

Alexandria Technical and Community College

BIOL 2225: Microbiology

A. COURSE DESCRIPTION

Credits: 3

Lecture Hours/Week: 2

Lab Hours/Week: 1

OJT Hours/Week: *.*

Prerequisites:

This course requires any of these three prerequisites

BIOL 1417 - Human Anatomy & Physiology I

BIOL 1416 - Essentials of Anatomy and Physiology

BIOL 1450 - General Biology I (Number of Years Valid: 5)

Corequisites: None

MnTC Goals: Goal 03 - Natural Science

This course meets Minnesota Transfer Curriculum (MnTC) goal area 3. This course is a study of microorganisms and their relationships to health and disease. The nomenclature, structure, physiology, genetics, and mechanisms of pathogenesis associated with the disease agents of bacteria, fungi, viruses, protozoa, and helminthes are covered in the course. Topics also include epidemiology, mutations, and the mechanisms of antibiotics. Integrated lab includes microscopic examination of bacteria, fungi, and parasites, the identification and culturing of bacteria, and the sensitivity of bacteria to antibiotics.

Prerequisites: BIOL1416 or BIOL1417 or BIOL1450.

B. COURSE EFFECTIVE DATES: 05/19/2008 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Diagram the three domains of all living organisms, the properties that distinguish them, the nomenclature, and the properties of nonliving organisms; including viruses, viroids, and prions.
2. Explain and demonstrate the ethical use of therapeutic applications by the use of recombinant DNA procedures and genetically engineered proteins.
3. Explain the mode of transmission, morphologic characteristics, morphological groupings, structures, and reproductive processes of bacteria, algae, fungi, and viruses.
4. Gain an understanding of the mechanisms of action and perform an experiment to evaluate various antiseptics and disinfectants.
5. Gain knowledge of antibiotic mechanisms of action differences, perform and evaluate an antibiotic Kirby-Bauer antibiotic sensitivity experiment.
6. Gain knowledge of bacterial virulence factors and how they influence bacterial survival.
7. Gain knowledge of normal flora, nosocomial infections, opportunistic infections, examples of acute, persistent, latent, chronic, and slow viral infections, endemic, epidemic, and pandemic infections, and epidemiology, catabolism, anabolism, mutational defects, restriction enzymes, plasmids, polymerase chain reactions, endotoxins and exotoxins, and molecular repair mechanisms.
8. Identify the pathogens, describe the pathogenesis, characteristics, symptoms, and complications of integumentary and wound infections, upper and lower respiratory systems, digestive system, genitourinary systems, and blood and lymphatic/immune systems diseases
9. Perform a Gram stain, examine, structurally compare, and illustrate the differences between the Gram positive and Gram negative cell wall.
10. Perform an experiment to evaluate the media used for a pure culture of bacterial microorganisms, Gram Positive and Gram negative bacteria, and fungal growth.
11. Perform laboratory exercises in Gram positive and Gram negative media identification techniques.
12. Perform laboratory experiments for the identification of Gram positive and Gram negative microorganisms using a dichotomous key.

D. LEARNING OUTCOMES (General)

1. The learner will demonstrate knowledge of the infections associated with the integumentary system, respiratory system, digestive system, genitourinary system, blood and lymphatic systems.
2. The learner will demonstrate knowledge of epidemiology and the mechanisms of antimicrobial medications.
3. The learner will demonstrate knowledge of the fundamentals of microbiology, bacterial genetics, mutations, and biotechnology.

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

Goal 03 - Natural Science

1. Demonstrate understanding of scientific theories.
2. Formulate and test hypotheses by performing laboratory, simulation, or field experiments in at least two of the natural science disciplines. One of these experimental components should develop, in greater depth, students' laboratory experience in the collection of data, its statistical and graphical analysis, and an appreciation of its sources of error and uncertainty.
3. Communicate their experimental findings, analyses, and interpretations both orally and in writing.
4. Evaluate societal issues from a natural science perspective, ask questions about the evidence presented, and make informed judgments about science-related topics and policies.

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted