

Syllabus for Biology 235 Microbiology

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Office Hours: MWF 10:00 AM - 11:00 AM and by appointment

Classrooms: Lecture - Collier 202 (Mellon Lecture Hall)
Lab – Collier 300

Course Description: Microbiology quite naturally involves the study of microorganisms, literally those organisms such as bacteria, viruses, fungi, algae, and protozoa that are too small to be seen clearly by the naked eye. This, however, would be a monumental task to perform within the time limits of one semester. Therefore, we will primarily restrict ourselves to the study of bacteria and viruses during this course. Even then, we will only be able to scratch the surface. Broad in its scope, this course will introduce you to the taxonomy, evolution, morphology, physiology, ecology and behavior of microorganisms. We will pay particular attention to the nature of infectious organisms in causing disease and how the human body fights these foreign invaders. I hope that you will find our journey exciting!

Course Objectives: Upon completion of this course students will be able to demonstrate:

- 1) knowledge of basic concepts in microbiology, including understanding the dynamic nature of host-microbe interactions in causing infectious disease and the importance of host defenses in the disease process
- 2) ability to make a scientific argument & support it with appropriate examples or scientific justification
- 3) knowledge of and ability to apply the scientific process
- 4) ability to find, evaluate, & use published scientific information
- 5) ability to objectively analyze and interpret data and to use other qualitative and quantitative microbiological techniques
- 6) competence in scientific writing and oral communication
- 7) ability to work together in teams
- 8) ability to integrate concepts within and among disciplines of science
- 9) understanding of the relevance of microbiology to society

Grading: The grading system is as follows:

A =	93-100	C =	73-76
A- =	90-92	C- =	70-72
B+ =	87-89	D+ =	67-69
B =	83-86	D =	63-66
B- =	80-82	D- =	60-62
C+ =	77-79	F =	59 and below

Texts: Talaro, Kathleen Park. 2005. *Foundations in Microbiology: Basic Principles* (5th edition), McGraw Hill, Boston.

Leboffe, M.J. and B.E. Pierce. 2006. *Microbiology: Laboratory Theory and Application* (2nd edition). Morton Publishing Co., Englewood, CO.

Class Attendance: It has been my experience that students who do poorly in this course generally have numerous absences. I strongly suggest that you attend and participate in all lecture sessions unless you have a valid reason not to. I will not specifically maintain lecture attendance records. However, if I detect that you have excessive absences or are habitually tardy I will speak with you in private.

Laboratory sessions, because they involve hands-on experiences that cannot be mastered effectively without performing them, are especially critical if one is to become a successful scientist.

Grading:	Lecture Exam 1	15%
	Lecture Exam 2	15%
	Lecture Exam 3	15%
	Final Exam	15%
	Laboratory Data Sheets	15%
	Laboratory Project & Report	15%
	Laboratory Attendance	<u>10%</u>
		100%

Policy on Academic Honesty: Moravian College's policies on academic honesty and disruptive course-related student behavior can be found in the Student Handbook. It is assumed that each of you has read and understands these policies and the consequences of violating them.

**Microbiology Lecture Schedule
Fall 2006**

Day & Date		Topic	Talaro Chapter
M	Aug. 28	History & Scope of Microbiology	1
W	30	Microbial Evolution	1
F	Sept. 01	Microbial Evolution	1
M	04	No Class-Labor Day	
W	06	Microbial Taxonomy	1
F	08	Biological Macromolecules	2
M	11	Prokaryotic Cell Structure	4
W	13	Prokaryotic Cell Structure	4
F	15	Prokaryotic Cell Structure	4
M	18	Eukaryotic Cell Structure	5
W	20	Eukaryotic Cell Structure	5
F	22	Exam 1	1,2,4,5
M	25	Viruses & Noncellular Infectious Agents	6
W	27	Viruses & Noncellular Infectious Agents	6
F	29	Viruses & Noncellular Infectious Agents	6
M	Oct. 02	Microbial Nutrition & Growth	7
W	04	Microbial Nutrition & Growth	7
F	06*	Microbial Nutrition & Growth	7
M	09	No Class-Fall Break	
W	11	Microbial Metabolism	8
F	13	Microbial Metabolism	8
M	16	Microbial Metabolism	8
W	18	Microbial Metabolism	8
F	20	Exam 2	6,7,8
M	23	Microbial Control	11
W	25	Microbial Control	11
F	27	Microbial Control	11
M	30	Chemotherapy	12
W	Nov. 01	Chemotherapy	12
F	03	Chemotherapy	12
M	06	Infection & Disease	13
W	08	Infection & Disease	13
F	10	Infection & Disease	13
M	13	Exam 3	11,12,13
W	15	Host Defenses	14
F	17	Host Defenses	14
M	20	Host Defenses	14
W	22	No Class-Thanksgiving	
F	24	No Class-Thanksgiving	
M	27	Specific Immunity	15
W	29	Specific Immunity	15
F	Dec. 01	Specific Immunity	15

M	04	Immunizations	16
W	06	Immunizations	16
F	08	Food & Dairy Microbiology	
M	11	Food & Dairy Microbiology	

Final Exam: Date, time & place to be announced 14,15,16 and Notes on Food & Dairy Microbiology

**Biology 235
Laboratory Schedule
Fall 2006**

Date	Laboratory Exercise
R Aug. 31	Set up: Exercise 1-1 (Nutrient Broth & Nutrient Agar Preparation) Exercise 1-2 (Common Aseptic Transfers and Inoculation Methods) Exercise 2-1 (Ubiquity of Microorganisms)
T Sept. 05	Read: Exercises 1-1, 1-2, 2-1 Do: Exercise 3-1 (Introduction to the Light Microscope) Exercise 3-2 (Calibration of the Ocular Micrometer) Exercise 3-3 (Examination of Eukaryotic Microbes-pp. 74-75 only) Exercise 3-4 (Simple Stains) Assignment: Talaro, Chapter 3
R Sept. 07	Set up: Exercise 1-3 (Streak Plate Methods of Isolation) Exercise 2-2 (Colony Morphology) Exercise 2-3 (Growth Patterns on Slants) Exercise 2-4 (Growth Patterns in Broth) Do: Exercise 3-4 (Simple Stains)
T Sept. 12	Read: Exercises 1-3, 2-2, 2-3, 2-4 Do: Exercise 3-6 (Gram Stain) Exercise 3-7 (Acid-Fast Stains)
R Sept. 14	Do: Exercise 3-8 (Capsule Stain) Exercise 3-9 (Endospore Stain) Exercise 3-11 (Flagella Stain)
T Sept. 19	Set up: Exercise 2-5 (Evaluation of Media) Exercise 2-8 (Fluid Thioglycollate Medium) Exercise 2-9 (Anaerobic Jar) Exercise 2-10 (The Effect of Temperature on Microbial Growth) Exercise 2-11 (The Effect of pH on Bacterial Growth) Exercise 2-12 (The Effect of Osmotic Pressure on Microbial Growth)
R Sept. 21	Read: Exercises 2-5, 2-8, 2-9, 2-10, 2-11, 2-12

T	Sept. 26	Set up: Exercise 4-1 (Mannitol Salt Agar) Exercise 4-2 (Phenylethyl Alcohol Agar) Exercise 4-3 (Desoxycholate Agar) Exercise 4-4 (Endo Agar) Exercise 4-5 (Eosin Methylene Blue Agar) Exercise 4-6 (Hektoen Enteric Agar) Exercise 4-7 (MacConkey Agar) Exercise 4-8 (Xylose Lysine Desoxycholate Agar)
R	Sept. 28	Read: Exercises 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8
T	Oct. 03	Set up: Exercise 5-2 (Phenol Red Broth) Exercise 5-4 (Methyl Red and Voges-Proskauer Tests) Exercise 5-5 (Catalase Test) Exercise 5-6 (Oxidase Test) Exercise 5-7 (Nitrate Reduction Test) Exercise 5-8 (Citrate Test) Exercise 5-9 (Malonate Test) Exercise 5-10 (Decarboxylation Test) Exercise 5-11 (Phenylalanine Deaminase Test)
R	Oct. 05	Read: Exercises 5-2, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11
T	Oct. 10	No Lab-Fall Break
R	Oct. 12	Field Trip to Isolate Microorganisms Set up: Exercise 8-4 (Soil Microbial Count)
T	Oct. 17	Set up: Exercise 5-13 (Starch Hydrolysis) Exercise 5-15 (Urease Tests) Exercise 5-16 (Casease Test) Exercise 5-17 (Gelatinase Test) Exercise 5-20 (SIM Medium) Exercise 5-21 (Triple Sugar Iron Agar) Exercise 5-22 (Lysine Iron Agar) Exercise 5-23 (Litmus Milk)
R	Oct. 19	Read: Exercises 5-13, 5-15, 5-16, 5-17, 5-20, 5-21, 5-22, 5-23
T	Oct. 24	Set up: Exercise 5-24 (Bacitracin Susceptibility Test) Exercise 5-25 (B-Lactamase Test) Exercise 5-26 (Blood Agar) Exercise 5-27 (Coagulase Tests) Exercise 5-28 (Motility Test)
R	Oct. 26	Read: Exercises 5-24, 5-25, 5-26, 5-27, 5-28

T	Oct. 31	Do: Exercise 5-31 (Bacterial Unknowns Project)
R	Nov. 02	Do: Exercise 5-31 (Bacterial Unknowns Project)
T	Nov. 07	Do: Exercise 5-31 (Bacterial Unknown Project)
R	Nov. 09	Do: Exercise 5-31 (Bacterial Unknowns Project)
T	Nov. 14	Set up: Exercise 7-3 (Antimicrobial Susceptibility Test) Exercise 7-5 (Epidemic Simulation)
R	Nov. 16	Read: Exercises 7-3, 7-5
T	Nov. 21	Finish: Exercise 5-31 (Bacterial Unknowns Project)
R	Nov. 23	No Lab-Thanksgiving Break
T	Nov. 28	Set up: Exercise 8-1 (Membrane Filter Technique) Exercise 8-2 (MPN Method for Total Coliform Determination)
R	Nov. 30	Read: Exercises 8-1, 8-2
T	Dec. 05	Set up: Exercise 10-3 (Gel Immunodiffusion) Do: Exercise 10-4 (Slide Agglutination) Do: Exercise 10-5 (Blood Typing)
R	Dec. 07	Read Exercise 10-3 Lab Cleanup