

# 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: Bergquist, L.M. and B. Pogosian. 2000. *Microbiology: Principles and Health Science Applications*. W.B. Saunders Co., Philadelphia.

Leboffe, M.J. and B.E. Pierce. 2002. *Microbiology: Laboratory Theory and Application*. 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	10%
	Lecture Exam 2	10%
	Lecture Exam 3	10%
	Final Exam*	15%
	Laboratory Data Sheets	10%
	Laboratory Midterm Exam	10%
	Laboratory Final Exam	10%
	Laboratory Project & Report	15%
	Laboratory Attendance	5%
	Instructor Evaluation	<u>5%</u>
		100%

\*cumulative

Policy on Academic Honesty: Moravian College's policies on academic honesty and disruptive course-related student behavior can be found in the 2004-2005 Student Handbook (pp 52-58). 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 2005**

Day & Date			Topic	Bergquist Chapter
M	Jan.	10	History & Scope of Microbiology	1
W		12	Microbial Evolution & Taxonomy	1
F		14	Microbial Evolution & Taxonomy	1
M		17	No Class-MLK Day	
W		19	Chemistry of Life	2
F		21	Microbial Cell Structure	4
M		24	Microbial Cell Structure	4
W		26	Prokaryotes	8
F		28	Prokaryotes	8
M		31	Eukaryotes	9
W	Feb.	2	Eukaryotes	9
<b>F</b>		<b>4</b>	<b>Exam 1</b>	<b>1,2,4,8,9</b>
M		7	Microbial Nutrition & Growth	5
W		9	Microbial Nutrition & Growth	5
F		11	Viruses	10
M		14	Viruses	10
W		16	Viruses	10
F		18	Microbial Control: Physical & Chemical	21
M		21	Microbial Control: Physical & Chemical	21
W		23	Microbial Control: Physical & Chemical	21
F		25	Chemotherapy	22
M		28	Chemotherapy	22
W	Mar.	2	Chemotherapy	22
<b>F</b>		<b>4</b>	<b>Exam 2</b>	<b>5,10,21,22</b>
M		7	No Class-Spring Break	
W		9	No Class-Spring Break	
F		11	No Class-Spring Break	
M		14	Epidemiology	11
W		16	Epidemiology	11
F		18	Pathogenicity & Host Defenses	12
M		21	Pathogenicity & Host Defenses	12
W		23	Pathogenicity & Host Defenses	12
F		25	No Class-Easter Break	
M		28	No Class-Easter Break	
W		30	The Immune Response	13
F	Apr.	1	The Immune Response	13
M		4	The Immune Response	13
W		6	Alterations of the Immune Response	14
<b>F</b>		<b>8</b>	<b>Exam 3</b>	<b>11,12,13,14</b>
M		11	Diseases of the Skin, Hair & Nails	15
W		13	Diseases of the Respiratory System	16

F	15	Diseases of the Gastrointestinal Tract	17
M	18	Diseases of the Gastrointestinal Tract	17
W	20	Diseases of the Genitourinary Tract	18
F	22	Diseases of the Genitourinary Tract	18
M	25	Diseases of the Nervous System, Eye & Ear	19
W	27	Diseases of the Blood, Lymph & Immune System	20
F	29	Diseases of the Blood, Lymph & Immune System	20

Final Exam: Date, time & place to be announced 15, 16, 17 18, 19, 20 (100 points)  
Cumulative questions (50 points)

**Biology 297  
Laboratory Schedule  
Spring 2005**

Date	Laboratory Exercise
R Jan. 13	Set up: Exercise 1-1 (Nutrient Agar & Nutrient Broth Preparation) Exercise 2-1 (Ubiquity of Microorganisms)
T Jan. 18	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. 86-87 only) Exercise 3-4 (Simple Stains) Assignment: Talaro, Chapter 3
R Jan. 20	Set up: Exercise 2-2 (Cultural Characteristics) Exercise 2-3 (Growth Patterns in Broth) Do: Exercise 3-4 (Simple Stains)
T Jan. 25	Read: Exercises 2-2,2-3 Do: Exercise 3-6 (Gram Stain) Exercise 3-7 (Acid-Fast Stains)
R Jan. 27	Do: Exercise 3-9 (Endospore Stain) Exercise 3-11 (Flagella Stain)
T Feb. 1	Set up: Exercise 2-4 (Evaluation of Media) Exercise 2-5 (Aerotolerance) Exercise 2-6 (Cultivation of Anaerobes) Exercise 2-7 (The Effect of Temperature on Growth) Exercise 2-8 (The Effect of pH on Bacterial Growth) Exercise 2-9 (The Effect of Osmotic Pressure on Growth)
R Feb. 3	Read: Exercises 2-4, 2-5, 2-6, 2-7, 2-8, 2-9
T Feb. 8	Set up: Exercise 4-1 (Streak Plate Method of Isolation) Exercise 4-2 (Mannitol Salt Agar) Exercise 4-3 (Phenylethyl Alcohol Agar) Exercise 4-4 (Desoxycholate Agar) Exercise 4-5 (Endo Agar) Exercise 4-6 (Eosin Methylene Blue Agar)

Exercise 4-7 (Hektoen Enteric Agar)  
Exercise 4-8 (MacConkey Agar)  
Exercise 4-9 (Xylose Lysine Desoxycholate Agar)

R	Feb. 10	Read: Exercises 4-1, 4-2, 4-3, 4-4, 4-5, 4-6, 4-7, 4-8, 4-9
T	Feb. 15	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	Feb. 17	Read: Exercises 5-2, 5-4, 5-5, 5-6, 5-7, 5-8, 5-9, 5-10, 5-11
T	Feb. 22	<b>Laboratory Midterm Exam</b> 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)
R	Feb. 24	Read: Exercises 5-13, 5-15, 5-16, 5-17, 5-20, 5-21, 5-22
T	Mar. 1	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	Mar. 3	Read: Exercises 5-24, 5-25, 5-26, 5-27, 5-28
T	Mar. 8	No Lab-Spring Break
R	Mar. 10	No Lab-Spring Break
T	Mar. 15	Set up: Exercise 5-3 (Enterotube II) Exercise 6-1 (Standard Plate Count)
R	Mar. 17	Read: Exercise 5-3 (Enterotube II) Exercise 6-1 (Standard Plate Count)

T	Mar. 22	Set up: Exercise 6-2 (Urine Streak-Semiquantitative Method) Exercise 6-4 (Direct Count) Exercise 7-9 (Snyder Test)
R	Mar. 24	Read: Exercise 6-2 (Urine Streak-Semiquantitative Method) Exercise 6-4 (Direct Count) Exercise 7-9 (Snyder Test)
T	Mar. 29	Do: Exercise 7-10 (MMWR Report) Exercise 7-11 (Epidemic Simulation)
R	Mar. 31	Do: Exercise 7-10 (MMWR Report) Exercise 7-11 (Epidemic Simulation)
T	Apr. 5	Do: Exercise 10-1 (The Fungi-Common Yeasts & Molds) Exercise 10-2 (Examination of Common Protozoans of Clinical Importance)
R	Apr. 7	Do: Exercise 10-2 (Examination of Common Protozoans of Clinical Importance) Exercise 10-3 (Helminth Parasites)
T	Apr. 12	Set up: Exercise 2-12 (Disinfectants: Use Dilution Method) Exercise 2-13 (Effectiveness of Hand Scrubbing) Exercise 2-14 (Antimicrobial Susceptibility Test)
R	Apr. 14	Read: Exercises 2-12, 2-13, 2-14
T	Apr. 19	Set up: Exercise 7-1 (Membrane Filter Technique) Exercise 7-2 (MPN Method for Total Coliform Determination)
R	Apr. 21	Read: Exercises 7-1, 7-2 Set up: Exercise 9-3 (Gel Immunodiffusion)
T	Apr. 26	Do: Exercise 9-1 (Differential Blood Cell Count) Read: Exercise 9-3
R	Apr. 28	Laboratory Cleanup 28th Annual Food Microbiology Festival

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