaction.</td>
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<td>Metabolism</td>
<td>Enzymes and Metabolism will be covered, including lysis, synthesis, and ATP formation. ATP production will be related to living things in Dead or Alive.</td>
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<tr>
<td>Brains</td>
<td>Basic anatomy and function of brains and neurons will be introduced. Neurotransmitters and neuron function will be related to some known differences and previous zombie stories.</td>
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<tr>
<td>Radiation &amp; Mutation</td>
<td>Genetics and Protein Synthesis will be covered, including the function of DNA, RNA, and proteins. Genetic diseases will be introduced, including sickle-cell anemia as a type of genetic disease. Radiation zombie stories will be covered and the history of radiation fears will be related to the understanding of DNA function and mutation.</td>
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<tr>
<td>Pathogens</td>
<td>Pathogens will be introduced including bacterial pathogens, viral pathogens, and eukaryotic pathogens, with special emphasis on pathogens that affect behavior and brains. Zombie stories that include pathogens will be used to discuss realistic and non-realistic pathogen-based zombies.</td>
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<tr>
<td>Epidemiology</td>
<td>Disease and Disease spread will be introduced, including a recap of correlation vs causation, virulence, dose of inoculation, incubation times, and fatality rates. The R-naught factor will be introduced to compare pathogen spread, and epi-curves will be introduced. Emphasis will be placed on the need for data before conclusions can be drawn, and the expected change in understanding that occurs during an active outbreak using the scientific method. Disease transmission and controls will be explored.</td>
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<td>Immune Systems</td>
<td>The immune system is introduced, beginning with first line defenses. Second line defenses are introduced and the process of eliciting a fever response are learned as though students must explain them to a patient. Emphasis is placed on fever being beneficial up to 104 degrees, and why. Inflammation is introduced, but detailed mechanism not explored. 3rd line of defense (adaptive immune response) is introduced, from antigen presentation to humoral and cytotoxic response. Effects of suppressor T cells and memory cells discussed.</td>
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<tr>
<td>Treatments: Antibiotics, Antivirals, and Antibodies.</td>
<td>Antibiotics are drugs which are used to selectively inhibit the growth of bacteria. There are multiple possible targets and mechanisms of action. Antibiotic resistance occurs when a bacterial cell is able to circumvent the activity of antibiotics, either through an enzyme that stops antibiotic action, or a mutation that alters the target of an antibiotic. Resistance can be caused by random mutation or by selection. Education of patients as to why following instructions when prescribed antibiotics is critical is emphasized. Antivirals are discussed in terms of their action and their severe limitations. Comparison is drawn between antibiotic resistance and selection for antiviral resistant strains.</td>
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Preparation & PPE

Pandemic preparation and PPE such as masks, bleach, and disinfectants will be introduced.

BUILD A BETTER ZOMBIE STORY

The final project consists of students (individually or in groups up to 3) composing a better zombie story and turning it in. The rubric requirements for the zombie story include using scientifically accurate models for zombies (with science as learned in course topics: Dead or Alive, Metabolism, Brains, Radiation or Mutation, Pathogens, Epidemiology, Immune Systems, Treatments, Preparation & PPE). Students may compose their story in different modalities, including writing a narrative, composing an art project, podcast, news broadcast, composing a comic, writing a song, etc. (examples will be shown in class).

Lab Experiment Objectives:

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<tr>
<th>Experiment</th>
<th>Description</th>
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<tbody>
<tr>
<td>Molecular Interaction</td>
<td>A wet activity without pathogens to explore the effects of charge, hydrophobicity, and shape on molecular interaction within cells. Effectively demonstrates how DNA bases pair up, &amp; how enzymes bind to substrates.</td>
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<tr>
<td>Brain Dissection &amp; Autonomic Nervous System</td>
<td>Students will observe mammalian brains, and have the opportunity to dissect brains to observe gross anatomy. A demonstration on autonomic nervous system activity will be performed.</td>
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<tr>
<td>DNA isolation</td>
<td>A wet lab without pathogens to show how DNA is isolated in laboratories to later accomplish pathogen identification or DNA testing.</td>
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<tr>
<td>Streak for Isolation and Streak a Lawn from environmental samples</td>
<td>Students will perform a streak for isolation technique (microbiology technique) with a BSL-1 level bacterium (non-pathogenic) and then a sample and streak a lawn technique from environmental samples in the micro lab. Safety requirements will be covered before this lab, and PPE including gloves, lab coats, and safety glasses will be provided.</td>
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<tr>
<td>Streak a Lawn &amp; perform Antibiotic Sensitivity test</td>
<td>Students will streak a lawn with a BSL-1 level bacterium (non-pathogenic) and perform an antibiotic sensitivity test with an antibiotic, and then a substance from a pool of choices with potential anti-bacterial action. Students will get results from this experiment and build a lab poster of their results with guidance from the professor, illustrating scientific methodology.</td>
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UNIVERSITY POLICIES AND ADDITIONAL INFORMATION THAT MUST APPEAR IN EACH COURSE SYLLABUS

UT Tyler Honor Code
Every member of the UT Tyler community joins together to embrace: Honor and integrity that will not allow me to lie, cheat, or steal, nor to accept the actions of those who do.

Students Rights and Responsibilities
To know and understand the policies that affect your rights and responsibilities as a student at UT Tyler, please follow this link: [http://www.uttyler.edu/wellness/rightsresponsibilities.php](http://www.uttyler.edu/wellness/rightsresponsibilities.php)

- **Withdrawing from Class** - Students are allowed to withdraw from this course through the University's [Withdrawal Portal](http://www.uttyler.edu/wellness/rightsresponsibilities.php). Texas law prohibits students who began college for the first time in Fall 2007 or thereafter from dropping more than six courses during their entire undergraduate career. This includes courses dropped at other 2-year or 4-year Texas public colleges and universities. Make sure to consider the impact withdrawing from this class has on your academic progress as well as the financial implications. We encourage you to consult your advisor(s) and financial aid for additional guidance. CAUTION #1: Withdrawing before
census day does not mean you get a full refund. Please see the Tuition and Fee Refund Schedule to an external site. CAUTION #2: All international students must check with the Office of International Programs to an external site before withdrawing. All international students are required to enroll full-time for fall and spring terms.

- **Final Exam Policy:** Final examinations are administered as scheduled. If unusual circumstances require that special arrangements be made for an individual student or class, the dean of the appropriate college, after consultation with the faculty member involved, may authorize an exception to the schedule. Faculty members are required to maintain student final examination papers for a minimum of three months following the examination date.

- **Incomplete Grade Policy:** If a student, because of extenuating circumstances, is unable to complete all of the requirements for a course by the end of the semester, then the instructor may recommend an Incomplete (I) for the course. The "I" may be assigned in lieu of a grade only when all of the following conditions are met: (a) the student has been making satisfactory progress in the course; (b) the student is unable to complete all course work or final exam due to unusual circumstances that are beyond personal control and are acceptable to the instructor; and (c) the student presents these reasons prior to the time that the final grade roster is due. The semester credit hours for an Incomplete will not be used to calculate the grade point average for a student. The student and the instructor must submit an Incomplete Form detailing the work required and the time by which the work must be completed to their respective department chair or college dean for approval. The time limit established must not exceed one year. Should the student fail to complete all of the work for the course within the time limit, then the instructor may assign zeros to the unfinished work, compute the course average for the student, and assign the appropriate grade. If a grade has not been assigned within one year, then the Incomplete will be changed to an F, or to NC if the course was originally taken under the CR/NC grading basis.

- **Grade Appeal Policy:** UT Tyler's Grade Appeal policy requires the completion of a Grade Appeal form for this action to take place. The grade appeal begins with the instructor of your course. If you do not agree with the decision of the instructor, you may then move your appeal to the department chair/school director for that course. If you are still dissatisfied with the decision of the chair/director, you may move the appeal to the Dean of the College offering that course who has the final decision. Grade appeals must be initiated within sixty (60) days from the date of receiving the final course grade. The Grade Appeal form is found on the Registrar's Form Library to an external site.

- **Disability/Accessibility Services:** The University of Texas at Tyler has a continuing commitment to providing reasonable accommodations for students with documented disabilities. Students with disabilities who may need accommodation(s) in order to fully participate in this class are urged to contact the Student Accessibility and Resources Office (SAR) as soon as possible to explore what arrangements need to be made to ensure access. If you have a disability, you are encouraged to visit the SAR Portal to an external site, (https://hood.accessiblelearning.com/UTTyler/) and complete the New Student Application. For more information, please visit the SAR webpage to an external site, or call 903.566.7079.

- **Military Affiliated Students:** UT Tyler honors the service and sacrifices of our military affiliated students. If you are a student who is a veteran, on active duty, in the reserves or
National Guard, or a military spouse or dependent, please stay in contact with me if any aspect of your present or prior service or family situation makes it difficult for you to fulfill the requirements of a course or creates disruption in your academic progress. It is important to make me aware of any complications as far in advance as possible. I am willing to work with you and, if needed, put you in contact with university staff who are trained to assist you. Campus resources for military affiliated students are in the Military and Veterans Success Center (MVSC). The MVSC can be reached at MVSC@uttyler.edu, or via phone at 903.565.5972.

- **Academic Honesty and Academic Misconduct:** The UT Tyler community comes together to pledge that "Honor and integrity will not allow me to lie, cheat, or steal, nor to accept the actions of those who do." Therefore, we enforce the Student Conduct and Discipline policy in the Student Manual Of Operating Procedures (Section 8).

- **FERPA** - UT Tyler follows the Family Educational Rights and Privacy Act (FERPA) as noted in University Policy 5.2.3. The course instructor will follow all requirements in protecting your confidential information.

- **COVID Guidance**
  - **Information for Classrooms and Laboratories:** It is important to take the necessary precautions to ensure a healthy and successful year. UT Tyler continues to urge you to protect yourselves against the flu, COVID and any new threats that may be developing. Be diligent about preventive measures such as washing hands, covering sneezes/coughs, social distancing and vaccinations, which have proven to be successful in slowing the spread of viruses. Encourage those who don’t feel well to stay home, and if they show symptoms, ask them to get tested for the flu or COVID. Self-isolation is important to reduce exposure. Please work with your faculty members to maintain coursework and please consult existing campus resources for support.
  - **Recording of Class Sessions:** Class sessions may be recorded by the instructor for use by students enrolled in this course. Recordings that contain personally identifiable information or other information subject to FERPA shall not be shared with individuals not enrolled in this course unless appropriate consent is obtained from all relevant students. Class recordings are reserved only for the use of students enrolled in the course and only for educational purposes. Course recordings should not be shared outside of the course in any form without express permission.

- **Absence for Official University Events or Activities:** This course follows the practices related to approved absences as noted by the Student Manual of Operating Procedures (Sec. 1 - 501).

- **Absence for Religious Holidays:** Students who anticipate being absent from class due to a religious holiday are requested to inform the instructor by the second class meeting of the semester.

- **Campus Carry:** We respect the right and privacy of students who are duly licensed to carry concealed weapons in this class. License holders are expected to behave responsibly and keep a handgun secure and concealed. More information is available at [http://www.uttyler.edu/about/campus-carry/index.php](http://www.uttyler.edu/about/campus-carry/index.php).
Resources to assist you in this course

- **UT Tyler Student Accessibility and Resource (SAR) Office** ([Links to an external site.]) (provides needed accommodations to students with document needs related to access and learning)
- **UT Tyler Writing Center** ([Links to an external site.])
- **The Mathematics Learning Center** ([Links to an external site.])
- **UT Tyler PASS Tutoring Center** ([Links to an external site.])
- **UT Tyler Supplemental Instruction** ([Links to an external site.])
- **Upswing (24/7 online tutoring)** - covers nearly all undergraduate course areas ([Links to an external site.])
- **Robert Muntz Library** ([Links to an external site.]) and **Library Liaison** ([Links to an external site.])
- **Canvas 101** ([Links to an external site.]) (learn to use Canvas, proctoring, Unicheck, and other software)
- Digital Support Toolkit (for supported courses only. Students are automatically enrolled in the toolkit for supported courses)
- **LIB 422** -- Computer Lab where students can take a proctored exam
- **The Career Success Center** ([Links to an external site.])
- **UT Tyler Testing Center** ([Links to an external site.])
- **Office of Research & Scholarship Design and Data Analysis Lab** ([Links to an external site.])

Resources available to UT Tyler Students

- **UT Tyler Counseling Center** ([Links to an external site.]) (available to all students)
- **TAO Online Support Center** ([Links to an external site.]) (online self-help modules related to mental & emotional health)
- **Military and Veterans Success Center** ([Links to an external site.]) (supports for all of our military affiliated students)
- **UT Tyler Patriot Food Pantry** ([Links to an external site.])
- **UT Tyler Financial Aid and Scholarships** ([Links to an external site.])
- **UT Tyler Registrar's Office** ([Links to an external site.])
- **Office of International Programs** ([Links to an external site.])
- **Title IX Reporting** ([Links to an external site.])
- **Patriots Engage** ([Links to an external site.]) (available to all students. Get engaged at UT Tyler.)