

Syllabus for Biology 297

Microbiology for the Health Sciences

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

Pierce, Burton E. and Michael J. Leboffe. 2005. *Exercises for the Microbiology Laboratory* (3rd 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 to gaining an understanding of basic concepts and techniques. Therefore, I will keep a record of laboratory attendance that will be worth 5% of your final course grade (e.g. 100% attendance = 5%; 90% attendance = 4.5%; 80% attendance = 4.0%, etc.)

Grading:	Lecture Exam 1	100 points
	Lecture Exam 2	100 points
	Lecture Exam 3	100 points
	Final Exam	150 points
	Laboratory Question Sheets	150 points
	Laboratory Midterm Exam	50 points
	Laboratory Final Exam	50 points
	Laboratory Project & Report	150 points
	Laboratory Attendance	100 points
	Instructor Evaluation*	<u>50 points</u>
		100 points

*includes preparedness, cleanliness, technique skills, attention to lab safety

Policy on Academic Honesty: Moravian College's policies on academic honesty and disruptive course-related student behavior can be found in the 2005-2006 Student Handbook. It is assumed that each of you has read and understands these policies and the consequences of violating them.

Microbiology for the Health Sciences
Lecture Schedule
Spring 2006

Day & Date			Topic	Talaro Chapter
M	Jan.	16	History & Scope of Microbiology	1
W		18	Microbial Evolution & Taxonomy	1
F		20	Microbial Evolution & Taxonomy	1
M		23	Chemistry of Life	2*
W		25	Procaryotic Cell Structure	4
F		27	Procaryotic Cell Structure	4
M		30	Eucaryotic Cell Structure	5
W	Feb.	1	Eucaryotic Cell Structure	5
F		3	Viruses	6
M		6	Viruses	6
W		8	Viruses	6
F		10	Exam 1	1,2,4,5,6
S		12	Charles Darwin's 197 th Birthday	
M		13	Microbial Nutrition & Growth	7
W		15	Microbial Nutrition & Growth	7
F		17	Microbial Control: Physical Methods	11
M		20	Microbial Control: Chemical Methods	11
W		22	Microbial Control: Chemical Methods	11
F		24	Chemotherapy	12
M		27	Chemotherapy	12
W	Mar.	1	Chemotherapy	12
F		3	Exam 2	7,11,12
M		6	No Class-Spring Break	
W		8	No Class-Spring Break	
F		10	No Class-Spring Break	
M		13	Infection & Disease	13
W		15	Infection & Disease	13
F		17	Epidemiology	13
M		20	Host Defenses	14
W		22	Host Defenses	14
F		24	Specific Immunity	15
M		27	Specific Immunity	15
W		29	Specific Immunity	15
F		31	Exam 3	13,14,15
M	Apr.	3	Cocci of Medical Importance	18
W		5	Gram-Positive Bacilli of Med. Importance	19
F		7	Gram-Negative Bacilli of Med. Importance	20
M		10	Gram-Negative Bacilli of Med. Importance	20
W		12	Miscellaneous Bacterial Diseases	21
F		14	No Class-Easter Break	
M		17	No Class-Easter Break	

W	19	Fungi of Medical Importance	22
F	21	DNA Viral Diseases	24
M	24	DNA Viral Diseases	24
W	26	RNA Viral Diseases	25
F	28	RNA Viral Diseases	25

Final Exam: Date, time & place to be announced 18, 19, 20,21, 22, 24, 25
(150 points)

Biology 297
Laboratory Schedule
Spring 2006

Date	Laboratory Exercise
W Jan. 18	Set up: Exercise 1-1 (Nutrient Agar & Nutrient Broth Preparation) Exercise 2-1 (Ubiquity of Microorganisms)
F Jan. 20	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) Assignment: Talaro, Chapter 3
W Jan. 25	Read: Exercise 1-2 (Common Aseptic Transfers and Inoculation Methods) Set up: Exercise 2-2 (Colony Morphology) Exercise 2-3 (Growth Patterns in Broth) Do: Exercise 3-4 (Simple Stains)
F Jan. 27	Read: Exercises 2-2, 2-3 Do: Exercise 3-6 (Gram Stain)
W Feb. 1	Do: Exercise 3-7 (Acid-Fast Stains) Exercise 3-9 (Endospore Stain) Exercise 3-8 (Capsule Stain)
F Feb. 3	Do: Exercise 3-11 (Morphological Unknown)
W Feb. 8	Set up: Exercise 2-5 (Evaluation of Media) Exercise 2-8 (Fluid Thioglycollate Medium) Exercise 2-9 (Anaerobic Jar) Exercise 2-10 (Effect of Temperature on Growth) Exercise 2-11 (Effect of pH on Microbial Growth) Exercise 2-12 (The Effect of Osmotic Pressure on Growth)
F Feb. 10	Read: Exercises 2-5, 2-8, 2-9, 2-10, 2-11, 2-12
W Feb. 15	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 (MacConkey Agar) Exercise 4-7 (Hektoen Enteric Agar)

Exercise 4-8 (Xylose Lysine Desoxycholate Agar)

F	Feb. 17	Read: Exercises 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8
W	Feb. 22	Review for Laboratory Mid-term Exam
F	Feb. 24	Laboratory Mid-Term Exam
W	Mar. 1	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)
F	Mar. 3	Read: Exercises 5-2, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11
W	Mar. 8	No Lab-Spring Break
F	Mar. 10	No Lab-Spring Break
W	Mar. 15	Set up: Exercise 5-13 (Starch Hydrolysis) Exercise 5-14 (Urease Tests) Exercise 5-15 (Casease Test) Exercise 5-16 (Gelatinase Test) Exercise 5-19 (SIM Medium) Exercise 5-20 (Triple Sugar Iron Agar) Exercise 5-21 (Lysine Iron Agar) Exercise 5-22 (Litmus Milk Medium)
F	Mar. 17	Read: Exercises 5-13, 5-14, 5-15, 5-16, 5-19, 5-20, 5-21, 5-22
W	Mar. 22	Set up: Exercise 5-23 (Bacitracin Susceptibility Test) Exercise 5-24 (B-Lactamase Test) Exercise 5-25 (Blood Agar) Exercise 5-26 (Coagulase Tests) Exercise 5-27 (Motility Test)
F	Mar. 24	Read: Exercises 5-23, 5-24, 5-25, 5-26, 5-27

W	Mar. 29	Set up: Exercise 5-28 (Bacterial Unknowns Project:Enterotube II) Exercise 6-1 (Standard Plate Count)
F	Mar. 31	Read: Exercise 5-28 (Bacterial Unknowns Project:Enterotube II) Exercise 6-1 (Standard Plate Count)
W	Apr. 5	Set up: Exercise 6-2 (Urine Streak-Semiquantitative Method) Exercise 7-9 (Snyder Test) Do: Exercise 6-3 (Direct Count: Hemacytometer)
F	Apr. 7	Read: Exercise 6-2 (Urine Streak-Semiquantitative Method) Exercise 7-9 (Snyder Test) Do: Lab Project: MMWR Report
W	Apr. 13	Do: Lab Project: MMWR Report
F	Apr. 14	Do: No Lab-Easter Break
W	Apr. 19	Set up: Exercise 2-14 (Measuring Disinfectant Effectiveness) Exercise 2-15 (Antimicrobial Susceptibility Test)
F	Apr. 21	Read: Exercise 2-14 (Measuring Disinfectant Effectiveness) Exercise 2-15 (Antimicrobial Susceptibility Test)
W	Apr. 26	Set up: Exercise 7-1 (Membrane Filter Technique) Exercise 7-2 (MPN Method for Total Coliform Determination)
R	Apr. 28	Read: Exercises 7-1, 7-2 Laboratory Cleanup

Laboratory Final Exam: This exam will be given in conjunction with the lecture exam during finals week.