

Syllabus for Biology 235 Microbiology

- Instructor:** Dr. Frank T. Kuserk
305 Collier Hall of Science
Office phone: (610) 861-1429
Home phone: (215) 368-2593
e-mail: kuserk@moravian.edu
- Office Hours:** MWF 10:00 AM - 11:00 AM and by appointment
- Classrooms:** Lecture – 330 Priscilla Payne Hurd Academic Center (PPHAC)
Lab – 300 Collier Hall of Science
- 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

Texts: Willey, J.M., L.M. Sherwood and C.J. Woolverton. 2008. *Prescott, Harley, and Klein's Microbiology* (7th edition). McGraw Hill, Boston, MA.

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

Grading:	Lecture Exam 1	15%
	Lecture Exam 2	15%
	Lecture Exam 3	15%
	Final Exam	15%
	Laboratory Data Sheets	10%
	Lab Midterm Exam	5%
	Lab Final Exam	5%
	Laboratory Project & Report	10%
	Laboratory Attendance & Evaluation	<u>10%</u>
		100%

Grading Scale: The grading scale 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

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.

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 2007**

Day & Date		Topic	W, S & W Chapter
M	Aug. 27	History & Scope of Microbiology	1
W	29	History & Scope of Microbiology	1
F	31	Microbial Evolution, Taxonomy & Diversity	19
M	Sept. 03	No Class-Labor Day	
W	05	Microbial Evolution, Taxonomy & Diversity	19
F	09	Microbial Evolution, Taxonomy & Diversity	19
M	10	Procaryotic Cell Structure & Function	3
W	12	Procaryotic Cell Structure & Function	3
F	14	Procaryotic Cell Structure & Function	3
M	17	Eucaryotic Cell Structure & Function	4
W	19	Eucaryotic Cell Structure & Function	4
F	21	Exam 1	1,19,3,4
M	24	Viruses & Noncellular Infectious Agents	16
W	26	Viruses & Noncellular Infectious Agents	17
F	28	Viruses & Noncellular Infectious Agents	18
M	Oct. 01	Microbial Nutrition	5
W	03	Microbial Nutrition	5
F	05	Microbial Growth	6
M	08	No Class-Fall Break	
W	10	Microbial Growth	6
F	12	Microbial Control	7
M	15	Microbial Control	7
W	17	Exam 2	16,17,18,5,6,7
F	19	Microbial Metabolism	8
M	22	Microbial Metabolism	8
W	24	Microbial Metabolism	9
F	26	Microbial Metabolism	9
M	29	Microbial Ecology	27
W	31	Microbial Ecology	27
F	Nov. 02	Marine & Freshwater Microorganisms	28
M	05	Terrestrial Microorganisms	29
W	07	Microbial Interactions	30
F	09	Exam 3	8,9,27,28,29,30
M	12	Pathogenicity of Microorganisms	33
W	14	Pathogenicity of Microorganisms	33
F	16	Antimicrobial Chemotherapy	34
M	19	Antimicrobial Chemotherapy	34
W	21	No Class-Thanksgiving	
F	23	No Class-Thanksgiving	
M	26	Epidemiology of Infectious Disease	36
W	28	Epidemiology of Infectious Disease	36

F		30	Nonspecific Host Resistance	31
M	Dec.	03	Nonspecific Host Resistance	31
W		05	Specific Immunity	32
F		07	Specific Immunity	32
M		1	Specific Immunity	32

Final Exam: Date, time & place to be announced

33,34,36,31,32

Biology 235
Laboratory Schedule
Fall 2007

Date	Laboratory Exercise
R Aug. 30	Set up: Exercise 1-1 (Nutrient Broth & Nutrient Agar Preparation) Exercise 2-1 (Ubiquity of Microorganisms)
T Sept. 04	Read: Exercises 1-1, 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: W,S & W, Chapter 2: The Study of Microbial Structure: Microscopy and Specimen Preparation
R Sept. 06	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. 11	Read: Exercises 1-3, 2-2,2-3, 2-4 Do: Exercise 3-6 (Gram Stain) Exercise 3-7 (Acid-Fast Stains)
R Sept. 13	Do: Exercise 3-8 (Capsule Stain) Exercise 3-9 (Endospore Stain) Exercise 3-11 (Flagella Stain)
T Sept. 18	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. 20	Read: Exercises 2-5, 2-8, 2-9, 2-10, 2-11, 2-12

T	Sept. 25	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. 27	Read: Exercises 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8
T	Oct. 02	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. 04	Read: Exercises 5-2, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11
T	Oct. 09	No Lab-Fall Break
R	Oct. 11	Laboratory Midterm Exam
T	Oct. 16	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. 18	Read: Exercises 5-13, 5-15, 5-16, 5-17, 5-20, 5-21, 5-22, 5-23
T	Oct. 23	Set up: Exercise 5-24 (Bacitracin Susceptibility Test) Exercise 5-26 (Blood Agar) Exercise 5-27 (Coagulase Tests) Exercise 5-28 (Motility Test) Exercise 5-30 (Enterotube II)
R	Oct. 25	Read: Exercises 5-24, 5-26, 5-27, 5-28, 5-30

T	Oct. 30	Field Trip to collect soil samples for microbial isolation, identification & quantification
R	Nov. 01	Do: Exercise 8-4 Soil Microbial Count
T	Nov. 06	Do: Exercise 5-31 (Bacterial Unknown Project)
R	Nov. 08	Do: Exercise 5-31 (Bacterial Unknown Project)
T	Nov. 13	Set up: Exercise 7-3 (Antimicrobial Susceptibility Test) Exercise 7-5 (Epidemic Simulation)
R	Nov. 15	Read: Exercises 7-3, 7-5
T	Nov. 20	Finish: Exercise 5-31 (Bacterial Unknown Project)
R	Nov. 22	No Lab-Thanksgiving Break
T	Nov. 27	Set up: Exercise 8-1 (Membrane Filter Technique) Exercise 8-2 (MPN Method for Total Coliform Determination)
R	Nov. 29	Set up: Exercise 8-7 (Making Yogurt) Read: Exercises 8-1, 8-2
T	Dec. 04	Read Exercise 8-2, 8-7 Lab Cleanup
R	Dec. 06	Laboratory Final Exam