

Microbiology for the Health Sciences

Biology 251 University of Wisconsin-Stevens Point Marshfield Campus

Spring 2019

Lecture: MW 1:00-2:15
MFS STEM 526

Lab: MW 2:30-3:35
MFS STEM 526

Lecture/Lab times may be adjusted if needed for quizzes or some lab experiments

Instructor:

Dr. Terese Barta

Main campus office Chemistry Biology Bldg Room 346

715-346-4241

tbarta@uwsp.edu (use this for email)

Marshfield campus office

STEM 622

terese.barta@uwc.edu

Office hours

Available after class (MW 3:30-4:30 pm)

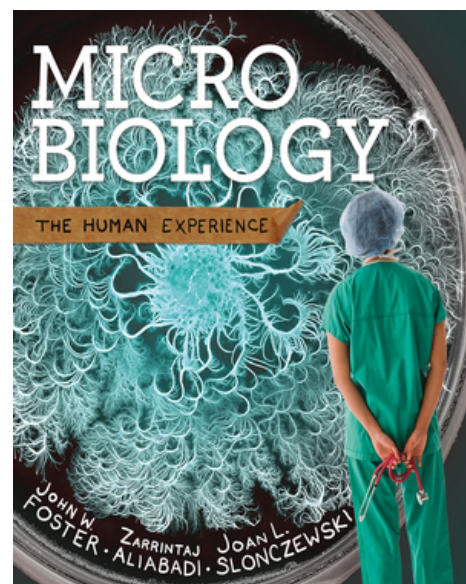
Virtual office hours: TR 4:00-5:00 pm, Main campus
(by phone and email); Appointments welcome.

Course Catalog Description. Survey of microorganisms and their activities; emphasis on structure, taxonomy, function, ecology, nutrition, physiology, pathology and genetics. Survey of applied microbiology: agricultural, medical, industrial, environmental and food. The laboratory is an introduction to standard techniques and procedures in general microbiology. Lecture, lab, and may also include demonstrations, discussion and field trips.

Prerequisites

CHE 125 recommended; BIO 101, BIO 162, or BIO 171 required, or consent of instructor.

This course has been designated the transfer equivalent of Biology 233 on the UW-Stevens Point Main Campus.



Textbook: *Microbiology, The Human Experience* by Foster, Aliabadi, & Slonczewski.

Lab Manual: *Microbiology Lab Manual*, by T. Barta, 2019. UWSP

Required supplies: black permanent marker (such as a Sharpie®).

Students are required to have chemical splash safety goggles for use in most of the laboratory sessions this semester.

Students may bring their own goggles or use goggles provided to them.

Class Policies

<p>Attendance Policies</p>	<p>It is expected that you will <u>attend</u> and be <u>on time</u> for all the lecture and laboratory sessions. Attendance in lecture will improve your performance on exams.</p> <p>Because of scheduling issues and the preparation time involved in setting up labs, there will be no make-ups for missed labs even if you are sick. If you know you must be absent, please arrange to get notes from another student. I must also be notified in advance. If there are critical lab skills you miss, you should make an appointment for an individual session to go over what you missed.</p> <p>Absences due to participation in academically sanctioned events such as athletic events, academic conferences, or music competitions will be considered excused absences if written documentation is provided in advance.</p>
<p>Student Behavior Expectations</p>	<p>In order to keep the course running smoothly, and to ensure that all students have a good learning environment, I have the following expectations of students in this course:</p> <ul style="list-style-type: none"> • Arrive on time, and take your seat promptly, so that the lecture can begin on time. It is rude and disruptive to others to arrive late. • Please silence your phones and keep them put away during class unless needed for an in-class activity. • Please keep computers/tablets put away during lecture. • Please refrain from talking or having side conversations during lecture, unless part of an organized activity. • If you have a question during lecture, please raise your hand and wait to be called on. <p>Cell phones. Use of cell phones without permission is not permitted in class. Repeated warnings may result in excusal from that day's class.</p>
<p>Late policies</p>	<p>Late assignments will receive a 10% point reduction per day unless a written excuse (and a valid reason) is provided. After 5 days, assignment will not be accepted.</p>
<p>Exams</p>	<p>The following policies will be enforced during exams. Students must sit separated by at least one seat. Students must stow backpacks, books, and other personal items in the cubicles provided. All materials must be put away before any exams will be distributed. Students must refrain from wearing hats, hoodie sweatshirts with pockets, and bringing water bottles or other beverages. Students may not leave the lecture hall until their exam is turned in (be sure to make use of the rest room before coming in to the exam). Students with wandering eyes will be asked to change their seat, and may be asked to surrender their exam.</p>

<p>Make-up exams and quizzes</p>	<p>Attendance at exams is required. Make-up lecture exams will be permitted ONLY for unavoidable emergencies provided that you have <u>notified me in advance</u>. <u>If you cannot call, please have someone else call as soon as possible</u>. Acceptable excuses for missing an exam include:</p> <ul style="list-style-type: none"> • personal injury, dental emergency, extreme illness or hospitalization, or that of an immediate family member for which you are responsible • death in the immediate family • verifiable court appearance or jury duty <p>Oversleeping is not a valid excuse for missing class, a lab test, or any exam. In general, the reasons that you miss an exam should be the same as those for which you would miss a job interview or your best friend's wedding. Make-up exams are difficult to administer, and students usually do poorly on them. Make-up exam format may differ from the original exam. Because of this, it is best to avoid make up exams if you can. However, if you have a valid reason, you can take a make-up exam. In order to qualify for a make-up exam, you must provide a written, verifiable excuse from an authorized party (doctor, dentist, minister, etc.) within five school days of the missed exam. This excuse should clearly articulate that you were UNABLE to make it to class for the exam, including a timetable for restriction from work or school.</p>
<p>Academic Misconduct</p>	<p>You are encouraged to work and study with each other in order to get the most out of the course. Lab experiments also involve working in groups. However, you are expected to work independently on assignments, quizzes, and examinations. All acts of dishonesty in any work constitute academic misconduct. This includes, but is not limited to, cheating, plagiarism, fabrication of information, misrepresentations of a student's academic performance, and abetting any of the above. This includes submitting papers or reports that reflect the work of a group rather than the work of an individual. (Be very careful about this. Although you may work in groups in lab, the written work you submit to me MUST BE YOUR OWN INDEPENDENT COMPOSITION.) I will be using Turnitin.com to check for originality. The Academic Standards and Disciplinary Procedures of the University of Wisconsin will be followed in the event that academic misconduct occurs. Students should refer to Dean of Students website for more information https://www.uwsp.edu/dos/Pages/Student-Conduct.aspx</p> <p>I take academic integrity seriously. So should you. Sanctions for academic misconduct are likely to result in one or more of the following: repeating the test, receiving a zero on the test, a letter of reprimand in your academic file, or a failing grade in the course.</p>
<p>Safe Learning Environment</p>	<p>UWSP values a safe, honest, respectful, and inviting learning environment. In order to ensure that each student has the opportunity to succeed, we have developed a set of expectations for all students and instructors. This set of expectations is known as the Rights and Responsibilities document, and it is intended to help establish a positive living and learning environment at UW-Stevens Point. More information is available at: http://www.uwsp.edu/stuaffairs/Pages/rightsandresponsibilities.aspx.</p>

Disability and Assistive Technology Center	<p>The Americans with Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for student with disabilities. For more information about UWSP's policies, visit: http://www.uasp.edu/stuaffairs/Documents/RightsRespns/ADA/rightsADAPolicyInfo.pdf.</p> <p>If you are registered with the Disability and Assistive Technology Center, please contact me as soon as possible to plan any course accommodations that may be necessary. If you have a disability but have not contacted the DATC, please call 715-346-3365 or visit 609 LRC to register for services, or contact the Marshfield Campus administration for guidance.</p>
Personal Emergencies	<p>If you anticipate receiving an important call (for reasons like family health issues), please notify me before class. If your family needs to contact you during class in an unanticipated emergency, they should call the biology office at 715-346-4524 or Campus Protective Services, 715-346-3456 (especially after hours).</p>
Communication	<p>Please check email regularly for announcements. It is the primary way I will communicate with the class. If you need to email me, please be aware that I check email during normal working hours, but infrequently in the evening or weekends. Some issues are better discussed face to face instead of email. Email is not an appropriate or constructive way to complain about grades or other issues. Please come see me personally to discuss things.</p>
Privacy issues	<p>If you have questions on the way your exams or assignments are graded, please make an appointment to meet with me privately. I will not discuss your exam in front of other students. This includes mathematical errors. Point challenges must be made within a week or getting the exam back.</p>
General Safety	<p>There are emergency placards posted in the lab and other locations on campus.</p> <p>You can also view the UWSP Emergency Management Plan at www.uwsp.edu/rmgt for more details on how to respond to emergencies including fire, weather, or active shooter situations.</p>
Lab Safety	<p>You will be asked to read and sign a safety agreement the first day of lab. Your signature indicates your willingness to abide by the safety policies of this university. Please be aware that no eating or drinking is allowed in the lab. Also, students must wear closed-toed/closed-heeled shoes in the lab. Even in warm weather, students should also wear clothing that covers the legs to the ankles (unintentional spillage of cultures and chemicals can and does occasionally happen). Students must obtain eye protection (goggles) and bring them to all labs. Gloves will be provided. Lab coat or protective shirt recommended but students must be willing to leave it in lab for the semester.</p> <p>Students who are pregnant, may become pregnant, are immune-compromised, care for someone who is immune-compromised, or live with someone who is immune-compromised should consult with their physician about working with microorganisms. If your physician suggests alternative accommodations for working in the microbiology laboratory, please let me know. The list of microorganisms/samples that you may be working with this semester is below. Some of these will only be demonstrations.</p>

Organisms and specimens we will be working with this semester:

<i>Bacillus subtilis</i>	<i>Pseudomonas aeruginosa</i>
<i>Clostridium butyricum</i>	<i>Pseudomonas fluorescens</i>
<i>Corynebacterium xerosis</i>	<i>Saccharomyces cerevisiae</i>
<i>Enterobacter aerogenes</i>	<i>Salmonella typhimurium</i>
<i>Escherichia coli</i>	<i>Serratia marcescens</i>
<i>Klebsiella pneumoniae</i>	<i>Staphylococcus aureus</i>
<i>Lactococcus lactis</i>	<i>Staphylococcus epidermidis</i>
<i>Micrococcus luteus</i>	<i>Streptococcus gallolytica</i>
<i>Neisseria perflava</i>	<i>Streptococcus pyogenes</i>
<i>Proteus vulgaris</i>	<i>Vibrio anguillarum</i>
	<i>Raw ground meat and vegetable products</i>

GRADING

Your grade is based on the following:

- 1) **Lecture exams (150 pts)** will cover lecture material and assigned readings. There will be two exams during the semester and the final exam. The final exam will focus on the last unit of material but also there will be a 50-point cumulative portion of the exam. Format for exams will consist of a combination of multiple choice, true-false, matching, and definitions/short answer questions.
- 2) **Lab quizzes (60 pts)**. There are six lab quizzes that cover the previous week's exercises. Refer to the lab schedule for dates. These quizzes will cover theory and techniques from lab exercises, as well as actual and/or expected results. Lab quizzes cannot be taken early. The lowest lab score will be dropped. Make-ups allowed only in extreme circumstances. If you miss a lab quiz due to an absence, it will count as your dropped score.
- 3) **Lab Report on Koch's postulates (15 pts)**. A report on a Koch's postulates experiment will be required. Directions will be provided separately. The assignment will be uploaded into D2L by a date to be determined.
- 4) **Practical lab exercises and assignments (35 pts)**. There will be 3 practical lab exercises (PLEs) worth between 5 and 20 points each, depending on the exercise. The PLEs are explained in the lab manual. The due dates are listed on the Laboratory Schedule.
- 5) **Pre-Lab and post-lab quizzes (55 pts)**. A pre-lab quiz, or possibly in some cases a post-lab quiz will be assigned for most of the lab exercises. The 3-5 point quizzes cover introduction material. Quizzes will be completed on D2L. The quiz is due prior to 1 pm on the day of the lab. There are at least 60 points possible but you only need 55 to get 100% in this category. There are NO MAKE-UPS for these quizzes.

- 6) **Team project (50 pts).** Students will work in teams to prepare a poster in PowerPoint on a disease topic of their choice. The poster will be due at the end of the semester and graded by both me and the class (60-40).
- 7) **Optional Case study (20 pts).** This assignment is optional but will count toward the total possible points in the course. Details will be explained in class.

Extra Credit. Because interesting opportunities for learning sometimes come up (visiting lecturers, seminars, special academic events, etc.), I may announce small assignments that will yield up to 5 points of extra credit. No more than 10 points extra credit will be added to your grade. I cannot offer extra credit assignments to individual students as a means of grade improvement. Everyone's grade should be based on the same criteria. If you're having trouble with the material you're already expected to do, you should not be asking for additional work (especially if you want something "easy" to replace something "hard."). It is better to concentrate on your study habits and test-taking skills rather than look for an "easy fix." If you are having trouble in the course, don't wait-- GET HELP EARLY! Please come see me during office hours to discuss options for improving your grades other than doing "extra credit."

In addition to the point-generating activities described above, you are expected to have complete attendance and full attention and participation in class. You will also be evaluated on your ability to follow directions, practice safety, and properly use and care for the microscope and other equipment. Lack of attention to these things may result in deduction of points. I also reserve the right to add assignments or modify point values if they are to your benefit.

Sometimes, students get off to a rocky start. It's important to identify what is and is not working for you and to make corrections to your study habits if your performance indicates that you're not succeeding. To motivate you to do that, I will award bonus points for improvements in exam performance from Exam I to Exam II.

- a) For improvements equal to or greater than 5% of the total exam score, I will award additional bonus points totaling 50% of the difference between the two scores. For example, if you score 70% on Exam I and 80% on Exam II (10% improvement), you will receive 5 bonus points.
- b) For any improvement equal to or greater than 2 points, but less than 5% of the difference, you will receive 2 bonus points.

I may use in-class quizzes to assess understanding during lecture. The Kahoot app can be used on your smartphone or can be used through the Kahoot website. It is encouraged but is not mandatory that you use Kahoot.

Points Breakdown

Lecture Exams	2 x 100 and final, 150 pts	350 points
Lab Quizzes	5 highest x 10 pts	50 points
Koch's Lab Report	15 pts	15 points
Practical Lab Exercises	35 pts	35 points
Pre/Post lab quizzes	55 pts (of at least 60 pts)	55 points
Group project	50 pts	50 points
(Optional Case Study	20 pts	20 points)
TOTAL		555-575 points*

*Points depend on optional case study. Also, I reserve the right to add additional short assignments (worth up to 10 points each) if they are to your advantage and aid in meeting learning objectives.

Grade record

You can use this to keep track of your percentage of points in the course.

EXAMS

Exam I _____/100

Group Project _____/50

Exam II _____/100

Optional case study _____/20

Final Exam _____/150

Total _____/350

Bonus points _____

LAB QUIZZES

Quiz 1 _____/10

Quiz 2 _____/10

Quiz 3 _____/10

Quiz 4 _____/10

Quiz 5 _____/10

Quiz 6 _____/10

TOTAL _____/50

(5 highest)

PLEs/LAB REPORTS

Koch's Postulates _____/15

PLE 1 _____/5

PLE 2 _____/10

PLE 3 _____/20

TOTAL _____/50

Pre Lab Quizzes _____/55

Progress total _____/ total possible (x 100) - ____%

Course Total = _____ / 555-575 (multiply by 100 to get %)

Lecture Schedule (may be adjusted if needed). Be sure to read the relevant text section before coming to lecture.

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Text Reading</i>
1	M 1/28	Course Introduction	
	W 1/30	Microbes Shape Human History (1.1)	Chap. 1
2	M 2/4	Basic Concepts of Disease	Chap. 2
	W 2/6	Chemistry of Life: organic molecules (4.1)	Chap. 4
3	M 2/11	Chemistry of Life, cont., Enzymes and chemical reactions	Chap. 4
	W 2/13	Eukaryotic cells (5.6)	Chap. 5 (5.6)
4	M 2/18	Bacterial Cell Structure (5.1)	Chap. 5 (5.1-5.3)
	W 2/20	Bacterial Cell Structure, cont.	Chap. 5 (5.4-5.5)
5	M 2/25	Bacterial Growth & Nutrition (6.1-pp. 158-161)	Chap. 6 (6.1, 6.3)
	W 2/27	Bacterial Growth, cont. (Environmental Factors)	Chap. 6 (6.4-6.6)
6	M 3/4	Bacterial Metabolism (Energy, Electron Carriers) (7.1)	Chap. 7 (7.1-7.2)
	W 3/6	Bacterial Metabolism: Sugar Catabolism, TCA cycle	Chap. 7 (7.3)
7	M 3/11	Bacterial Metabolism: Fermentation and Respiration	Chap. 7 (7.4)
	W 3/13	Bacterial Genetics: Central Dogma (pp. 224-top 227)	Chap. 8 (8.2, 8.5, 8.6)
8	M 3/18	LECTURE EXAM I	
	W 3/20	No lecture; Work on Team Project	
9	M 3/25	SPRING BREAK-NO CLASS	
	W 3/27	SPRING BREAK-NO CLASS	
10	M 4/1	Bacterial Genetics: mechanisms of Genetic Change (9.1)	Chap. 9 (9.1)
	W 4/3	Biotechnology	Chap. 8 (8.4)
11	M 4/8	Bacterial Diversity (10.1)	Chap. 10
	W 4/10	Eukaryotic Microbes (Fungi, Amoebas, Parasites) (11.1)	Chap. 11

12	M 4/15	Viruses & other non-cellular pathogens (12.1 up to virus structure)	Chap. 12
	W 4/17	LECTURE EXAM II	Chap. 14
13	M 4/22	The Human Microbiota ("Normal Flora") (14.2)	Chap. 15
	W 4/24	The Immune System: Innate Immunity (15.1)	Chap. 16
14	M 4/29	The Immune System: Adaptive Immunity (16.1)	Chap. 17 (17.6)
	W 5/1	Vaccination and Immunotherapy (17.6: pp. 553-556)	
15	M 5/6	Antibiotic Therapy & Resistance (13.4)	Chap. 13 (13.4-13.8)
	W 5/8	Microbial Pathogenesis (18.1)	Chap. 18
16	M 5/13	Epidemiology: Tracking Disease (pp. 880-883)	Chap. 26
	W 5/15	Poster presentations (Diseases)	Chaps. 20, 21

Final Exam: to be announced

Exam I will cover material approximately through the first 10 lectures. Exam II will cover another 8 or 9 lectures, metabolism through Eukaryotes. The final Exam will cover the remaining lecture material, plus a comprehensive section.

Lab Schedule

	Day/Date	Lab exercise	Quizzes
1	Mon 1/28	Intro to Lab; Glo-Germ Handwashing Experiment	
2	Wed 1/30	The Microscope & Measurement	
3	Mon 2/4	Culture Media Preparation	
4	Wed 2/6	Microbes in the Human Environment Aseptic transfers and Inoculation Methods	
5	2/11	Observing Growth and Colony Morphology <i>Koch's Postulates Experiment (KP)</i>	Quiz 1
6	2/13	Simple Staining & Cell morphology, KP cont.	
7	2/18	Differential Staining: Gram Stain, KP cont.	
8	2/20	PLE #1: Morphological unknown, KP cont.	Quiz 2
9	2/25	Microbial Quantitation: Plate Counts, KP, cont.	
10	2/27	Observe quantitation results, KP, cont.	
11	3/4	Oxygen and Growth	
12	3/6	Read oxygen results; Complete KP	Quiz 3
13	3/11	Physical Parameters of growth (temperature, pH, osmotic pressure)	
14	3/13	Read results of physical parameter experiment	
15	3/18	LECTURE EXAM I (No Lab)	
16	3/20	Work on team project (No lab) KP report due (submit to D2L)	
17	3/25	Spring Break	
18	3/27	(No class)	
19	4/1	Chemical Control of Growth	
20	4/2	Read Chemical Control results	
21	4/8	Effects of Heat and UV	
22	4/10	Read results	Quiz 4

23	4/15	Selective & Differential Media; Normal flora of skin, nose, and throat	
24	4/17	LECTURE EXAM II ; Read results	
25	4/22	Bacterial Characterization and Identification; PLE #2	
26	4/24	Read results	Quiz 5
27	4/29	PLE #3 : Unknown Identification	
28	5/1	Unknown Results	
29	5/6	Food & water microbiology	
30	5/8	Read results	
31	5/13	Antibiotics (Kirby Bauer and MIC)	
32	5/15	Read Results; Lab Check out	Quiz 6

Quizzes Cover:

Quiz 1: Labs 1-4

Quiz 2: Labs 5-7

Quiz 3: Labs 9-11

Quiz 4: Labs 13, 14, 19, 20

Quiz 5: 21-24

Quiz 6: 25, 26; 29-31