

MERCER COUNTY COMMUNITY COLLEGE
SCIENCE AND HEALTH PROFESSIONS DIVISION
COURSE OUTLINE

BIO 201 General Microbiology

Spring 2008

Course Coordinator: Professor D.N. Hilker
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Office: MS 122

<u>4</u> Credit Hours	<u>3</u> Lecture Hours	<u>3</u> Laboratory Hours
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Required Texts/Laboratory Items:

1. Microbiology, by Tortora, et.al.
Benjamin Cummings Publishing Co., 9th edition, 2007 (CD-ROM included)
ISBN 0-8053-4791-7
2. Laboratory Experiments in General Microbiology, by D.N. Hilker
Stipes Publishing Co., 4th edition
3. Disposable gloves (laboratory requirement)

Optional Texts:

1. Study Guides for Microbiology, B. Funke
Benjamin Cummings Publishing Co.
ISBN 0-8053-7809-X
2. Quick Study Academic Microbiology Bar Chart

Catalog Description:

The study of the morphology, taxonomy and metabolism of microbes with emphasis on fungi, protozoa, helminths, viruses and bacteria. Review of role of microbes in nature and their industrial application and medical importance. Laboratory exercises permit development of skill in techniques, reinforce certain lecture material and introduce concepts and material not presented in lecture. The laboratory portion of the course stands alone and is essentially a complete and separate course by itself and will include mini-lectures when necessary and appropriate.

Prerequisites: Successful completion of BIO 101 or BIO 103 (grade of C or better) or consent of instructor

Grading:**Lecture:** 75% of total course grade

1. There will be a total of 5 exams (4 exams and a cumulative final exam) given in the course. **There will be NO make up exams!!!** Exams will count 70%.
2. Students will be divided into teams of three to four. Thirteen in-class assignments will be given throughout the semester that count 8 points each. **These assignments are timed so you and your team members must work together and be prepared.** A maximum of 100 points can be obtained. There are no make-up assignments if absent. This team assignment will count 5% of your grade.

Laboratory: 25% of total course grade

Throughout the course, you will be given a total of 13, 10-point laboratory quizzes. The best 10 quiz grades will be computed in determining your laboratory grade and will make up 90% of the laboratory grade. Toward the end of the semester, each student will be given an unknown microorganism that he/she will try to identify. Correct identification (written laboratory report required) will result in an additional 10 points. Failure in attempting the unknown will result in a zero for the entire laboratory portion of the course. The students' performance will also be constantly evaluated by the laboratory instructor. An EXTRA CREDIT report may be done (page 8) and will be calculated into the laboratory grade as described.

Absence from more than two laboratory sessions will result in a grade of NO CREDIT for the ENTIRE COURSE. There are **no make up quizzes** given if you miss a laboratory.

Final Course Grade

In summary, the computation of the final course grade is as follows:

Lecture: 1. $\frac{\text{Sum of 5 exams}}{5} \times 70\%$

2. Sum of 13 assignments x 5%

Laboratory:

a) Sum of 10 best lab quizzes x 90% } x 25%
 b) Additional 10 pts. if unknown identified }

For example:

Lecture: 1. Sum of 5 exams = 400 pts.
 2. Sum of 13 assignments = 96 pts. (100 pts. max)

$$\begin{aligned} \text{Laboratory: Sum of 10 best lab quizzes} &= 80 \text{ pts.} \times .90 = 72 \text{ pts.} \\ \text{Unknown identified} &= 10 \text{ pts.} \\ &\bullet \frac{400 \text{ pts.}}{5} \times .70 = 56 \text{ pts.} \\ &\bullet 96 \text{ pts.} \times 0.5 = 4.8 \text{ pts.} \\ &\bullet (72 \text{ pts.} + 10 \text{ pts.}) \times .25 = 20.5 \text{ pts.} \\ &\text{Total} = 81.3 \text{ pts.} = B^- \end{aligned}$$

Course Grading:

A = 93-100

A⁻ = 90-92

B⁺ = 87-89

B = 83-86

B⁻ = 80-82

C⁺ = 77-79

C = 70-76

D = 60-69

F = 0-59

Attendance

I expect students to attend class unless you are ill or have some other important reason for not attending. If you are unable to attend please inform me of your absence. An attendance sheet will be circulated in lecture. Please print your name and only your name.

Mercer's Academic Integrity Policy

Any student who: a) knowingly represents work of others as his/her own; b) uses or obtains unauthorized assistance in the execution of any academic work; or c) gives fraudulent assistance to another student is guilty of cheating. Violators will be penalized in accordance with established college policies and procedures.

Your examination should reflect your work and knowledge alone. You may not use **any** outside help, written or oral. You may not use notes of any sort; nor exchange papers, comments or gestures with classmates. Such an exchange of information constitutes cheating. You are just as guilty of cheating **giving** information to a person as is the person **receiving** it. Any observed instance of cheating is punishable by confiscation of the examination papers and being assigned a grade of zero for the examination. This applies equally to the giver and receiver of information. Cheating may result in a student being removed from the course and/or being reported to the Academic Standards Committee for possible academic probation or dismissal. Be careful not to give the **appearance** of cheating. Keep your eyes to yourself. Keep your papers right in front of you so they cannot be seen by the people to either side of you or the person behind you. If you have a question, raise your hand and consult with a proctor.

Note: I reserve the right to conduct an additional evaluation (e.g. oral or written exam) if any particular test score is dramatically inconsistent with other exam results or classroom performance. My goal is to make an accurate and fair assessment of a student's performance in this course.

Course Objectives

Upon satisfactory completion of this course, students should be able to:

1. Highlight the historical events in the science of microbiology.
2. Describe the molecular classification of organisms and distinguish between prokaryotic and eukaryotic cells.
3. Demonstrate an understanding of fungi, protozoa, and helminths.
4. Explain the structure and physiology of bacterial cells, describe bacterial growth requirements, and explain the various methods of genetic exchange in bacteria.
5. Describe viral multiplication in animal/bacteria hosts, distinguishing features of viruses and classification of important animal viruses.
6. Review the roles of microbes in nature, society, and their industrial application including genetic engineering.
7. Explain methods of transmission of infectious diseases and the microbe's ability to cause disease.
8. Describe the infectious process, non-specific and specific host defense mechanisms against disease, and humoral and cellular immunological defense mechanisms. To be able to explain the role antibodies play in transplantation, hypersensitivity reactions and immunological testing.
9. Describe the physical and chemical methods available in preventing microbial growth and how to control microbes with chemotherapeutic measures.
10. To be able to describe various bacterial, viral, fungal, protozoan and helminthic infections as related to various anatomical locations.
11. Through laboratory work, students will develop various laboratory skills that include aseptic technique, dilutions, microscopy and interpretation of biochemical reactions. Students will be required to identify an unknown microorganism.

**Spring 2008
Lecture Schedule
BIO 201**

<u>Unit #</u>	<u>Week of</u>	<u>Chapter(s)</u>	<u>Subject</u>
1	1/22	1, 3, 10, 14 (Videotapes)	Introduction, History
2	2/5	12, 21, 22, 24 25, 26 (Videotapes)	Mycology
3	2/12	12, 22 through 26 (Videotapes)	Animal Parasites (protozoa and helminths)
4	2/26	2, 4, 5, 6, 8 (Videotapes)	Bacterial Physiology, Structure & Genetics
5	3/4	13, 21 through 26 (Videotapes)	Virology
6	3/11	11 and 27; Appendix A (Videotapes)	Bacterial Groups
7	*3/25	9 and 28 (Videotapes)	Applied Microbiology and Genetic Engineering
8	3/25	14, 15 (Videotapes)	Infection & Disease
9	4/1	16	Resistance to Infection: Cellular Defenses
10	4/8	17, 18, 19 (Videotapes)	Immunity: Humoral Defenses, Hypersensitivity and Serology
11	4/15	7, 20 (Videotapes)	Control of Microbes
12	4/15	21, 24	Diseases of the Skin, Eyes, and Respiratory System
13	4/22	25	Diseases of the GI Tract

***Spring Recess: 3/17 – 3/23/08**

Withdrawal Deadline: Wednesday April 9, 2008

<u>Unit #</u>	<u>Week of</u>	<u>Chapter(s)</u>	<u>Subject</u>
14	4/29	26 (Videotapes)	Urogenital System
15	5/6	22, 23	Diseases of the Internal Organs, Vascular System, & Nervous tissue

Note: Classes end 5/12/08

Microbiology Place Website and CD

The website associated with the textbook, The Microbiology Place (www.microbiologyplace.com), is a comprehensive tutorial and review tool that provides students with a wide variety of activities for every chapter in the textbook. The CD packaged free with new copies of the text is a duplicate of the website. Directions on how to log on and register to this site are found in the beginning of the textbook.

Online Resources for Microbiology Education

The following websites might be of interest to you:

www.microbeworld.org/
www.microbe.org/microbes/what_is.asp
www.whyfiles.org
www.cdc.gov (Centers for Disease Control)
www.asm.org (American Society of Microbiology)

Lecture Exam Dates

All lecture exams will be given in class. **There are no make-up exams.** The final exam will be given during the final examination period (5/13 – 5/17/08). The day and time will be announced. The following are the units that will be covered for each of the five exams:

Exam #1	Units 1,2,3
Exam #2	Units 4,5,6
Exam #3	Units 7,8,9,10 (I, II, III)
Exam #4	Units 10 (IV on), 11,12,13
Exam #5	Units 14, 15 and 1 through 13

The days that these exams will be given will be announced in class.

Any student in this class who has special needs because of a disability is entitled to receive accommodations. Eligible students at Mercer County Community College are assured services under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. If you believe you are eligible for services, please contact Arlene Stinson, the Director of Academic Support Services. Ms. Stinson's office is LB221, and she can be reached at (609) 570-3525.

Library Videotapes/DVD'S

Microbiology videotapes/DVD's that are relevant to the material in the course can be found at the Circulation Desk in the Library and are available for students to view. They include the following videotapes/DVD's which correspond to the classroom units:

- Unit #1: Classification of Living Things: Monera, Protista, Fungi
 - Biological Classification
 - Biology of Bacteria
 - Compound Microscope: Structure and Operation
 - Germ Genie: The Threat of Biological Warfare
 - Microorganisms
- Unit #2: Biology of Fungi
 - Fatal Fungus
- Unit #3: Biology of Protozoa
 - Our Living World: Parasites
 - Parasites: Eating Us Alive
 - *Eaten Alive: A Parasite Primer (viewer discretion)
 - *Hookworm
- Unit #4: Basic Chemistry for Biology Students
- Unit #5: Biology of Viruses
 - A New Hantavirus (Centers for Disease Control: CDC)
 - Hepatitis C: The Silent Surge
 - Ebola: The Plague Fighters
 - Mad Cow Disease
 - The Virus That Cures
 - The Emerging Viruses
 - Influenzae
 - *HPV: Issues and Answers
 - *Hepatitis A
 - *A World Without Polio
 - *The Age of Viruses
- Unit #6: Cholera
 - Deadly Meat: When a Hamburger Can Kill
 - Meningitis: The Sudden Illness
 - Tuberculosis: The Forgotten Plague
 - The Plague Fighters
 - The Great Plague
 - *Eaten Alive: Micro-Parasites; Invisible Death
 - *Super Staph: Invincible Bacteria?
 - *Food-Borne Illness
- Unit #7: Genetic Engineering
 - Biotechnology
 - Transgenesis: Agricultural Biotechnology
- Unit #8: *The Immune System At Work
 - *War Against Deadly Microbes and Lethal Viruses
- Unit #10: The Immune Response
 - The Microbiology of AIDS
 - Video guide to Immuno Biotechnology
- Unit #11: Antibiotics: Growing Resistance
 - Penicillin: Discovering the Truth
 - Antibiotics: The Double Edge Sword
- Unit #14: Video guide to HIV and AIDS
 - Miss Ever's Boys (HBO movie: Syphilis)
 - And The Band Played On (HBO movie: AIDS)
 - *AIDS: A Global Crisis
 - *Chlamydia: The Hidden Disease

*Available on DVD only.

BIO 201 Microbiology – Extra Credit Report

Report

Throughout the semester, collect 10 short articles from local newspapers, magazines, journals or articles from the internet on the field of microbiology. These articles should indicate their source and date. The articles should be written within the last six months. For each article, write a ½ page (minimum of ten sentences) essay in **your own words** either summarizing the article or giving your opinion of the article. **The essays should be typed double-spaced and a font size no greater than 12. The final report should consist of the 10 articles and 10 short essays.**

Grading

The report will be graded on its scientific content, accuracy, and expression. And yes, spelling, sentence structure and proper use of the English language counts!

Points will be added to your laboratory grade, prior to multiplying your total numerical laboratory grade by 25%. The points are as follows:

A = 5 points

B = 4 points

C = 3 points

D/F = 0 points

Date Due

On or before Monday, April 21, 2008. (Office MS 122 or mailbox in MS 128) before 9:00 p.m.

Library Resources

The Mercer County Community College library has a number of books pertaining to various areas of microbiology, virology, mycology, immunology, parasitology, chemotherapy and etc. The following are a partial listing of periodicals that may prove useful: American Journal of Clinical Pathology, Bioscience, Human Biology, Journal of Bacteriology, Journal of Experimental Biology, Journal of American Medical Association (JAMA), American Journal of Epidemiology, Journal of Medical Technology, American Journal of Nursing, Health, Journal of Parasitology, Laboratory Medicine, Perspectives in Biology and Medicine, American Journal of Public Health, New England Journal of Medicine, Microbe, Clinical Microbiology Reviews, Emerging Infectious Diseases, and Microbiology and Molecular Biology (MMBR).

Spring 2008
BIO 201 LABORATORY SCHEDULE

NOTE: DISPOSABLE GLOVES MUST BE BROUGHT TO ALL LABORATORIES.

<u>Week of</u>	<u>Laboratory</u>	<u>Experiments</u>	<u>Topic</u>
1/22	1	1,2,3	Intro to Microscopes Survey of Microbes Collecting Microbes
1/29	2	3	Mold Identification Isolation Techniques
2/5	3	4	Staining Techniques Study of Molds
2/12	4	5	Media Preparation
2/19	5	6	Pour Plate Techniques
2/26	6	7	Temp. vs. Growth Temp. vs. Survival
3/4	7	9 10 11 12	pH Osmotic Pressure Ultraviolet Light Anaerobic Techniques
3/11	8	23 24 25	Transformation Latex Agglutination Parasitology
*3/25	9	13 14 17 18	Antimicrobial Agents Antibiotics Skin Microbes Throat Cultures
4/1	10	17-18 19 20	ID Skin & Throat Microbes Water Analysis for Contamination Water Microbes

***Spring Recess: 3/17-3/23/08**

<u>Week of</u>	<u>Laboratory</u>	<u>Experiments</u>	<u>Topic</u>
4/8	11	22	Microbes of the Mouth
4/15	12	22 15	Microbes of the Mouth Biochemical Reactions
4/22	13	15 16	Biochemical Reactions Unknown Identification
4/29	14	16	Unknown Identification
5/6	15	16	Unknown Identification

Students may keep track of their progress in this class by recording their results on this page.

Lecture:

Exam #1: _____
 Exam #2: _____
 Exam #3: _____
 Exam #4: _____
 Exam #5: _____

Laboratory:

Quiz #1: _____ Extra Credit Report: _____
 Quiz #2: _____ Unknown Identified: _____
 Quiz #3: _____
 Quiz #4: _____
 Quiz #5: _____
 Quiz #6: _____
 Quiz #7: _____
 Quiz #8: _____
 Quiz #9: _____
 Quiz #10: _____
 Quiz #11: _____
 Quiz #12: _____
 Quiz #13: _____

Extra Credit Report is due on or before Monday, April 21, 2008.

Points Received: _____

In-Class Team Assignment: Maximum of 100 points can be obtained.

#1 _____ #4 _____ #7 _____ #10 _____ #13 _____
 #2 _____ #5 _____ #8 _____ #11 _____
 #3 _____ #6 _____ #9 _____ #12 _____

Withdrawal Deadline: Monday April 9, 2008