Microbiology Laboratory **BIOL 4101-001**
Section 001: Thursday, 2:00 pm– 4:50 pm **Lab: BEP 132**
Dr. Riqing Yu Office: HPR 105 **Spring 2026**

Laboratory description: In this lab course, you will learn basic microbiological laboratory skills in culturing, isolation, and identification of bacteria (culture-based) from environmental or human samples. After isolating the novel bacterial strains, you will have chance to practice a series of microbial molecular biological techniques, including genomic DNA extraction, 16S rRNA gene amplification by PCR, gel electrophoresis, DNA purification and sequencing, gene blasting and phylogenetic/ bioinformatic analysis. This lab will also provide training in enzyme activities and antibiotic disk assay.

Laboratory objectives: To learn basic microbial techniques and procedures that will benefit your future studies or jobs in biomedical, industrial, environmental, and education careers; To learn how to design and carry out novel microbial and environmental experiments; To learn how to write a scientific laboratory report.

Lab manual: This Microbiology Laboratory Manual is optimally designed for use of students who are concurrently taking a lecture class in Microbiology. A lab manual will be provided in the first week in the lab upon purchase at a basic printing cost.

Grading: Each lab report or assignment will be 100 points-based (10% of the total score). Final grades 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.

Assignments	% of Final Scores
Lab reports	50%
Midterm exam	20%
Lab participation and liability	10%
Final exam	20%

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

There will be no make-up labs. If you miss two or more labs without pre-notice and legitimate absence reasons, 15% of total points will be deducted from your overall lab grade.

Makeup tests: In the case of illness, sports competitions or other excused absences, you will be only given 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.

Lab reports: Each lab report will generally be 3-5 pages (1 or 1.5 lines) long and include graphs and/or tables. The report will be in a simplified format of a journal article (Introduction, Materials & Methods, Results, Discussion, and References Cited). Five labs will be designated for the report write-ups. Lab report will be generally due a week after completion of the lab, and you need to turn in the lab report online on the Canvas before the due time. Late lab report without justified reason and pre-notice will cause 10% grade deduction per day.

Plagiarism: If any lab report has a 40% similarity rating with another report or publication, it is a 25-point deduction. A lab report containing portions that have high similarity to another submission or publication will be subject to a 5-point deduction for each sentence, regardless of similarity rating for the overall submission.

Cleanup as the lab liability: Before leaving the lab, you have the liability to clean up what you have done, put away all waste, rinse any used glassware, disinfect unwanted cultures and the lab bench, etc. Those are parts of your experiments. Do not leave a mess, and do not expect someone else to clean up after you. Leaving a mess will cause loss of your liability points as the point loss of lab participation when you are absent without legitimate reasons.

Laboratory protection and safety:
a. Read and understand each lab procedure before starting the lab.
b. Always wear safety goggles and gloves whenever working with chemicals, flame or anything that may be infective. The lab will provide safety glasses and gloves.
c. Lab coats are also provided and required to wear in the experiment.
d. Treat all chemicals as potentially hazardous and dispose of waste according to instructions.
e. Eating, drinking, smoking, tobacco chewing, etc. are not allowed in the lab.
f. No wearing of shorts, skirts, loose clothing or open-toed shoes.

Important infectious disease 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.

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 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.

Artificial intelligence language use in BIOL 4101: 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 lab 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. Information used in your report which is copied from other documents should be referenced appropriately. Members of lab groups will collaborate on experiments, calculation and interpretations. However, the members should answer the questions and write the lab report independently.

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.

Tentative Lab Schedule[1]

Section 001

Date		Topic	Assignment	
			Starting day	Report due day
Thu	Jan 15	Lab 1 Preparing a Culture Medium, and Culturing and Handling Microorganisms	No report	
Thu	Jan 22	Lab 2 Bacterial Strain Isolation by Using Plate Streaking Technique	No report	
Thu	Jan 29	Lab 3 Microscopy and First Isolation of Environmental Strains	No report	
Thu	Feb 05	Lab 4 Gram Staining and 2nd Environmental Strain Isolation	Lab Isolation report (2-4)	
Thu	Feb 12	Lab 5 Antibiotic Disk Assay	Lab Antibiotic report (5)	Report I (Lab 2-4)
Thu	Feb 19	Lab 6 Bacterial Genomic DNA Extraction (Part I)	No report	Report II (Lab 5)
Thu	Feb 26	Lab 7 Nucleic Acid Measurement and PCR Amplification of Bacterial 16S rRNA Genes (Part II)	No report	
Thu	Mar 05	Lab 8 Gel Electrophoresis of Microbial 16S rRNA Genes (Part III) **(Exam Review during gel solidification period)**	No report	
Thu	Mar 12	**Spring break**		
Thu	Mar 19	**Midterm Exam** (Lab 1-8)	TA re-runs PCR/gel to get extra 16S	
Thu	Mar 26	Lab 9 Purification of Bacterial 16S rRNA Genes (Part IV)	Lab PCR report (6-9)	
Thu	Apr 02	Lab 10 Microbial Metabolism and Enzymes	Lab Enzyme report (10)	Report III (Lab 6-9)
Thu	Apr 09	Lab 11 Gene Analysis and Basic Bioinformatics Tools (Part V)	No report	Report IV (Lab 10)
Thu	Apr 16	Lab 12 16S rRNA Gene Sequencing and Phylogenetic Analysis (Part VI)	Lab Phylo-report 11-12	
Thu	Apr 23	**Final Exam** (Lab 9-12, & Chapter 19 Microbial Taxonomy)		Report V (Lab11-12)
Thu				

[1] Schedule is subject to change. Total five lab reports. BIOL 4101 Microbiol Lab: Permission# (Contact Rosa Carrillo).