Spring 2017
3444 (Section- 003 - 009)
General Microbiology Lab Syllabus

Graduate TA: **Email:**
Office Hours/Location: **Room:** LS 338 (Sections 003, 004, 005, 008)
LS 341 (Sections 006, 007, 009)

Class day & Time: Monday – Thursday 2:00 – 4:50 p.m.

Lab Manual: Microbiology Laboratory Theory and Application: Fourth Edition.
Morton Publishing Company, Leboffe and Pierce

Supplements: UTA Microbiology Lab Handouts available for purchase for the **price of $15.00.**

Lab Kits for Microbiology Lab – Purchase Price: $20

Both can be purchased in the Life Sciences Building Room 127 from Jan. 19 – Jan. 20th, Thursday – Friday from 10 am to 4 pm and January 23rd – February 9th, Monday – Thursday from 10 am to 4 pm. The online store can be viewed at http://www.squareup.com/store/phi-sigma

Student Learning Outcomes:

- Demonstrate lab safety and the wearing of proper attire in the microbiology laboratory
- Appropriately use the scientific method
    - Properly maintain and document lab data and results as well as analyze laboratory assignments
- Properly design, perform, and analyze an experiment while documenting it in a scientific manner
- Demonstrate proper usage of a bright-field microscope
- Properly demonstrate how to transfer organisms utilizing the aseptic technique as well as maintain an aseptic environment
- Demonstrate mastery and use of streak plate technique as a means of isolation, bacterial staining (simple and complex) techniques, wet mounts, bacterial smears, and proper culturing techniques
- Visually recognize and explain the difference between Gram positive and Gram negative bacteria (Gram stain procedure)
- Differentiate between organisms as well as species of various bacteria via biochemical testing
- Understand, thoroughly explain, and demonstrate how to control microbial growth
- Understand and thoroughly explain environmental factors affecting microbial growth
- Understand and thoroughly explain the use of various media in the microbiology laboratory
- Demonstrate professional behavior (body language, speech, etc.) in the microbiology laboratory

Tentative Schedule of Lectures
Spring 2017
***This only serves as an outline. It is subject to change at instructor's discretion.**

Lab #	Dates	Topic/Title	Reading

1. Feb. 6 – Feb. 9 **Introduction to Micro Lab**
Safety and Laboratory Guidelines in Lab Manual p.1-7

Refer to Microbiology Lab Notebook Handouts (MLNH)
Orientation & Safety ..... MLNH p. 4 – 5

Refer to Microbiology Lab Notebook Handouts (MLNH) pages 6-7
Media Prep ..... Ex. 1-2
Aseptic Techniques and Inoculation Methods ..... Ex. 1-3
Steam Sterilization ..... Ex. 2-12
Evaluation of Media ..... Ex. 2-5
Ubiquity of Microorganisms ..... Ex. 2-1
Microscopy ..... Ex. 3-1
Wet Mount Preparation ..... p. 221-222
Microscopic Examination of Pond Water ..... Ex. 3-4

2. Feb. 13 – Feb. 16 **Observation of Environmental Isolation Plates & Staining I**
Refer to Microbiology Lab Notebook Handouts (MLNH) pages 8 – 9
Colony Morphology ..... Ex. 2-2
Observe pictures of bacteria on pages 64 - 71
Growth Patterns on Slants……Ex. 2-3
Growth Patterns in Broth……Ex. 2-4

Staining I
Bacterial Structure ..... p. 181 - 184
Smear Preparation and Simple Staining ..... Ex. 3-5
Gram Staining ..... Ex. 3-7
Endospore Staining: Schaeffer-Fulton Method ..... Ex. 3-10

3. Feb. 20 – Feb. 23 **Staining II, Streaking, & Water Quality**
Refer to Microbiology Lab Notebook Handouts (MLNH) pages 10 - 16

Pure Culture Techniques
Streak Plate Methods of Isolation ..... Ex. 1-4
T-Streak Method……p. 42 - 43
Quadrant Streak Method ..... p. 43
Examples of streaks on page 42 - 43

T-Streak ..... MLNH p. 15 – 16

Bacteriological Examination of Water: Qualitative Tests ..... MLNH p. 12 – 13
Spread Plate Method ..... Ex. 1-5
Standard Plate Count: (Viable Count) ..... Ex. 6-1
Membrane Filter Technique ..... Ex. 8-12
Closed-System Growth (Read Only) ..... Ex. 6-4
The Spectrophotometer— Appendix E……p 847-849

Capsule Staining ..... Ex. 3-9

Gram Stain and Microscope Practical

4. Feb. 27 – Mar. 2 **Biochemical Tests I**

Refer to Microbiology Lab Notebook Handouts (MLNH) pages 17 - 18

Read Aerotolerance ..... p. 91
- Fluid Thioglycollate Medium ..... Ex. 2-7
- Anaerobic Jar ..... Ex. 2-8

Read – A Word about Biochemical Tests and Acid-Base Reactions ..... p. 286

Read – Introduction to Energy Metabolism Tests ..... p. 287

Biochemical Tests: Differential Tests

Read Fermentation Tests ..... p. 303
- Glucose - Phenol Red Broth ..... Ex. 5-3
- Methyl Red and Voges-Proskauer Tests ..... Ex. 5-4
- Catalase ..... Ex. 5-6
- Nitrate Reduction Test ..... Ex. 5-8

Media Reference Guide ..... MLNH p. 43 - 47

5. Mar. 6 – Mar. 9 **Biochemical Tests II**

Refer to Microbiology Lab Notebook Handouts (MLNH) pages 19 - 21

Nutrient Utilization Media ..... p. 339
- Citrate Test ..... Ex. 5-9

Tests Detecting Hydrolytic Enzymes ..... p. 361
- Starch Hydrolysis ..... Ex. 5-13
- Urea Hydrolysis ..... Ex. 5-18
- Casein Hydrolysis Test ..... Ex. 5-16
- Gelatin Hydrolysis Test ..... Ex. 5-17

Combination Differential Media ..... p. 393
- SIM Medium ..... Ex. 5-20
- Triple Sugar Iron Agar (TSIA) ..... Ex. 5-21

Mar. 13 – 17 **SPRING BREAK – No Lab**

6. Mar. 20 – Mar. 23 **Gram Negative Unknown**

Midterm

Streak Plate Practical

Receive gram-negative unknown

Refer to Microbiology Lab Notebook Handouts (MLNH) pages 22 - 27

Hand-in notebooks (1st time)

7. Mar. 27 – Mar. 30 **Environmental Factors Affecting Microbial Growth**

Refer to Microbiology Lab Notebook Handouts (MLNH) pages 28 – 29

Effect of Environmental Factors on Bacterial Growth Rate ..... p. 103
- The Effect of Temperature on Microbial Growth ..... Ex. 2-9
- The Effect of pH on Microbial Growth ..... Ex. 2-10
- The Effect of Osmotic Pressure on Microbial Growth ..... Ex. 2-11
- The Lethal Effect of Ultraviolet Radiation on Microbial Growth ..... Ex. 2-13

8. Apr. 3 – Apr. 6 **Control of Microbial Growth/Selective and Differential Media**

Refer to Microbiology Lab Notebook Handouts (MLNH) pages 30 - 36

Medical Microbiology ..... p. 517

Bring antiseptic to lab to test

Evaluation of Alcohol ..... MLNH p. 34

Evaluation of Antiseptics ..... MLNH p. 36

Antimicrobial Susceptibility Test: Kirby-Bauer Method ..... .Ex. 7-3
Demonstration
Glass Pipette Handling---Appendix C ..... p. 839 – 842
Digital Pipette—Appendix D……p. 843 – 846
Slide Coagulase Test ..... Ex. 5-27
Selective Media ..... p. 235
Mannitol Salts Agar ..... Ex. 4-4
MacConkey Agar..... Ex. 4-5
Eosin Methylene Blue Agar..... Ex. 4-6
Bile Esculin Agar ..... Ex. 4-3
SF Medium Agar ..... MLNH p. 35
Blood Agar ..... Ex. 4-2

9. Apr. 10 – Apr. 13 **Gram (-) and Gram (+) Mixed Unknowns Part I**
Receive mixed unknowns Gram (-) and Gram (+)
Gram-negative unknown report due
Refer to Microbiology Lab Notebook Handouts (MLNH) pages 37 - 40

10. Apr. 17 – Apr. 20 **Gram (-) and Gram (+) Mixed Unknowns Part II**
Notebook check (2nd time)
Refer to Microbiology Lab Notebook Handouts (MLNH) page 41

11. Apr. 24 – Apr. 27 **Clean-up/Check-out**
Mixed unknown reports due
Final Lab Exam

You are responsible for reading the designated exercises before coming to each week's lab. What you will actually perform in the lab that day may vary from what is written in the lab manual. You will be informed of any changes made to the lab procedure at the beginning of that lab period.

Microbiology Lab Notebook Handouts (MLNH)
PLEASE NOTE THE **Microbiology Lab Notebook Handouts (MLNH) ARE VERY IMPORTANT. THE HANDOUTS AER THE DIRECTIVES THAT WILL GUIDE YOU IN THE LAB!**

Laboratory Policies
1. Attendance is required; **this will often include checking cultures 24-48 hours or more post-inoculation**. Missed labs can only be "made up" by gaining permission to attend another lab section the same week since equipment and supplies for each exercise are only available during the week the exercise is scheduled. If a lab section is full, you must obtain permission from both your Graduate TA and the Graduate TA of the alternative lab section you plan to attend prior to your making up the lab. Students with disabilities please contact your Graduate TA to discuss any special needs that you may have. **PLEASE DO NOT PLAN TO ATTEND ANOTHER LAB SECTION WITHOUT PRIOR PERMISSION.**
2. Closed toe shoes and at least ankle length pants are required to enter into the microbiology lab rooms (even during open hours).
3. No food, drink (including water bottles), or gum chewing is allowed while in the microbiology lab rooms. Headphones/listening to music while working is also prohibited.

Make-up Exam Policy:
Students are required to be present for quizzes and examinations. Whether or not an absence for an exam or quiz will be excused is at the discretion of the instructor. An exam missed due to an excused absence must be taken as directed by the GTA (in the presence of the GTA). An unexcused absence for an exam will result in an exam grade of zero.

Grading

Weekly quizzes*	20%
Midterm	20%
Final	20%
Unknowns	20%
Practicals	15%
Notebook	5%
TOTAL	**100%**

*Weekly quizzes are typically composed of approximately 60% material from the last week's lab and 40% from reading material assigned for that week's lab. The lowest quiz grade will be dropped before calculating the final lab grade. The instructor may offer one extra credit assignment. The extra credit assignment is not mandatory for the student to complete (nor does the instructor have to offer it) and is offered ONLY at the instructor's discretion. **The final exam will be comprehensive.**

"A grade of I (incomplete) may be assigned for a course if, in the opinion of the instructor, there are extenuating documentable circumstances which prevent the student from completing the required work within the semester of enrollment for the course. The incomplete must be removed by the end of the final examination period of the following semester, excluding the summer session, for the student to receive credit for the course. If the incomplete is not removed during the allotted time period, it will revert automatically to an F."

Lab Supplies

A composition notebook is required in which you will accumulate any handouts, the lab lecture notes, the results and quizzes for each of the labs. This notebook will be graded twice during the semester.

Lab Kit

Individual components are available in the bookstore or you may lease a kit from Phi Sigma (the Biology Graduate Student Society) and the Mu Sigma Microbiology Society. These items will be available for purchase of $20. You may rent these kits during the first couple weeks of lab.

- Inoculating loop
- Lens Paper (10-15 sheets)
- Bibulous paper (5-6 sheets)
- 5 glass microscope slides
- 1 Clothespin (spring-type, for holding slides)
- Matches

Aprons and Goggles must be worn at all time while in the lab – you will be given an apron and a pair of goggles to use during the semester, **but the goggles must be returned at the end of the semester. Please note that if you do not wear your lab apron and goggles, you may be asked to leave the lab.**

You will need the following for lab:

Sharpie permanent marker
Gloves will be provided
Lock for drawer - Please let the Graduate TA know which drawer you take.

IMPORTANT NOTE:

All microbiology lab students, please note that at the end of the semester, during the lab clean-up, if you do not clear out ALL ITEMS with your name, initials, and or lab section, from the cold room, hot room, incubators, lab drawers, and benches, you will receive 5 points off your overall lab grade.

Expectations for Out-of-Class Study: Beyond the time required to attend each lab session, students enrolled in this course should expect to spend a minimum of two hours per week of their own time in open hours to check on cultures post inoculations, complete unknowns, and practice techniques covered in lab.

Cell Phone Policy: Cell phones' ringers must be turned off during class time and no cell phones should be visible during class. If your phone rings during class, pick up your belongings and quietly leave the room. Do not return until the next class. This includes classes in which lab practical exams are being administered. If your phone disturbs anyone in the lab and you are asked to leave, submit what you have completed and leave. You will be graded as if you submitted the exam complete.

Mandatory Online Safety Training:

1. Go to http://www.uta.edu/training.

2. Log on using your network log-on ID and password (what you use to access email). If you do not know your NetID or need to reset your password, visit https://webapps.uta.edu/oit/selfservice/ .

3. The available courses for completion will be listed under "Training I'm Enrolled In". Complete the course entitled 'Student Lab Safety Training – General.' ***NOTE: If you completed Wet, Dry or Biology Lab Safety Training course last semester for another class, that training is still applicable until the end of this academic year. Please follow instructions in #4 to print the certification page for your TA.

4. Go to 'Training I've Completed' and print the displayed page for your TA. Verify that it shows clearly your name, and that 'General, Wet, Dry or Biology' training is completed/passed and the date when the training was completed. If you have just completed the training but it is not updated on the 'Training I've Completed' page, please log out of the system and log back in. If the training still does not show up on this page, call the Helpline at 817-272-5100.

5. If you were enrolled in a course with a lab last semester and did not complete the training or if you do not see training for this academic year listed, email compliance@uta.edu providing your name, a contact phone number, NetID and course (e.g. BIOL 1441-005) and request the appropriate training for your course.

6. Students who have not completed the training by census date may be dropped from the lab (and consequently the lecture).

7. Lab Safety Training is required to be completed once every academic year. Training completed in the Fall semester is valid for the Fall, Spring and Summer sessions. It is your responsibility to print your training certification page and turn it in each semester to your TA for each course with a lab you are enrolled in.

For training specific questions, contact the Environmental Health and Safety office at 817-272-2185.

For technical assistance with the training, please contact the Office of Institutional Compliance at 817-272-5100 or email compliance@uta.edu