

BIOL 345 FUNDAMENTALS OF MICROBIOLOGY Winter 2010

Instructor: Craig L. Moyer
Office Hours: TR: 2:00 - 2:50 pm & by appointment @ BI 406
Lecture: TR: Noon - 1:20 pm in BI 212
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Required Text: Microbial Life, 2nd ed., 2007. Staley *et al.*, Sinauer Publishers.
ISBN: 978-0-87893-685-4

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 18 th	5-7pm	BI 212
EXAM II	Monday, November 15 th	5-7pm	BI 212
FINAL	Friday, December 10 th	8-10am	BI 212

MICROBIOLOGY “TENTATIVE” COURSE OUTLINE

LECTURE DATE	TOPICS
Week 1 Sept 23 R	Overview & Historical Perspective Course Introduction: Why Study Microbes?
Week 2 Sept 28 T Sept 30 R	Historical Perspectives on Microbiology Microbes as Cellular Systems An Overview: Comparing Bacterial, Archaeal and Eukaryal Cells
Week 3 Oct 05 T Oct 07 R	The Microbial Cell: Organization and Structure The Microbial Cell: Form and Function
Week 4 Oct 12 T Oct 14 R	Microbes as Energy Transducers Microbial Taxonomy and Molecular Phylogeny An Overview: Metabolic Strategies Generating ATP <i>(End of MT#1 Info)</i>
Week 5 Oct 19 T Oct 21 R	Heterotrophic Generation of ATP: Aerobic Respiration Heterotrophic Generation of ATP: Anaerobic Respiration
Week 6 Oct 26 T Oct 28 R	Heterotrophic Generation of ATP: Fermentation Autotrophic Generation of ATP: Chemolithotrophy
Week 7 Nov 02 T Nov 04 R	Autotrophic Generation of ATP: Chemolithotrophy Autotrophic Generation of ATP: Photoautotrophy
Week 8 Nov 09 T Nov 11 R	Microbial Growth & Molecular Processes Microbial Modification of the Biosphere & Origins of Life Veteran's Day <i>(End of MT#2 Info)</i>
Week 9 Nov 16 T Nov 18 R	Microbes as Agents of Infectious Disease Environmental Factors & Growth Parameters Regulation of Gene Expression
Week 10 Nov 23 T	Normal Flora & Virulence & Pathogenicity
Week 11 Nov 30 T Dec 02 R	Microbial Death & Antibiotic Resistance Acellular Pathogens & Emergent Diseases

READING ASSIGNMENTS FOR BIOLOGY 345

Readings are from the required text: Staley *et al.*, 2007. *Microbial Life*, 2nd ed.

LECTURE TOPIC

Overview and Historical Perspective

READINGS

Chapter 1 & 2
Review Chapter 3

Microbes as Cellular Systems

The Microbial Cell
Microbial Taxonomy & Molecular Phylogeny
Microbial Diversity & Ecology

Chapter 4
Chapter 17
Review Chapter 24

Microbes as Energy Transducers

Metabolic Strategies
 Overview
 Respiration & Fermentation
 Chemolithotrophy
 Photoautotrophy
 Biogeochemical Cycles
Metabolism in Early Organisms

Chapter 8
Chapter 8
Chapter 8
Chapter 9
Chapter 24
Review Chapter 1

Microbial Growth & Molecular Processes

Environmental Effects on Microbial Growth
Plasmids & Pathogenicity Islands
Comparative Microbial Genomics
Microbial Genome Evolution
Regulation via Attenuation
Quorum Sensing

Chapter 6
Chapter 15
Chapter 16
Chapter 16
Chapter 13
Chapter 13

Microbes as Agents of Infectious Disease

Normal Flora
Virulence and Pathogenicity
Antibiotics & Antibiotic resistance
Viruses, Viroids and Prions
Emergent Diseases

Chapter 26
Chapter 26
Chapter 7
Chapter 14
Chapter 30