

# BIOL 345 FUNDAMENTALS OF MICROBIOLOGY Fall 2013

**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  
**Website:** <http://fire.biol.wvu.edu/cmoyer/cmoyer.courses.html>  
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**Required Text:** Madigan *et al.*, 2012. *Brock: Biology of Microorganisms*, 13<sup>th</sup> Edition. Prentice Hall Publishers. ISBN: 9780321649638 (\$50 online).

## 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>
<b>Total Points:</b>	<b>500</b>

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.

<b>EXAM I</b>	Monday, October 21 <sup>st</sup>	<b>5-7pm</b>	<b>BI 212</b>
<b>EXAM II</b>	Monday, November 18 <sup>th</sup>	<b>5-7pm</b>	<b>BI 212</b>
<b>FINAL</b>	Thursday, December 12 <sup>th</sup> (second session)	<b>3-5pm</b> <b>5-7pm</b>	<b>CB 485</b>

## MICROBIOLOGY “TENTATIVE” COURSE OUTLINE

LECTURE DATE	TOPICS
<b>Week 1</b> Sept 26 R	<b>Overview &amp; Historical Perspective</b> Course Introduction
<b>Week 2</b> Oct 01 T Oct 03 R	Why Study Microbes? Historical Perspectives on Microbiology
<b>Week 3</b> Oct 08 T Oct 10 R	<b>Microbes as Cellular Systems</b> An Overview: Comparing Bacterial, Archaeal and Eukaryal Cells An Overview: Continued...
<b>Week 4</b> Oct 15 T Oct 17 R	The Microbial Cell: Organization and Structure The Microbial Cell: Form and Function <i>(End of MT#1 Info)</i>
<b>Week 5</b> Oct 22 T Oct 24 R	Microbial Taxonomy and Molecular Phylogeny An Overview: Metabolic Strategies Generating ATP
<b>Week 6</b> Oct 29 T Oct 31 R	<b>Microbes as Energy Transducers</b> Heterotrophic Generation of ATP: Aerobic & Anaerobic Respiration Heterotrophic Generation of ATP: Fermentation
<b>Week 7</b> Nov 05 T Nov 07 R	Autotrophic Generation of ATP: Chemolithotrophy Autotrophic Generation of ATP: Photoautotrophy
<b>Week 8</b> Nov 12 T Nov 14 R	<b>Microbial Growth &amp; Molecular Processes</b> Microbial Modification of the Biosphere Origins of Life <i>(End of MT#2 Info)</i>
<b>Week 9</b> Nov 19 T Nov 21 R	Environmental Factors & Growth Parameters Regulation of Gene Expression
<b>Week 10</b> Nov 26 T Nov 28 R	<b>Microbes as Agents of Infectious Disease</b> Normal Flora & Virulence & Pathogenicity Thanksgiving Vacation
<b>Week 11</b> Dec 03 T Dec 05 R	Comparative Genomics Microbial Death & Antibiotic Resistance Viruses and Emergent Diseases

## READING ASSIGNMENTS FOR BIOLOGY 345

Readings are from the required text: Madigan *et al.*, 2012. *Brock: Biology of Microorganisms*, 13<sup>th</sup> ed.

### LECTURE TOPIC

#### Overview and Historical Perspective

### READINGS

Chapter 1; Ch 2 (2.7)

#### Microbes as Cellular Systems

The Microbial Cell

Chapter 2 (2.1 - 2.6); Chapter 3 (all)

Chapter 6 (6.2 - 6.3) review rest

Microbial Evolution & Systematics

Chapter 16 (16.5 - 16.13)

Microbial Diversity & Ecology

Chapter 2 (2.8 - 2.12); Chapter 23 (all)

Chapter 17 (17.1); Chapter 19 (19.1)

#### Microbes as Energy Transducers

Metabolic Strategies

Overview

Chapter 4 (4.4 - 4.7)

Respiration & Fermentation

Chapter 4 (4.8 - 4.12); Chapter 14 (14.1 - 14.6)

Chemolithotrophy

Chapter 13 (13.6 - 13.11)

Photoautotrophy

Chapter 13 (13.1 - 13.5 & 13.12 - 13.13 )

Biogeochemical Cycles

Chapter 24 (24.1 - 24.6)

Metabolism in Early Organisms

Chapter 16 (16.1 - 16.4)

#### Microbial Growth & Molecular Processes

Environmental Effects on Microbial Growth

Chapter 4 (4.1 - 4.3); Chapter 5 (all)

Comparative Microbial Genomics

Chapter 12 (12.1 - 12.6)

Microbial Genome Evolution

Chapter 12 (12.10 - 12.13)

Sensing and Signal Transduction

Chapter 8 (8.7 -8.11)

RNA-based Regulation

Chapter 8 (8.14 - 8.16)

#### Microbes as Agents of Infectious Disease

Normal Flora

Chapter 27 (27.1 - 27.5)

Virulence and Pathogenicity

Chapter 27 (27.6 - 27.13)

Antibiotics & Antibiotic resistance

Chapter 26 (26.6 - 26.9)

Viruses, Viroids and Prions

Chapter 9 (review)

Emergent Diseases

Chapter 32 (review)