

Professor: **Dr. Petra Levin**
Rebstock 301
plevin@wustl.edu
Tel. 935-7888

Teaching Assistants

Gayle Bentley
Email: gbentley@wustl.edu
Office Hours: Wednesday 9-10am
Brauer Hall 1039

Lisa Drewry
Email: lisa.drewry@go.wustl.edu
Office Hours: Friday 9-10am, LS 111

Jeremy Huynh
Email: huynh@wustl.edu
Office Hours: Monday 9-10am, LS 111

Yangqing Peng
Email: pengyangqing@go.wustl.edu
Office Hours: Thursday 5-6pm, LS 311

Course Objectives:

At the end of the course students should understand the biology, diversity, and utility of microorganisms. In addition, by reading and evaluating relevant articles from the primary literature, students will become familiar with approaches used to solve research problems concerning these organisms.

Texts:

Microbiology: An Evolving Science by Slonczewski and Foster

This year, in response to the recent Ebola outbreak in West Africa, we are also assigning Ebola: the natural and human history of a deadly virus by David Quammen. Quammen is a great science writer and in this book he provides a measured account of Ebola, past present and future. (It's a nice counterpoint to the sensationalistic and frankly somewhat alarmist Hot Zone, by David Preston

Course Web Site:

This course uses Blackboard. Login at bb.wustl.edu using your WUSTL key.

NOTE: Hard copies of the lecture notes will be distributed in class. However, you are responsible for printing out ALL other handouts from the web.

Supplementary Texts and Resources:

For additional reading, The Great Influenza, Vaccine, and Microbe Hunters are good for historical perspective. Microbe Hunters is dated in terms of style and language (See Publisher's Note on page vi) but it's a good introduction to the history of microbiology. The Great Influenza is the story of the 1918 influenza epidemic that killed 40 million people in less than a year. Vaccine is a medical and social history of vaccine development and use.

I also highly suggest the blog "Small Things Considered" which is a running discussion of all things microbial by eminent microbiologists and students. It can be found at: <http://schaechter.asmblog.org/>

Research Article Tutorials:

25% of your final grade will come from participation in weekly tutorial sections. Understanding how to read and evaluate journal articles is an essential part of basic research. To this end, each week you will be required to read a primary research article on topics in molecular microbiology. These papers will complement topics discussed in class the day they are assigned and will be accompanied by study questions and key word definitions. Both the papers and the study questions are available on the course web site.

During the Research Tutorials, the TAs will facilitate discussion of the assigned article paper. Students will be divided into small groups and each group will present one of the figures from the paper to the rest of the section using the board.

You are expected to read the article **BEFORE** attending the session and hand in answers to the accompanying study questions at the **BEGINNING** of the tutorial. Answers to the study questions count towards **15% of your final grade**. You are expected to answer these questions independently, however you may discuss the paper itself with other students. Class participation in these sessions will count towards **10% of your final grade**.

Exams:

There will be two in-class exams that cover the material indicated on the syllabus. The final exam will include some basic concepts from the topics covered on the first two exams but the majority will focus on the final third of the course. **Each exam is worth 25% of your final grade. No make up exams will be given.**

Exam Review: We will have evening review sessions before each exam. Exams from prior years will also be available online. These exams should be taken as guidelines for studying not as gospel.

Regrades: If you would like a question to be regraded, you will need to put your rationale for requesting a regrade in writing and turn it in with the exam to one of the TAs. Be advised we will regrade the entire exam and not just individual questions. You will have one week from the time your corrected exam is returned to ask for a regrade.

PLAGIARISM AND CHEATING:

Unless explicitly told otherwise, you are expected to work independently. Plagiarizing from either the primary literature or from another student will result in a failing grade, or, in more egregious cases, an appearance before the Academic Integrity Committee.

Cheating on an exam will result in an immediate failing grade for the exam, an appearance before the Academic Integrity Committee, and potentially a failing grade for the course.

NOTE:

This is an upper level biology course that moves quickly that covers a significant amount of ground in a short period of time. It is critical to stay on top of the material. As an upper level college course extra credit is NOT an option.

If you feel like you are falling behind or simply have any questions about the lectures or research, please, please talk to either your TA or the instructor. We are here to help you!

While we do not take attendance, missing class can mean missing out on lecture material that is not covered in the slides (Not to mention burning over \$200 in hard earned cash. See: <http://cmcforum.com/life/02142013-Cmçnumbers-what-happens-when-you-skip-class>).

Syllabus:

Date	Topics	Reading
1/12	Historical Perspectives, Phylogeny, Bacterial Cell Structure and Growth	Ch 1, 2, 3.1-3.3, 4.3-4.5, 17 Selling Soap
1/14	Metabolism I Energy generation	Ch 13, 14, 15
1/16	NO SECTION	Handout on Reading a Scientific Paper
1/19	No Class MLK DAY	
1/21	Metabolism II Metabolic Diversity	Ch 4.1, 19 20,000 Microbes
1/23	Tutorial	Todor et al, 2014
1/26	Cell cycle	Ch 3.4-3.6, 7.1-7.5
1/28	Transcriptional, Translation and Regulation	Ch 8.1-8.3; 10.1 – 10.6 Losick and Sonenshein Review
1/30	Tutorial	Kudla et al, 2009
2/2	Guest Lecture on Genome Annotation Dr. Barry Goldman Monsanto	Ch 7.6, 8.7, 10.9 Dr. Goldman's handouts
2/4	Genetics	Ch 9 DNA transfer review
2/9	Exam I	REBSTOCK 322 and REBSTOCK 309

Date	Topics	Reading
2/11	Bacterial development	Ch 4.7
2/13	Tutorial	Ghosh et al Traag et al
2/16	Transport and secretion	Ch 3.2, 4.2, 8.5 Mota et al, 2005
2/18	Overview of Pathogenesis	Ch 23.3-23.5, 25 and 26 (This is a lot of reading but we will keep coming back to these sections during this module so its all valuable, I promise!)
2/20	Tutorial	Alegado et al
2/23	The immune system in a nutshell	Ch 23.6-23.9, 24 Immunity's early warning system
2/25	Mutualism	Ch 17.6, p794-798, Ch 23.1-23.2
2/27	Tutorial	Somevanshi et al
3/2	Extracellular Pathogens Strep, Staph, Cholera	Ch 25, 26
3/4	Biofilms	Ch 4.6 Biofilm Review
3/6	TUTORIAL	Kolodkin-Gal et al Leiman et al
3/16	Intracellular Pathogens	Gouin Review
3/18	Guest Lecture on Microbial Pathogenesis Dr. Joe Vogel Department of Molecular Microbiology Washington University	Dr. Vogel's handouts
3/23	Exam II	REBSTOCK 322 and REBSTOCK 309

Date	Topics	Reading
3/25	Viruses I: Lambda how I love thee CRISPR	Ch 6.1-6.4 Ch 11 (11.1 in particular) Weidenheft et al, 2012;
3/27	Tutorial	Qi et al, 2013
3/30	Viruses II: Flu the coop	Ch 6.5-6.7, 11 (11.3 in particular), 26, 27.7 Lamb and Jackson, 2005
4/1	Microbes and Public Health Ebola; NTDs	Ch 28 <i>EBOLA: The Natural and Human History of a Deadly Virus.</i>
4/3	Tutorial and a REMINDER to submit your questions for the everything you ever wanted to know about microbiology but were afraid to ask "Call in show" on APRIL 22!	Gire et al Qui et al
4/6	Guest Lecture on Parasitology Dr. Steve Beverley Chairman Department of Molecular Microbiology Washington University School of Medicine	Ch 20 Tackling Malaria
4/8	Antibiotics, Antibiotic Resistance and vaccines	Ch 27 Antibiotic and vaccine handouts
4/10	Tutorial	Seder et al http://www.cdc.gov/malaria/biology/life_cycle.htm
4/15	Guest Lecture on Microbial Ecology Nate McNulty Department of Molecular Microbiology Washington University School of Medicine	Ch 21 Ley Review
4/15	Bioremediation and Biofuels	Chapter 22 Biofuels handout
4/17	Tutorial	Ley et al, 2008
4/20	Genetic Engineering	Ch 12 Custom made microbe, Grains of doubt
4/22	MICROBIOLOGY "CALL IN" SHOW!	
5/4	EXAM III (AKA THE FINAL)	10:30am REBSTOCK 322 and REBSTOCK 309