BIOLOGY B235: MICROBIOLOGY
Manchester Community College
Course Syllabus
Spring 2018
CRN#10260 & CRN# 10014
M-W or T-Th

INSTRUCTOR: Jonathan Morris, Ph.D.  Phone: (860)512-2771  Office: Tower 515

Times: CRN# 10260 - M-W section, Rm SSC241 - 11-12:20; Lab LRC 127 M-W 12:30–1:50
     CRN# 10014 - T-Th section, Rm SSC242 - 5:30- 6:50; Lab LRC 127 T-Th 7:00 – 8:20.

Office Hrs: W 10-11 AM & 2:20–3:20 PM & T- Th 4:15-5:15 PM (or by appointment)

E-Mail: Jmorris@mcc.commnet.edu

COURSE PREREQUISITES: Biology 105, 115, 121 or 211 with C or better and Chemistry 111 or higher with C or better and eligibility for English 101

TEXT & SUPPLIES:
  1. Microbiology 12th ed., Tortora, Funke, and Case
  2. Symbiosis for General Microbiology
  3. MasteringMicrobiology (included with custom book or available on-line)
  4. Sharpie black permanent marker
  5. Lab coat
  6. Safety glasses or eye glasses
  7. Combination lock

COURSE OBJECTIVES:
This course is designed to provide students with an introduction to microbiology. Students will learn the fundamentals of microbiology, survey the world of microbial organisms, and study the interactions between microbes, their hosts, and their effects on the environment. There will also be laboratory exercises each week that will teach the basics of handling, culturing, and identifying microbes.

Specific Learning Outcomes:
By the conclusion of this course students will be able to:
  1. Summarize the harmful as well as the beneficial effects of microorganisms on their host and the environment.
  2. Describe with the ecology, genetics, life cycle and biological processes found in microorganisms.
  3. Discuss the classifications of microorganisms and the tools used to study these organisms.
  4. Explain how microbes cause human disease and about defenses which are used to suppress microbial diseases, including both those that are a part of the human body as well as those that are medical.
  5. Evaluate and critic the reliability or accuracy of microbiology related information and references.

COURSE REQUIREMENTS:
1. Students are expected to attend all classes. Poor attendance will be noted and will affect your grade. Arrive on time for class. You must contact the instructor in advance to make arrangements to make up the work if you will miss a class or exam, however missing class for any reason will affect your grade. Only students with a prearranged absence will be permitted to make up a quiz or exam. There will be no lab make ups. A missed lab results in a loss of lab points.
2. Reading assignments must be completed before each class. Questions and other in class assignments will be given to the class periodically to assure that the readings have been completed and the materials understood.

3. Assignments must be turned in on time and points may be deducted for work that is submitted late.

4. Students are encouraged to keep a course portfolio during the semester. Your portfolio will be a learning tool as well as mapping out your progress throughout the semester. Periodically your portfolio will be reviewed to access your progress in the course. If problems arise in studying and retaining the materials then the portfolio should provide clues to what could be done to improve your performance. Portfolios will be given points that will be taken into account when grades are determined. You will earn points on the portfolio based the portfolio rubric. These points will then be used to add points to your final course grade.

The portfolio will be kept in a three ringed notebook. In it you will document all of your learning activities. Use the portfolio rubric to guide your efforts. All of the following sections must be in the portfolio to receive credit.

1. Comprehensive class notes.
2. A detailed outline you write based on the assigned readings.
3. Self-assessment - This is a critical self-evaluation that is completed after each exam and as needed between. (min. 200 words each)
4. Three microbiology related articles shared with the class.
5. Any other graded or ungraded assignments for the class and lab.
6. All other class or lab related handouts, research or other class or lab work.

5. Your grade will depend on the results of:          

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Approximate weight</th>
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<tbody>
<tr>
<td>4 Exams</td>
<td>40 %</td>
</tr>
<tr>
<td>1 Safety quiz, 1 Lab Exam</td>
<td>20 %</td>
</tr>
<tr>
<td>Written answers to class questions, MasteringMicrobiology, homework, 3 articles, class participation &amp; attendance</td>
<td>10%</td>
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<tr>
<td>Class presentations</td>
<td>10%</td>
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<tr>
<td>Lab reports</td>
<td>20%</td>
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<tr>
<td>Class Portfolio (used as additional assessment for extra credit)</td>
<td>10 %</td>
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</tbody>
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By visiting My Grades in BlackBoard you can see a list of all of the assignment for this semester as well as your current grade in the course. Below are the grade equivalents used in this course.

<table>
<thead>
<tr>
<th>Letter Grade</th>
<th>Average</th>
<th>Letter Grade</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>95-100%</td>
<td>C</td>
<td>74-76%</td>
</tr>
<tr>
<td>A−</td>
<td>90-94%</td>
<td>C−</td>
<td>70-73%</td>
</tr>
<tr>
<td>B+</td>
<td>87-89%</td>
<td>D+</td>
<td>67-69%</td>
</tr>
<tr>
<td>B</td>
<td>84-86%</td>
<td>D</td>
<td>64-66%</td>
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<tr>
<td>B−</td>
<td>80-83%</td>
<td>D−</td>
<td>60-63%</td>
</tr>
<tr>
<td>C+</td>
<td>77-79%</td>
<td>F</td>
<td>&lt; 60%</td>
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</table>

*** Final grades and academic standing can be obtained from www.mycommnet.edu.

6. This class will make use of an online course management system called Blackboard Learn. A copy of this syllabus and the class schedule, as well as various class handouts and assignments, will be posted on Blackboard. Thus, you are strongly encouraged to visit Blackboard on a regular basis to download and print these course materials. To access Blackboard Learn, you need to login to myCommNet at http://my.commnet.edu. You can also link to myCommNet from the MCC home page. You will need your NetID and your password.

** Some course content as presented in Blackboard Learn is not fully supported on mobile devices at this time. While mobile devices provide convenient access to check in and read information about your courses, they should not be used to perform work such as taking tests, quizzes, completing assignments, or submitting substantive discussion posts.
7. **Withdrawal Policy:** Withdrawal from this course is a student initiated process. I will not automatically assign a grade of W to students who simply stop attending class and/or submitting work. If you choose to stop attending class or submitting course work but do not formally withdraw from the course, then you will receive the grade earned for the course (with zero’s assigned to all missing work). During the first 14 calendar days of the semester, courses that a student drops or for which a student receives a refund will be removed from the student’s schedule and will not appear on his/her transcript. After 14 days a student who wishes to withdraw from any course must either withdraw online or submit the appropriate withdrawal form to the Registrar’s office by. The [Course Withdrawal Form Prior to Two Thirds of Semester](http://www.mcc.commnet.edu/students/form.php) is available at the Registrar’s office or online at http://www.mcc.commnet.edu/students/form.php. Prior to the 2/3 deadline, you do not need my permission or signature to withdraw from this course. Should a student wish to receive a withdrawal (W) after the 2/3 deadline then the student must obtain the proper form from the registrar and have it signed by the instructor **before finals week begins.** The form must be returned to the registrar by the last day of finals.

**Incompletes:** An incomplete is a temporary grade assigned when coursework is missing and the student agrees to complete the requirements. Incompletes are assigned when there are extenuating circumstances, such as illness, that prevent the student from completing the course. A student may request an Incomplete but a faculty member is not required to honor the request. Refer to the Student Handbook or College Catalog. If an incomplete is granted the student must agree to complete the missing coursework prior to the 10th week of the next semester. Those wishing to take an incomplete must discuss this option with me prior to completing any paperwork. Incompletes will only be assigned only if students have completed at least 75% of the course work and there are extenuating circumstances (serious illness, bereavement, etc.).

**Audit:** The MCC catalog states, “This status allows a student to participate in class activities without being required to meet the examination requirements of the course. A student who wishes to change from credit to audit status must request this from the Registrar’s office within the first four weeks of the course. Full tuition and fees are charged for course audits. Financial Aid does NOT COVER AUDITED CLASSES.” (NOTE: A student is not required to have instructor’s permission in order to audit a course.)

8. Students who do not follow MCC Safety guidelines as presented for the microbiology lab will be told to leave the lab and will have points deducted from their lab grade. Students who repeatedly violate safety guideline will fail the lab portion of the course and may be told to stay out of the lab. Each student will be required to sign a lab safety agreement stating that they understand and agree to follow all safety guidelines. (See [Laboratory Safety Rules and Regulations in the Symbiosis Lab Manual](#) for a list of these rules.)

9. Cell phones must be set on silent or vibrate if they are brought to class. Phones will not be answered and messaging not used in class or lab. Cell phones may never be used in the lab since they could become contaminated. Student will leave class if an emergency requires them to answer a phone call. Cell phones or other electronic devices may **never** be brought out or used in lab or class unless approved by the instructor. This includes recording devices. Repeated violations will result in the phone being held by the professor during class with a possible loss of points.

10. **Academic Integrity:**

Manchester Community College is committed to academic integrity. An academically honest student submits for evaluation only such work, including tests, papers, reports, presentations or ideas that have been written, performed or created solely by that student. On those occasions when the stated rules of a course permit collaborative efforts, the contributions of other individuals and sources should be appropriately acknowledged. It is, at all times, the responsibility of the student to maintain conduct consistent with the concept and definition of academic integrity, including not only the avoidance of plagiarism, but also other actions further outlined under College Policies in the Student Handbook.

Plagiarism is the act of taking someone else’s idea, writing or work, and passing it off as one’s own. If you fail to give credit to the source of the material, whether directly quoted or put in your own words, this lack of credit constitutes plagiarism. Whether you take, buy or receive material from the Internet, from a book, from another student or from any other source, and you fail to give credit, you are stealing ideas; you are engaged in plagiarizing. Plagiarism is a serious violation of academic standards and has serious academic consequences for the student.
Whether done intentionally or unintentionally, plagiarism will result in loss of credit for the work in question. Repeated cases of plagiarism will result in an F for the course and a report will be made to the Dean of Students. Always write using your own words when submitting a written assignment. When you get information from any source, make sure you provide a citation to protect yourself if there is a question about copying.

11. Students with a medical condition that might lead to increased susceptibility to infection should discuss the safety of taking a microbiology course, where living microorganisms will be handled, with their physician or health care provider. This includes students with immunosuppressant illness, students taking immunosuppressant medications, and women who are pregnant. Please make your instructor aware of your health issue during the first week of class and be prepared to provide a note from your physician or health care provider giving their permission for you to attend the course without risk your health. A list of live microbes used during the semester is available if need by the health care provider.

12. **Services for Students with Disabilities:**
If you have a disability (e.g., learning, physical, or psychological) and require reasonable accommodations to enable you to participate in this course, such as extended time on exams, please contact me during the first two weeks of class. You must be registered with the Office of Disability Services. MCC has disability services providers who can provide you with additional information and review appropriate arrangements for reasonable accommodations. To make an appointment with a disability services provider concerning a learning disability, contact Gail Stanton (Lowe Room 131, 860-512-3325, gstanton@mcc.commnet.edu). To make an appointment with a services provider concerning a physical or psychological disability, contact Joe Navarra (Lowe Room 131, 860-512-3332, jnavarra@mcc.commnet.edu).

13. **Class Cancellation:**
If class is cancelled by MCC due to inclement weather conditions or other emergency, students will be notified via the school’s web page (www.mcc.commnet.edu). Students may also call the MCC information line at 860-512-3004. Although closing information may be broadcast on local news and radio stations, do not rely solely on such outlets – check the website or information line. If class is cancelled by me, students will be informed by a standardized, professionally-printed form posted at the door of the classroom and signed by the Division Director or MCC Police.

**COURSE SCHEDULE**

**Laboratory Exercises:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Activity</th>
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<tbody>
<tr>
<td>1/17&amp;18</td>
<td>Introduction to the Microbiology Lab/Review of the Microscope</td>
</tr>
<tr>
<td>1/22-25</td>
<td>Introduction to Microscopy/Study of Pond Water (Lab # 1&amp;2)</td>
</tr>
<tr>
<td>1/29-2/1</td>
<td>Isolation Techniques A: Streak Plates (Lab #3)</td>
</tr>
<tr>
<td>2/5-2/8</td>
<td>Isolation Techniques B: Pour Plates (Lab #3)</td>
</tr>
<tr>
<td>2/12-2/20</td>
<td>Preparation of Smears, Simple Stains, and Wet Mounts (Lab #4)</td>
</tr>
<tr>
<td><strong>2/15 and 2/19 No Class/Lab</strong></td>
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<tr>
<td>2/21-2/22</td>
<td>Differential Staining Procedures (Lab #5)</td>
</tr>
<tr>
<td>2/26-3/1</td>
<td>Additional Differential Staining (Lab #6)</td>
</tr>
</tbody>
</table>
3/5 - 3/8  Oxygen Requirements of Bacteria (Lab #7)

3/12-3/16  **Spring Break - No Classes, no labs**

3/19-3/22  Physical Growth Requirements (Lab #8)

3/26-3/29  Physiological Characteristics of Bacteria: Carbohydrates (Lab #9)

4/2-4/5  Physiological Characteristics of Bacteria: Nitrogen (Lab #10)
         Physiological Characteristics of Bacteria: Misc. Reactions (Lab #11)

4/9 & 10  Bacterial Unknown Project: Development and Use of Diagnostic Keys (Labs #12 & 13)

4/11 & 12  Unknown project: Restreak and Gram Staining

4/16, 19 & 23  Antibiotic Sensitivity Testing (Lab #14) and Continue with Unknown Tests

4/18  **No Class/no lab**

4/23 or 4/24  Parasite video

4/26-5/2  Disinfectant lab and work on unknowns

5/3 or 5/7  **Lab Exam**

### Class Schedule:

<table>
<thead>
<tr>
<th>Date</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/12 or 13</td>
<td><strong>Exam I</strong></td>
</tr>
<tr>
<td>2/15 &amp; 19</td>
<td>No class</td>
</tr>
<tr>
<td>3/7 or 8</td>
<td><strong>Exam II</strong></td>
</tr>
<tr>
<td>3/12-15</td>
<td>No Class</td>
</tr>
<tr>
<td>4/9 or 10</td>
<td><strong>Exam III</strong></td>
</tr>
<tr>
<td>4/23-26</td>
<td><strong>Presentations</strong></td>
</tr>
<tr>
<td>5/7</td>
<td><strong>Class ends</strong></td>
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</tbody>
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<table>
<thead>
<tr>
<th>Date</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/9</td>
<td>M-W  Final Exam, 11:00-1:00</td>
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<tr>
<td>5/8</td>
<td>T-TH Final Exam, 5:30-7:30</td>
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</tbody>
</table>
Topics Covered In General Microbiology

Below is a list of topics that will provide a guide for students during the semester. As the course progresses students should become familiar with each of these topics. Each topic includes important concepts and vocabulary with which the students will develop competencies. Lectures will be used to present and elaborate on these topics. Readings from the text will provide the students with an introduction to these topics and a means for the student to continue their learning and as a review of the material presented in lecture.

Introduction to Microbiology
- A general overview of the field and the course
- Brief survey of Microorganisms and Microbiology

Observing Microbes
- The microscope
- Preparing Specimens
- Staining Techniques

Prokaryotic Cell
- Bacterial forms
- Structures and functions within the cell

Microbial Metabolism
- Catabolic and anabolic reactions
- Metabolic diversity

Microbial Growth
- Nutritional requirements
- Sources of nutrients
- Culture Media
- Pure cultures
- Growth of bacterial cultures

Control of Microbes
- History of Microbial control
- Terminology
- Microbial death
- Physical methods of control
- Chemical agents used to control microbes
- Effectiveness of methods of microbial control

Microbial Genetics
- Nature of the genetic material
- DNA: The code
- Replication
- The Central Dogma
- Transcription
- Translation
- Mutations and mutational repair
- Control of gene expression
- Genetic transfer and recombination

Classification of Microorganisms
- Phylogenetic relationships
- Classification of organisms
- Methods used to classify organisms

The Prokaryotes
- Bacteria
- Bergey’s Manual
- Archaea

Survey of eukaryotic microorganism
- Fungi
- Lichens
- Algae
- Protozoa
- Slime molds
- Helminthes
- Medical importance of eukaryotic microorganisms

The Virus
- General overview
- General structure
- Classification
- Modes of multiplication
- Cultivation
- Detection and control
- Medical importance of viruses

*Microbe-Human interactions
- Human as a host
- Infection and disease
- Signs and symptoms
- Nosocomial infections
- Emerging infectious disease
- Epidemiology

*Microbial Mechanism of Pathogenicity
- Mechanisms of infection and disease
- Cellular damage caused by infection
- Pathogenic properties of Viruses
- Pathogenic properties of other microbes

*The Human Immune System
- Types of immunity
- Nonspecific immune reactions
- Inflammation
- Cellular immune response
- Humoral immunity
- Cell mediated immunity
- Immune disorders

*Covered if time permits
## Learning outcomes for Microbiology

<table>
<thead>
<tr>
<th>Instructional Unit</th>
<th>Learning Outcomes</th>
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</table>
| **Introduction to Microbiology** | - provide a general overview of the field of Microbiology  
- provide details of a brief survey of Microorganisms and Microbiology |
| **Tools of the Laboratory** | - Explain aseptic technique and laboratory safety protocols  
- explain basic culturing of microbes  
- describe commonly used types of microscopes used in microbiology  
- discuss commonly staining techniques used to view microorganisms |
| **Prokaryotic Cell** | - recognize the basic bacterial forms  
- identify and describe structures and functions within the prokaryotic cell  
- identify common bacterial groups and be familiar with Archaea  
- identify and describe medical importance of bacteria |
| **Survey of eukaryotic microorganism** | - describe form and function of eukaryotic microorganisms  
- describe habitats found, nutritional requirements, reproductive strategies, human uses, interactions with the environment and harmful impacts of Fungi, Protozoa, Algae, and Helminthes  
- identify and describe medical importance of eukaryotic microorganisms |
| **The Virus** | - provide a general overview of viral structure, classification, modes of replication, cultivation, detection and control.  
- Explain the medical importance of viruses |
| **Microbial Metabolism** | - explain how catabolic and anabolic reactions in a cell create and use energy and how nutrients are used in these processes for growth and metabolism  
- provide a general overview of the diversity of metabolic pathways found in microorganisms |
| **Microbial Growth and Ecology** | - provide information on the nutritional requirements of microbial growth including, sources of nutrients, how microbes feed, and environmental factors that influence microbial growth.  
- discuss microbial ecology and microbial growth and how growth is measured. |
| **Microbial Genetics** | - describe the nature of the genetic material and the DNA molecule  
- explain The Central Dogma including processes of transcription, translation, the Genetic Code, the function of ribosomes and various role played by RNA  
- explain how mutations occur, their effect on an organism and processes of mutational repair  
- explain how gene expression is controlled and how prokaryotes can horizontally transfer genetic information. |
| **Control of Microbes** | - provide information on the history of microbial control including terminology that is used in the field  
- describe common physical and chemical methods used to control microbes |
| **Microbe-Human interactions (if time permits)** | - explain how the human is a host for microbial growth  
- explain how and when infection occurs as well as the mechanisms of infection and disease  
- distinguish between signs and symptoms  
- explain the origins and prevention of nosocomial infections |
| The Human Immune System (if time permits) | • explain the types of immunity, including nonspecific immune reactions, inflammation, cellular immune response, humoral immunity, and cell mediated immunity |
| Laboratory Skills | • Use a light microscope to view and interpret slides  
• Properly prepare slides for microbiological examination  
• Perform simple and differential staining techniques including Gram stains  
• Properly use aseptic techniques for the transfer and handling of microorganisms and instruments, including:  
  • Sterilizing and maintaining sterility of transfer instruments  
  • Performing aseptic transfer  
  • Obtaining samples  
• Use appropriate methods to identify microorganisms (media-based, molecular and serological) including:  
  • Isolating colonies  
  • Maintaining pure cultures  
  • Using biochemical test media to identify organisms  
  • Accurately recording macroscopic observations  
• Estimate the number of microbes in a sample  
• Use standard microbiology laboratory equipment correctly  
• Apply and explain important safety considerations associated with the handling of microbiological materials. |