

# MICROBIOLOGY FOR THE HEALTH SCIENCES

## COURSE OUTLINE

Spring, 2012

- I. Foundations of Microbiology
  - A. Introduction to Microbiology
    - 1. A brief history of microbiology
    - 2. Contemporary microbiology and the roles of microbiologists
  - B. Microbial Diversity
    - 1. Microscopy and staining
    - 2. Prokaryotic and eukaryotic organisms
    - 3. The basic nature of viruses
- II. General Microbiology
  - A. Chemical and Functional Microbial Anatomy
    - 1. Eukaryotic cells: Summary
    - 2. Prokaryotic cells: Membranes, walls, spores, flagella, pili, capsules, etc
  - B. Microbial Nutrition and Growth
    - 1. Physical and chemical requirements for growth
    - 2. Culture media and cultivation of microorganisms
    - 3. Microbial growth
    - 4. Chemical and physical control of microbial growth
  - C. Microbial Metabolism
    - 1. Introductory concepts: Metabolism, enzymes and re-dox reactions
    - 2. Energy trapping metabolic pathways
    - 3. Biosynthesis and use of metabolic energy
  - D. Microbial Genetics
    - 1. Structure and function of genetic material
    - 2. Genetic variability and transfer of genetic information
    - 3. Genetic engineering and contemporary biotechnology
  - E. Viruses
    - 1. Anatomy
    - 2. Replication
    - 3. Effects on cells
- III. Applied and Environmental Microbiology
  - A. Industrial Microbiology
  - B. Food Microbiology
  - C. Water and Sewage Microbiology
- IV. Principles of Medical Microbiology
  - A. Introduction to Infectious Diseases
    - 1. Normal microbiota
    - 2. Symbiotic and parasitic relationships
    - 3. Pathogenicity and virulence
  - B. Host Parasite Relationships
    - 1. Mechanisms of pathogenicity
    - 2. Mechanisms of immunity
  - C. Epidemiology
    - 1. Introductory concepts: Basic language and principles of epidemiology
    - 2. Disease transmission
  - D. Antimicrobial Chemotherapy
    - 1. Introductory concepts: Spectrum of activity, selective toxicity, therapeutic index, etc
    - 2. Mechanism of action of selected antimicrobials
- V. Microbial Diseases
  - A. Respiratory System
  - B. Digestive System
  - C. Nervous System
  - D. Urinary and Reproductive Systems
  - E. Cardiovascular and Lymphatic Systems
  - F. Skin, Wounds and Eyes