

COURSE OUTLINE
BIOL-107
Fundamentals of Microbiology
4 Credits
Science Core Course

HOWARD COMMUNITY COLLEGE

Description

Fundamentals of Microbiology is a course designed with a strong emphasis towards the allied health careers. Following the successful completion of Biology 107, the student will be able to describe the characteristics of living things from the molecular to the cellular level for both prokaryotic and eukaryotic cells. The study of microbiology will enable the student to understand the biology of bacteria, fungi, protozoa and viruses in terms of morphology, classification, reproduction, metabolism, genetics, population growth, and disease production. In the laboratory, the student will gain experience with the tools and techniques used in the study of microorganisms. Prerequisite: ENGL-096 or ENGL-086. (3 hours lecture, 3 hours lab)

Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Discuss the scientific method and how it is used to derive, test and refine hypothesis.
2. Describe the structure and function of the atom, and types of chemical bonds.
3. Discuss the pH scale and discuss the importance of pH to living systems.
4. Discuss the structure of carbohydrates, lipids and proteins and their subunits, list food sources and describe their importance to cells and organisms.
5. Differentiate among eukaryotic cells, prokaryotic cells and viruses and discuss the structure and function of their components.
6. Compare active and passive transport processes and discuss the structural properties of the plasma membrane.
7. Explain the basic principles of bioenergetics, including the process of cellular respiration.
8. Identify the structure and function of DNA, including the processes of replication, transcription, translation and mutagenesis.
9. Explain the processes of mitosis and meiosis.

10. Discuss the cause, effects and diagnosis of common genetic disorders.
11. Discuss how microorganisms are transmitted between hosts and the routes of entry and exit.
12. Discuss the factors that determine whether disease will follow infection, including virulence and host resistance.
13. Discuss the control of growth and infection of microorganisms by physical methods, chemical methods and by the specific resistance mechanisms of the host.
14. For selected pathogens, discuss the diseases that they cause, the method of transmission and means of prevention.

Major Topics

- I. The Main Themes of Microbiology
- II. From Atoms to Cells: A Chemical Connection
- III. Prokaryotic Profiles: The Bacteria
- IV. Eukaryotic Cells and Microorganisms
- V. An Introduction to Viruses
- VI. Microbial Metabolism
- VII. Microbial Genetics
- VIII. Physical and Chemical Control of Microbes
- IX. Drugs, Microbes, Host
- X. Infection and Disease
- XI. Host Defenses
- XII. Immunity
- XIII. The Cocci and Bacilli of Medical Importance
- XIV. Miscellaneous Bacterial Agents of Disease
- XV. Parasitic Diseases of Humans
- XVI. Viral Diseases - RNA & DNA

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member.

Writing: Specific writing assignments will be determined by the individual faculty member.

Other Course Information

This course is a Science core course, Science elective, and an Arts and Sciences Elective.