MERCER COUNTY COMMUNITY COLLEGE
MATH, SCIENCE, HEALTH PROFESSIONS DIVISION
COURSE OUTLINE

BIO 201 General Microbiology

Summer 2015
Course Coordinator: Professor D.N. Hilker
Hilkerd@mccc.edu  609-570-3367  Office: MS 122
Course Website: http://www.mccc.edu/~hilkerd/

<table>
<thead>
<tr>
<th>Credit Hours</th>
<th>Lecture Hours</th>
<th>Laboratory Hours</th>
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<tbody>
<tr>
<td>4</td>
<td>3</td>
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</table>

Required Texts/Laboratory Items:

1. Microbiology, by Tortora, et.al.

2. BIO201 General Microbiology Lecture Notes, by D.N. Hilker
   MCCC Book Store, Second Edition

3. Laboratory Experiments in General Microbiology, by D.N. Hilker

4. Print laboratory lecture notes before each lab. Notes can be found on the course
   website located at http://www.mccc.edu/~hilkerd/ OR can be purchased under
   Optional Texts.

5. Disposable gloves (laboratory requirement). Closed-toed shoes in lab are highly
   recommended.

Optional Texts:

1. BIO201 General Microbiology Laboratory: Laboratory Experiment Lecture Notes,
   by Prof. Hilker

2. Study Guide for Microbiology, by Tortora, et al
   Benjamin Cummings Publishing Co.

3. 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

Note: Participation in Biology laboratory courses is permitted provided the student has completed
the required prerequisites, is a minimum of 16 years of age or by permission of the instructor and
the Dean of the division.
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. Ten in-class assignments will be given throughout the semester that counts 10 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

1. There will be a total of 12 laboratory quizzes (10 points each) given at the beginning of the class that will make up 90% of your laboratory grade. The best 10 quiz grades will be computed in determining your laboratory grade. **There are no make-up quizzes if you miss a laboratory or come late to laboratory.**

2. 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 and will count **10% of your laboratory grade.** 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.

3. An optional **EXTRA CREDIT report** may be done and will be calculated into the laboratory grade as described on page 8.

Absence from more than 2 lab classes will result in the instructor withdrawing a student from the course or failing the course if it occurs after the withdrawal deadline for the semester.

Final Course Grade

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

**Lecture:**

1. **Sum of 5 exams** x 70% = 400 pts.
2. **Sum of 10 assignments** x 5% = 96 pts. (100 pts. max)

**Laboratory:**

- a) **Sum of 10 best lab quizzes** x 90% = 400 pts.
- b) **Additional 10 pts. if unknown identified** = 0 pts.

**For example:**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Sum of 5 exams</th>
<th>= 400 pts.</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Sum of 10 assignments</td>
<td>= 96 pts. (100 pts. max)</td>
</tr>
</tbody>
</table>
Laboratory: Sum of 10 best lab quizzes = 80 pts. x .90 = 72 pts.
Unknown identified = 10 pts.
- 400 pts. x .70 = 56 pts.
- 96 pts. x 0.5 = 4.8 pts.
- (72 pts. + 10 pts.) x .25 = 20.5 pts.
Total = 81.3 pts. = B-

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 microbes 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.
<table>
<thead>
<tr>
<th>Unit #</th>
<th>Day</th>
<th>Chapter(s)</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5/27</td>
<td>1, 3, 10, 14 (DVD’s)</td>
<td>Introduction to Microbiology</td>
</tr>
<tr>
<td>2</td>
<td>5/29</td>
<td>12, 21, 22, 24 25, 26 (DVD’s)</td>
<td>Mycology</td>
</tr>
<tr>
<td>3</td>
<td>6/1</td>
<td>12, 22 through 26 (DVD’s)</td>
<td>Animal Parasites: Protozoa and Helminths</td>
</tr>
<tr>
<td>4</td>
<td>6/5</td>
<td>2, 4, 5, 6, 8 (DVD’s)</td>
<td>Bacterial Physiology, Structure &amp; Genetics</td>
</tr>
<tr>
<td>5</td>
<td>6/8</td>
<td>13, 21 through 26 (DVD’s)</td>
<td>Virology</td>
</tr>
<tr>
<td>6</td>
<td>6/10</td>
<td>11 and 27; Appendix A (DVD’s)</td>
<td>Bacterial Groups</td>
</tr>
<tr>
<td>7</td>
<td>6/12</td>
<td>9 and 28 (DVD’s)</td>
<td>Applied Microbiology and Biotechnology</td>
</tr>
<tr>
<td>8</td>
<td>6/12</td>
<td>14, 15 (DVD’s)</td>
<td>Infection &amp; Disease</td>
</tr>
<tr>
<td>10</td>
<td>6/17</td>
<td>17, 18, 19 (DVD’s)</td>
<td>Immunity: Humoral Defenses (3rd Line of Defense), Hypersensitivity and Serology</td>
</tr>
<tr>
<td>11</td>
<td>6/19</td>
<td>7, 20 (DVD’s)</td>
<td>Control of Microbes</td>
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<tr>
<td>12</td>
<td>6/22</td>
<td>21, 24</td>
<td>Diseases of the Skin, Eyes, and Respiratory System</td>
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<tr>
<td>13</td>
<td>6/24</td>
<td>25</td>
<td>Diseases of the GI Tract</td>
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**Withdrawal Deadline:** Friday June 19, 2015  
**Note:** Schedule is subject to change at the discretion of the instructor
<table>
<thead>
<tr>
<th>Unit #</th>
<th>Day</th>
<th>Chapter(s)</th>
<th>Subject</th>
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</thead>
<tbody>
<tr>
<td>14</td>
<td>6/26</td>
<td>26 (DVD’s)</td>
<td>Diseases of the Urinary &amp; Reproductive Systems</td>
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<tr>
<td>15</td>
<td>6/29</td>
<td>22, 23</td>
<td>Diseases of the Nervous &amp; Cardiovascular Systems</td>
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</tbody>
</table>

**Note:** Classes end: 6/29/15     Final Examination In class: 7/1/15

**Mastering Microbiology Website: Optional**
The textbook publisher has available for purchase a comprehensive tutorial and review tool that provides students with a wide variety of activities for every chapter in the textbook. Students can buy MasteringMicrobiology directly online via the site [http://www.masteringmicrobiology.com/](http://www.masteringmicrobiology.com/).

**Online Resources for Microbiology Education**
The following websites might be of interest to you:
- [www.microbeworld.org/](http://www.microbeworld.org/)
- [www.whyfiles.org](http://www.whyfiles.org)
- [www.cdc.gov](http://www.cdc.gov) (Centers for Disease Control)
- [www.asm.org](http://www.asm.org) (American Society of Microbiology)

**Lecture Exam Dates**
Lecture exams will be given in class or in the WWC Testing Center. It is your responsibility to check the times of the Testing Center and to have a valid student ID. When exams are given in the Testing Center they will be scheduled outside of the normal classroom time. **There are no make-up exams. The cumulative final exam (Exam 5) will be given in class on Wed. 7/1/15.**

- 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.

Mercer County Community College is committed to ensuring the full participation of all students in its programs. If you have a documented differing ability, or think that you may have a differing ability that is protected under the ADA and Section 504 of the Rehabilitation Act, please contact Arlene Stinson in LB 216 [stinsona@mccc.edu](mailto:stinsona@mccc.edu) for information regarding support services.

If you do not have a documented differing ability, remember that other support services are available to all students on campus including the Learning Center located in LB 214.
Library DVD’S/Videotapes
Helpful microbiology DVD’s/videotapes that are relevant to the material in the course can be found at the Circulation Desk in the WWC Library. They include the following DVD’s/videotapes which correspond to the classroom units:

Unit #1:  *Classification of Living Things: Monera, Protista, Fungi
          *The Domains of Life: Life’s Three Great Branches
          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
          *Unseen Enemies: Hookworm
          Our Living World: Parasites
          Parasites: Eating Us Alive
          *Eaten Alive: A Parasite Primer (viewer discretion)

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
          *Understanding Hepatitis C
          *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
          *Tuberculosis
          The Plague Fighters
          *Super Staph-Invincible Bacteria
          *Eaten Alive: Micro-Parasites; Invisible Death

Unit #7: Genetic Engineering
          *Biotechnology
          *Transgenesis: Agricultural Biotechnology

Unit #8: *The Immune System At Work

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 #13: *Foodborne Illness

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
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 from January 2014 to present. 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 hard copies of the 10 articles and 10 essays. Online submission of the report will NOT be accepted.

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 June 22, 2015 (Office MS 122) before 2:00 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).
### Summer 2015
### BIO 201 LABORATORY SCHEDULE

**NOTE:** DISPOSABLE GLOVES MUST BE BROUGHT TO ALL LABORATORIES. CLOSED-TOED SHOES ARE HIGHLY RECOMMENDED.

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<thead>
<tr>
<th>Day</th>
<th>Laboratory</th>
<th>Experiments</th>
<th>Topic</th>
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<tbody>
<tr>
<td>5/27</td>
<td>1</td>
<td>1, 2, 3</td>
<td>Intro to Microscopes</td>
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<td></td>
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<td>Survey of Microbes</td>
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<td>Collecting Microbes</td>
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<tr>
<td>5/29</td>
<td>2</td>
<td>4</td>
<td>Staining Techniques</td>
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<tr>
<td>6/1</td>
<td>3</td>
<td>3</td>
<td>Mold Identification</td>
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<td>Isolation Techniques</td>
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<td>6/3</td>
<td>4</td>
<td>5</td>
<td>Culture Media</td>
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<td>6</td>
<td>Pour Plate Techniques</td>
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<tr>
<td>6/5</td>
<td>5</td>
<td>7</td>
<td>Temp. vs. Growth</td>
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<td>8</td>
<td>Temp. vs. Survival</td>
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<td>6/8</td>
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<td>9</td>
<td>pH</td>
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<td>10</td>
<td>Osmotic Pressure</td>
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<td>11</td>
<td>Ultraviolet Light</td>
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<td>12</td>
<td>Anaerobic Techniques</td>
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<td>6/10</td>
<td>7</td>
<td>23</td>
<td>Transformation</td>
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<td>24</td>
<td>Latex Agglutination</td>
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<td>25</td>
<td>Parasitology</td>
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<td>6/12</td>
<td>8</td>
<td>13</td>
<td>Antimicrobial Agents</td>
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<td>14</td>
<td>Antibiotics</td>
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<td>17</td>
<td>Skin Microbes</td>
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<td>18</td>
<td>Throat Cultures</td>
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<td>6/15</td>
<td>9</td>
<td>17-18</td>
<td>ID Skin &amp; Throat Microbes</td>
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<td>19</td>
<td>Water Analysis for Contamination</td>
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<td>20</td>
<td>Water Microbes</td>
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<td>Day</td>
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<td>Experiments</td>
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<tr>
<td>6/17</td>
<td>10</td>
<td>22</td>
<td>Microbes of the Mouth</td>
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<tr>
<td>6/19</td>
<td>11</td>
<td>22</td>
<td>Microbes of the Mouth</td>
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<td>15</td>
<td>Biochemical Reactions</td>
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<td>6/22</td>
<td>12</td>
<td>15</td>
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<td>6/24</td>
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<tr>
<td>6/26</td>
<td>14</td>
<td>16</td>
<td>Unknown Identification</td>
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Laboratory classes will end on Friday June 26, 2015.

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: ______
Quiz #2: ______
Quiz #3: ______
Quiz #4: ______
Quiz #5: ______
Quiz #6: ______
Quiz #7: ______
Quiz #8: ______
Quiz #9: ______
Quiz #10: ______
Quiz #11: ______
Quiz #12: ______

*Extra Credit Report:_____
Unknown Identified:_____

*Extra Credit Report is due on or before Monday June 22, 2015 before 2:00 pm (MS122)

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

#1 ______ #4 ______ #7 ______ #10 ______
#2 ______ #5 ______ #8 ______
#3 ______ #6 ______ #9 ______

Withdrawal Deadline: Friday June 19, 2015