BIOL 345 FUNDAMENTALS OF MICROBIOLOGY Fall 2012

Instructor: Craig L. Moyer
Office Hours: **TR:** 2:00 - 2:50 pm & by appointment @ BI 406
Lecture: **TR:** Noon - 1:20 pm in BI 234
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Required Text: Madigan *et al.*, 2012. *Brock: Biology of Microorganisms*, 13th Edition. Prentice Hall Publishers. ISBN: 9780321649638 ($45 online).

Objectives of the Course:

Seven Central Themes will guide your successful study of Microbiology:

1. Microbiology in its historical perspective;
2. Microbes as cellular systems;
3. Microbes as energy transducers;
4. Microbes as agents of environmental and geochemical change;
5. Microbes as tools for the study of macromolecular processes;
6. Microbes as agents of infectious disease; and
7. Microbes as products of evolutionary change (This theme is intercalated throughout!)

Evaluation of Coursework:

Two lecture exams @ 150 pts each	300
Comprehensive final exam	200
Total Points:	**500**

The two midterm exams are scheduled outside of the usual lecture period to give you time to develop reasoned answers and essays. **Note the dates and times of the exams and work out potential conflicts now.** Make-up exams will be given only if you are excused from the exam BEFORE the scheduled date and time, or, in the event of illness, you have a note from a health professional confirming that you were unable to take the exam during the scheduled time. Make-up exam format will be at the discretion of the professor.

EXAM I	Monday, October 22nd	**5-7pm**	**BI 234**
EXAM II	Monday, November 19th	**5-7pm**	**BI 234**
FINAL	Friday, December 14th	**8-10am**	**BI 234**

MICROBIOLOGY "TENTATIVE" COURSE OUTLINE

LECTURE DATE	TOPICS
Week 1	**Overview & Historical Perspective**
Sept 27 R	Course Introduction: Why Study Microbes?
Week 2	
Oct 02 T	Historical Perspectives on Microbiology
	Microbes as Cellular Systems
Oct 04 R	An Overview: Comparing Bacterial, Archaeal and Eukaryal Cells
Week 3	
Oct 09 T	The Microbial Cell: Organization and Structure
Oct 11 R	The Microbial Cell: Form and Function
Week 4	**Microbes as Energy Transducers**
Oct 16 T	Microbial Taxonomy and Molecular Phylogeny
Oct 18 R	An Overview: Metabolic Strategies Generating ATP
	(End of MT#1 Info)
Week 5	
Oct 23 T	Heterotrophic Generation of ATP: Aerobic Respiration
Oct 25 R	Heterotrophic Generation of ATP: Anaerobic Respiration
Week 6	
Oct 30 T	Heterotrophic Generation of ATP: Fermentation
Nov 01 R	Autotrophic Generation of ATP: Chemolithotrophy
Week 7	
Nov 06 T	Autotrophic Generation of ATP: Chemolithotrophy
Nov 08 R	Autotrophic Generation of ATP: Photoautotrophy
Week 8	**Microbial Growth & Molecular Processes**
Nov 13 T	Microbial Modification of the Biosphere & Origins of Life
Nov 15 R	Environmental Factors & Growth Parameters
	(End of MT#2 Info)
Week 9	
Nov 20 T	Regulation of Gene Expression & Comparative Genomics
Nov 22 R	Thanksgiving Vacation
Week 10	**Microbes as Agents of Infectious Disease**
Nov 27 T	Normal Flora & Virulence & Pathogenicity
Nov 29 R	Microbial Death & Antibiotic Resistance
Week 11	
Dec 04 T	Impact of Infectious Disease – Video "SmallPox Deadly Again?"
Dec 06 R	Acellular Pathogens & Emergent Diseases

READING ASSIGNMENTS FOR BIOLOGY 345

Readings are from the required text: Madigan *et al.*, 2012. *Brock: Biology of Microorganisms*, 13th ed.

LECTURE TOPIC	READINGS
Overview and Historical Perspective	Chapter 1; Ch 2 (2.7)
Microbes as Cellular Systems	
The Microbial Cell	Chapter 2 (2.1 - 2.6); Chapter 3 (all) Chapter 6 (6.2 - 6.3) review rest
Microbial Evolution & Systematics	Chapter 16 (16.5 - 16.13)
Microbial Diversity & Ecology	Chapter 2 (2.8 - 2.12); Chapter 23 (all) Chapter 17 (17.1); Chapter 19 (19.1)
Microbes as Energy Transducers	
Metabolic Strategies	
Overview	Chapter 4 (4.4 - 4.7)
Respiration & Fermentation	Chapter 4 (4.8 - 4.12); Chapter 14 (14.1 - 14.6)
Chemolithotrophy	Chapter 13 (13.6 - 13.11)
Photoautotrophy	Chapter 13 (13.1 - 13.5 & 13.12 - 13.13)
Biogeochemical Cycles	Chapter 24 (24.1 - 24.6)
Metabolism in Early Organisms	Chapter 16 (16.1 - 16.4)
Microbial Growth & Molecular Processes	
Environmental Effects on Microbial Growth	Chapter 4 (4.1 - 4.3); Chapter 5 (all)
Comparative Microbial Genomics	Chapter 12 (12.1 - 12.6)
Microbial Genome Evolution	Chapter 12 (12.10 - 12.13)
Sensing and Signal Transduction	Chapter 8 (8.7 -8.11)
RNA-based Regulation	Chapter 8 (8.14 - 8.16)
Microbes as Agents of Infectious Disease	
Normal Flora	Chapter 27 (27.1 - 27.5)
Virulence and Pathogenicity	Chapter 27 (27.6 - 27.13)
Antibiotics & Antibiotic resistance	Chapter 26 (26.6 - 26.9)
Viruses, Viroids and Prions	Chapter 9 (review)
Emergent Diseases	Chapter 32 (review)