HIGHLAND COMMUNITY COLLEGE

Syllabus

BS 203 Microbiology
5 Credit Hours (Lecture and Lab)
Prerequisites: BS 101 or BS 105 or 5 Credit Hour Anatomy and Physiology with Lab
C&I Revision Date: 11/17/2025

Department:

Biology

Course Description:

This course will provide a study of the morphology, physiology, and classification of microorganisms associated with disease. The course will also focus on methods of disease prevention through sanitation, disinfection and sterilization, sources and means of infection, and body defenses.

Course Competencies:

The learning outcomes and competencies detailed in this syllabus meet or exceed the learning outcomes and competencies specified by the Kansas Core Outcomes Groups for this course as approved by the Kansas Board of Regents. **(Kansas Regents Shared Number Course and Title: KRSN Course BIO 2040 Microbiology and Lab.)**

Upon completion of the course, students in Microbiology Lecture will be able to:

1. Analyze the impact of microorganisms in health, environment, and industry.
2. Connect the basic anatomy of microbes to their physiological needs.
3. Illustrate how the basic structure of microorganisms relates to their susceptibility to antimicrobials.
4. Compare and contrast the processes of replication, transcription, translation in microbes and ways of acquiring new genetic information.
5. Compare and contrast methods of controlling microbial growth.
6. Distinguish among the major types of metabolic processes in microorganisms.
7. Illustrate the concepts and mechanisms of microbial pathogenicity.
8. Explain strategies for identifying and managing infectious diseases.
9. Identify healthcare associated infections and concepts of epidemiology.
10. Distinguish between innate and adaptive immune responses including how vaccines work and are effective methods to prevent disease.

Upon completion of this course, students in Microbiology Laboratory will be able to:

1. Use a bright field light microscope to view and interpret slides, including
    a. Correctly setting up and focusing the image
    b. Proper handling, cleaning, and storage of the microscope
    c. Correct use of multiple lenses
    d. Recording microscopic observations
2. Properly prepare slides for microbiological examination, including
    a. Cleaning and disposing of slides
    b. Preparing smears from solid and liquid cultures
    c. Performing wet mount and/or hanging drop preparations
    d. Performing simple and differential stains

3. Properly use aseptic techniques for the transfer and handling of microorganisms and instruments, including
    a. Sterilizing and maintaining sterility of transfer instruments
    b. Performing aseptic transfer
    c. Obtaining microbial samples
4. Use appropriate microbiological media and test systems, including
    a. Isolating colonies and/or plaques
    b. Maintaining pure cultures
    c. Using biochemical test media
    d. Accurately recording macroscopic observations
5. Estimate the number of microbes in a sample using serial dilution techniques, including
    a. Correctly choosing and using pipettes and pipetting devices
    b. Correctly spreading diluted samples for counting
    c. Estimating appropriate dilutions
    d. Extrapolating plate counts to obtain the correct CFU or PFU in the starting sample
6. Use standard microbiology laboratory equipment correctly, including
    a. Using the standard metric system for weights, lengths, diameters, and volumes
    b. Lighting and adjusting a laboratory burner
    c. Using an incubator
7. Practice safe microbiology, using appropriate protective and emergency procedures.
8. Document, interpret, and report on experimental protocols, results, and conclusions.

Course Content:

A. Introduction to microorganisms
    1. What microbiology is
    2. Practical applications of microbiology
    3. Evolution of the study of microorganisms
    4. How bacteria are named
    5. The divisions of microbiology
B. Microorganisms associated with disease
    1. Fungi
        a) Anatomical and physiological study of the fungi
        b) Taxonomic characteristics of the fungi
        c) Fungi associated with disease
    2. Viruses
        a) Structure of the viruses
        b) Classification of the viruses
        c) Cellular activities of the viruses in causing disease
    3. Bacteria
        a) Morphological and biochemical differences between the bacteria
        b) Reproduction and genetics of the bacteria
        c) Action of the bacteria in causing disease
    4. Parasitic protozoa and helminths
        a) Protozoa associated with disease
        b) Parasitic worms associated with diseases of humans
C. Infection and parasitology
    1. Definitions of the forms of symbiosis
    2. Establishment and maintenance of an infection by a pathogenic organism
D. Control of pathogens
    1. Terminology dealing with sterilization and disinfection
    2. Methods of sterilization and disinfection
    3. Use of drugs to treat infections

E. Defenses of the body against invading microorganisms
    1. Mechanical defenses of the skin and membranes of the body
    2. Chemical and cellular defenses of blood and the lymphatic system

Learning Assessments:

Course competencies will be assessed by the use of lecture tests, subject area tests, lab assignments, quizzes, and Web site activities.

Instructional Materials:

Textbook: Microbiology: An Introduction, Tortora, Funke, Case, 11th Ed., Benjamin Cummings, 2013. ISBN: 978-0-321-73360-3

Guidelines for Requesting Accommodations Based on Documented Disability or Medical Condition

It is the intention of Highland Community College to work toward full compliance with the Americans with Disabilities Act, to make instructional programs accessible to all people, and to provide reasonable accommodations according to the law.

Students should understand that it is their responsibility to self-identify their need(s) for accommodation and that they must provide current, comprehensive diagnosis of a specific disability or medical condition from a qualified professional in order to receive services. Documentation must include specific recommendations for accommodation(s). Documentation should be provided in a timely manner prior to or early in the semester so that the requested accommodation can be considered and, if warranted, arranged.

In order to begin the process all students **must** complete the "Disabilities Self-Identification Form" on our Disability Services website.

This form can also be accessed at the Highland Community College homepage under Students Services/Student Resources/Disability Service or by contacting the Disabilities Coordinator.

A Note on Harassment, Discrimination and Sexual Misconduct

Highland Community College seeks to assure all community members learn and work in a welcoming and inclusive environment. Title VII, Title IX, and College policy prohibit harassment, discrimination and sexual misconduct. Highland Community College encourages anyone experiencing harassment, discrimination or sexual misconduct to talk to report to the Vice President for Student Services, the Human Resources Director or complete an online report about what happened so that they can get the support they need and Highland Community College can respond appropriately.

There are both confidential and non-confidential resources and reporting options available to you. Highland Community College is legally obligated to respond to reports of sexual misconduct, and therefore we cannot guarantee the confidentiality of a report, unless made to a confidential resource. Responses may vary from support services to formal investigations. As a faculty member, I am required to report incidents of sexual misconduct and thus cannot guarantee confidentiality. I must provide our Title IX coordinator with relevant details such as the names of those involved in the incident. For more information about policies and resources or reporting options, please review our Equity Grievance Policy.