

BIOL 345 FUNDAMENTALS OF MICROBIOLOGY Fall 2008

Instructor: Craig L. Moyer & Marion Brodhagen
Office Hours: **TR:** 1:30 - 2:30 pm & by appointment @ BI 406
Lecture: **TR:** Noon to 1:20 pm in BI 234
Website: <http://fire.biol.wvu.edu/cmoyer/cmoyer.courses.html>
email: cmoyer@hydro.biol.wvu.edu

Required Text: Madigan *et al.*, 2008. *Brock: Biology of Microorganisms*, 12th Edition. Prentice Hall Publishers. ISBN: 0-13-232460-1

Note: Earlier 11th 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 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 20	5-7pm	BI 234
EXAM II	Monday, November 17	5-7pm	BI 234
FINAL	Monday, December 8	4:00-6:00pm 6:00-8:00pm	BI 415 BI 234
<i>or</i>	Wednesday, December 10	4:00-6:00pm 6:00-8:00pm	BI 415 BI 234

MICROBIOLOGY “TENTATIVE” COURSE OUTLINE

LECTURE DATE	TOPICS
Week 1 Sept 25 R	Historical Perspective Course Introduction: Why Study Microbes? Historical Perspectives on Microbiology
Week 2 Sept 30 T Oct 02 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 07 T Oct 09 R	Microbial Taxonomy and Classification Phylogeny of Microorganisms Microbial Diversity (no more Prokaryotes!!!)
Week 4 Oct 14 T Oct 16 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 21 T Oct 23 R	Heterotrophic Generation of ATP: Fermentation Autotrophic Generation of ATP: Chemolithotrophy
Week 6 Oct 28 T Oct 30 R	Autotrophic Generation of ATP: Chemolithotrophy Autotrophic Generation of ATP: Photoautotrophy
Week 7 Nov 4 T Nov 6 R	Microbial Modification of the Biosphere Origins of Life (<i>End of MT#2 Info</i>)
Week 8 Nov 11 T Nov 13 R	Veteran's Day Holiday Microbial Modification of the Biosphere
Week 9 Nov 18 T Nov 20 R	Microbial Genomes & Molecular Processes Effects of Environmental Factors Bacterial Growth Parameters and Measurements
Week 10 Nov 25 T	Microbes as Agents of Infectious Disease Normal Flora, Virulence and Pathogenicity Regulation of Gene Expression
Week 11 Dec 02 T Dec 04 R	Microbial Death & Antibiotic Resistance Acellular Pathogens & Emergent Diseases

READING ASSIGNMENTS FOR BIOLOGY 345

Readings are from the required text: Madigan and Martinko. 2008. *Brock: Biology of Microorganisms*, 12th Edition. Prentice Hall Publishers.

LECTURE TOPIC

Overview and Historical Perspective

Microbes as Cellular Systems

The Prokaryotic Cell

Microbial Taxonomy and Classification

Phylogeny of Microorganisms

Microbial Diversity

Microbes as Energy Transducers

Metabolic Strategies

Overview

Respiration & Fermentation

Chemolithotrophy

Photoautotrophy

Biogeochemical Cycles

Metabolism in Early Organisms

Microbial Growth

Microbial Genomes & Molecular Processes

Bacterial Chromosomes

Comparative Prokaryotic Genomics

Plasmids & Pathogenicity Islands

Attenuation, Quorum Sensing,

Signal Transduction & Riboswitches

Microbes as Agents of Infectious Disease

Normal Flora

Virulence and Pathogenicity

Antibiotics

Antibiotic resistance

Viruses, Viroids, and Prions

Emergent Diseases

READINGS

Chapter 1; Ch 2 (2.7)

Chapter 2 (2.5 - 2.6); Ch 7 (7.3);

Review Chapter 7;

Chapter 4 (4.1 - 4.4, 4.6 - 4.15)

Chapter 14 (14.10 - 11.14)

Chapter 14 (14.5 - 14.9)

Chapter 2 (2.9-2.10);

Chapter 15 (15.1 - 15.2);

Chapter 17 (17.1 - 17.2)

Chapter 2 (2.8);

Chapter 5 (5.6 - 5.8)

Chapter 5 (5.9 - 5.14);

Chapter 21 (21.6 & 21.1 - 21.5)

Chap. 20-21 (20.8-20.13; 21.8; 21.10)

Chapter 20 (20.1 - 20.7)

Chapter 24 (24.1 - 24.5; 24.11);

Chapter 15 (15.4 - 15.5)

Chapter 14 (14.1 - 14.4)

Chapter 5 (Intro, 5.1 - 5.2); (Fig 23.20);

Chapter 6 (Intro, 6.1 - 6.18)

Chapter 7 (7.4); Ch 11 (11.11)

Chapter 13 (13.1 - 13.3)

Chapter 11 (11.9 - 11.12)

Chapter 9 (9.5 - 9.7; 9.16);

(9.2 - 9.4; 9.9 - 9.10; 9.14 - 9.15)

Chapter 28 (Intro, 28.1 - 28.5)

Chapter 28 (28.6 - 28.12)

Chapter 27 (27.6 - 27.9);

Chapter 25 (25.5 - 25.6)

Chapter 27 (27.12 - 27.13)

Chapter 10 (Intro, 10.1 - 10.2; 10.5 - 10.6; 10.12 - 10.15)

Chapter 33 (33.10 - 33.12)