MIDSTATE COLLEGE
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Fall 2010

Course Number and Name :	BIO 200 Principles of Microbiology
Method of Delivery:	Classroom
Credit Hours:	6 hours
Course Description:	This course is designed to be an introduction to the world of microbial populations and to their relationships to the human in health and disease. The laboratory component includes concepts concerning microbial identification, growth, and prevention of disease in humans.
Prerequisite:	General Biology
Text:	Foundations in Microbiology, Basic Principles
Author:	Kathleen Park Talaro
Publisher:	McGraw-Hill
Edition:	seventh
ISBN#:	978-0-07-721079-3
Lab Text:	Microbiology: A Laboratory Experience
Author:	Cynthia Alonzo
Publisher:	Hands-On Labs, Inc.
ISBN#:	978-1-866151-14-7
Materials Needed:	Microbiology LabPaq
Topics:	1. The main themes of microbiology. 2. Chemistry of Biology. 3. Methods of studying microorganisms. 4. Procaryotic cell structure and function. 5. Eucaryotic cell structure and function. 6. Virus structure and function. 7. Microbial nutrition, growth, metabolism and ecology. 8. Microbial genetics and genetic engineering. 9. Physical and chemical agents for microbial control. 10. Nonspecific host defenses and specific immunity.

Lecture Learning Objectives:	Upon completion of this class, a student will be able to: 1. Understand characteristics of microorganisms and history of microbiology. 2. Identify and differentiate between prokaryote and eukaryote cell structure and function. 3. Compare and contrast virus and bacteria. 4. Compare and contrast algae, protozoa and fungi. 5. Explain the role of ATP in metabolism and DNA in reproduction and protein synthesis. 6. Understand the factors and techniques that produce and control microbial growth in the lab, the human body and the environment. 7. Describe nonspecific host defense mechanisms and specific immunity.
Laboratory Learning Objectives:	1. Accurately use the microscope to identify microorganisms. 2. Properly handle microorganisms through slide preparation and staining techniques, and observe their morphology. 3. Prepare culture medium, use the streak technique. 4. Describe biochemistry tests for motility, osmosis, fermentation and metabolism of glucose. 5. Demonstrate the destruction and inhibition of microorganisms using antiseptics, disinfectants and antibiotics.

Midstate Grading Scale:	90-100	A
	80-89	B
	70-79	C
	60-69	D
	0-59	F

Midstate Plagiarism Policy:
Plagiarism is using another person's words without giving credit to the author. Original speeches, publications, and artistic creations are sources for research. If students use the author's words in a paper or assignment, they must acknowledge the source. Plagiarism is strictly against the academic policy of the college and is grounds for failing the course. If repeated, plagiarism may result in suspension from the college. (See the Midstate College catalog and/or Student Handbook for additional information.)
In courses containing writing assignments, the college promotes the use of an electronic resource which compares the student's writing against previously submitted papers, journals, periodicals, books, and web pages. Students and instructors can use this service to reduce the incidence of plagiarism. This electronic resource has been found to conform

to legal requirements for fair use and student confidentiality. It is able to provide a report to the student indicating the parts of the assignment that match.

Instructor Information: Sandra Holm
Office Hours: Tuesday 9:00 a.m.-10:00 p.m.
E-mail: sholm@midstate.edu

Participation Requirements/Policies and Procedures:

1. All work is to be completed on time unless unusual circumstances occur. If you miss class, you are expected to use your course outline to determine what you missed. Class notes, assignments and take home tests will be placed in the front office for you to collect during the week after the missed class. Tests will be placed in the library. All assignments and tests are due on the day of the next class meeting.
2. You are expected to be on time. If you must arrive or leave during class, do so quietly and as unobtrusively as possible**. Five points will be deducted** from the attendance grade for arriving late or leaving early from class.
3. ***Attendance is expected, not suggested.*** Excessive absence is 2 or more day or night classes. If for some reason you are unable to attend class, you must call or e-mail the instructor and pick up your assignments in the front office to be prepared for the next class session.
4. ***Academic dishonesty is never tolerated and will be referred to the dean.***
5. All assignments must be hand written using black ink, or typed, unless otherwise specified by the instructor. Work should be portfolio quality. Ragged edged paper is not acceptable.
6. Please make certain your cell phone is on "vibrate". Calls can only be returned during breaks. No text messaging will be allowed during class. Phones must be turned off during testing.

Grading Specifications for Lecture Part of Course:

Attendance (10 at 5 points each)	50
Oral/Written Reports (1 assignment at 100 points each)	100
Tests (7 chapter tests x 50 points)	350
Final Exam	100
Total Points	**600**

Grading Specifications for Laboratory Part of Course:

Attendance/Participation (12 at 5 points each)	60
Written Lab Reports and Notebook (12 at 25 points each)	300
Final Exam	50
Total Points	**410**

Laboratory Course Outline

Every student will record experiment observations during each lab in their lab notebook. Lab notes are evidence of a student's work and of the student's understanding of the concepts demonstrated in the experiments. Students should write neatly and try to express

their thoughts clearly, concisely and completely so someone else could duplicate the results. Lab notebooks will be checked weekly.

Each week students will complete a laboratory report based upon the notes in their notebooks. The lab report will include the title of the lab, purpose, procedure, data tables (if appropriate), observations, questions (located at the end of each exercise in the lab manual), and conclusions. A rubric will be used to grade the lab reports.

Week	Topic	Objective(s)
1	Observing Bacteria and Blood	To gain functional knowledge of microscope operations through practical applications of a microscope in the observation of bacteria and blood. Objective 1
2	Bacterial Morphology	To learn and employ disinfecting techniques. To observe bacterial morphology using different preparation techniques, and to employ direct and indirect staining techniques. Objective 2
3	Aseptic Technique and Culturing Microbes	To learn and employ aseptic technique, become familiar with basic requirements of microbial growth, learn basic forms of culture media, and become familiar with methods used to control microbial growth. Objective 3
4	Isolation of Bacteria	To become familiar with subtypes of culture media and the uses for each, to learn and employ the streak and pour dish techniques, and to be able to generate a pure culture of a specific organism. Objective 3
5	Differential Staining	To understand and employ differential staining techniques, and to be able todescribe the differences between gram-negative and gram-postitive bacteria. Objective 2

6	Methyl Red Voges-Proskauer Test	To perform the MR-VP biochemical test, and learn variations in how different organisms metabolize glucose. Objective 4
7	Motility Testing	To learn flagellar structure and arrangements common in microbes, and to use direct observation and testing to determine if a given microbe is motile. Objective 4
8	Carbohydrate Fermentation Testing	To be able to generate a fermentation profile for a specified organism, and learn how biochemical tests are used and employ a chemical indicator. Objective 4
9	Osmosis	To learn the basic principles of osmosis, and test for the effects osmotic changes have on microbes. Objective 4
10	Antibiotic Sensitivity	To understand the basic principles of antimicrobial therapy, to become familiar with the phenomenon of antibiotic resistance, and employ an antibiotic sensitivity test. Objective 5
11	Fomite Transmission	To learn modes of pathogen transmission, and identify sites of potential fomite transmission in the environment. Objective 5
11	Microbes in the Environment	To identify environmental sources of microbes. Objective 5
12	Final Exam	

Grading Rubric for BIO 200 Laboratory Reports

Points	
5	All information is presented in a scientific format and is correct, no grammatical or spelling errors
4	Most of the information is presented in a scientific format and is correct, 1-2 grammatical or spelling errors
3	Some information is presented in a scientific format and correct, 3-4 grammatical or spelling errors
2	Little information is presented in a scientific format and correct, 5-6 grammatical or spelling errors
1	Does not state information in a scientific format and information is incorrect or omitted completely, more than 6 grammatical or spelling errors

Laboratory Report Format:

Student's Name_____ Date of Experiment_____

Date Report Submitted_____

Title: Should be the same title of the exercise stated in the laboratory manual.

Purpose/Hypothesis: Write a brief statement about what the experiment is designed to determine or demonstrate in Anatomy and Physiology.

Procedure: Briefly summarize what you did in performing the exercise. Do not simply copy the procedure statement from the lab manual.

Pictures/Tables: Pictures or tables are an excellent way to organize observations and information.

Observations: What did you observe? Observations are most easily recorded in table form.

Questions: Questions are present at the end of the exercise. They are designed to help you think critically about the exercise you just performed. Answer all questions and submit them on a separate sheet of paper with your lab report.

Conclusions: What did you learn from the experiment? Your conclusions should be based upon your observations recorded in your lab book during the experiment.
Conclusions should be written using your best formal English, using complete sentences, paragraphs, and correct spelling and grammar.

Lecture Outline

Week 1 Chapter 1

Chapter 1 includes an introduction of microbiology covering topics such as the impact of microorganisms on earth, the general characteristics of microorganisms, lifestyles of microorganisms and the historical foundations of microbiology.
Objective 1

Week 2 Chapter 2

A discussion of the chemistry of life is covered in chapter 2.
Objective 5

Week 3 Chapter 3

Chapter 3 covers the various types of microscopes used to view microorganisms and the methods of culturing microbes.
Objective 6
Test #1 on Chapters 1 & 2
Reports

Week 4 Chapter 4 and 5

An in-depth look at the structure and function of prokaryotic and eukaryotic cells is presented in chapters 4 and 5.
Objectives 2 and 4
Test #2 on Chapter 3
Reports

Week 5 Chapter 6

Chapter 6 covers the structure and function of viruses.
Objective 3
Test #3 on Chapters 4 and 5
Reports

Week 6 Chapter 7

This chapter focuses on the elements of microbial nutrition, ecology and growth.
Objective 5
Test #3 on Chapter 6
Reports

Week 7 Chapters 8 and 9

Chapter 8 discusses microbial metabolism and chapter 9 presents information on microbial genetics.
Objective 2
Test #4 on Chapter 7
Reports

Week 8 Chapter 10

Concepts related to genetic engineering are presented in chapter 10.
Objective 2
Test #5 on Chapters 8 and 9
Reports

Week 9 Chapters 11 and 12

Physical and chemical agents used for control of the growth of microbes and the use of chemotherapeutic agents to treat infections are explored in these chapters.
Objective 6
Reports

Week 10 Chapter 13

This chapter covers the major factors in developing an infection, sources and spread of microbes and the study of disease in populations.
Objective 6
Test #6 on Chapters 11 and 12
Reports

Week 11 Chapter 14 and 15

Nonspecific host defense mechanisms and first and second line of defense against disease are topics covered in Chapter 14. Chapter 15 continues with specific host defense mechanisms against disease, in particular humoral immunity and cell-mediated immunity.
Objective 7
Test #7 on Chapter 13
Reports

Week 12 Final Exam

Reports can be on topic of student's choice concerning an area of microbiology-ex. major scientist or disease: Louis Pasteur, Robert Koch, Robert Whittaker, Carl Woese, Joseph Lister, James Watson and Francis Crick, Jonas Salk, Barry Marshall and J.Robin Warren, Edward Jenner, TB, Ebola, Yersinia pestis-Plague, Smallpox, Anthrax, MRSA, AIDS, Cholera

Grading Rubric

Criteria

Organization

1-audience cannot understand presentation because there is no sequence of information
2-audience has difficulty following presentation because student jumps around
3-student presents information a logical sequence which audience can follow
4-student presents information in logical, interesting sequence which audience can follow

Content Knowledge

1-student does not have grasp of information; student cannot answer questions about subject
2-student is uncomfortable with information and is able to answer rudimentary questions
3-student is at ease with content, but fails to elaborate
4-student demonstrates full knowledge with explanations and elaboration

Visuals

1-student used no visuals
2-student used 1-3 visuals that rarely supported the text
3-student used 4-5 visuals that related to text and presentation
4-student used 5 or more visuals to reinforce screen text and presentation

Mechanics

1- Student's presentation had 4 or more spelling and/or grammatical errors
2- Presentation had 3 misspellings and/or grammatical errors
3- Presentation has no more than 2 misspellings and/or grammatical errors
4- Presentation has no misspellings or grammatical errors

Delivery

1-Student mumbles, incorrectly pronounces terms, and speaks too quietly hear in the back of the room
2-Student incorrectly pronounces terms and speaks too quickly for student's easy comprehension of material
3-Student's voice is clear. Student pronounces most words correctly

4-Student used a clear voice and correct, precise pronunciation of terms

Quiz

1-Student had no quiz to support the presentation
2-Student had required 5 question quiz, questions did not cover major aspects of presentation and/or there were 3 misspellings or grammatical errors
3-Questions covered major topics in presentation and there were 2 or less misspellings and/or grammatical errors.
4-Questions covered major topics in presentation and there was one misspelling and/or grammatical error
5-Questions covered major topics in presentation and there were no misspellings or grammatical errors

Points

Organization	**4**
Content Knowledge	**4**
Visuals	**4**
Mechanics	**4**
Delivery	**4**
Quiz	**5**
Total	**25**