Syllabus for
BIO 212—Principles of Microbiology Lecture
3.0 Credit Hours
Summer 2017

I. COURSE DESCRIPTION

A study of the characteristics and importance of microorganisms with emphasis on their pathogenicity, control and relationships to health and disease designed for nursing majors. This course does not count as upper division biology credit.
Prerequisites: One semester each of general biology and chemistry, both with labs.
Corequisite: BIO 212 Lab.

II. COURSE GOALS

This is a course designed to enable the student to study the fundamental principles of bacterial morphology and physiology, virology, mycology, infection, pathogenicity, epidemiology, and host immunity in the disease process. The physical and chemical requirements for bacterial growth and various methods to control microbial growth are discussed. The course also includes an introduction to biotechnology and recombinant DNA, as well as an introduction to practical applications in immunology and chemotherapy. Mastery of selected details illustrating these concepts is expected; the ability to read critically, with comprehension, is a useful skill for successful completion of this course.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

A. Terminal Objectives

Primarily as a result of successfully completing this course, the student will be able to think critically and apply the information given in class to everyday life problems.
In addition, the student will be able to do the following:

1. Describe and discuss the significance of microbiology to our lives.
2. List some milestones in microbiological history.
3. Describe some basic techniques for the study of microorganisms.
4. Describe the diversity of the microbial world.
5. Describe general principles of microbial metabolism, biosynthesis, regulation, and growth.
6. Identify the factors affecting microbial growth.
7. Describe how the human body and various organisms interact in terms of health and disease.
8. Discuss useful tools for diagnosing diseases.
9. Describe the important processes of molecular genetics.
10. Describe the characteristics of viruses.
11. Identify and classify the important subgroups of bacteria, fungi, and protozoa.
12. Describe how various antimicrobial drugs kill microbes.
13. List important concepts in Biotechnology and rDNA technology.
14. Discuss the components and the role of immunology in prevention of disease.

B. Unit Objectives

1. Unit One: Fundamentals of Microbiology

As a result of successfully completing this unit, the student will be able to do the following:

a. Identify the contribution made to the development of microbiology by certain outstanding research workers of the past.
b. Discuss the importance of biological molecules in cells.
c. Explain different ways to observe microorganisms through a microscope.
d. Draw structures of prokaryotic and eukaryotic cells and explain their function.
e. List the characteristics of fungi, protozoa and helminthes.
f. Discuss the medical significance of fungi, algae, protozoa and helminths
g. Explain the general features of viruses, viroids and prions.
h. List methods for Isolation, cultivation and identification of viruses.
i. Discuss the role of viruses in cancer.

2. Unit Two: Microbial metabolism, growth and genetics.

As a result of successfully completing this unit, the student will be able to do the following:

a. Discuss the role of enzymes in metabolism and physiology.
b. Explain representative biochemical pathways that produce energy in microorganisms.
c. Discuss the physical and chemical requirements for microbial growth various kinds of culture media and know various kinds of media used for bacterial growth.
d. Explain the phases of microbial growth and methods of measuring growth.
e. Discuss physical methods and chemical agents used to control microbial growth.
f. Explain the genetic basis of antibiotic resistance in pathogens and emerging new diseases.
g. Discuss ways by which genetic material is transferred from one microbe to other.
h. Explain the various tools and techniques in biotechnology used in research and developing new remedies.
i. Discuss new technology used in tracking outbreaks of infectious diseases and forensic microbiology.

3. Unit Three: Interaction between Microbes and Their Hosts

As a result of successfully completing this unit, the student will be able to do the following:

a. Explain the general principles of diseases.
b. Discuss principles of pathology and pathogenesis.
c. Discuss the role of epidemiological principles in controlling diseases.
d. Explain the properties of microbes that contribute to causing disease.
e. Discuss the nonspecific and specific defenses of the hosts that prevent the ability of microbes to cause disease.
f. Explain the use of immunologic- based tools in diagnostics.
g. Describe the principles and effects of vaccination.

h. Discuss various types of vaccines and the recent developments in vaccines.
i. Explain the mode of action of antibacterial, antifungal, antiviral, antiprotozoan and antihelminthic drugs in controlling infections.
j. Identify areas of research on new chemotherapeutic drugs including antisense DNA and SiRNA. The Nobel Prize in medicine for 2006 was awarded to the discovery of SiRNA technology.

IV. TEXTBOOKS AND OTHER LEARNING RESOURCES

A. Required Textbooks:

Tortora, G.B., Funke and Case, C. 2006. Microbiology, 9th edition, Reading: Addison Wesley. 885 p.

B. Optional:

Funke, B. 2006. Study Guide for Microbiology: An Introduction. 9th edition, Reading: Addison Wesley. 328p.

V. POLICIES AND PROCEDURES

A. University Policies and Procedures

1. Attendance at each class or laboratory is mandatory at Oral Roberts University. Excessive absences can reduce a student's grade or deny credit for the course.
2. Students taking a late exam because of an unauthorized absence are charged a late exam fee.
3. Students and faculty at Oral Roberts University must adhere to all laws addressing the ethical use of others' materials, whether it is in the form of print, electronic, video, multimedia, or computer software. Plagiarism and other forms of cheating involve both lying and stealing and are violations of ORU's Honor Code: "I will not cheat or plagiarize; I will do my own academic work and will not inappropriately collaborate with other students on assignments." Plagiarism is usually defined as copying someone else's ideas, words, or sentence structure and submitting them as one's own. Other forms of academic dishonesty include (but are not limited to) the following:
   a. Submitting another's work as one's own or colluding with someone else and submitting that work as though it were his or hers;
   b. Failing to meet group assignment or project requirements while claiming to have done so;
   c. Failing to cite sources used in a paper;
   d. Creating results for experiments, observations, interviews, or projects that were not done;
   e. Receiving or giving unauthorized help on assignments.

   By submitting an assignment in any form, the student gives permission for the assignment to be checked for plagiarism, either by submitting the work for electronic verification or by other means. Penalties for any of the above infractions may result in disciplinary action including failing the assignment or failing the course or expulsion from the University, as determined by department and University guidelines.
4. Final exams cannot be given before their scheduled times. Students need to check the final exam schedule before planning return flights or other events at the end of the semester.

5. Students are to be in compliance with University, school, and departmental policies regarding the Whole Person Assessment requirements. Students should consult the Whole Person Assessment handbooks for requirements regarding general education and the students' majors.
   a. The penalty for not submitting electronically or for incorrectly submitting an artifact is a zero for that assignment.
   b. By submitting an assignment, the student gives permission for the assignment to be assessed electronically.

B. Course Policies and Procedures

1. Attendance policy.
   Oral Roberts University tries to educate and train you to succeed in a wide variety of situations, which usually require that you be present, punctual and prepared to do your job well. The attendance policy of this course is to prepare you for a responsible, successful post-ORU reality. Your sick or other emergency leaves equal the number of times you meet in a week, i.e., three days. Any additional absences will cost you. One absence 1%, two absences 2% and three absences 3%. **There are no exceptions to this policy except for an official University activity.** Absence on exam days will cost you 20 points. Exams will not be given earlier than the scheduled date.
2. Grading
   All earned points are added together from all the exams, quizzes, and the final exam.
   The following criteria are used to assign grades at the end of the semester:

Letter	Grade	Course Average
A	90	100%
B	80	89%
C	70	79%
D	60	69%
F	59% and below	

3. Examinations
   a. Students are evaluated by his or her performance on a daily quiz (10 points each), two, one-hour examinations (100 points each), and a final examination at the end of the course (100 points). A quiz over the previous lecture is given at the beginning of each class, except friday. **THE STUDENT MUST BE ON TIME TO TAKE THE QUIZ. There are NO makeup quizzes.** Quizzes are included in the total points for the course.
   b. The examinations will consist of short answer questions and definitions in any combination. Questions will be based on material from the text, handouts and material presented in the class.
   c. Successful performance on these examinations requires mastery of the subject material presented.
   d. Makeup examinations are given within 48h after the regular examination to students who have an excused absence. **Taking a make-up exam for an unexcused absence will result in the loss of 20 points plus the charging of a $15 late fee.**
4. Whole Person Assessment Requirements
   None

VI. COURSE CALENDAR

Week 1

Unit 1: Fundamentals of Microbiology
A Survey of the Microbial World
Exam 1

Week 2

Unit 2: Microbial metabolism
Microbial growth and genetics
Exam 2

Week 3

Unit 3: Interaction between Microbes and Their Hosts
Final Exam

Course Inventory for ORU's Student Learning Outcomes

Principles of Microbiology Lecture – BIO 212
Summer 2017

This course contributes to the ORU student learning outcomes as indicated below:
Significant Contribution – Addresses the outcome directly and includes targeted assessment.
Moderate Contribution – Addresses the outcome directly or indirectly and includes some assessment.
Minimal Contribution – Addresses the outcome indirectly and includes little or no assessment.
No Contribution – Does not address the outcome.

The Student Learning Glossary at http://ir.oru.edu/doc/glossary.pdf defines each outcome and each of the proficiencies/capacities.

OUTCOMES & Proficiencies/Capacities	Significant Contribution	Moderate Contribution	Minimal Contribution	No Contribution
1 **Outcome #1 – Spiritually Alive** Proficiencies/Capacities				
1A Biblical knowledge			X	
1B Sensitivity to the Holy Spirit				X
1C Evangelistic capability				X
1D Ethical behavior				X
2 **Outcome #2 – Intellectually Alert** Proficiencies/Capacities				
2A Critical thinking	X			
2B Information literacy			X	
2C Global & historical perspectives				X
2D Aesthetic appreciation				X
2E Intellectual creativity			X	
3 **Outcome #3 – Physically Disciplined** Proficiencies/Capacities				
3A Healthy lifestyle				X
3B Physically disciplined lifestyle				X
4 **Outcome #4 – Socially Adept** Proficiencies/Capacities				
4A Communication skills				X
4B Interpersonal skills				X
4C Appreciation of cultural & linguistic differences				X
4D Responsible citizenship				X
4E Leadership capacity				X