# LECTURE SYLLABUS - MICROBIOLOGY, BIOL 4300-001
# Fall 2024, Tue/Thu 8:00 AM – 9:20 AM

**Instructor:** Riqing Yu, Ph.D. (ryu@uttyler.edu)
Associate Professor, Department of Biology
Office: HPR 105; Tel: (903) 566-7257
**Office Time:** Mon/Wed 4:00-5:00 pm, Thu 9:30-10:30 am

**Lecture** (Time & location)**:** Tue/Thu 8:00 AM-9:20 AM; **Classroom:** Arts and Sciences 00158.
**Instruction Mode:** Face to Face.

**Required Textbook:** Willey, Sandman, and Wood: Prescott's Microbiology, 11th or 12th ed. McGraw-Hill, 2023 (ISBN10: 1264088396). All reading assignments are from this book.

**Course Description:** Microbiology is an upper-level course, aimed at juniors and seniors who want to expand their knowledge of the prokaryotic and eukaryotic microbes and viruses, microbial metabolism and genetics, phylogenetic evolution and microbiome, and microbial interactions with environments and human. It is also a basic course for enrolling in the medical or graduate school.

The major topics are microbial cell structure and function, microbial metabolism and growth, genetics and metabolic regulation, diversity and evolution, metagenomic and community analysis, nutrient cycling and bioremediation, human microbiome and diseases, and microorganisms in industry, clinic and food science. Students will be expected to understand and appreciate unique nature of microorganisms and their importance to life in both beneficial and harmful aspects, and be able to use them in class, in the laboratory, and in exams.

**Objectives:** This course will lead you to learn the fundamental scientific concepts and basic skills of applied and research microbiology for junior and senior undergraduate students. Specifically, we will assess the ways in which human activities and environments impact microbial systems and vice versa. Special consideration will be given to microbial molecular biology and genetics, microbiome characterization, analyses of microbial metabolisms and their regulation, human microbiome and diseases, and functioning genes and species in a variety of natural and engineered systems.

**Prerequisites:** Prior exposure to General Biology and Lab I (1106) and II (1107) and Organic Chemistry I is required.

**Artificial intelligence language use in BIOL 4300:** During some class assignments, we may leverage AI tools to support your learning, allow you to explore how AI tools can be used, and/or better understand their benefits and limitations. Learning how to use AI is an emerging skill, and we will work through the limitations of these evolving systems together. However, AI will be limited to assignments where AI is a critical component of the learning activity. The TA and I will indicate when and where the use of AI tools for the course assignments is appropriate.

**Academic Integrity:** Students are reminded of their pledge to uphold the University of Texas at Tyler Honor Code. Please refer to http://www.uttyler.edu/educpsych/files/HonorCode.pdf for guidelines covering academic fraud as they may apply to the course assignments and exams.

**Canvas:** All course PPT slides, announcements, assignments and grades will be posted online using Canvas (http://www.uttyler.edu/canvas/index.php). Updates to this syllabus will be posted; please check periodically. Homework assignments will be forwarded to students via Canvas and completed assignments should be submitted online on Canvas. Please refer to the "assignments" section on Canvas for detailed instructions on how to view and submit homework assignments. Letter grades which are combined from all grades will not be assigned until the end of the semester.

**Grading:** Each exam or assignment will be 100 points based. Final grade scale will be calculated as follows. Your overall letter grade will be rounded up one level if your grade is only within 1 point lower than the grade scale. All exams and their questions are forbidden for photoing or copying, and the instructors and the university own the copy right of the course exams.

| **Assignments** | **% of Final Scores** |
|---|---|
| Midterm 1 | 20% |
| Midterm 2 | 20% |
| Class attendance & participation | 5% |
| Paper presentation | 15% |
| Midterm 3 | 20% |
| Final (Midterm 4) | 20% |

| **Final grade scale** | | | | |
|---|---|---|---|---|
| **A:** 90-100% | **B:** 80-89% | **C:** 70-79% | **D:** 60-69% | **F:** <59% |

**Makeup Tests and Attendance:** In the case of illness, sports competitions or other excused absences, you will be only given for one chance of makeup exam if you notify the professor before the exam. You must have a note from your physician, a coach or whoever is appropriate for explaining a legitimate absence. If you are not excused, you will receive a zero. No one may take the final exam early.

**Attendance:** Attendance is required for the active and interactive study and to follow the teaching procedures for all students, which also involves the viewing of course recordings and materials as necessary. Answering quizzes, completing homework, and/or submitting comments in discussions are also indispensable parts so that I can note attendance in class. The instructor is also required to provide attendance data for Financial Aid, midterm, and final grades submissions; therefore, it is critical that you maintain activity in this class. Attendance: The instructor will randomly check the class attendance for 10-15 times to evaluate the attendance grade based on the percentage the student shows up.

**Presentation assignment:** Every **3-4** students (required 3 or more students to fit the three classes' session) as a group will have **10 minutes** to present one microbiology-related research paper, including introduction, hypothesis, material and methods, results, discussion or conclusions.

By choosing any *microbe-related topic* you are interested in (not animal cells or cancer cells), you could search the proper papers by Pubmed (http://www.ncbi.nlm.nih.gov/pubmed) or other database source online. Once browsing the abstracts of papers, you will further determine one paper you really want to present (you may use another review paper on the same topic for your PPT introduction). Then you could download the paper either directly from Pubmed if it is

available, or you could find the full papers on the e-journals in UTTyler library (https://sfx-01uotat.hosted.exlibrisgroup.com/uttyler/journalsearch).

Final presentation grades will be evaluated by the instructor and all your classmates with a full grade of 100 points. The evaluation criteria include a reasonable and clear introduction and hypothesis, understandable methods, supportable results and conclusions with efficient communication (see the posted presentation evaluation criterion).

**ProctorU:** As one option for taking exams online, ProctorU Auto is an online proctoring service that allows you to take your exam from the comfort of your home. ProctorU's automated service is available 24/7 and does not require scheduling. Beyond the cost of the initial equipment needed (e.g. a camera for your computer), there is no any additional cost for proctoring. You will need to create a ProctorU account and install the ProctorU extension before attempting any assessment. To create a ProctorU account, follow the ProctorU tool within Canvas (See https://www.youtube.com/watch?v=u8o9SA75ZVI&feature=youtu.be). Please make sure you are using the current version of Chrome or Firefox, and download the ProctorU extension available at http://bit.ly/proctoruchrome for Chrome or https://www.proctoru.com/ for Firefox.

Your enrollment in this course requires the use of ProctorU for online assessment proctoring. YOUR ACTIVITIES ARE RECORDED WHILE YOU ARE LOGGED INTO OR TAKING YOUR ASSESSMENT(S). The recording serves as a proctor and will be reviewed and used to maintain academic integrity. You can find more detailed information on ProctorU at https://www.uttyler.edu/digital-learning/proctoru-resources. If you have religious or other concerns about this methodology, please contact the SAR office.

In order to use ProctorU, you will need the following: High-speed Internet connection, Webcam (internal or external), Windows, Mac, or Chrome Operating System, Up-to-date Chrome or Firefox browser and ProctorU extension installed, Valid photo ID, Quiet environment to take your assessment. You can visit the Test Taker Resource Page for additional information at https://bit.ly/ProctorMe. Please familiarize yourself with the tool before the first quiz.

| Type | Minimum | Recommended |
|---|---|---|
| Web Camera | 640×480 resolution | 1280×720 resolution |
| PC Users | Windows Vista | Windows 10 (10 S is not supported) |
| Mac Users | OS X 10.5 or higher | OS X 10.13 High Sierra |
| Internet Download Speed | .768 Mbps | 1.5 Mbps |
| Internet Upload Speed | .384 Mbps | 1 Mbps |
| RAM | 1024 MB | 2 GB |
| Ports | 1935, 843, 80, 443, 61613, UDP/TCP | 1935, 843, 80, 443, 61613, UDP/TCP |

**Disability/Accessibility Services:** In accordance with Section 504 of the Rehabilitation Act, Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA), the University of Texas at Tyler offers accommodations to students with learning, physical and/or psychological disabilities. If you have a disability, including non-visible a diagnosis such as a learning disorder,

chronic illness, TBI, PTSD, ADHD, or you have a history of modifications or accommodations in a previous educational environment, you are encouraged to visit https://hood.accessiblelearning.com/UTTyler and fill out the New Student application. The **Student Accessibility and Resources** (SAR) office will contact you when your application has been submitted and an appointment with Cynthia Lowery, Assistant Director Student Services/ADA Coordinator. For more information, including filling out an application for services, please visit the SAR webpage at http://www.uttyler.edu/disabilityservices, the SAR office located in the University Center, # 3150, or call 903.566.7079.

**Current University Policies on Covid-19:** During the Covid period, a face mask is encouraged in the class, especially if you have not been vaccinated. This course does contain a group presentation project. If you are sick especially infected with Covid, please stay at home to avoid spreading the virus to your classmates and instructors.

**Important Covid-19 Information of UT Tyler 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 (CDC quarantine/isolation guidelines). Please work with your faculty members to maintain coursework and please consult existing campus resources for support.

Students who are feeling ill or experiencing symptoms such as sneezing, coughing, or a higher-than-normal temperature will be excused from the class or laboratory and should stay at home and may join the course or lab remotely by Zoom. Students who have difficulty adhering to the Covid-19 safety policies for health reasons are also encouraged to join the class or lab remotely. Students needing additional accommodations may contact the Office of Student Accessibility and Resources at University Center 3150, or call (903) 566-7079 or email saroffice@uttyler.edu.

**Privacy:** Students do not have the right to be "anonymous" whether classes are in person or online, or for online courses. All discussion pages will take place within Canvas, and your names will be displayed.

## Course Schedule

| | | Date | Topic | | Cover & Reading |
|---|---|---|---|---|---|
| | | Mon | Aug 26 | | Total 80 min/class |
| | | Tue | Aug 27 | The Evolution of Microorganisms and Microbiology | Ch 1, 3 |
| | | Thu | Aug 29 | Bacterial, Archaeal and Eukaryotic Cell Structure | Ch 3-5 |
| | | Tue | Sept 03 | Viruses and Other Acellular Infectious Agents | Ch 6 |
| | | Thu | Sept 05 | Viruses and Other Acellular Infectious Agents | Ch 6, 7 |
| | | Tue | Sept 10 | Microbial and Archaeal Growth | Ch 7 |
| | | Thu | Sept 12 | Antimicrobial Chemotherapy (Review) | Ch 9 |
| | | Tue | Sept 17 | **Midterm Exam #1** (Ch 1, 3, 4, 5, 6, 7, 9) | |
| | | Thu | Sept 19 | Introduction to Metabolism | Ch 10 |
| | | Tue | Sept 24 | Catabolism: Energy Release and Conservation | Ch 11 |
| | | Thu | Sept 26 | Anabolism: The Use of Energy in Biosynthesis | Ch 11, 12 |
| | | Tue | Oct 01 | Bacterial Genome Replication and Expression | Ch 13 |
| | | Thu | Oct 03 | Bacterial Genome Replication and Expression (Review) | Ch 13 |
| | | Tue | Oct 08 | Paper presentation 1 | |
| | | Thu | Oct 10 | **Midterm Exam #2** (Ch 10-13) | |
| | | Tue | Oct 15 | Mechanisms of Genetic Variation | Ch 16 |
| | | Thu | Oct 17 | Mechanisms of Genetic Variation | Ch 16 |
| | | Tue | Oct 22 | Microbial DNA Technologies | Ch 17 |
| | | Thu | Oct 24 | Microbial Genomics | Ch 18 |
| | | Tue | Oct 29 | Microbial Genomics (Review) | Ch 18 |
| | | Thu | Oct 31 | Paper presentation 2 | |
| | | Tue | Nov 05 | **Midterm Exam #3** (Ch 16, 17, 18) | |
| | | Thu | Nov 07 | Microbial Taxonomy and the Evolution of Diversity | Ch 19 (11th ed) |
| | | Tue | Nov 12 | Proteobacteria | Ch 21 |
| | | Thu | Nov 14 | Biogeochemical Cycling and Global Climate Change | Ch 21, 28 |
| | | Tue | Nov 19 | Paper presentation 3 | |
| | | Thu | Nov 21 | Human Diseases Caused by Viruses and Prions | Ch 37 |
| | | Tue | Nov 26 | Thanksgiving holidays | |
| | | Thu | Nov 28 | Thanksgiving holidays | |
| | | Tue | Dec 03 | Human Diseases Caused by Bacteria | Ch 37, 38 |
| | | Thu | Dec 05 | Human Diseases Caused by Bacteria | Ch 38 |
| | | Tue | Dec 10 | **Final Exam** (Ch 19, 21, 28, 37, 38) (8-10 am on Dec. 10) | |
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[1]Schedule is subject to change. BIOL 4300 Microbiology Lecture : Permission #-contact Valdime Walker.