

**MERCER COUNTY COMMUNITY COLLEGE
SCIENCE AND ALLIED HEALTH DIVISION
COURSE OUTLINE**

BIO 115 Microbiological Science Concepts

3 credits

INSTRUCTOR: Professor Diane N. Hilker, Program Coordinator
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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:

Introduction to Microbiology with the Study Guide to the Telecourse
(Package), 3rd Edition, Ingraham and Ingraham, 2004, ISBN 0495261831

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 college's Library.

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 located in LA 215. **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, Spring and Summer Semester Hours are posted on the door of LA 215 or you may call the Testing Center. (ext. 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

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

SPECIFIC DATES WILL BE DISTRIBUTED EACH SEMESTER.

GRADING POLICY:

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

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. **NO** papers will be accepted after the deadline, **NO EXCEPTIONS WILL BE MADE!**

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 be in communication with you, via US Postal System, throughout the semester. It is **VERY** important that I have a correct address to mail your written assignments as well as your test grades.

I will also communicate with you via e-mail. If students would like to exchange e-mail addresses, I will arrange that.

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!

BIO 115 Telecourse Series: Unseen Life on Earth
READING ASSIGNMENTS/HOMEWORK: Introduction to Microbiology,
3rd Edition by Ingraham and Ingraham

Week	Unit	Video Program	Reading Assignments	Homework (Study Guide Review Questions)
1	1	The Microbial Universe	Chapter 1	Pgs 5 – 7
2	2	The Unity of Living Systems	Chapter 2: pgs 37 – 42 Chapter 4: pgs 82 – 107	Pages 13 – 15
3	3	Energy and Growth	Chapter 5: pgs 114 – 117 Chapter 8: pgs 201 - 207	None
		FIRST MAJOR EXAM		
4	4	Life's Databases	Chapter 6: pgs 144 – 155; 161 - 165	None
5	5	Microbial Genetics	Chapter 6: pgs 167 – 171 Chapter 7: pgs 179 – 193	None
		SECOND MAJOR EXAM		
6	6	Microbial Evolution	Chapter 10: pgs 238 - 245	Pgs 45 - 47
7	7	Microbial Diversity	Chapter 10: pgs 245 – 254 Chapter 28: pgs 693 - 701	None
		THIRD MAJOR EXAM		
8	8	Microbial Ecology	Chapter 28: pgs 701 – 716 Chapter 14: pgs 346 – 347 (Symbiosis)	Pgs 57 - 59
9	9	Microbial Control	Chapter 3: pgs 68 – 69 (Sterilization) Chapter 9: pgs 223 – 234 Chapter 20: pgs 473 – 477 (Hospital Epidemiology) Chapter 21: pgs 489 – 491; 494 - 497	Pgs 65 – 67
		FOURTH MAJOR EXAM		

10	10	Microbial Interactions	Chapter 12: pgs 298 – 299 (lichens) Chapter 14: pgs 346 – 347 (Symbiosis) Chapter 28: pgs 695 - 700	None
11	11	Human Defenses	Chapter 14: pgs 342 –346; 357 – 358 Chap. 16 pgs 393 – 396 (phagocytes) Chap. 17 pgs 408 - 414 Chap. 20 pgs 479 - 483 (Immunization)	None
12	12	Human Disease	Chapter 15: pgs 364 – 372 Chapter 20: pgs 465 – 477 Chapter 22: pgs 519 – 522	Pgs 87 - 89
		FIFTH MAJOR EXAM		

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: Energy and Growth

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: Life's Databases

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: Microbial Genetics

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.