

Biology 333/533

General Microbiology

Spring 2017

Lecture:

11:00-11:50 MW TNR 120

Labs

Sect. 1 10:00-11:50 TR

Sect. 2 1:00-1:50 TR

Sect. 3 3:00-4:50 TR

TNR 451

Dr. Terese Barta

TNR 465

715-346-4241

tbarta@uwsp.edu

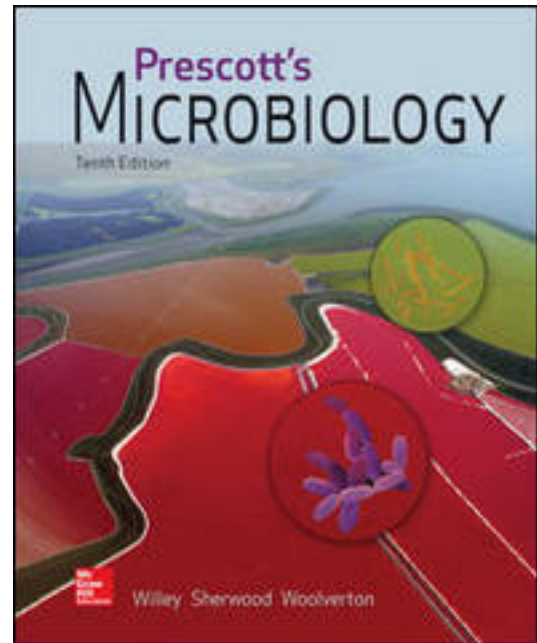
Office hours

3:00-4:00 M

1:00-2:00 W

9:00-10:00 F

Other times by appointment



Textbook: Prescott's *Microbiology*, Willey, Sherwood & Woolverton. 10th Edition. Wm. C. Brown Publishers.

Lab Manual: *Microbiology Lab Manual* Spring/Summer 2018 edition. T. Barta. (Purchase in DUC Bookstore). Do not use a manual from a previous semester.

Course Description & Objectives

Pre-reqs: Biology 101, 130 or 160, Chem 106 or 117.

This course is designed to introduce you to the study of microorganisms. Although it will focus heavily on bacteria, other topics will be introduced including fungi, non-cellular infectious entities such as viruses, eukaryotic parasites, the immune system, and epidemiology.

Core learning objectives. By the end of the semester you should be able to:

- Ask science-based questions and use critical thinking skills to investigate how and where microbes grow and interact with their physical and biological environment.

- Compare and contrast structural and biochemical features of prokaryotic cells,

eukaryotic cells, and acellular infectious agents.

- Explain the biochemical and physiological processes that are unique to microbial organisms.
- Describe the application of microbial genetics to biotechnology.
- Describe the impact of microbial processes to humans and the environment.

Required supplies: black permanent marker (such as a Sharpie®), safety goggles with covered vents.

Optional supplement: *A Photographic Atlas for the Microbiology Lab*, by Leboffe and Pierce (DUC bookstore or commercial sources).

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Lab-based Learning Objectives

Students will be able to use the lab skills they acquire to:

- Demonstrate aseptic technique in the safe handling and culture of microbes
- Complete commonly used laboratory practices to culture and identify microbes
- Perform standard techniques to analyze the growth of microbes
- Apply scientific based methods (physical and chemical) treatments to inhibit their growth.
- Utilize the scientific method to plan, carry out, and analyze experiments
- Show competency in basic math as it relates to biology

TESTS, ASSIGNMENTS, AND GRADING POLICIES

There are **680-705 points** in the course (may vary depending on optional case study, additional assignments or pop quizzes).

1) Lecture Exams (350 pts). There will be two term exams, each worth 100 points. Each exam will be based on 10-11 lectures plus any assigned reading (dates on lecture schedule). Exams will be held in the evenings, but conflicts will be worked out. The final exam will focus on the last 8 lectures of the course but also there will be a 50-point cumulative component of the exam. Final exam is Monday, May 14, 8:00-10:00 AM.

2) Lab quizzes (100 pts). There are six lab quizzes, each worth 15 points plus a 10-pt quiz on lab math (last lab). 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.

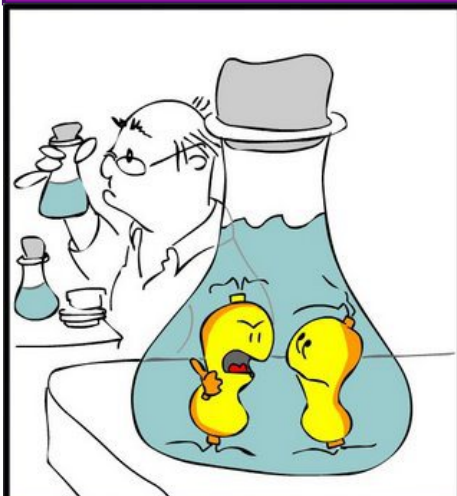
3) Practical lab exercises and assignment--PLEs (75 pts). There will be 6 practical lab exercises (PLEs) worth between 5 and 15 points each, and also a lab assignment worth 10 points. The PLEs are explained in the lab manual. The due dates are listed on the Laboratory Schedule.

4) Bacterial disease quiz (10 pts). You need to know the full scientific name of about 45 bacterial disease agents covered in lecture or lab. The quiz will be part of the final exam.

5) Pre-Lab Quizzes (approx. 145 pts). A pre-lab quiz (5 points each for almost all labs) that covers introduction material will be taken on D2L. The quiz is due prior to 10 am the day of lab. There are **NO MAKE-UPS** for these quizzes.

6) Optional case study (20 points). This assignment will be optional but will count toward the total possible points in the course. Details will be explained in class.

In addition to the point-generating activities described above, you are expected to have complete attendance and full attention and participation in class. There may be pop quizzes. 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.



I'M FED UP WITH THIS GUY -
LET'S BECOME PATHOGENIC

Grading Scale:

≥ 92.0%	= A
90-91.9%	= A-
87-89.9%	= B+
82-86.9%	= B
80-81.9%	= B-
77-79.9%	= C+
72-77.4%	= C
70-71.9%	= C-
67-69.9%	= D+
60-66.9%	= D
< 60 %	= F

A Desire2Learn (D2L) site is set up for the course. You can keep track of your points in the class on the **Grades** page.

If you fail the first exam, you must schedule a meeting with me.

Because of the bonus points available on quizzes and exams, there will be no "rounding" up of grades if you are below a point cut-off.

GENERAL POLICIES

Make-up exams and quizzes will be permitted **ONLY** for unavoidable emergencies provided that you have called in advance. If I am not available to take your call, you should leave a message on voice-mail (it will record the date and time of your call). *If you cannot call, please have someone else call.* The format of the make-up quiz may differ from that of the original quiz.

Excused absences are allowed for unavoidable emergencies only. Family vacations and hunting trips are not considered unavoidable emergencies.

Academic Integrity. 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.

Standards and Disciplinary Procedures for UWSP can be found at:

<http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/SR-R-2010/rightsChap14.pdf>

Grades are based on the percentage of total points. I cannot give you a higher grade if you tell me you "worked hard" because I have no way to objectively measure anyone's perceived level of effort. Please realize that **there are no additional points that can be added after the final exam.**

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.

Communication: Some things are better discussed face to face instead of email. If you need to email me,

however, please be aware that I check email while I am work, but infrequently on weekends and evenings.

If you have questions on the way your exam is graded, please see me in my office. I will not discuss your exam in front of other students. Except for mathematical errors, point challenges to your exam grades must be done in person within 48 hours of the exam key being posted.

UWSP is committed to providing reasonable and appropriate accommodations to students with disabilities and temporary impairments. If you have a disability or acquire a condition during the semester where you need assistance, please contact the Disability and Assistive Technology Center on the 6th floor of Albertson Hall (library) as soon as possible. DATC can be reached at 715-346-3365 or DATC@uwsp.edu. If you are already registered with the Disability and Assistive Technology Center, please inform me as soon as possible.

Cell phones. Use of cell phones without permission is not permitted in lab. Repeated warnings may result in excusal from that day's class.

SUCCESS IS A CHOICE!

- **Make learning your top priority.** Even if you have a job outside of school, college is a full-time job. It is your career. Make the most of your tuition dollars.
- **Come to class (ON TIME) everyday.** Be there in mind as well as body. Don't rely on someone else's notes to learn what was important.
- **Take good notes.** The quizzes and exams will be based on your notes, so taking good notes is important. Develop a good shorthand technique that works for you so you can concentrate on what's being said. Leave lots of space for adding and clarifying things during review.
- **Study every day.** Plan on spending at least 1-2 hours per day per hour of class time. Also, research has shown that people learn better by studying intensively for short intervals frequently, compared to longer periods on a less frequent basis.
- **Study your notes when they are fresh,** i.e., as soon as possible after class even if only briefly (to get material from short-term memory into long-term memory).
- **Study in an active manner.** Just re-reading notes gives you a false sense of familiarity. Analyze them; quiz yourself, make comparative tables, term lists, one-page summaries, etc. Practice information retrieval. I do not recommend note cards because they fragment information rather than connect it.
- **Study to LEARN, not to just to pass the test.** Trying to study what you think will be emphasized on the test is counterproductive. The more you understand, the better you will do.
- **Find a study group or study partner.** You can quiz each other and help each other learn.
- **Spend your time in lab wisely.** Really think about the material in class and try to understand it. Think about the experiment you are doing. Ask questions. Knowledge is something that is built upon, not just acquired. Don't rush through the experiments or look for ways to get out of lab early.
- **Study your lab notes as much as your lecture notes.** Many students mistakenly think lab is a "supplement" to lecture. It is equally important.
- **If you need help, get it *right away*.** One of the biggest mistakes students make is waiting too long to get help. Please see me right away if you are having trouble understanding the material. I will do whatever I can to help you find the best way to comprehend the subject.
- **Put your cell phone away while you are studying.** Texting and calling while studying interferes with your ability to concentrate and learn. There is no such thing as "multi-tasking."
- **Keep a regular schedule, get enough sleep, eat a sensible diet, and stay sober. Seriously.** An all too common consequence of alcohol use is the inability to keep up on academic responsibilities. Research shows a strong negative correlation between alcohol and grades. Students with D/F averages consume 6.4 more drinks per week than "A" students. And even "B average" students drink an average of 1.1 more drinks per week than A students.

Safety Issues

LAB SAFETY

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 are not permitted to wear open-toed or open-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). Lab coats or aprons are not provided—you will need to provide your own if you wish to wear them.



Risk Management

Risk Management is a unit of Business Affairs. The office of Risk Management provides the UWSP campus with leadership and direction in the areas of general risk management, property and liability insurance and claims management, loss prevention and control, worker's compensation management, occupational health and safety, laboratory safety and chemical hygiene, DOT compliance, ergonomics, hazardous materials/wastes management, and environmental management.

Quick Links

- ✚ Emergency Plan
- ⚠ Emergency Procedures
- 📄 Pointer Alerts ←
- 🔗 Training Resources

EMERGENCY RESPONSE GUIDANCE

See the UWSP Emergency Management Plan at www.uwsp.edu/rmgt for more details on emergency responses. In the event of a medical emergency, call 911 or use the nearest red emergency phone. In the event of a tornado warning, proceed to the lowest level interior room without windows. If there is a fire alarm, evacuate the building in a calm manner. Meet on away from the building on the south side near the Sundial. Notify instructor or emergency personnel of any missing individuals. In an active shooter situation, remember: **Run/Hide/Fight** in that order. Evacuate quickly if able; if trapped, hide quietly in a locked room, turn off lights, and silence cellphones. Spread out—do not cluster together. *If no other option is available*, work together to surprise and overtake the attacker. Follow directions of emergency responders and stay where you are until directed. Please watch: [Shots Fired On Campus - When Lightning Strikes](#) on the Risk Management page.

Pointer Alerts are designed to provide information about active credible campus emergency situations that pose a threat and require immediate action. Sign up on the Risk Management page. Click on "Pointer Alerts."

Personal Emergencies. 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 (after hours).

Lecture Schedule (may be adjusted if needed)

<i>Week</i>	<i>Date</i>	<i>Topic</i>	<i>Text Reading</i>
1	M 1/22	Course Introduction; Scope of Microbiology	
	W 1/24	Evolution of Microorganisms History of Microbiology as a Science	Chap. 1: 2-9;11-17
2	M 1/29	Review of biological chemistry	Appendix I
	W 1/31	Prokaryotic cell organization	Chap. 3
3	M 2/5	Cell structure, continued	Chap. 3
	W 2/7	Cell structure, continued	Chap. 3
4	M 2/12	Endospores	Chap 3: (3.9)
	W 2/14	Bacterial cell growth & mathematics of growth	Chap. 7: 132-137
5	M 2/19	Intro to metabolism: Enzymes, Energy concepts	Chap. 10
	W 2/21	Carbohydrate metabolism, Glycolysis; carbohydrates other than glucose	Chap. 11: 229-235; 248-249
6	M 2/26	Aerobic & anaerobic respiration	Chap. 11: 236-245
	W 2/28	Fermentation; catabolism of proteins & lipids	Chap. 11: 245-249
7	M 3/5	Introduction to bacterial genetics, DNA structure & Replication	Chap.13: 284-293; 387
	W 3/7	Central Dogma: Gene expression in bacteria	Chap 13: 298-316
8	M 3/12	Gene regulation	Chap. 14: 321-328; 337-339
	W 3/14	Mechanisms of Genetic Variation: mutations, plasmids, transposable elements	Chap. 16: 370-377, 382-384
10	M 3/19	Mechanisms of Genetic Variation: conjugation, transformation, transduction	Chap. 16: 384-397
	W 3/21	Genetic Biotechnology: DNA cloning; Polymerase Chain Reaction	Chap. 17: 400-403; 406-410
	3/26-3/30	SPRING BREAK – NO CLASS	
11*	M 4/2	Bacterial Diversity: Archaea	Chap. 4, Chap. 20
	W 4/4	Bacterial diversity, cont. (Eubacteria)	Chaps. 22-24 (parts)
12	M 4/9	Intro to Viruses, other acellular infectious entities	Chap. 6
	W 4/11	Virus reproduction strategies	Chap. 27, Chap. 38
13	M 4/16	Normal Microbiota of the Human Body	Chap. 32
	W 4/18	Immunology: innate defenses	Chap. 33
14	M 4/23	Immunology: innate defenses, cont. to adaptive defenses	Chap. 33, 34
	W 4/25	Immunology: adaptive defenses	Chap. 34: 736-759
15	M 4/30	Pathogenicity & virulence	Chap. 35: 771-781
	W 5/2	Disease therapies: vaccines	739-40; Chap. 37: 818-822
16	M 5/7	Disease therapies: Antibiotics	Chap. 9
	W 5/8	Epidemiology	818-822

***Lecture Exams 6:00-7:30 pm on Wednesday evenings, 3/7 and 4/18 (Room to be announced).**

Spring 2018 Lab Schedule

Labs are designed to be completed within the 1 hour-50 minute period. Preparedness for lab and efficient work habits on your part are essential to making that a reality. You are expected to read through the lab exercise(s) in the manual before coming to lab. Experimental results will usually be recorded and discussed during the following lab session.

Proper safety precautions and respect for others in the lab is paramount. Careless or sloppy work in the laboratory will not be tolerated. Students who demonstrate careless work that endangers themselves or others in the lab will lose points in the course, and if the behavior continues, could be asked to withdraw from the course.

The **lab quizzes** are given at the beginning of the period (dates noted below).

Week	Dates	Day	Lab Exercises
1	Jan 23	T	Lab Introduction; Scientific method (handwashing experiment)
	Jan 25	R	Microscopes & Measurement*
2	Jan 30	T	Aseptic Technique & Culture Transfer Methods*; Surface and Air Sampling
	Feb 1	R	Colony Morphology; Simple Staining & Cell Morphology
3	Feb 6	T	The Gram Stain*; PLE #1 (Gram unknown)
	Feb 8	R	Quiz 1 ; Acid-fast, Endospore & Capsule Staining*
4	Feb 13	T	Bacterial Motility; PLE #2 (Morphological unknown)
	Feb 15	R	Bacterial Nutrition & Growth Media
5	Feb 20	T	Quantitation of Microbial Growth*
	Feb 22	R	Quiz 2 ; Relationship of Oxygen to Growth
6	Feb 27	T	Environmental Parameters of Growth: Temperature, pH, Osmosis
	March 1	R	Control of Microbial Growth (Heat & UV); <i>PLE #1 graded</i>
7	March 6	T	Chemical Control of Growth
	March 8	R	Quiz 3 ; Biochemical Characterization & Differentiation of Bacteria—part 1 (Exoenzymes)
8	March 13	T	Biochemical Characterization & Differentiation of Bacteria—part 2 (Other tests)
	March 15	R	Complete Biochemical Characterization; Dichotomous key assignment ; PLE #3 (Streak plate)
9	March 20		Medically Significant Bacteria: The Enterics; Start PLE #4 Identification of an unknown enteric
	March 22		Finish Enteric Tests; continue PLE #4

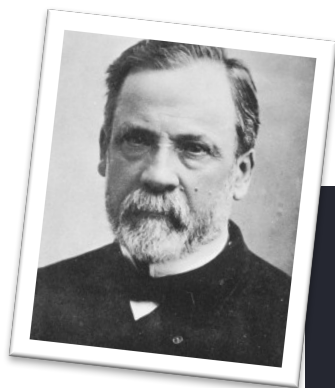
10	March 26- March 30		SPRING BREAK
11	April 3 April 5	T R	Continue Unknown Enteric (PLE #4) Complete biochemical tests for PLE #4; Microbial Flora of the Mouth (Dental Microbiology)
12	April 10 April 12	T R	Quiz #4 ; Medically Significant Bacteria: The Cocci Bacterial Genetics: pGLO Transformation
13	April 17 April 19	T R	Bacteriophage; PLE #4 due The Fungi: Yeasts & Molds; PLE #5 (Micropipetting)
15	April 24 April 26	T R	Microbiology of Water Quiz #5 ; Soil Microbiology
14	May 1 May 3	T R	Food Microbiology Chemotherapeutic Agent Testing
15	May 8 May 10	T R	Tracking Disease Outbreaks (ELISA): PLE #6 (serial dilution plating) Quiz 6 with Math Quiz ; Complete PLE #6; Lab check out

*labs that have video(s) posted on D2L that should be viewed before coming to class.

Pre-Lab Quizzes. Each week you are expected to read the assigned lab ahead of time and complete a set of prelab questions that assess your understanding of the background material and procedures. These questions are posted in D2L under quizzes. Questions are assigned at random and therefore may be different between students. Some pre-labs will have an associated video that should be viewed prior to answering the questions. Proper preparation for lab will ensure your understandings of the concepts and your ability to work cooperatively with your lab partners.

Please note: students that drop the course must clean their slides and empty their cans before their drop slip will be signed.

FINAL EXAM: Monday, May 14, 8:00-10:00 pm. No exceptions unless student can document three exams scheduled on the same day.



“When observation is concerned, chance favors only the prepared mind.”

--Louis Pasteur