MERCER COUNTY COMMUNITY COLLEGE
SCIENCE AND ALLIED HEALTH DIVISION
COURSE OUTLINE

BIO 115 Microbiological Science Concepts
Reviewed Spring 2019

3 credits

INSTRUCTOR: Professor Diane N. Hilker, Program Coordinator
Office: MS 122
Telephone: 609 –570-3367   Fax: 609 – 570 – 3831
e-mail: hilkerd@mccc.edu

NOTE: YOU ARE RECEIVING THE COURSE REQUIREMENTS IN A CLEAR, WRITTEN FORM. TO AVOID ANY MISUNDERSTANDINGS, PLEASE READ CAREFULLY! CONTINUATION IN BIO 115 AUTOMATICALLY CONSTITUTES YOUR ACCEPTANCE OF THE CONDITIONS BELOW.

This is a non-traditional type course – there are NO regular classroom sessions. The student MUST take the responsibility of working on his/her own.

TEXTBOOK:

The textbook package may be purchased at the College Bookstore; SC 222. Hours of operation are posted on the door of the College Bookstore. There is also a copy of the textbook and study guide at the circulation desk at the WWC and JKC College’s Libraries

VIDEO PROGRAMS: There are 12 videos for BIO115. They can be viewed in the following manner: MCCC Cable Broadcast (semester schedule to be provided), borrowed from the MCCC WWC Library or accessed on the following website: http://www.mccc.edu/student_library_online_bio115.shtml

CATALOG DESCRIPTION: Microbiology survey course for non-science majors based on the telecourse series, Unseen Life on Earth, developed in conjunction with the American Society of Microbiology. Topics include microbial cell biology, microbial genetics, and the interactions of microorganisms with humans and the environment. This is a non-laboratory course.

PREREQUISITES: ENG 030 or proficiency
COURSE REQUIREMENTS:

Five Unit Tests @ 100 points (raw score) each  500 points  
Five Writing Assignments @ 20 points each  100 points  
Total Points  600 points

You are to choose ONE question from each of the five units for your writing assignment. Each written assignment will be 2 – 3 pages double spaced, typed pages. Fonts will be no larger than 12 and margins will be no larger than 1 inch.

TESTS:
All BIO 115 tests are to be taken in the Academic Testing Center at either WWC or JKC. Please allow yourself at least 45 minutes to complete the exams. Test questions will come from the video programs, and corresponding reading assignments and homework.

All BIO 115 telecourse students are expected to follow the General Policies for the Academic Testing Center.

1. Fall, and Spring Semester Hours are posted on the door of the Testing Center or you may call the Testing Center. (609-570-3295)
2. Tests will be distributed up to 30 minutes before the listed closing time, and the doors will be locked. No one will be admitted after that time.
3. All students MUST present a current photo MCCC ID.
4. Students MUST know the course number, test number and instructor’s name.
5. College policies regarding, misconduct and academic integrity (i.e., unruly behavior, cheating) will be enforced. Any irregularities will be reported for action by the instructor, academic department, academic standards committee, and/or dean.

You are allowed to take each Unit Test ONCE. (Be sure that you are properly prepared.) You must use a number 2 lead pencil for the obscan sheet. All tests MUST be completed by the established deadline.

Note: Depending on student performance on each test, test grades may be curved.
TESTS MAY BE TAKEN ANYTIME BEFORE OR ON THE DEADLINE DATE

<table>
<thead>
<tr>
<th>TEST NUMBER</th>
<th>LESSONS COVERED</th>
<th>TEST DEADLINE</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Microbial Cell Biology: Units 1, 2, 3</td>
<td>1 week after Unit 3 airs</td>
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<tr>
<td>2</td>
<td>Microbial Genetics: Units 4, 5</td>
<td>1 week after Unit 5 airs</td>
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<tr>
<td>3</td>
<td>Microbial Diversity &amp; Evolution: Units 6, 7</td>
<td>1 week after Unit 7 airs</td>
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<tr>
<td>4</td>
<td>Microorganisms in the Environment: Units 8, 9</td>
<td>1 week after Unit 9 airs</td>
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<tr>
<td>5</td>
<td>Microorganisms and Humans: Units 10, 11, 12</td>
<td>1 week after Unit 12 airs</td>
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</table>

SPECIFIC DATES WILL BE DISTRIBUTED EACH SEMESTER.

GRADING POLICY:

<table>
<thead>
<tr>
<th>Total Points Earned</th>
<th>Course Grade</th>
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<tbody>
<tr>
<td>555 – 600 points</td>
<td>A 93 – 100%</td>
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<tr>
<td>537 – 554 points</td>
<td>A- 90 – 92%</td>
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<td>519 – 536 points</td>
<td>B+ 87 – 89%</td>
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<td>495 – 518 points</td>
<td>B 83 – 86%</td>
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<td>477 – 494 points</td>
<td>B- 80 – 82%</td>
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<td>459 – 476 points</td>
<td>C+ 77 – 79%</td>
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<td>417 – 458 points</td>
<td>C 70 – 76%</td>
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<td>357 – 416 points</td>
<td>D 60 – 69%</td>
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<td>Less than 356 points</td>
<td>F less than 59%</td>
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WRITING ASSIGNMENTS:

There are 5 writing assignments required for the course. For each writing assignment, there are several questions that you can choose. You will only choose one of the questions to answer. These assignments should be in your OWN words. You may use your textbook and information you have learned from the videos. I do not want them to be cut and pasted from other sources even if you have referenced these sources. **Do not plagiarize.**

Written assignments are to be submitted on or before the established deadline. 5 points will be deducted for each late day beyond the deadline date.

Written assignments can be forwarded to me in the following ways:

1. Mailed:
   
   **MCCC**  
   **PO Box B**  
   **Trenton, NJ 08690 - 1099**  
   **Attention: Diane N. Hilker; Science & Allied Health**  
   OR

2. Brought to the college and placed in my mailbox in room MS 128 or placed in the BIO 115 folder outside my office (MS 122).  
   OR

3. E-mailed as Microsoft Word attachment to: hilkerd@mccc.edu. Please indicate in the subject line of the email “BIO 115 Writing Assignment”.

4. Faxed to me at the college at: 609 – 570 – 3831

**WRITTEN ASSIGNMENTS THAT ARE PLACED UNDER MY OFFICE DOOR WILL NOT BE ACCEPTED!**

**SPECIFIC DATES ARE DISTRIBUTED EACH SEMESTER**

**COMMUNICATION:**

I will return your graded writing assignments via the US Postal System. It is **VERY** important that I have your correct address.

I will also communicate with you via e-mail. If students would like to exchange e-mail addresses, I will arrange that. When you email me, you can expect me to get back to you within 2 business days.
ADVICE ON HOW TO STUDY FOR BIO 115

1. **BEFORE VIEWING THE VIDEO PROGRAM:** Read the Unit Overview for each unit in the corresponding Telecourse Study Guide. **Test questions may come from these readings.**

2. **VIEW THE VIDEO**

3. **READ AND STUDY** the Unit Objectives and Key Concepts in the Telecourse Study Guide.

4. **READ:** The textbook assignments listed in this Course Outline. The assignments will differ from the Telecourse Study Guide.

5. **VIEW THE PROGRAM A SECOND TIME:** This time taking notes while viewing the program. You may want to tape the program.

6. **HOMEWORK:** Homework assignments are for your benefit. Test questions may come from the homework. It is **not necessary** to hand in these assignments.

7. **DO NOT FALL BEHIND:** Keep up with the course on a weekly basis. Each unit of the course builds upon knowledge gained in previous units.

8. **DO NOT WAIT TO STUDY:** Most students that have difficulty save all of their studying until a day or two prior to the test. There is too much material covered on each test to learn in a day or two.

**IF YOU ARE DOING ALL OF THE THINGS LISTED ABOVE AND ARE STILL HAVING TROUBLE, CONTACT YOUR COURSE INSTRUCTOR IMMEDIATELY!**

Mercer County Community College is committed to supporting all students in their academic and co-curricular endeavors. Each semester, a significant number of students document disabilities, which may require learning, sight, hearing, manual, speech, or mobility accommodations to ensure access to academic and co-curricular activities. The college provides services and reasonable accommodations to all students who need and have a legal entitlement to such accommodations.

For more information regarding this you can contact Arlene Stinson, Director of Academic Support Services, in LB 214 or by email stinsona@mccc.edu.
<table>
<thead>
<tr>
<th>Week</th>
<th>Unit</th>
<th>Video Program</th>
<th>Reading Assignments</th>
<th>Homework (Study Guide Review Questions)</th>
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<tr>
<td>1</td>
<td>1</td>
<td>The Microbial Universe</td>
<td>Chapter 1</td>
<td>Pgs 5 – 7</td>
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<tr>
<td>2</td>
<td>2</td>
<td>The Unity of Living Systems</td>
<td>Chapter 2: pgs 37 – 42</td>
<td>Pages 13 – 15</td>
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<td>Chapter 4: pgs 82 – 107</td>
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<td>3</td>
<td>3</td>
<td>Metabolism</td>
<td>Chapter 5: pgs 114 – 117</td>
<td>None</td>
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<td>Chapter 8: pgs 201 – 207</td>
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<td>Chapter 28: pgs 710-712</td>
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<td>Chapter 29: pgs 722-724</td>
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<td>4</td>
<td>4</td>
<td>Reading The Code of Life</td>
<td>Chapter 6: pgs 144 – 155; 161 - 165</td>
<td>Pgs 31-33</td>
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<td>5</td>
<td>5</td>
<td>Genetic Transfer</td>
<td>Chapter 6: pgs 167 – 171</td>
<td>None</td>
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<td>Chapter 7: pgs 179 – 193</td>
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<td>6</td>
<td>6</td>
<td>Microbial Evolution</td>
<td>Chapter 10: pgs 238 - 245</td>
<td>Pgs 45 - 47</td>
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<td>7</td>
<td>7</td>
<td>Microbial Diversity</td>
<td>Chapter 10: pgs 245 – 254</td>
<td>None</td>
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<td>Chapter 28: pgs 693 - 701</td>
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<td>8</td>
<td>8</td>
<td>Microbial Ecology</td>
<td>Chapter 28: pgs 701 – 716</td>
<td>Pgs 57 - 59</td>
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<td>Chapter 14: pgs 346 – 347 (Symbiosis)</td>
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<td>9</td>
<td>9</td>
<td>Microbial Control</td>
<td>Chapter 3: pgs 68 – 69 (Sterilization)</td>
<td>Pgs 65 – 67</td>
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<td>Chapter 9: pgs 223 – 234</td>
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<td>Chapter 20: pgs 473 – 477 (Hospital Epidemiology)</td>
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<td>Chapter 21: pgs 489 – 491; 494 - 497</td>
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<td>10</td>
<td>10</td>
<td>Microbial Interactions</td>
<td>Chapter 12: pgs 298 – 299 (lichens)</td>
<td>None</td>
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<td>Chapter 14: pgs 346 – 347 (Symbiosis)</td>
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<td>Chapter 28: pgs 695 – 700</td>
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<tr>
<td>Week</td>
<td>Chapter</td>
<td>Topic</td>
<td>Review Material</td>
<td>Exam Notes</td>
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<tr>
<td>11</td>
<td>11</td>
<td>Human Defenses</td>
<td>Chapter 14: pgs 342 –346; 357 – 358 Chap. 16 pgs 393 – 396 (phagocytes) Chap. 17 pgs 408 - 414 Chap. 20 pgs 479 - 483 (Immunization)</td>
<td>None</td>
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<td><strong>FIFTH MAJOR EXAM</strong></td>
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WRITTEN ASSIGNMENTS

You are to choose ONE question from each of the five writing assignments. Each written assignment should be 2 to 3 double-spaced, typed pages. Fonts should be NO larger than 12 and margins should be no longer than 1 inch.

Questions For Writing Assignment #1

Microbial Cell Biology

Unit #1: The Microbial Universe

1. Identify and discuss the contributions made by three scientists in the field of microbiology. (Choose 3 of the following scientists: Koch, Pasteur, Van Leeuwenhoek, Jenner, Lister, Ehrlich, Fleming, Redi, Needham, and Spallanzani).

2. Describe the major characteristics of bacteria, archaea, fungi, protozoa, algae, and viruses.

3. Define microorganism. Give some examples of how microorganisms have affected human history.

Unit #2: The Unity of Living Systems

4. Discuss the similarities and differences between prokaryotic and eukaryotic cells.

5. The following statement is made in the video: “What microbes are ultimately telling us is that each of us contains within our genetic material a written history of life on Earth.” Briefly explain the statement.

6. Discuss in detail the structure of the prokaryotic cell.

Unit #3: Metabolism

7. Name in sequence, the phase of growth in a culture. Explain each one.

8. Based on the information in the video, as well as in your textbook (pgs 710 – 712), discuss the treatment of waste water.

Choose only one of the above 8 questions.
Questions for Writing Assignment # 2

Microbial Genetics

Unit #4: Reading the Code of Life

1. Describe the components of DNA, and explain its functional relationship to RNA and protein.

2. Discuss how genetic mutation and recombination provide material for natural selection to act on.

3. Explain what antibiotic resistance means to you and do you feel antibiotics are overly prescribed in today’s society.

Unit #5: Genetic Transfer

4. In the video, you learned that the Zimbabwe government is making laws regarding the release of genetically engineered organisms. What are the benefits of genetic engineering? The risks? (Opinion)

5. Compare and explain the mechanisms of genetic recombination in bacteria.

Choose only one of the above 5 questions.
Question for Writing Assignment #3

Microbial Evolution and Diversity

Unit #6: Microbial Evolution

1. Explain the statement: Biological classification schemes change as we get new information. Use schemes developed by Haeckel, Chatton, Whittaker and Woese as examples.

2. Explain the analog between DNA and music presented in the video.

Unit #7: Microbial Diversity

3. Describe how taxonomists have used morphology, biochemistry and physiology, serology, and phase typing to classify bacteria.

4. Discuss how microorganisms are capable of carrying out certain transformations in the biosphere (soil and water).

Choose only one of the above 4 questions
Questions For Writing Assignment #4

Microorganisms in the Environment

Unit #8: Microbial Ecology

1. Outline the nitrogen cycle and explain the roles of microorganisms in this cycle.

2. How does the phosphorus cycle differ from the nitrogen and carbon cycles? Describe the phosphorus cycle.

3. What is sewage? What is biochemical oxygen demand (BOD)? Why is it important in sewage treatment?

Units #9: Microbial Control

4. Discuss the different methods of food preservation.

5. Read the chemical ingredients on a canned food item at home and explain how these chemicals act as preservatives (page 234). Should chemical preservatives be added to food?

6. Discuss the various types of nosocomial infections. How do you think these infections can be reduced?

Choose only one of the above 6 questions.
Question For Writing Assignment #5

Microorganisms and Humans

Unit #10: Microbial Interactions

1. Compare: Commensalism, mutualism and parasitism. Give examples of each.

Unit #11: Human Defenses

2. Discuss the various kinds of vaccines: attenuated, inactivated,acellular and DNA based.

3. What are normal biota and where are they found? Discuss the three types of biota: resident, transient and opportunists.

Unit #12: Human Diseases

4. Define disease transmission and discuss the various modes of transmission.

Choose only one of the above 4 questions.