Allied Health Microbiology
BHS/MB 255 Ecampus

Instructor: Dr. Linda Bruslind
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Course Credits: This class combines 120-150 hours of instruction, online laboratories, and assignments for 4 credits.
Enforced Pre-requisites: none.
Course Content: General properties of cellular microbes and viruses, microbial biochemistry and genetics, pathogenesis and disease, immunity, and microbial infections (see **Class Schedule** below). Lecture and lab emphasis is on medical microbiology, infectious diseases, and public health. Not intended for biological sciences majors. Crosslisted as BHS 255.

Learning Resources: the course content will be presented using narrated streaming lectures, assigned textbook reading, group discussions, and individual assignments.

Lectures – the lectures will be available on a week-by-week basis as streaming video (refer to the Class Schedule). Students should read the assigned pages in the online textbook first, before viewing the online lecture material.
Textbook – openstax *Microbiology* textbook, https://cnx.org/contents/5CvTdmJL@4.9:ryt9cF1D@8/Preface
Laboratory – students will utilize a lab kit and online components from eScience. Each student will need to purchase a voucher code from the OSU bookstore and then redeem it to order the kit directly from eScience labs. The kit will be shipped to the student's home.

Baccalaureate core learning outcomes:
This course fulfills the Baccalaureate Core requirement for the Perspectives category of Biological and Physical Sciences. It does this by covering fundamental principles and techniques in the area of allied health microbiology, a biological science, and requiring students to conduct and analyze relevant experiments that correlate to the principles being taught. Students will then apply their knowledge to other subject areas, allowing them to view the information in a different context.

Students will:
1. Recognize and apply concepts and theories of basic physical or biological sciences. [weekly quizzes, homework]
2. Apply scientific methodology and demonstrate the ability to draw conclusions based on observation, analysis, and synthesis. [weekly lab exercises, homework]
3. Demonstrate connections with other subject areas. [weekly discussions, homework]

Course Learning Outcomes:
1. Retain specialized language relevant to medical microbiology.
2. Acquire an understanding of the fundamental concepts of medical microbiology including a detailed understanding of aspects of the different types of microbes, microbial growth and control, pathogenesis and epidemiology, immunology, and infections of various anatomical systems.
3. Demonstrate an ability to formulate hypotheses and design experiments based on the scientific method.
4. Analyze and interpret results from a variety of microbiological methods and apply these methods to analogous situations.
5. Solve problems in microbiology using mathematical reasoning and graphing skills.
6. Effectively communicate fundamental concepts of microbiology in written format.
7. Identify credible scientific sources and interpret and evaluate the information therein.
8. Practice pure culture and selective techniques to enrich for and isolate microorganisms.
9. Practice safe microbiology, using appropriate protective and emergency procedures.
10. Document and report on experimental protocols, results and conclusions.
11. Discuss microbiological issues in context of other subject areas, including epidemiology, economics, public health, and social science.

GRADING:	Midterm I	75 pts.
	Midterm II	75 pts.
	Final Exam	75 pts.
	Get Acquainted Activity	4 pts.
	Quizzes (10)	26 pts.
	Homework (3)	30 pts.
	Discussions (10)	40 pts.
	Laboratory (10 exercises)	150 pts.
	TOTAL	475 pts

Final grades are assigned on a straight percentage basis: A = 93-100%; A- = 90-92%; B+ = 87-89%; B = 83-86%; B- = 80-82%; C+ = 77-79%; C = 73-76%; C- = 70-72%; D+ = 67-69%; D = 63-66%; D- = 60-62%; < 60% = F. Incompletes (I) will not be given except in extraordinary circumstances. **If you choose S/U grading, you need to get 70% (C-) to get an "S." Election of S/U grading should be known only to the student and their academic advisor.**

Pre/Post Assessment (5 pts extra credit) – In order to gain rudimentary information about what students are learning in the course, a pre- and post-assessment of 10 multiple choice questions will be offered. A student will receive +2.5 pts extra credit for participating in each. Credit is based on participation, not score. The activity is designed to be closed note, closed book, no web, no outside sources at all, and based on **independent** performance. Both tests will be available on Canvas.

Get Acquainted Activity (4 pts total) – In order to earn the 4 points for this activity students must participate in the get acquainted activity posted on Canvas, following the instructions listed. No make-ups for missing the assignment will be given.

Weekly Quizzes (3 pts each, 26 pts total) – Each quiz is worth 3 points and will cover material from the textbook chapters assigned each week (equivalent to 1 or 2 textbook chapters). The lowest 2 quiz scores for each student will be dropped. These quizzes are designed as closed book, closed note with a limited time period (5 min.) and **must be completed within the time period, once opened**. Do not start each quiz until you have read the assigned chapters for the week and feel adequately prepared**. Quizzes will auto-submit once time has expired or the due date has been reached. Re-takes are not allowed.**

Group Discussions (4 pts each, 40 pts total) – Students are expected to participate in ten graded discussions. Each student will need to post twice for each discussion, by the deadlines listed, following the detailed instructions posted on Canvas.

Homework (10 pts each, 30 pts total) – Students are expected to submit all 3 homework assignments, by the deadline indicated. Assignments will be posted on Canvas.

Exams (100 pts each, 300 pts total) – Students are expected to take all three exams, as indicated on the syllabus. Each exam will cover one unit of information, as dictated on the Class Schedule. The final exam is not cumulative, and none of the exam scores are dropped, replaced or averaged. Students will be given 50 minutes for each midterm and 110 minutes for the final exam (per University regulations). Students will have three days in which to take each exam. **Exams will auto-submit once time has expired or the due date has been reached. Re-takes are not allowed.**

This course requires that students take exams under the supervision of an **approved** proctor, which may involve an additional fee. It is the responsibility of the student to schedule a proctor ahead of time. **If this will cause hardship, please drop the course before 11:55 pm PST on Sunday, October 1 to avoid tuition charges.** It is important to submit proctoring requests as early as possible to avoid delays, with a recommendation of at least 2 weeks before each exam. Proctoring guidelines and registration for proctored exams are available online through the Ecampus testing and proctoring website (**http://ecampus.oregonstate.edu/services/proctoring/)** or contact Ecampus via phone: 541-737-9204/1-800-667-1465. Additional details about scheduling a proctor can be found on Canvas in the **Start Here** module.

Laboratory (100 pts) – the course will utilize a variety of experiments, both hands on and online. Many of the experiments will utilize materials/resources from eScience. It is important that students follow the directions and safety instructions provided. Other lab exercises will be conducted using online resources freely available through a variety of sites (see **Laboratory Schedule** below).

Course Policies:

- **Class information**: (i.e. narrated lectures, homework instructions/links, quizzes) are posted on Canvas at Learn@oregonstate.edu in weekly modules. Students must have an operational ONID account to access class material.
- **Correspondence:** email correspondence with the instructor must be respectful in nature and tone, with transparency as to sender.
- **Exams (midterm I, midterm II, final exam)** are only available through a proctor. Proctoring guidelines and registration for proctored exams are available online through the Ecampus testing and proctoring website (**http://ecampus.oregonstate.edu/services/proctoring/)** or contact Ecampus via phone: 541-737-9204/1-800-667-1465. Additional details about scheduling a proctor can be found on Canvas.
- **Quizzes** are available online though Canvas, on the dates indicated. No late quizzes are accepted. Correct answers for the quiz questions will be revealed once the quiz deadline has passed.
- **Grading:** It is the student's responsibility to carefully examine all graded papers upon return. Students have **one week** to contest a score, from the time of the posting of a score. Any grade adjustments made after this period are at the instructor's discretion.
- **Late work:**
    - No make-up is given for the Get Acquainted Activity. Student must post an appropriate submission by the deadline listed.
    - No make-up is given for exams, quizzes, or homework assignments not taken within the specified time period. Exams, quizzes, and homework assignments must be **completed** by the deadline listed.
    - No make-up is given for discussion points, once the deadline indicated as passed.

Link to Statement of Expectations for Student Conduct:
http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/code_of_student_conduct.pdf

Statement Regarding Students with Disabilities:
Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at http://ds.oregonstate.edu. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations.

BHS/MB 255 Lecture Schedule

Required Texts: openstax *Microbiology* textbook, https://cnx.org/contents/5CvTdmJL@4.9:ryt9cF1D@8/Preface
The lectures are available as streaming media on Canvas.

Unit	Week	Lecture	Topics	Reading Assignments	Learning Activities
Extra Credit			**Pre-Assessment**		
1	1	1 2	An Invisible World The Cell	Chapter 1 Chapter 3	Quiz 1 Discussion 1
	2	3 4 5	Prokaryotic Diversity The Eukaryotics of Microbiology Acellular Pathogens	Chapter 4 Chapter 5 Chapter 6	Quiz 2 Discussion 2
	3	6 7 8	Microbial Biochemistry Microbial Growth Microbial Genetics	Chapter 7: Section 7.5 Chapter 9 Chapter 12: Section 12.4	Quiz 3 Discussion 3
					Homework 1
Midterm I					
2	4	9 10	Control of Microbial Growth Antimicrobial Drugs	Chapter 13 Chapter 14	Quiz 4 Discussion 4
	5	11 12	Microbial Mechanisms of Pathogenicity Disease and Epidemiology	Chapter 15 Chapter 16	Quiz 5 Discussion 5
	6	13 14	Innate Nonspecific Host Defenses Adaptive Specific Host Defenses	Chapter 17 Chapter 18	Quiz 6 Discussion 6 Homework 6
	7	15 16	Diseases of the Immune System Laboratory Analysis of the Immune Response	Chapter 19 Chapter 20	Quiz 7 Discussion 7
					Homework 2
Midterm II					
3	8	17 18	Skin and Eye Infections Respiratory System Infections	Chapter 21 Chapter 22	Quiz 8 Discussion 8
	9	19 20	Urogenital Infections Digestive System Infections	Chapter 23 Chapter 24	Quiz 9 Discussion 9
	10	21 22	Circulatory and Lymphatic System Infections Nervous System Infections	Chapter 25 Chapter 26	Quiz 10 Discussion 10
					Homework 3
Extra Credit			**Post Assessment**		
Final Exam					

BHS/MB 255 Laboratory Schedule

Week	Topic	Lab Activity	Source
1	Introduction to Science	Design an Experiment	eScience lab kit
2	Microbiology Lab Safety	Importance of Hand Hygiene	eScience lab kit
3	Microscopy and Staining	Virtual Magnification Exercise Virtual Microscope Gram Staining	eScience lab kit Virtual Interactive Bacteriology Laboratory or Virtual Labs
4	Culturing and Aseptic Technique	Agar Plate Preparation and Bacterial Inoculation Bacterial Transfer to a Stab Tube and an Agar Plate	eScience lab kit
5	Growth of Microorganisms	Fluid Thioglycollate Medium Effect of Chemical Germicides on Bacterial Growth	eScience lab kit
6	Selective Media and Agar	Selection and Differentiation of Body Inhabiting, Gram-Positive Bacteria Selection and Differentiation of Gram-Negative Bacteria from Liquid Samples	eScience lab kit
7	Antibiotic Sensitivity	Kirby-Bauer disk diffusion test	eScience lab kit
8	The Immune System: Friend and Foe	Immunology Virtual Lab	hhmi BioInteractive
9	Case Studies in Microscopy	The Fatal Flu, Battle of the Biofilms, Middle Ear Mayhem, or Aches on a Plane	Cornell site
10	Case Studies in Microbiology	Salem's Secrets: A Case Study on Hypothesis Testing and Data Analysis	National Center for Case Study Teaching in Science