

BIOL 345 FUNDAMENTALS OF MICROBIOLOGY Winter 2003

Instructor: Craig L. Moyer
Office Hours: TR: 3 - 5pm & by appointment @ BI 409
Lecture: TR: 10am to 11:20 am in ES 310
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Required Text: Madigan, Martinko and Parker. 2002. *Brock: Biology of Microorganisms*, 10th Edition. Prentice Hall Publishers.

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, February 3	5-7pm	BI 234
EXAM II	Monday, February 24	5-7pm	BI 234
FINAL	Monday, March 17	8-10am	ES 310

MICROBIOLOGY “TENTATIVE” COURSE OUTLINE

LECTURE DATE	TOPICS
Week 1 Jan 7 T Jan 9 R	Historical Perspective Course Introduction: Why Study Microbes? Historical Perspectives on Microbiology
Week 2 Jan 14 T Jan 16 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 Jan 21 T Jan 23 R	Microbial Taxonomy and Classification Phylogeny of Microorganisms Microbial Diversity
Week 4 Jan 28 T Jan 30 R	Microbes as Energy Transducers An Overview: Metabolic Strategies Generating ATP (<i>End of MT#1 Info</i>) Heterotrophic Generation of ATP: Respiration & Fermentation
Week 5 Feb 4 T Feb 6 R	Autotrophic Generation of ATP: Chemolithotrophy Autotrophic Generation of ATP: Photoautotrophy Microbial Modification of the Biosphere
Week 6 Feb 11 T Feb 13 R	Biogeochemical cycles & Metabolic Strategies of Primitive Microbes Microbial Origins of Life – Video “It came from Outer Space”
Week 7 Feb 18 T Feb 20 R	Bacterial Growth Parameters and Measurements (<i>End of MT#2 Info</i>) Effects of Environmental Factors & Life in Extreme Environments
Week 8 Feb 25 T Feb 27 R	Microbial Genomes & Molecular Processes Bacterial Chromosomes, Comparative Prokaryotic Genomics Regulation of Gene Expression
Week 9 Mar 4 T Mar 6 R	Microbes as Agents of Infectious Disease Normal Flora, Virulence and Pathogenicity Microbial Death & Antibiotic Resistance
Week 10 Mar 11 T Mar 13 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, Martinko and Parker. 2002. *Brock: Biology of Microorganisms*, 10th 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);

Chapter 7 (p. 201, Table 7.4);

Chapter 4 (4.4-4.6, 4.8-4.15);

Chapter 11 (11.9-11.12)

Microbial Taxonomy and Classification

Chapter 11 (11.4-11.8)

Phylogeny of Microorganisms

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

Microbial Diversity

Chapter 13 (13.1)

Microbes as Energy Transducers

Metabolic Strategies

Overview

Chapter 2 (2.4); Ch 5 (5.14);

Chapter 5 (5.6, review 5.7-5.8)

Respiration & Fermentation

Chapter 5 (5.9-5.13);

Chapter 17 (17.13 & 17.20)

Chemolithotrophy

Chapter 17 (17.8-17.11, 17.15, 17.17)

Photoautotrophy

Chapter 17 (17.1-17.7)

Biogeochemical Cycles

Chapter 19 (19.9-19.10, 19.13-19.14);

Chapter 12 (12.4-12.5)

Metabolism in Primitive Organisms

Chapter 11 (11.1-11.2)

Microbial Growth

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

Chapter 6 (Intro, 6.1-6.13)

Microbial Genomes & Molecular Processes

Bacterial Chromosomes

Chapter 7 (7.4); Ch 10 (10.19)

Comparative Prokaryotic Genomics

Chapter 15 (15.3)

Plasmids & Pathogenicity Islands

Chapter 10 (10.6-10.8)

Attenuation, Quorum Sensing &

Chapter 8 (8.8-8.10, scan 8.4-8.7)

Signal Transduction

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,

9.12-9.13)

Emergent Diseases

Chapter 25 (25.10-25.11)