

BIOL 345 FUNDAMENTALS OF MICROBIOLOGY Fall 2007

Instructor: Craig L. Moyer
Office Hours: **WF:** Noon - 2pm & by appointment @ BI 406
Lecture: **TR:** 10 to 11:20 am in OM 330A
Website: <http://fire.biol.wvu.edu/cmoyer/cmoyer.courses.html>
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Required Text: Madigan and Martinko. 2006. *Brock: Biology of Microorganisms*, 11th Edition. Prentice Hall Publishers. ISBN: 0-13-144329-1
Note: Earlier 10th edition is also an acceptable substitute for the most recent edition (and cheaper!).

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
<u>Comprehensive final exam</u>	<u>200</u>
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 possible 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.

EXAM I	Monday, October 22	5-7pm	BI 212
EXAM II	Monday, November 19	5-7pm	BI 212
FINAL	Tuesday, December 11	8-10am	OM 330A

MICROBIOLOGY “TENTATIVE” COURSE OUTLINE

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

READING ASSIGNMENTS FOR BIOLOGY 345

Readings are from the required text: Madigan and Martinko. 2006. *Brock: Biology of Microorganisms*, 11th Edition. Prentice Hall Publishers.

LECTURE TOPIC

Overview and Historical Perspective

READINGS

Chapter 1; Ch 2 (2.3)

Microbes as Cellular Systems

The Prokaryotic Cell

Chapter 2 (2.1 - 2.2); Ch 7 (7.3);

Review Chapter 7 (Table 7.6);

Chapter 4 (4.4 - 4.6, 4.8 - 4.16)

Microbial Taxonomy and Classification

Chapter 11 (11.10 - 11.13)

Phylogeny of Microorganisms

Chapter 11 (11.5 - 11.9)

Microbial Diversity

Chapter 2 (2.5); Ch 12 (12.1 - 12.2);

Chapter 13 (13.1 - 13.2)

Microbes as Energy Transducers

Metabolic Strategies

Overview

Chapter 2 (2.4);

Chapter 5 (5.6 - 5.8)

Respiration & Fermentation

Chapter 5 (5.9 - 5.14);

Chapter 17 (17.13 & 17.20 - 17.21)

Chemolithotrophy

Chapter 17 (17.8-17.12, 17.15, 17.17)

Photoautotrophy

Chapter 17 (17.1 - 17.7)

Biogeochemical Cycles

Chapter 19 (19.6 - 19.14, skip 19.11);

Chapter 12 (12.4 - 12.5)

Metabolism in Early Organisms

Chapter 11 (11.1 - 11.4)

Microbial Growth

Chapter 5 (Intro, 5.1 - 5.2); (Fig 19.14);

Chapter 6 (Intro, 6.1 - 6.16)

Microbial Genomes & Molecular Processes

Bacterial Chromosomes

Chapter 7 (7.4); Ch 10 (10.19)

Comparative Prokaryotic Genomics

Chapter 15 (15.4 - 15.5)

Plasmids & Pathogenicity Islands

Chapter 10 (10.7 - 10.11)

Attenuation, Quorum Sensing,

Chapter 8 (8.10 - 8.12);

Signal Transduction, & Riboswitches

(scan 8.4 - 8.9 & 8.13 - 8.14)

Microbes as Agents of Infectious Disease

Normal Flora

Chapter 21 (Intro, 21.1 - 21.5)

Virulence and Pathogenicity

Chapter 21 (21.6 - 21.12)

Antibiotics

Chapter 20 (20.6 - 20.9);

Chapter 30 (30.5 - 30.6)

Antibiotic resistance

Chapter 20 (20.12 - 20.13)

Viruses, Viroids, and Prions

Chapter 9 (Intro, 9.1 - 9.2, 9.5 - 9.6,

9.13 - 9.14)

Emergent Diseases

Chapter 25 (25.11 - 25.13)