

# Microbiology Laboratory Syllabus Spring Summer 2020

Instructors	e-Mail	Days	Time	Section
Christopher Mataczynski	el7551@wayne.edu	T/Th	9:00 - 11:20 am	31380-002
Aleksander Ochocki	ev5457@wayne.edu	T/Th	11:30 am - 1:50 pm	31381-003
Muntasir Rahman	gp6161@wayne.edu	T/Th	2:00 - 4:20 pm	31382-004
Dave Lall	DaveLall@wayne.edu	W/F	8:00 - 10:20 am	31383-005
Sumit Bandyopadhyay	fj5746@wayne.edu	W/F	12:30 - 2:50 pm	31384-006
Qing Chen	ej1656@wayne.edu	W/F	8:00 - 10:20 am	37805-007
Bianca Pereira	gc3019@wayne.edu	W/F	12:30 - 2:50 pm	37806-008
Shelby Kasto	fq1592@wayne.edu	W/F	12:30 - 2:50 pm	38072-009
Mike Sergeant	sergeantmike@wayne.edu	W/F	12:30 - 2:50 pm	38081-010

**Lab Location:** Online During the Regularly Scheduled Lab Time

## **Course Objectives:**

**Upon the successful completion of this laboratory, the student should be able to:**

1. Learn how to safely handle and grow pure cultures of microorganisms.
2. Learn how to perform standard microbial procedures such as dilutions, pipetting, and enumeration of microbial populations.
3. Learn how to use the light microscope correctly.
4. Learn how to isolate and identify microbes from natural samples such as soil and the human body.
5. Learn how to perform and interpret basic immunological and biochemical assays.

## **Lab Manual:**

*Microbiology: Laboratory Theory and Application 4th Edition Customized for Wayne State University (digital edition)*

Michael J. Leboffe and Burton E. Pierce

ISBN-13: 978-1-64043-258-1

Lab Manual can be purchased through Vital Source at: [www.vitalsource.com](http://www.vitalsource.com) using the ISBN number listed above or through the URL listed below:

<https://www.vitalsource.com/products/custom-ebook-wayne-st-univ-mlta4-michael-j-leboffe-v9781640432581?term=9781640432581>

## **Handouts:**

In addition to the laboratory manual, some supplemental material will be provided as handouts for downloading off of your laboratory section of Canvas.

## **Lab Policies:**

Students are only permitted to access the Canvas page of the lab section for which they are officially registered.

For any issues pertaining to the lab, students must first contact their laboratory instructor, then the Lab Coordinator (Krystyn Purvis; [Krystyn@wayne.edu](mailto:Krystyn@wayne.edu)), and then the lecture instructor.

We will be using the Respondus lockdown browser and Respondus Monitor for all quizzes, midterms, and practicals.

- Students are required to use either Chrome or Firefox as their browser. Other browsers are not compatible with Respondus and are therefore not permitted.
- Students must clear the data of their electronic device (cookies and cache) before attempting a quiz, midterm, or practical. Failure to clear this data may result in slow loading times on these assessments.
- While taking quizzes, midterms, and practicals, students are not permitted to use additional electronic devices, only the electronic device needed to obtain access to Canvas.
- All quizzes, midterms, and practicals are to be the work of the individual student and should be in the student's own words.
- Students are not permitted to work with others or use study materials to assist with answers these assessments (aka No Cheating).
- Students will be asked one question at a time and will not be able to go back once an answer is submitted.

## **Grading:**

### **Summary of Laboratory Grading Criteria**

Pre-lab check	45 points
Quizzes	25 points
Lab Notebooks	135 points (35+50+50)
Midterm Exam	75 points
<u>Final Lab Practical</u>	<u>120 points</u>
Lab Total	400 points

### **Quizzes.**

Quizzes will be administered online through your laboratory section's Canvas page => Quizzes using the Respondus lockdown browser and Respondus Monitor.

- Students will have 24 hours from the time the quiz becomes available in which to take it. Any attempt to access a quiz after this 24-hour timeframe will be denied.
- Students will be given a Practice quiz on the second day of lab. Students must take this Practice quiz to test their electronic device to make sure that it is compatible with the Respondus lockdown browser and monitor.
  - Students must notify their laboratory instructor about any issue experienced during the Practice quiz so that these issues may be addressed in a timely fashion.
- Students will be given 6 quizzes throughout the semester (please refer to the laboratory schedule for the dates of these quizzes).
- Quizzes will consist of 10 multiple-choice questions that will cover the lab material up through that day of lab.
- Students will be given 15 minutes in which to take the gradable quizzes and should use their time wisely. Quizzes will be automatically submitted once the time is up.
- The lowest quiz score will be dropped. There are no makeups for quizzes missed.

### **Laboratory Exams:**

Two major laboratory exams will be given. Students will be tested on the degree to which they have achieved the course objectives described above.

- These exams will include application of the skills and knowledge acquired during the semester to solve microbiological problems as well as evaluation of the student's technical competency and knowledge.
- Improperly or incompletely spelled names of microorganisms will be marked off.
- The first exam will be given online at mid-term and will be a combination of written (short answer and multiple choice) questions and some practical stations.
- The second exam will be entirely in the form of an online laboratory practical and will be given during the last laboratory period.
  - The online laboratory practical will be comprehensive.
  - There will be 12 Canvas "questions" with 2-3 sub-questions each.

***No make-up exams will be given for laboratory midterms or practicals.***

## **Laboratory notebooks.**

Keeping a well-organized and thorough laboratory notebook is an essential part of laboratory research.

- Students are required to type out their notebook entries and submit them on Canvas through Unicheck as a pdf file.
- It is absolutely essential that you write your **pre-lab**: introduction, purpose statement, and protocols in your laboratory notebooks **BEFORE** each online laboratory session.
- Results of the experiments will be included in the lab lectures posted on Canvas in the form of images and/or tables.
- During the online laboratory session, students will discuss the results with their classmates and the laboratory instructor.
- Laboratory instructor may provide individual instructions to their students on what should be included in the results and discussion of the laboratory notebook writeup.
- Students may be required to answer additional questions within the discussion section of their notebook write-ups. These questions will be posted ahead of time as much as possible.

## **Pre-lab write-up checks.**

Pre-lab write-ups are worth 45 points of your total laboratory score.

- Each pre-lab check is worth up to 5 points.
- Students are required to submit the pre-lab for each day of lab by the start of that day's virtual lab. For example, if you are in a Tuesday section that starts at 9am, then you must submit your pre-lab by 9 am on the day that the lab experiment is scheduled.
- Late submission will not be accepted.
- Laboratory instructors will randomly check these submissions throughout the semester and assign points to these random checks.
  - Pre-lab submissions should be named in the following manner:
    - Ex. 2-1\_Ubiquity of Microorganisms\_YourFirst&LastName
    - For example, if your name is John Smith then, the submission should be titled, Ex. 2-1: Ubiquity of Microorganisms\_JohnSmith

## **Notebook collections:**

Notebooks will be collected and graded three times throughout the semester for a total of 135 points toward your laboratory score.

Students will combine all separate notebook entries into one document and name it in the following manner:

- Notebook #1\_Your First&LastName

**Notebook Collection #1 (35 points): Thursday, May 21 by 11:59pm**

**Notebook Collection #2 (50 points): Tuesday, June 23 by 11:59pm**

**Notebook Collection #3 (50 points): Thursday, July 23 by 11:59pm**

Failure to submit the notebook **by the deadline stated by the laboratory instructor** will result in a 25% penalty for each **day it is late.**

Scores earned will be based upon the criteria discussed in the *Keeping a Laboratory Notebook* handout.

### **Grade Disputes:**

A one (1) week period will be granted after the posting of a score on Canvas to challenge that score. After the 1-week period, there will be no room to challenge your score. Students should submit any score challenges **in writing** to their laboratory instructor before this one-week period ends.

**PLEASE NOTE:** This week to challenge a score starts after the Graduate Teaching Assistant posts the score online, not from the time at which you decide to check your score on Canvas.

It is the student's responsibility to check his/her scores on Canvas. If a score is missing or incorrect, then the student must contact his/her TA in a timely manner. Scores will not be adjusted after the week to challenge has passed.

For the Final Lab Practical and final notebook collection, the time allotted for grade dispute will be adjusted to approximately two days after these items are handed back to allow for assigning of final grades by the Lecture Instructor.

### **Students with disabilities:**

If you have a documented disability that requires accommodation, please register with Student Disability Services for coordination of your academic accommodations. The Student Disability Services (SDS) office is located at 1600 David Adamany Undergraduate Library within the Student Academic Success Services Department.

The SDS telephone number is 313-577-1851 or 313-577-3365; (TTY--telecommunication device for hearing impaired students).

Once you have your accommodations in place, you can contact your laboratory instructor or the laboratory coordinator to have any questions answered.

Please be aware that a delay in getting this documentation may also delay the facilitation of your needed accommodations.

- **Accommodations and services cannot be guaranteed if students choose not to follow the procedures for registering with Student Disability Services in a timely manner.**
- Accommodations and services can be revisited as needed, but they **are not retroactive** and cannot be guaranteed if procedures are not followed with reasonable, advanced notice.

Student Disability Services' mission is to assist the university in creating an accessible community where students with disabilities have an equal opportunity to fully participate in their educational experience at Wayne State University.

Please refer to the SDS website for further information about students with disabilities and the services provided for faculty and students: <http://studentdisability.wayne.edu/>

**Students with accommodation letters must provide their instructor and the lab coordinator with the letter prior to the third week of lab.**

<b>Microbiology Laboratory Schedule</b>						
Week	Lab	Date	Experiment/Exercise	Lab Book		
				Experiment	Pages	
1	1	T. May 5	<b>Check-in</b>			
		W. May 6	Lab safety, syllabus and course requirements.	Handouts and Intro	1-9	
1	2	Th. May 7	<b>Microscopy and Survey of Microorganisms</b>			
		F. May 8	Ubiquity of Microorganisms; part I	2-1	55,57-58	
			Ubiquity of Microorganisms: Cultural Characteristics; part II	2-2, 2-4 (familiarize yourself with the terms used to describe bacterial growth on a plate and in a broth)	63-72; 79	
			Brightfield Microscopy: Introduction to the Light Microscope	3-1 (pre-lab only)	141-149	<b>Practice Quiz</b>
2	3	T. May 12	<b>Microscope Slide Techniques; Bacterial Morphology</b>			
		W. May 13	Common Aseptic Transfers and Inoculation Methods	1-3 (Read Only) -- no prelab needed	27; 29-38	<b>Quiz #1</b>
			Bacterial Structure and Simple Staining	3-5	181-188	
2	4	Th. May 14	<b>Bacterial Morphology and Cytology</b>			
		F. May 15	Negative Stain	3-6	191-192	
			Capsular Staining	3-9	211-212	
3	5	T. May 19	<b>Bacterial Morphology and Cytology</b>			
		W. May 20	The Gram Stain	3-7	195-200	
			Motility Test: semisolid media	5-28	437-438	
3	6	Th. May 21	<b>Bacterial Morphology and Cytology</b>			
		F. May 22	Acid-Fast Stain (Ziehl-Neelsen Method)	3-8	203-207	
			Bacterial Endospores (Schaeffer-Fulton Method)	3-10	215-218	<b>Notebook Collection #1 due by 11:59pm</b>
4	7	T. May 26	<b>Culture Methods: Preparation of microbial media.</b>			<b>Quiz #2</b>
		W. May 27	Culture Media Preparation and Steam Sterilization.	1-2	21-26	
			<b>Microbial Nutrition and Pure Culture Methods</b>			
			Microbial Growth Requirements	1-2	21-28	
			Streak plate (omit pour plate technique)	1-4	41-46	
			Pick isolated colonies from streak plate and make pure cultures.	1-4	25-28	
4	8	Th. May 28	NO LABS -- Thursday labs cancelled to stay on schedule with Friday labs			
		F. May 29	NO LABS -- Friday, May 29 is scheduled as a Monday			
5	9	T. June 2	<b>Selective and Differential Media</b>			
		W. June 3	Phenylethyl Alcohol Agar	4-1	235-238	
			Mannitol Salt Agar	4-4	253-254	
			MacConkey Agar	4-5	259-262	
			Eosin Methylene Blue Agar	4-6	267-268	
			Hektoen Enteric Agar	4-7	273-274	
		Biosafety Cabinet	Refer to Lab Lecture			
5	10	Th. June 4	<b>Eukaryotic Microbes: The Fungi</b>			
		F. June 5	The Fungi- Common Yeasts and Molds (Day #1 & #2)	12-1	783-791	
6	11	T. June 9	<b>Bacterial Population Counts</b>			
		W. June 10	Standard Plate Count (Viable Count)	6-1	467-472	
			Using Glass Pipettes	Appendix C (read only)	839-842	
6	12	Th. June 11	<b>Bacterial Viruses</b>			<b>Quiz #3</b>
		F. June 12	Viruses: Isolation of Bacteriophage from Sewage: Enrichment	6-5	497-501	
			Viruses: Isolation of Bacteriophage from Sewage: Filtration and Seeding	6-5	497-501	
7	13	T. June 16	<b>Mid-term Written Examination: 75 points</b>			
		W. June 17	<b>Mid-term Written Examination: 75 points</b>			

Week	Lab	Date	Experiment/Exercise	Lab Book	
				Experiment	Pages
7	14	Th. June 18	<b>Environmental Influences on Microbial Growth</b>		
		F. June 19	Oxygen requirements of microorganisms	2-6, 2-7,2-8	1-92, 95-96, 99-100
			Temperature: Effects on Growth	2-9	103-104
			Osmotic Pressure and Bacterial Growth	2-11	113-115
8	15	T. June 23	<b>Identification of Bacteria: Biochemical Tests</b>		
		W. June 24	Physiological Characteristics: Oxidation and Fermentation Tests	5-3, 5-4, 5-6, 5-8	303-306, 311-314, 321-323, 333-336
8	16	Th. June 25	<b>Identification of Bacteria: Biochemical Tests</b>		
		F. June 26	Physiological Characteristics: Miscellaneous Tests	5-9, 5-12, 5-20, 5-21	339-341, 357-358, 393-396, 401-403
9	17	T. June 30	<b>Identification of Bacteria: Biochemical Tests</b>		
		<b>W. July 1</b>	Physiological Characteristics: Hydrolytic Reactions	5-13, 5-15, 5-16, 5-18	361-363, 371-372, 375-376, 383-385
9	18	Th. July 2	No Labs -- Independence Day Holiday -- Thursday labs cancelled to stay on schedule with Friday labs		
		F. July 3	<b>No Labs -- University Closed for Independence Day Holiday</b>		
10	19	T. July 7	<b>Identification of Bacteria: Biochemical Tests</b>		
		W. July 8	The API 20E Identification System	5-29	441-446
10	20	Th. July 9	Ultraviolet Light: Lethal Effects	2-13	64-65
		F. July 10	Antibiotic Sensitivity Testing	7-3	529-533
11	21	T. July 14	<b>Medical Microbiology and Immunology</b>		
		W. July 15	Identification of Gram Positive Pathogens: Staphylococcus Day#1 & #2	Refer to the lab lecture	253-254, 367-368, 423-425, 433-434
11	22	Th. July 16	<b>Medical Microbiology and Immunology</b>		
		F. July 17	E-Test and MICs Day #1 & #2	Refer to the lab lecture	
12	23	T. July 21	<b>Review for Practical</b>		
		W. July 22	<b>Review for Practical</b>		
12	24	Th. July 23	<b>LABORATORY FINAL - LAB PRACTICAL: Comprehensive, 120 points</b>		
		F. July 24	<b>LABORATORY FINAL - LAB PRACTICAL: Comprehensive, 120 points</b>		

Notebook Collection #2 due by 11:59pm

Quiz #4

Quiz #5

Quiz #6

Notebook Collection #3 due by 11:59pm