

BIOL 345 FUNDAMENTALS OF MICROBIOLOGY Spring 2000

Instructor: Craig L. Moyer
Office Hours: MWF: 3 - 4pm & by appointment @ BI 409
Lecture: MWF: 9am @ PH 228
Homepage: <http://fire.biol.wvu.edu/cmoyer/courses.html>

Required Text: Madigan, Martinko and Parker. 2000. *Brock: Biology of Microorganisms*, 9th Edition. Prentice Hall Publishers.

Objectives of the Course:

Seven Central Themes will guide your successful study of Microbiology:

- I. Microbiology in its historical perspective;
- II. Microbes as cellular systems;
- III. Microbes as energy transducers;
- IV. Microbes as agents of environmental and geochemical change;
- V. Microbes as tools for the study of macromolecular processes;
- VI. Microbes as agents of infectious disease; and
- VII. 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 50-minute 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, April 17	5-8pm	BI 212
EXAM II	Monday, May 15	5-8pm	BI 212
FINAL	Wednesday, June 7	10:30-12:30pm	PH 228

MICROBIOLOGY “TENTATIVE” COURSE OUTLINE

LECTURE DATE	TOPICS
	THEME I. Historical Perspective
Mar 29	Course Introduction: Why Study Microbes?
Mar 31	Historical Perspectives on Microbiology
	THEME II. Microbes as Cellular Systems
Apr 03	An Overview: Comparing Prokaryotic and Eukaryotic Cells
Apr 05	The Prokaryotic Cell: Organization and Structure
Apr 07	The Prokaryotic Cell: Form and Function
Apr 10	Microbial Taxonomy and Classification
Apr 12	Phylogeny of Microorganisms
Apr 14	Microbial Diversity
	THEME III. Microbes as Energy Transducers
Apr 17	An Overview: Metabolic Strategies for Generating ATP
Apr 19	Heterotrophic Generation of ATP: Respiration
Apr 21	Heterotrophic Generation of ATP: Fermentation
Apr 24	Autotrophic Generation of ATP: Chemolithotrophy
Apr 26	Autotrophic Generation of ATP: Photoautotrophy
Apr 28	Microbial Evolution – Metabolic Strategies of Primitive Microbes
May 01	Microbial Origins of Life – Video “It came from Outer Space”
May 03	Effects of Environmental Factors
May 05	Bacterial Growth Parameters and Measurements
	THEME IV. Microbes as Agents of Environmental and Geochemical Change
May 08	Extreme Environments & Biogeochemical cycles
May 10	Microbial Modification of the Biosphere
May 12	Bioremediation of Pollutants & Environmental Biotechnology
	THEME V. Microbes & Molecular Processes
May 15	Central Dogma Prokaryote Style
May 17	Regulation of Gene Expression
May 19	Bacterial Genetics: DNA Transfer
May 22	Viruses: Characteristics & Lifestyles
	THEME VI. Microbes as Agents of Infectious Disease
May 24	Normal Flora, Virulence and Pathogenicity
May 26	Microbial Death & Antibiotic Resistance
May 31	Infectious Diseases
Jun 02	Impact of Infectious Disease – Video “SmallPox Deadly Again?”

READING ASSIGNMENTS FOR BIOLOGY 345

Readings are from the required text: Madigan, Martinko and Parker. 2000. *Brock: Biology of Microorganisms*, 9th Edition. Prentice Hall Publishers.

LECTURE TOPIC	READINGS
Overview and Historical Perspective	Chapter 1 (Review Chap. 2)
Microbes as Cellular Systems	
The Prokaryotic Cell	Chapter 3
Microbial Taxonomy and Classification	Chapter 12 (12.9-12.10)
Phylogeny of Microorganisms	Chapter 12 (12.4-12.8)
Phylogeny of Microbial Diversity	Chapter 13 (Intro); Chapter 14 & 17 (Intro only)
Microbes as Energy Transducers	
Metabolic Strategies	Chapter 4 Chapter 15 (selected)
Microbial Evolution	Chapter 12 (12.1-12.3)
Microbial Growth	Chapter 5
Microbes as Agents of Environmental Change	
Biogeochemical Cycling & Extreme Environments	Chapter 16 (16.9-16.18)
Bioremediation of Pollutants	Chapter 16 (16.19-16.22)
Microbial Modification of the Biosphere	Handouts Provided
Environmental Biotechnology	Chapter 10 (10.12; review rest of chapter)
Microbes & Molecular Processes	
Molecular Processes	Chapters 6 & 7
Bacterial Genetics	Chapter 9 (Intro; 9.1-9.11)
Viruses	Chapter 8 (Intro; 8.1-8.7; 8.12;8.14; 8.20; 8.22; 8.23)
Microbes as Agents of Infectious Disease	
Normal Flora	Chapter 19 (Intro; 19.1-19.5)
Virulence and Pathogenicity	Chapter 19 (19.6-19.11)
Pathogenic Microbes	Chapter 22 (22.10); Chapter 23/24 (selected)
Antibiotics and Chemotherapeutic Agents	Chapter 18 (18.6-18.9); Chapter 11 (11.5-11.6)
Antibiotic Resistance	Chapter 18 (18.12-18.13)