Montgomery County Community College
BIO 241
Clinical Microbiology II
4-3-3

COURSE DESCRIPTION:
A course that introduces Immunology, Virology, Mycology, and Parasitology as well as the immunological basis of serological tests and their uses in the diagnosis of infectious and non-infectious diseases. For students of Medical Laboratory Technology. (Laboratory/lecture format) This course is subject to a course fee. Refer to http://mc3.edu/adm-fin-aid/paying/tuition/course-fees for current rates.

REQUISITES:
Previous Course Requirements
- BIO 141 Clinical Microbiology I with a minimum grade of "C"

Concurrent Course Requirements
None

LEARNING OUTCOMES Upon successful completion of this course, the student will be able to:	LEARNING ACTIVITIES	EVALUATION METHODS
1. Correctly use terms that are commonly used in immunology, virology, mycology, and parasitology.	Lecture Laboratory Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications Including Journal Club Presentations	Lecture Tests Case Study-Based Wiki/Rubric
2. Describe how the cells and tissues of the immune system relate to specific and non-specific defense of the host.	Lecture Laboratory Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications Including Journal Club Presentations	Lecture Tests Journal Club/Rubric

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
3. Describe the basic processes involved in immune reactions, including hypersensitivity, and autoimmune disease.	Lecture Laboratory Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications Including Journal Club Presentations	Lecture Tests Exams
4. Explain how immune responses of the host relate to serological tests and the performance and interpretation of these tests in the clinical laboratory.	Lecture Laboratory Group Discussions Case Studies Hands-On Laboratory Demonstrations Video Presentations of Laboratory Material	Lecture Tests Lab Tests Lab Competencies Lab Worksheets Immunology Lab Practical
5. Describe general descriptions of certain viruses and their activities, and explain how these relate to viral classification and the pathogenesis of viral infections.	Lecture Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications Including Journal Club Presentations	Lecture Tests Journal Club/Rubric
6. Describe fungi include: basic biology, elementary classification, relationships between fungi and disease, and techniques for isolation and identification.	Lecture Laboratory Group Discussions Case Studies Hands-On Laboratory Demonstrations Student “Work-Ups” and Identification of Unknown Specimens	Lecture Tests Lab Tests Lab Worksheets Lab Competencies Mycology & Parasitology Lab Practical
7. Describe common pathogenic protozoa and helminths include: basic biology, elementary classification, relationship to disease, and techniques for identification.	Lecture Laboratory Group Discussions Case Studies Hands-On Laboratory Demonstrations	Lecture Tests Lab Tests Lab Worksheets Mycology & Parasitology Lab Practical

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
8. Describe characteristics and basic laboratory techniques for the identification of spirochetes and defective bacteria.	Lecture Laboratory Group Discussions Case Studies Hands-On Laboratory Demonstrations Student “Work-Ups” and Identification of Unknown Specimens	Lecture Tests Lab Worksheets Lab Tests Immunology Lab Practical

At the conclusion of each semester/session, assessment of the learning outcomes will be completed by course faculty using the listed evaluation method(s). Aggregated results will be submitted to the Associate Vice President of Academic Affairs. The benchmark for each learning outcome is that *70% of students will meet or exceed outcome criteria*.

SEQUENCE OF TOPICS:

I. Introduction to Clinical Immunology
   - A. Overview of Immunology
   - B. History of Immunology

II. Cells and Tissues of the Immune System
   - A. The Lymphatic System
   - B. The Hematopoetic System
     1. Granulocytes
     2. Agranulocytes
        - a. monocytes
        - b. lymphocytes

III. Humoral Immunity
   - A. Antigens and Immunogenicity
   - B. Clonal Selection
   - C. Immunoglobulin Structure and Classes
   - D. Primary and Secondary Responses
   - E. Monoclonal Antibodies

IV. Antigen-Antibody Reactions
   - A. Immune Complex Formation
   - B. Antibody Affinity and Avidity
   - C. Cross-Reactive Antibodies

V. Detection and Measurement of Antibodies and Nucleic Acid
   - A. Agglutination and Precipitation
   - B. Elisa Testing (Enzyme-Linked Immunoassay)
   - C. Radioimmunoassay
   - D. Western and Southern Blotting
   - E. Immunofluorescence
   - F. Complement Assays
   - G Flow Cytometry
   - H. DNA Probe, Nucleic Acid Hybridization, PCR

VI. The Complement System
    A. Classical Pathway
    B. Alternate Pathway
    C. Consequences of Complement Activation
VII. Cellular Immunity
    A. Innate Immunity
    B. Inflammation
    C. Phagocytosis
    D. T-Cell Immunity
    E. Cytokines as Immune Response Modifiers
VIII. Immunity to Infectious Diseases
    A. Innate and Acquired Defense
    B. AMI and CMI Response
    C. Development and Improvement of Vaccines
IX. Immune Deficiencies
    A. Genetically Determined Diseases
    B. Acquired Immune Deficiency Diseases Including AIDS
    C. Immunosuppression – Intentional
    D. Immune Modulation
X. Hypersensitivities and Autoimmunity
    A. Type I, II, III, and IV Hypersensitivity
    B. Autoimmune Diseases
XI. Serological Diagnosis of Bacterial Infections
    A. *Salmonella* Grouping
    B. Syphilis Serology
    C. *Staphylococcus* Identification
    D. Immunology and Streptococcal Infections
XII. Viruses
    A. Viral Structure, Function, and Classification
    B. Viral Infections and Host Defenses
    C. RNA Virus Infections: Polio, Influenza, Rubeola, Rubella, Mumps, Rabies, Rhinovirus, HIV
    D. DNA Virus Infections: Herpesviruses, Adenovirus, HPV
    E. Viral Hepatitis
XIII. Fungi
    A. Basic Biology of Fungi
    B. Yeasts and Yeast Infections: *Candida* and *Cryptococcus*
    C. Molds and Mold Infections: Histoplasmosis, Blastomycosis, Coccidiomycosis
    D. Fungal Opportunists: *Aspergillus*, *Mucor*, *Cladosporium*
    E. Laboratory Diagnosis of Fungal Infections

XIV. Medical Parasitology
- A. Characteristics of Parasitic Infections
- B. Protozoal Infections and Normal Flora
  1. Intestinal: Giardiasis, Amoebic dysentery, Cryptosporidiosis
  2. Tissue: Malaria, Toxoplasmosis
- C. Helminthic Infections
  1. Intestinal: Pinworm, Ascaris, Hookworm, Tapeworm
  2. Tissue: Trichinosis, Flukes
- D. Laboratory Diagnosis of Infections Caused By Parasites

XV. Spirochetes and Defective Bacteria
- A. *Treponema* and *Borrelia*
- B. *Mycoplasma*
- C. *Chlamydia* and *Rickettsia*

LEARNING MATERIALS:
The textbooks for the course are often changed in order to best meet the needs of students. Currently they are:

Forbes, Sahm, and Weissfield. (2007). *Diagnostic Microbiology* (12th ed.). C.V. Mosby Co.

Tortora, Funke, and Case. (2013). *Microbiology: An Introduction* (11th ed.). Pearson Benjamin Cummings Co.

A laboratory manual, outlines, course objectives, supplemental readings, and handouts are provided by the instructor.

Other learning materials may be required and made available directly to the student and/or via the College's Libraries and/or course management system.

COURSE APPROVAL:

Prepared by:	Judy Earl, MS, MT(ASCP)	Date:	4/10/1998
Revised by:	Elaine Venuti, MS, MT(ASCP)	Date:	10/2008
Revised by:	Elaine Venuti, MS, MT(ASCP)	Date:	1/31/2009
VPAA/Provost Compliance Verification:	Dr. John C. Flynn, Jr.	Date:	9/11/2009
Revised by:	Elaine Venuti, MS, MT(ASCP)	Date:	11/28/2012
VPAA/Provost or designee Compliance Verification:	Victoria L. Bastecki-Perez, Ed.D.	Date:	5/23/2013
Revised by:	Debbie Dalrymple	Date:	6/27/2016
VPAA/Provost or designee Compliance Verification:	Victoria L. Bastecki-Perez, Ed.D.	Date:	6/27/2016

This course is consistent with Montgomery County Community College's mission. It was developed, approved and will be delivered in full compliance with the policies and procedures established by the College.