

Syllabus for  
**BIO 212—Principles of Microbiology Laboratory**  
1.0 Credit Hours  
Spring 2012

I. COURSE DESCRIPTION

An introduction to microbiology lab techniques including isolation, cultivation, characterization, and identification of micro-organisms designed for nursing majors. This course does not count as upper division biology credit. (Two 2-hour lab periods per week.)

Corequisite: BIO 212 Lecture.

Lab fee: \$50.

II. COURSE GOALS

The purpose of this course is to enable the student to learn laboratory techniques and participate in experiments.

III. STUDENT LEARNING OUTCOMES FOR THIS COURSE

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

- A. Prepare slides of microorganisms from different source materials.
- B. Perform the staining procedures included in this course and obtain satisfactory results.
- C. Isolate and identify microorganisms in pure culture.
- D. Perform serial dilutions to quantify and enumerate bacteria.
- E. Determine the morphological, nutritional, and physiological characteristics of an organism by using the standard tests in the laboratory manual.
- F. Describe the importance of microbiological techniques in human diagnosis of infectious disease.
- G. Describe three (3) applications of microbiological techniques in human life and environment.
- H. Demonstrate ability to use Bergey's Manual of Determinative Microbiology, to identify microorganisms.
- I. Quantify bacterial growth using a spectrophotometer.
- J. Demonstrate the effectiveness of certain antibiotics using Kirby-Bauer test.
- K. Demonstrate effect of osmolarity and pH on growth of bacteria.
- L. Recognize and identify stages in viral infection of bacteria.
- M. Utilize effectively the compound microscope and explain fully the mechanisms of its operation.

VI. TEXTBOOK AND OTHER LEARNING RESOURCES

- A. Required Textbooks  
Kerr, T.J. and McHale, B.B. 2003. Applications in General Microbiology: A Laboratory Manual, 6<sup>th</sup> ed. Winston-Salem: Hunter Textbooks. 395 p. ISBN: 9780887252785.
- B. Optional Textbooks (Highly recommended).  
Leboffe, M.J. and Pierce, B.E. 2005. A Photographic Atlas for the Microbiology Laboratory, 3<sup>rd</sup> ed., Englewood, CO: Morton Publishing. 186 p. ISBN: 9780895826565.

## 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., two days. Any additional

absences will cost you. One absence 1.5% and two absences 3%. There are no exceptions to this policy except for an official University activity. Absence on exam days will cost you 20 points.

2. Grading

Ten (10) quizzes based on questions at the end of each exercise and the lab text material (10 points each) are in the laboratory during the semester. **No make-up quizzes are given.**

Quizzes	100
Notebook assignments	100
Practical Examination I (hands-on)	120
Midterm examination	100
Practical examination II (stations)	60
Unknowns	50
General laboratory techniques (Neatness and cooperation)	20
Comprehensive examination	<u>100</u>
	650

Reports for Unknowns are due on **the date specified to you by the instructor at the beginning of the semester**. There will be no exceptions to this policy.

3. Exam Policies

- a. *Makeup Exams*—Any examination not taken at the scheduled time due to an excused absence must be made up at a time arranged with or by the instructor. Generally, tests missed for an unexcused absence cannot be made up. If a test absence is allowed to be made up, the University late test fee must be paid in advance.
- b. *Final Exam*—The final exam is NOT optional. ORU requires that a final exam be taken at the scheduled time, unless written permission from an authorized person is received; otherwise, makeup of an exam should be scheduled in advance of the exam.

4. Other Information

- a. *Scheduled Meetings*—Two 2-hour laboratory meetings are scheduled per week. Usually not all of this time will be needed; however, there are a few instances in which the students need to come in at times other than the regularly scheduled time to evaluate their experiments.
- b. *Assignments*—The laboratory exercises are performed according to the schedule listed below. It is important for each student to read the material pertinent to the laboratory exercise before the laboratory period.
- c. *Incompletes*—An Incomplete ("I") is given for work that is incomplete at the time final grades are given due to circumstances beyond the student's control. It is the student's responsibility to personally submit to his or her instructor a written petition for an "incomplete" before final exam week and receive back written approval. If granted, the student must make up the incomplete work within one semester, or the "incomplete" automatically becomes an "F." Incompletes are not granted to students who have procrastinated or otherwise neglected the course by absences, late work, etc.
- d. No laboratory experiments may be omitted. Excused absences made up by making arrangements with the instructor. If a student misses six or more labs, a grade of "F" is automatically given.

5. Whole Person Assessment Requirements

None

## VI. COURSE CALENDAR

Week	Day	Exercise	Topic
1	Th	Lee Notes	Introduction Bacteria in Natural and Laboratory Environments
2	T	Ex. 1	Introduction to the Microscope
	Th	Ex.4	Isolation of Pure Cultures
3	T	Ex. 6 Ex. 7	Simple Staining and Bacterial Morphology Differential Staining: Gram
	Th	Ex. 7 Ex. 8	Continued: Acid Fast Special Staining Techniques: Capsule
4	T	Ex. 8 Ex. 9	Continued: Spore Motility of Bacteria
	Th	Ex. 11 Ex. 12	Anaerobic Bacteria Minimum Growth Requirements
5	T	Ex. 24 Ex. 25	Effects of Ultraviolet Light Effects of Organic Material on Antiseptics and Disinfectants
	Th	Ex. 22	Effects of Temperature on Microorganisms
6	T	Ex. 23 Ex. 27	Effects of Osmotic Pressure and pH Antibiotic Susceptibility Testing
	Th	Ex. 13	Bacterial Enumeration
7	T	Ex. 17	Intracellular Enzymes
	Th	Ex. 16	Extracellular Enzymes
8	T	Ex. 34	Bacteriophage: Demonstration
	Th		Practice Test
9	T		<b>Midterm exam (written)</b>
			<b>SPRING SEMESTER BREAK</b>
10	T		INSTRUCTIONS FOR PRACT I & II and UNKNOWN
	Th	Ex. 18 Ex. 15	Carbohydrate Utilization Selective and Differential Media

Week	Day	Exercise	Topic
11	T	Ex. 20	Biochemical Reactions
	Th	Ex. 19 Ex. 20	IMVIC Tests Complete
12	T		Lab Practical I (hands-on)
	Th		Lab Practical II (Stations)
13	T	Ex.21	Start Unknowns
	Th		Unknowns
14	T		Unknowns
	Th		Unknowns
15	T		<b>Comprehensive Final (written)</b> <b>Unknowns due</b>

## Course Inventory for ORU's Student Learning Outcomes

### Principles of Microbiology Lab – BIO 212 Spring 2012

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
-------------------------------------	--	--------------------------	-----------------------	----------------------	-----------------

<b>1</b>	<b>Outcome #1 – Spiritually Alive</b> Proficiencies/Capacities				
1A	Biblical knowledge				X
1B	Sensitivity to the Holy Spirit				X
1C	Evangelistic capability				X
1D	Ethical behavior				X

<b>2</b>	<b>Outcome #2 – Intellectually Alert</b> Proficiencies/Capacities				
2A	Critical thinking	X			
2B	Information literacy			X	
2C	Global & historical perspectives				X
2D	Aesthetic appreciation				X
2E	Intellectual creativity			X	

<b>3</b>	<b>Outcome #3 – Physically Disciplined</b> Proficiencies/Capacities				
3A	Healthy lifestyle				X
3B	Physically disciplined lifestyle				X

<b>4</b>	<b>Outcome #4 – Socially Adept</b> 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