

Monday and Wednesday 10:00 to 11:30am

Friday Sections 10:00 to 11:30am TBA

Professor:

Dr. Petra Levin

Rebstock 301

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Graduate TAs:

PJ Buske

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Office Hours: 9-10am Friday

Rebstock 303

Chris Affolter

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Office Hours: 6-7pm Thursday

McD 412

Aditi Alaganan

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Office Hours: 9-10am Wednesday

LS 112

Varsha Raghavan

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Office Hours: 11:30-12:30pm Monday

LS 112

Course Objectives:

The major goal of the course is that each student understands the biology, diversity, and utility of microorganisms and some approaches used to solve research problems concerning these organisms. In addition, students will gain familiarity with reading and evaluating primary research papers.

Recommended Text Book:

Microbiology: An Evolving Science by Slonczewski and Foster

You can purchase this as a hard copy at the bookstore or buy single chapters for \$2 each online at:

<http://nortonebooks.com/disciplines/Discipline.asp?Disclid=4>

Web Site:

<http://www.nslc.wustl.edu/courses/Bio349/bio349.html>

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.

Texts and Resources:

The textbook, Microbiology, is a good resource throughout the course although some lectures will be based on review articles. The latter are available as PDFs on the course web site.

I would also recommend The Great Influenza, Vaccine, and Microbe Hunters as optional reading 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. All of these books

are easy reads and give you a perspective on what life was like before antibiotics not to mention molecular biology!

You might also want to read 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:

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.

You will be assigned to a Friday section at the beginning of the semester. During these sections TAs will facilitate discussion of the weekly research 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 an overhead projector and/or 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 will 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 on reserve in the biology library. 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:

Except when 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.

Syllabus:

Date	Topics	Reading
1/12	Historical Perspectives, Phylogeny, Bacterial Cell Structure and Growth	Ch 1.2, 3.1, 3.2, 3.7, 4.3-4.5, 18 Selling Soap
1/14	Metabolism I Energy generation	Ch 4.1, 13, 15
1/16	NO SECTION	Handout on Reading a Scientific Paper
1/19	No Class MLK Day	
1/21	Metabolism II Metabolic Diversity	Ch 14, 19 20,000 Microbes
1/23	Tutorial	Reguera et al, 2005
1/26	Cell cycle	Ch 3.6, 7.1-7.3, 7.5
1/28	Transcription and Transcriptional Regulation	Ch 8.1-8.3
1/30	Tutorial	Osawa et al, 2007 See also supporting online material at: http://www.sciencemag.org/cgi/content/full/320/5877/792
2/2	Genetics	Ch 9 DNA transfer review
2/4	Transport and secretion	Ch 3.5, 4.2, 8.5 Mota et al, 2005
2/6	Tutorial	Srivatsan et al Rise of the machine
2/9	Environmental Sensing and Signalling	Ch 5
2/11	Guest Lecture on Genome Annotation Dr. Barry Goldman Monsanto	Ch 7.6, 8.7 Goodner, 2003 Dr. Goldman's handouts X Prize article
2/13	EXAM I	

Date	Topics	Reading
2/16	Bacterial development	Ch 4.7, p218-219, p643, p366-368
2/18	Overview of Pathogenesis	Ch 23.1, 23.2, 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!) Source of deadly <i>E. coli</i> is found
2/20	Tutorial	Mignot et al
2/23	The immune system in a nutshell	Ch 23.3-23.9, 24 Immunity's early warning system
2/25	Extracellular Pathogens	Ch 25, 26
2/27	Tutorial	Meehl et al
3/2	Biofilms	Ch 4.6, p658-659, p711 Battling Biofilms
3/4	Intracellular Pathogens	Gouin Review
3/6	Tutorial	Mah et al
3/16	VIDEO	Frontline AIDS series
3/18	Guest Lecture on Microbial Pathogenesis Dr. Joe Vogel Department of Molecular Microbiology Washington University	Dr. Vogel's handouts
3/20	TUTORIAL	Gouin et al, Nature
3/23	Exam II	

Date	Topics	Reading
3/25	Viruses I: Lambda how I love thee	Ch 6.1-6.4, 6.6-6.7, p373-375
3/27	VIDEO	INFLUENZA 1918
3/30	Viruses II: Flu the coop	Ch 6.5, 25.8, 26 Lamb and Jackson, 2005
4/1	Antibiotics and Vaccines	Ch 27 The Challenge of Antibiotic Resistance When to use Antibiotics
4/3	Tutorial	Morens et al, 2008
4/6	Microbes from a world health perspective	Ch 27 Handouts
4/8	Guest Lecture on Parasitology Dr. Steve Beverley Chairman Department of Molecular Microbiology Washington University School of Medicine	Ch 20 Tackling Malaria
4/10	Tutorial	Habtewold et al, 2008 http://www.cdc.gov/malaria/biology/life_cycle.htm
4/13	Guest Lecture on Microbial Ecology Dr. Andrew Goodman Department of Molecular Microbiology Washington University School of Medicine	Ch 21 Ruth Ley Review
4/15	Microbial diversity and phylogeny	Ch 17, 18, p626-627
4/17	Tutorial	Ley et al, 2008
4/20	Genetic Engineering	Ch 12 Custom made microbe Grains of doubt
4/22	Bioremediation and Biofuels	22.1-22.5 A tentative comeback Blue-green acres
4/24	VIDEO	Frontline AIDs series part II
5/4	EXAM III (AKA THE FINAL)	10:30am location TBA