

**Microbial (Molecular) Physiology
Bio 450/650 Lecture Syllabus Fall 2016
MWF 8-9am Halsey Science 266**

Instructor: Dr. Sabrina Mueller-Spitz
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Office Hours: Monday 9:30-11:30 and Friday 10-11
Other times are available by appointment.

Course Objectives: Gain a fundamental understanding of cellular composition, membrane transport, genomic diversity, horizontal gene transfer, diversity of metabolic processes, growth and cell death, communication, and techniques used to elucidate physiological processes. Understand how to apply theoretical microbiology to practical problems. Integrate primary scientific literature of microbiology to further your understanding of the ways microbes live and respond to the environment. Develop scientific writing skills and critical thinking about scientific research. Learn how to plan, conduct, and evaluate research.

Course Readings: Readings will be posted on D2L corresponding to the lecture and lab material, which will be a collection of journal article reviews and primary literature papers that will act as the course textbook.

General Topic Outline:

Genomics	Species Concept/Evolution
Cell Composition and Structure	Growth and Cell Division
Membrane Transport	Secretion Systems
Metabolism	Gene Regulation
Stress Response	Biofilm Formation
Quorum Sensing	Small RNAs
Horizontal Gene Transfer	Evolution
Applied Microbiology-Beer Brewing	

If there is a topic that you want to cover specifically please let me know.

Grading: Your course grade will be based on the following items:

Course Breakdown	Undergraduate Point Totals	Graduate Student Point Totals
Participation	60 points	50 points
Exams	325 points	320 points
Discussion Leadership	35 points	35 points
quality discussion questions	3.5 pts	2.5 pts
paper choice	1.5 pts	2.5 pts
leading/facilitating discussion	10 pts	15 pts
written summary	20 pts	15 pts
Discussion Participation	65 points	65 points
Study Guide Questions	10 points	5 points
Term Paper/Lecture	Not Required	70 points
Lab Activities	455 points	455 points
Point Total	950 points	1000 points

Grading Scale

<u>% Point Totals</u>	<u>Undergraduate Grade</u>	<u>% Point Totals</u>	<u>Graduate Grade</u>
93-100	A	98-100	A
90-92.9	A-	95-97.9	A-
87-89.9	B+	92-94.9	B+
82-86.9	B	89-91.9	B
81.9-80	B-	86-88.9	B-
77-79.9	C+	83-85.9	C+
71-76.9	C	79-82.9	C
69-70.9	C-	76-78.9	C-
67-68.9	D+	74-75.9	D+
61-66.9	D	71-73.8	D
60.9-60	D-	70.9	D-
≤ 60	F	≤69	F

Grade Descriptions:

- 1) Three written examinations will be given during the semester. Each exam will be made up of a combination of subjective questions (e.g. short answer, essay, data analysis) and direct content. Make-up exams will ONLY be given for documented excuses (e.g. death in the family, medical excuses, job/graduate school interview). It is the student's responsibility to schedule a make-up exam with the professor, within 48 hours of the missed exam. Exam grades will be given back and grades posted within a week of ALL students taking the exam. **Graduate students will have different exams from the undergraduate students that require a more in-depth analysis of the topics.** For each exam you will be given 1.5 hours to complete it, which means you can take the exam from 7:30-9am or 8-9:30 am. Exams will be handed back about 1 week after taking each exam. (330 points)
- 2) Scientific paper discussions will be moderated by two students together. The group chooses the discussion paper dealing within the scheduled topic. (NO REVIEW PAPERS) **The group must meet with professor two weeks before the class presentation/discussion to discuss the paper choice. If this is late you will lose 5 points from the discussion grade. Graduate Students will run a paper discussion alone.**

*Each student needs to develop a list of three reading questions pertaining to the article. The purpose of each question is to foster discussion about the research project and application of the result among the class. **Each student will post their discussion questions on the D2L discussion page one week before the scheduled discussion** (if this is late you will lose 5 points from the discussion grade).*

Each student will be graded separately facilitating discussion between the class members. This means you need to try and carry the conversation about the results and analysis by the authors.

A written summary of the paper needs to be completed by each student. The objective of the analysis is to succinctly explain the importance of the paper/research to in expanding our understanding of physiology. This short paper is due within 1 week of your discussion to the Discussion drop-box on D2L. The analysis will be graded based upon the following the grading rubric below. Late assignments will lose 10% of the total grade by each day it is late. (35 points)

Grading Rubric for Summary of Discussion Paper & Discussion ~500 words	Total 20 pts
Items to Address in the Analysis 1) How did this paper advance your understanding of bacterial physiology? Support your answer with three elements from the paper. 2) Is the phenomenon/topic in presented in the paper applicable to all bacteria? Why or Why not? Support with three elements from the paper.	12
Using the information presented in the article how could you plan a follow-up experiment on the same topic	4
Writing Style (Grammar, Spelling, Flow of Argument/Discussion) & Citation	4

- 3) Discussion Contribution Every student is required to read the paper and answer the discussion questions for each paper. **To obtain full credit for the discussions you need to constructively CONTRIBUTE to the discussion!** The discussions are used to enhance your ability to analyze scientific papers and evaluate the research. (65 points)
- 4) Participation Assignments: We will utilize bacteria that have fully sequenced and annotated genomes. Over the semester we will examine genome variations, protein secretion, reconstruct essential pathways for carbon utilization, quorum sensing, secondary metabolites, small RNAs and horizontal gene transfer. These assignments will be started in class and then finished the assignment outside the classroom. Each student will be responsible for discussing/presenting information corresponding to their bacterium during class. The objective is get you familiar with tools to analyze the freely available data to address questions about microbial function based on genomic data and application of this data. (60 points Undergrad: 50 points Grad)
- 5) *Graduate students (650 students) Term Paper: The purpose of this term paper is to prepare you for writing, reviewing, and editing a scientific publication. You will write a mini-review of any topic that interests you covered under the umbrella of microbial physiology. You will need a minimum of six peer reviewed primary literature papers from the past 3-5 years that provided you with the information about the topic. Your final paper needs to be ~4000 words, which includes abstract, title, and references. The presentation should summarize your review paper. The presentation needs to be 20 minutes long. This assignment is broken into multiple parts detailed below in the grading rubric. (70 points)

Mini Review Grading Rubric	70 points	Due date
Topic Idea/Outline	3	October 14 th
Meeting I w/professor where we will discuss your topic outline (All graduate students will meet together).	1	By October 28 th
Rough Draft	10	November 16 th
Meeting II w/professor to discuss rough draft	1	By Dec 2 nd
Final Paper	35	December 9 th
Presentation	20	December 12 th

Course Policies:

Academic Dishonesty: Cheating on an exam, plagiarizing (e.g. using information from a website, textbook, journal article, or public press without a citation), or any other form of academic dishonesty will be dealt with in accordance with the current UWO Student Discipline Code section 14.

Academic dishonesty could result in the instructor assigning a grade of "F" for the course should circumstances warrant. I TAKE ACADEMIC MISCONDUCT VERY SERIOUSLY. If you have any questions when working on assignments for this class or any other please come. **REMEMBER WHEN IN DOUBT CITE THE SOURCE or ASK FOR HELP!**

Email: When contacting me by email include the course number (Biol 450 or Microbiology Physiology) in the Subject line to make sure that your email receives a response in a timely manner. If I am unable to understand the content or context of your email, I will not respond, so please send a detailed message. (If your email is in text speak, I will not respond.) Any Email messages received after 5pm on weekdays or over the weekend, may not be responded until the next business day.

Mobile Devices: Turn off all cell phones, mp3players, or any other device that can be distracting to classmate prior to lecture. ***Any mobile phone use in class will results in a loss of 20 points. This also applies to lab.***

Exam Dates:

Exam 1: October 10th

Exam 2: November 16th

Exam 3: December 14 or 16th

Class Discussions Date:

General Topic

Discussion 1: September 19th Professor

Genomics-Genome Comparison

Discussion 2: October 7nd

Growth & Division

Discussion 3: October 26th

Protein Secretion

Discussion 4: November 4th

Carbon Utilization

Discussion 5: November 14th

small RNAs

Discussion 6: December 2th

Quorum Sensing or Biofilms

Discussion 7: December 9th

Horizontal Gene Transfer or Evolution