

MCB 431, Microbial Physiology

Course Schedule- Fall 2017

Instructor: **Dr. Cari Vanderpool**

Recommended text: *The Physiology and Biochemistry of Prokaryotes*, 4th Ed.

Date	Lecture	Topic	Reading	
August	29	1	Introduction to course	
	31	2	Cell Structure 1	
September	5	3	Cell Structure 2	
	7	4	Cell Structure 3 Discussion 1	
	12	5	DNA Replication Discussion 2- Group Alpha	Dimude, et al., mBio 6:e01294-15
	14	6	Cell division Discussion 3- Group Beta	Zielinska, et al., Mol. Micro. mmi.13775
	19		Discussion 4- Group Gamma	Pang, et al., PLoS Genet. 13:e1006908
	21	7	Transcription and Transcriptional Regulation Discussion 5- Group Delta	Bidnenko, et al., PLoS Genet. 13:e1006909
	26	8	Translation and Translational Regulation Discussion 6- Group Epsilon	Fan, et al., Mol. Cell j.molcel.2017.07.010
	28		Discussion 7- Group Zeta	Burgos, et al., J. Bact. JB.00407-17
October	3	9	Post-transcriptional Regulation Discussion 8- Group Eta	Chen, et al., Genes Dev. 31:1382
	5	10	Protein Trafficking Discussion 9- Group Theta	
	10		Protein Trafficking Discussion 9 Group Theta	Lazzaro, et al., mBio 00599-17
	12		Exam #1 Lectures 1-10	
	17	11	Discussion 10, Group Iota Transport of Solutes Across Membranes	Moffitt, et al., eLife 5:e13065
	19	12	Discussion 11- Group Kappa	Stempler, et al., Nat. Comm. 8:315
	24		Discussion 12- Group Lambda	Sexton, et al., Nat. Comm. 8:230
	26	13	Metabolism Discussion 13- Group Mu	Ferla, et al., Mol. Micro. 105:508
	31	14	Energy Generation, Electron Transport Discussion 14- Group Nu	Guest, et al., J. Bact. JB.0153-17
November	2		Cell Signaling 1 Project Introduction, Project work	
	7	15	Cell Signaling 2 Discussion 15- Group Omicron	Stacey, et al., J. Bact. 199:e00048-17
	9	16	Oxidative Stress Project Work	
	14		Discussion 16- Group Pi Project Work	Scholz, et al., mBio 8:e01079-17
	16		Discussion 17, Group Rho Project Work	Grothl, et al., Mol. Micro. mmi.13768
	21		No Class- Thanksgiving break	
	23		No Class- Thanksgiving break	
	28	17	Stress Responses 2 Project Work	
	30	18	Development 1 Project Presentations	
December	5	19	Development 2 Project Presentations	
	7		Project Presentations	
December	12		Exam #2 Lectures 11-19	

MCB 431 MICROBIAL PHYSIOLOGY
SYLLABUS – FALL 2017

Instructor

Dr. Cari Vanderpool
Office: C226 CLSL
email (preferred): cvanderp@life.illinois.edu
Twitter: @MicroPhysL
Phone: 217-333-7033
Office hours: By appointment

Class Time and Location

TR 9:30-10:50
207 Psychology Building

I am happy to meet with students in person. Please contact me before or after class or by email to ask questions or set up a time to meet.

Texts

Suggested textbook: White, Drummond and Fuqua. The Physiology and Biochemistry of Prokaryotes. 4th ed.

Optional textbook: Madigan, Martinko, Stahl and Clark. Brock: Biology of Microorganisms. 13th ed. (This is useful for background information, particularly if you have not taken MCB 300.)

Other readings: Other readings are used to supplement information in the texts in order to provide you with the most up-to-date information on microbial physiology. These readings are listed on the course schedule.

Website: If you are registered for the course, you should have access to the MCB 431 website via learn.illinois.edu. I will make every effort to post lectures prior to class, but at times they may be posted immediately following class.

Course Style

This course is lecture-style with accompanying discussions.

Grading

2 exams (130 points each)	260 points
iClicker questions (5 points each, 14/18 count)	70 points
1 presentation/leading of discussion	60 points
Final Project Presentation: Group Evaluation	50 points
Final Project Presentation: Peer Individual Evaluation	10 points
TOTAL COURSE POINTS	450 points

Final grades will be assigned based on point totals as follows:

≥418 = A	324-350 = C
405-417 = A-	315-323 = C-
396-404 = B+	306-314 = D+
369-395 = B	279-305 = D
360-368 = B-	270-278 = D-
351-359 = C+	≤277 = F

Attendance

Attendance at lectures is expected due to the complex, inter-related nature of the subject matter and the frequent iClicker questions and discussions. No points are assigned for attending lecture, per se, but attendance is required to receive credit for iClicker questions. If you miss a lecture, you can obtain the lecture slides from the course website and notes from a fellow student.

Exams

There will be 2 exams, each covering material from ~10 lectures. Exams will be comprised of a mixture of multiple choice and short response questions.

Make-up exams will be given only in cases where there is a documented reason (e.g., illness with doctor's note or family emergency) that made it impossible for you to take the exam as scheduled. Make-up exams will NOT be given without this documentation. Make-ups must be taken within two weeks of the original exam date.

iClicker questions

During most lectures, iClicker questions will be presented. Students may discuss with one another to formulate answers. Correct answers receive 5 points, incorrect answers receive 2 points to reflect participation. 14/18 iClicker scores will count toward the point total. iClicker questions cannot be made up.

Presentation: Leading Class Discussion

Class discussions will be led by small groups (2-3) of students. Primary research papers will be presented and discussed. Discussion leaders will present relevant background information and then lead the class through a description of the research question, methods used, major results and data interpretation. Discussion papers are listed on course calendar. A scoring rubric for Oral Presentations is provided below. Points for Group Presentation-Scientific and Visual Content (total 40/60) will be assigned to all group members. Points for Individual Delivery (total 20/60) will be assigned to each group member separately.

Participation: Class Discussions

All students are **strongly encouraged to read each discussion paper**, particularly the introduction and discussion sections. Students should engage in the discussion, asking questions or providing opinions on the study. The discussions are most fruitful when they are true back-and-forth conversations!

Information from discussion papers

You are responsible for understanding all the material from lectures and discussions. I do not expect you to remember specific results from papers. However, you should understand the scientific questions that are being addressed, and how certain experiments can address those questions. I may use examples from figures found in discussion papers and modify them slightly to ask questions on exams. It won't help you to memorize results or details of an experiment, but you should understand the concepts and be able to apply them to similar scientific problems.

Final Project

The final project will be a group project where each group of 3-4 students acts as a "research and development" team to devise a novel strategy to combat the global crisis posed by the rapid rise in antibiotic resistance. Groups will have several weeks to develop their ideas and put together a 15-20 minute pitch to sell their ideas to the class. The scoring rubric for the final project is shown below.

Extra Credit: Maximum 20 points

1. Attending scientific seminars through the departments of Microbiology or Biochemistry or through certain other units (e.g., Institute for Genomic Biology). Attend the seminar and prepare a summary to present in class (~5 minutes, one or two slides with relevant figures and bullet points). Send slides to Dr. Vanderpool and present in class within 1 week of the date of the seminar. Seminars through the Department of Microbiology (Thursdays at 4:00 PM, B102 CLSL) are approved. For other seminars, please email speaker name and seminar title to Dr. Vanderpool for approval. See the MCB website for seminar listings (https://mcb.illinois.edu/calendar_events/) (5 points each)

2. Prepare a 5-minute presentation on microbiology "current events." Email me for approval prior to preparing your presentation so we don't have duplicates. **DO NOT LEAVE THIS UNTIL THE END OF THE SEMESTER.** We will not have time for these presentations in the last few class sessions. (5 points each)

Scoring Rubric for Presentations in Class Discussions

Category		Scoring Criteria	Total Points	Score
Scientific Content (25 points)	Introduction	Defines background and importance of research	7	
		States hypotheses, identifies scientific questions being asked		
	Figures	Introduces figures in logical order (even if different from paper)	16	
		Clearly states rationale or hypotheses driving each experiment		
		Describes methodology		
		Explicitly states relevant results		
		Brings in audience questions/comments that enhance discussion		
		Summarizes interpretation of results		
	Conclusion	Summarizes major points of paper	7	
Summarizes flaws or weaknesses of paper				
Provides "take-home" message				
Visual Content (10 points)		Figures are easily visible	10	
		Text is readable and clear		
		Appropriate references for information that was not included in the paper		
Individual Delivery (20 points)		Contributes equally with other group members	20	
		Speaks clearly at an understandable pace		
		Well practiced (smooth)		
		Answers questions knowledgably		
		Draws audience into discussion		
Score		Total Points	60	

Final Project Evaluation: Group

Group: _____

Category		Scoring Criteria	Total Points	Score
Scientific Content (40 points)	Introduction	Defines background and importance of research, open questions Clearly describes strategy/approach Provides convincing rationale for strategy/approach	15	
	Approach	Clearly outlines main experimental methods proposed Provides convincing rationale for use of particular method Describes caveats/pitfalls of experimental methods, proposes alternatives or strategies to minimize	15	
	Innovation	Clearly describes how/why approach is novel or what advantages it has over existing anti-microbial strategies/therapies Provides "take-home" message	10	
Visual Content (10 points)		Figures are easily visible Text is readable and clear Use appropriate diagrams or figures to justify/describe approach	10	

Final Project Evaluation: Individual

Name: _____

Category	Scoring Criteria	Total Points	Score
Individual Delivery (10 points)	Contributed equally with other group members to research and development of presentation <u>During presentation:</u> Speaks clearly at an understandable pace Well practiced (smooth) Answers questions knowledgably Draws audience into discussion	10	