

Biology 328: Microbiology Spring 2008

Time: Lecture: MWF 9:15-10:20 am
Lab: WR 1:45-3:30 pm OR
RF 11:15-1:00 pm

Place: Morken 124 (Lecture), Rieke 128 (Lab)

Lecturer: Dr. Ann J. Auman

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Office: 154 Rieke Science Center

Office Hours: M 11:00 - 12:30 pm,
W 12:00 - 1:30 pm,
R 10:00 - 11:00 am,
F 1:00 - 2:00 pm,
or by appointment

Course Materials: posted on Sakai

Text: *Microbial Life, 2nd edition* by Staley, Gunsalus, Lory, and Perry
(published in 2007, ISBN 978-0-87893-685-4)

Since this material can be complex at times, it is important for you to **keep up with the assigned reading**. After we go over a particular chapter, be sure to go through the summary and review questions at the end of the chapter. This will be a good review and will check that you understand the material.

Goal: The overall goal of this class is for students to develop skills necessary for success as biological scientists. In the context of learning information about microbiology, students will be exposed to:

- reading and writing about primary literature
- using Excel
- using current computer analysis techniques
- working in groups
- designing experiments, recording data, and drawing conclusions
- media preparation skills
- giving oral presentations

General: We will begin with a discussion of some history and introduce basic microbiological concepts. Then we will move into the cell biology of microbes and learn the differences between prokaryotic and eukaryotic cells. We will then learn about microbial growth and cell metabolism. We will then spend some time discussing genetics with a focus on microbial genetics. We will end the class with a look at specific groups of microbes in an effort to illustrate microbial diversity. The subject matter is of a cumulative nature → if you miss an important concept at the beginning, you may have trouble understanding later on.

Exams: There will be 4 lecture exams given throughout the semester, each worth 100 points. Exam 4, to be given during the final exam week, is **not cumulative**.

Lab: Laboratory exercises will be posted on Sakai. In order to encourage preparedness for lab, 5 pop-quizzes, each worth 15 pts., will be given throughout the semester. These quizzes will be given at the beginning of the lab period and will assess basic information about lab exercises either to be performed that day or recently completed.

Attendance for the lab is **mandatory** since the lecture exams will assume familiarity with the lab exercises. **There will be no make-up labs.**

In lab, **protective lab coats will be provided** and their use is optional. **Use of goggles is mandatory** and they will be provided if necessary. Be aware that staining procedures often stain clothing. **Close-toed and close-soled shoes** are required.

Lab Preparation Period: Ideally, we would prepare each week's materials during class for later use. Unfortunately, due to time constraints, this is not possible. However, to get students familiar with what is involved in laboratory preparation, each student is **required to sign up for 1 laboratory preparation period over the course of the entire semester.** To accommodate students' schedules, half of the available sessions will be held on Mondays at 1:45 pm while the other half will be held on Mondays at 3 pm. Depending on the media and supply requirements for that week's lab exercises, this laboratory preparation period may last up to 2-3 hours in length. Laboratory preparation periods will be supervised by my teaching assistant(s) who is/are familiar with media preparation protocols. You should sign up for 1 laboratory preparation session. Over the course of the semester, should your schedule change and you become unable to participate on your scheduled day, it is your responsibility to find someone to trade with and to inform me via e-mail as to this change. **Your participation in the laboratory preparation period is worth 20 pts.** If you have a legitimate course conflict with both of these time periods, please see me ASAP to discuss alternatives.

Grading:

A:	100-94%	B:	86-84%	C:	76-74%
A-:	93-90%	B-:	83-80%	D:	64-56%
B+:	89-87%	C+:	79-77%	E:	55-0%

Total Points:

Exams 1-4 (4 X 100 pts. each):	400 pts.
History of Microbiology:	30 pts.
Exponents Worksheet:	5 pts.
Generation Time Worksheet:	10 pts.
Growth Curve Excel Assignment:	20 pts.
Attendance at Biology Department/University events	20 pts.
Dilution Problems:	30 pts.
Microbiology Topics:	
Paper:	75 pts.
Oral Presentation:	25 pts.
5 X 15 pt. lab pop-quizzes:	75 pts.
Lab assignments (3):	50 pts.
Lab Notebook:	75 pts.
16S rRNA Analysis Unknown Write-up:	25 pts.
Bacterial Genome Annotation	20 pts.
Lab Investigations Paper/Poster:	100 pts.
Class Participation/Attendance:	20 pts.
Laboratory Preparation Period:	20 pts.

Grand Total: **1000 pts.**

Missed Exams & Quizzes/Late Assignments:

If there is an emergency at test time, please contact me ASAP. **Make-up exams may be oral** and will be given at a time I deem appropriate. Since exams are given during class time, please schedule interviews and medical appointments around scheduled class time whenever possible. If you cannot avoid being gone on a test day, it is your responsibility to contact me **at least one week** prior to the scheduled test date. Any missed exam will require appropriate documentation for absence (ie. doctor's note) for make-up. **No documentation = no make-up exam.**

Lab pop-quizzes will be given at the start of the lab section. If you are late, your quiz will be due when the rest of the class finishes with their quizzes. If you arrive after all quizzes are turned in, you will receive a 0/15 for that quiz. Quizzes cannot be made up. If you are absent for unavoidable reasons and provide appropriate documentation (ie. doctor's note) for absence, arrangements will be made such that the missed quiz will not hurt your final grade.

Throughout the semester, exercises will be due in either lecture or lab. These exercises are due at the beginning of the class they are due. **Late assignments** are defined as **any assignments turned in after the beginning of class the day they are due. 20% will be deducted for any late assignment turned in prior to the next class, an additional 30% will be deducted for any late assignment turned in prior to the 2nd class after it is due, and no credit will be given after that.** Late assignments will only be accepted without penalty if they are accompanied by appropriate documentation for absence (ie. doctor's note).

Course Prerequisites:

Biology 161, 162, 323. One semester of organic chemistry recommended.

Special Arrangements:

If you need adaptations or accommodations because of disability, have emergency medical information to share with me, or need other special arrangements, please come speak to me or leave a voicemail ASAP. If you have questions regarding the services available for special needs at PLU, please call Counseling and Testing at x7602.

Academic Integrity:

To encourage academic integrity, I expect all class members to adhere to a class honor code in which any knowledge of dishonesty is expected to be communicated to the instructor. If dishonesty is involved in any person's exam, a course grade of E will be assigned to that individual and course withdrawal will not be permitted. If dishonesty is involved in any other quiz/assignment the student(s) will earn a zero for that quiz/assignment. Unless otherwise communicated by the instructor, all work submitted is to be your own and NOT collaborative in nature. Individual (not collaborative) work is expected from, but not limited to, the following assignments: laboratory notebook, microbiology topics paper and presentation, growth curve Excel assignment, history of microbiology assignment, genome annotation assignment, other lab assignments. Please refer to the student code of conduct for PLU's academic integrity policy (www.plu.edu/academics/integ).

Tentative Course Schedule

Date	Lecture Topic	Labs
Week 1: 2/7-2/8	Intro Ch. 1	Week 1: Safety, Laboratory Map, Microscopy
Week 2: 2/11-2/15	History of Micro. Ch. 2 Bacterial Cell Structure Ch. 4 Exponents due Fri. 2/15	Week 2a: Media, Aseptic Transfer, Streak Plate, Ubiquity Week 2b: Staining, <i>E. coli</i> isolation, set up Winogradsky columns
Friday 2/15	Seminar 2-3 pm in Leraas	Title: Great Basin hot springs cafe: who's the clientele and what's on the menu? Speaker: Brian Hedlund, Ph.D. (UNLV)
Monday 2/18	No Lecture	
Week 3: 2/19-2/22	History of Micro due Wed. 2/20 Bacterial Cell Structure (continued) Ch.4	Week 3a: Dilutions and Pipetting, Dilution Problems, <i>E. coli</i> purification Week 3b: Cancelled: Please attend 1 or more sessions of Global Health Symposium
Week 4: 2/25-2/29	Dilution Problems due Mon. 2/25 Generation Time due Wed. 2/27 Microbial Nutrition/Growth Ch. 5,6	Week 4a: Growth Curve, Counting Bacteria Week 4b: Make <i>E. coli</i> stock, Starch Hydrolysis, Lipid Hydrolysis, Gelatin & Casein Hydrolysis
Week 5: 3/3-3/7	EXAM 1 MON. 3/3 Microbial Growth Control Ch. 7 Basics of Metabolism Ch. 8	Week 5a: Litmus Milk, Nuclease Activity, Hemolysis, Observe Winogradsky Week 5b: Growth Curve Excel assignment due, Sugar Fermentations, Hydrogen Sulfide Production, IMViC Reactions
Week 6: 3/10-3/14	Basics of Metabolism (continued) Ch. 8 Photosynthesis Ch. 9 Micro Topics Choice due MON. 3/10	Week 6a: IMViC Reactions, Catalase & Oxidase Production Week 6b: Nitrate Respiration, Ammonification, Urea Hydrolysis, Motility, Isolating luminescent bacteria
Week 7: 3/17-3/20	Biosynthesis Ch. 10 Micro Topics References due WED. 3/19	Week 7a: Observe Winogradsky, Endospore enrichment, Purifying luminescent bacteria Week 7b: Take home luminescent bacteria
Friday 3/21- Friday 3/28	SPRING/EASTER BREAK: No Lectures	NO LABS
Week 8: 3/31-4/4	EXAM 2 WED. 4/2 Assembly Ch. 11	Week 8a: Make new <i>E. coli</i> stock, <i>Streptococcus salivarius</i> enrichment Week 8b: <i>E. coli</i> antibiotic and colicin testing, Water Analysis I, Endospore stain
Week 9: 4/7-4/11	Biodegradation Ch. 12	Week 9a: Water Analysis II, 16S rRNA gene analysis, Laboratory Investigations: Choose topic/submit proposal Week 9b: Water Analysis III, Laboratory Investigations: Proposal due
Week 10: 4/14-4/18	Genetics Ch. 13 Micro Topics Paper due Wed. 4/18	Week 10a: Laboratory Investigations: Media Prep Week 10b: Lab Notebook due, Laboratory Investigations: Media Prep
Week 11: 4/21-4/25	Genetics (continued) Ch. 13 EXAM 3 FRI. 4/25	Week 11a: Laboratory Investigations: Do Experiment Week 11b: 16S Unknown write-up due, Laboratory Investigations: Do Experiment
Week 12: 4/28-5/2	Virology Ch. 14	Week 12a: Laboratory Investigations: Prepare posters Week 12b: Prepare/Present posters at Academic Festival 5/2
Week 13: 5/5-5/9	Genetic Exchange Ch. 15	Week 13a: Micro Topics Presentations Week 13b: Micro Topics Presentations
Week 14: 5/12-5/16	Microbial Genomics Ch. 16 Taxonomy Ch. 17	Week 14a: Micro Topics Presentations Week 14b: Micro Topics Presentations
Tuesday 5/20	EXAM 4 (NOT CUMULATIVE)	8:00-9:50 am