MOHAWK VALLEY COMMUNITY COLLEGE

UTICA, NEW YORK

COURSE NUMBER BI 201

MICROBIOLOGY

REVIEWED Spring 2023

COURSE OUTLINE

Course Number: BI201 C-3, P-3, Cr-4

Course Title: Microbiology

1. Course Description

This course introduces the morphology, physiology, and genetics of microorganisms and their impact on health and environment. Organisms studied include bacteria, fungi, virus, and protozoa. Laboratories emphasize safe handling and culturing of live bacteria, as well as identification procedures.

Prerequisite(s): BI141 General Biology 1 or BI217 Human Anatomy & Physiology 2.

Student Course Outcomes

1. Students will be able to identify the structural components of a bacterial cell.

2. Students will identify the physical and chemical requirements of bacteria and how these can be manipulated to achieve microbial control.

3. Students will be able to discuss the operon and its relation to alterations in phenotype.

4. Students will be able to discuss the role of microorganisms in genetic engineering and the consequences.

5. Students will be able to identify specific metabolic pathways and related them to specific groups of microorganisms.

6. Students will identify microbial structures and processes that enhance pathogenicity.

7. Students will identify the structures and disease mechanisms associated with fungi.

8. Students will identify the component parts of virus and their methods of replication.

9. Students will identify methods of disease spread,

10. Students will identify selected bacterial, fungal and viral disease as to causative agents, portals of entry and modes of transmission.

11. Students will identify the significance of reservoirs in the propagation and control of microorganisms

12. Students will write and submit a researched, graded final project on some aspect of microbiology.

Outcomes Dealing With Lecture Content :

 The student will

 1. be able to recognize the of contributions of microbial research to an understanding of biological concepts (especially regarding genetics and metabolism).

 2. be able to identify of the similarities and differences in the morphology, physiology and genetics of procaryotic and eucaryotic organisms.

 3. be able to trace the etiology and control of infectious disease, based on a survey of some of the important pathogenic groups of bacteria, viruses and fungi.

 4. be able to identify the relationship of immunology, resistance, and sensitivity of hosts to disease organisms.

 5. be able to identify the parts of the operon and the role each plays in genetic expression.

 6. explain the purpose of metabolism and the catabolic pathways

 7. be able to identify how different groups of organisms satisfy their

 requirement for ATP and carbon skeletons.

 8. to identify the influence of the different metabolic pathways on organismic growth.

 9. be able to identify some of the positive impacts of microorganisms

 10. be able to discuss the immune system, how it functions, and the interrelationship of the B and T sides.

Outcomes of the Laboratory:

 The student will

1. demonstrate the proper techniques for the safe handling and transfer of bacteria from one culture media to another.

2. be able to perform and interpret various bacteriologic tests.

3. be able to properly prepare and interpret selected stain procedures.

4. demonstrate the proper use of a microscope in bacteriologic viewing.

5. be able to isolate organisms and maintain a pure culture.

6. be able to demonstrate proper and safe handling of bacteriologic specimens.

7. be able to demonstrate the appropriate selection and application of selected stains and tests used in bacteriologic identification.

8. be able to distinguish among selective, differential, and undefined media.

III. LECTURE TOPICS

 UNIT

 1 Introduction

 2 Bacterial Structure and Function

 3 Microbial Growth

 4 Genetics

 5 Metabolism

 6 Fungi and other Eukaryotes

 7 Viruses

 8 Epidemiology

 9 Mechanisms of Pathogenicity

 10 Nonspecific Defenses

 11 Specific Defenses/Immunity and Vaccines

 12 Microbial Control – Physical, Chemical

 and Antimicrobial Agents

 LABORATORY TOPICS

 UNIT

 1 Laboratory Rules and Procedures

 Handling Test Tubes

 2 Inoculating solid media

 The isolation streak

 3 Preparing a smear

 The Simple Stain

 Using the Microscope (Oil Immersion)

 4 The Gram Stain

 5 Acid-Fast Stain

 Negative Stain

 6 Endospore Stain

 Capsule Stain

 7 Motility Demonstration

 8 Pure Culture Techniques

 9 Oxygen Requirements

 Biooxidations

 Hydrolysis

 10 Gram Positive Cocci

 11 Gram Negative Enterics

 Assignment of Unknowns

 12 Microbial Control

 Chemical Agents

 Antimicrobials

 13 Characterization of Unknowns

 14 Practicum