

AMERICAN UNIVERSITY OF RAS AL KHAIMAH

BIOL 231: General Microbiology Laboratory

Course Description

Course Title	General Microbiology Laboratory
Instructor	Mr. John Marton Room No. 119, Block B Phone extension: 1246 Email: jmarton@aurak.ac.ae
Credit Hours	1
Catalog Description	(1:0:2) Laboratory techniques in culturing, staining, and identifying microorganisms.
Co-requisites	BIOL 230

Textbook and other learning resources

Biology of Microorganisms Laboratory Manual, 2nd edition, Royt, P. and Andrykovitch, G., 2005, Kendall/ Hunt Publishing Co. ISBN-13: 9780757516504.

Handouts containing detailed procedures will be provided for some laboratory exercises

SigmaPlot : www.sigmaplot.com

Course materials will be available through AURAK Blackboard, including the syllabus, assignments, model answers to quizzes etc.

Course Goals

- To introduce students to basic research techniques used in a general microbiology laboratory

Student Learning Outcomes

At the end of this course the student will be able to:

- **CSLO 1:** Apply basic techniques used in a general microbiology laboratory such as culturing, staining, and identifying bacteria and fungi.
- **CSLO 2:** Apply techniques of bacterial genetics such as bacterial conjugation and transformation
- **CSLO 3:** Apply virologist methodologies using bacteriophage
- **CSLO 4:** Work safely in lab settings using microorganisms
- **CSLO 5:** Use graphing software Sigma Plot

Teaching and Learning Methodologies

Group work is adopted for laboratory experiments to promote team cooperation. Laboratory reports communicate the experimental laboratory exercises in writing and require students to exercise data interpretation, analysis and written presentation skills. Students will be provided a general rubric for writing of lab reports and will be informed of any additional requirements for specific laboratory reports. Quizzes, assignments, and group discussions are intended to reinforce learning and will assess student knowledge. The application of the methodologies and techniques used in the research will also be emphasized.

Evaluation Plan

- Lab Reports 20%
- Assignments 5%
- Lab Skills 5%
- Quizzes 20 %
- Midterm Exam 20%
- Final Exam 30%

Assessment Tool (number)	CSLO achieved	Weightage
Assignments	CSLO 1, CSLO 2, CSLO 3, CSLO 4, CSLO 5	5%
Lab reports (one report for each lab exercise)	CSLO 1, CSLO 2, CSLO 3, CSLO 4, CSLO 5	20%
Lab skills	CSLO 1, CSLO 2, CSLO 3, CSLO 4, CSLO 5	5%
Quizzes (4) [closed book, consisting of problem-solving/ data analysis questions (30%), questions requiring True or False responses (30%) and questions requiring short descriptive answers (40%)]	CSLO 1, CSLO 2, CSLO 3, CSLO 4, CSLO 5	20%
Midterm Examination [comprehensive closed book, consisting of problem-solving/data analysis questions (30%), questions requiring short descriptive answers (30%) and a practical component (40%), 2 hours]	CSLO 1, CSLO 2, CSLO 3, CSLO 4, CSLO 5	20%
Final Examination [comprehensive closed book, consisting of problem-solving/data analysis questions (30%), questions requiring short descriptive answers (30%) and a practical component (40%), 2 hours]	CSLO 1, CSLO 2, CSLO 3, CSLO 4, CSLO 5	30%

The quizzes and examinations (midterm and final) consist of a combination of problem-solving and short-answer questions as well as laboratory skills-based questions that test students' theoretical knowledge of the laboratory exercises, analytical, data interpretation, problem solving and technical/practical skills. The

practical element of the examinations accounts for 40% of the mark. Lab skills of students will be monitored during conducting of the laboratory exercise and students will be provided verbal feedback on their performance of the technique/procedure at the time. Written feedback will be provided to students on assignments, lab reports, quizzes and examinations to inform students of any deficiencies in their responses and ways to improve their performance.

Topic Breakdown

Week	Topic
1	General Introduction: Safety in the Laboratory
2	Bright field Microscopy, Culture of Microorganisms, and Normal Flora of Human Hands
3	Observing Microorganisms: The simple Stain, Microscopic Measurements
4	Pure Culture Techniques, Identification of an Unknown Bacterium, The Gram stain
5	The Negative Stain, The Acid Fast Stain
6	Measurement of Bacterial Cell Number
7	Flagella and Motility, Oxygen Requirements of Bacteria
8	Midterm Examination
9	Results of Exercise 11. Introduction to Sigma plot, Introduction of the safe use of microorganisms in the laboratory
10	The Spore Stain, Bacterial Genetics Conjugation
11	Transformation of a bacterial Host with Plasmid Vector
12	Identification of an Unknown Enterobacteriaceae, The molds
13	Identification of an unknown Enterobacteriaceae continued, Disinfectants and Antiseptics, Antibiotics: Demonstration and discussion
14	Bacteriophage Assay, Video: HIV in the research laboratory
15	Immunology: Agglutination Reactions, The molds continued

