Montgomery County Community College
BIO 141
Clinical Microbiology I
4-3-3

COURSE DESCRIPTION:
BIO 141 is the first part of a two part Medical Microbiology course for MLT students. It examines the microbial world with emphasis on the morphology and biological properties of bacteria and their relationship to man and the clinical laboratory. It enables the student to understand how infectious disease is spread, how bacteria are isolated and identified, how microbes are controlled and the nature and use of antibiotics. The procedures used in the identification of medically important bacteria are stressed. 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
- CHE 131 Chemistry for Technology I or CHE 151 Principles of Chemistry I
- BIO 121 General Biology l or BIO 130 Introductory Anatomy and Physiology or BIO 151 Principles of Biology l 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. Identify characteristics of bacteria in human diseases.	Lecture Laboratory Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications Hands-On Laboratory Demonstrations Video Presentations of Laboratory Material Student "Work-Ups" and Identification of Unknown Specimens	Lecture Exams Lab Tests Research/Writing Assignment/Rubric

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
2. Apply information relating to microbial growth as shown by appropriate culturing techniques for bacteria.	Lecture Laboratory Hands-On Laboratory Demonstrations Video Presentations of Laboratory Material Student “Work-Ups” and Identification of Unknown Specimens	Lecture Exams Lab Tests Lab Competencies Lab Unknowns Lab Worksheets Lab Practical
3. Demonstrate proficiency in basic laboratory techniques for staining and identifying bacteria using established criteria.	Lecture Laboratory Hands-On Laboratory Demonstrations Video Presentations of Laboratory Material Student “Work-Ups” and Identification of Unknown Specimens	Lab Tests Lab Unknowns Lab Competencies Lab Worksheets Lab Practical
4. Describe modes of transmission of disease and methods of control of microbes.	Lecture Laboratory Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications	Lecture Exams Research Assignment/ Rubric
5. Explain how basic chemistry and microbial metabolism relates to tests used in the identification of medically important bacteria.	Lecture Laboratory Group Discussions Case Studies Hands-On Laboratory Demonstrations Student “Work-Ups” and Identification of Unknown Specimens	Lecture Exams Lab Tests Lab Unknowns Lab Competencies Lab Worksheets Lab Practical
6. Describe the modes of action of various antibiotics in relationship to bacterial metabolism.	Lecture Laboratory Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications	Lecture Exams Lab Worksheets Lab Practical Writing Assignment/Rubric

LEARNING OUTCOMES	LEARNING ACTIVITIES	EVALUATION METHODS
7. Discuss how bacterial genetics relates to the development of resistance to antibiotics.	Lecture Laboratory Group Discussions Case Studies Review of Current Issues in Bacteriology from Scientific Journals and News Publications	Lecture Exams
8. Describe commercial test systems.	Lecture Laboratory Hands-On Laboratory Demonstrations Student “Work-Ups” and Identification of Unknown Specimens	Lecture Exams Lab Practical Lab Tests Lab Unknowns Lab Worksheets
9. Describe and apply procedures for the routine handling of common specimens in the clinical microbiology laboratory, including: criteria for acceptance; choice of media for primary isolation; tests and media used for routine identifications; conditions for incubation; follow-up procedures; and safety precautions.	Lecture Laboratory Group Discussions Case Studies Hands-On Laboratory Demonstrations Video Presentations of Laboratory Material Student “Work-Ups” and Identification of Unknown Specimens	Lecture Exams Lab Tests Lab Unknowns Lab Worksheets 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 Medical Microbiology
   - A. The Microbial World
   - B. History of Microbiology
   - C. Microscopy

II. Microbial Cells
   - A. Chemical Composition

- B. Procaryotic Structures
- C. Eucaryotic Structures

III. Bacterial Growth
- A. The Growth Curve
- B. Nutritional Requirements
- C. Environmental Requirements
- D. Culture Techniques

IV. Control of Infectious Microbes
- A. Transmission and Containment
- B. Sterilization
- C. Chemical Disinfection

V. Principles of Disease
- A. Transmission of Diseases
- B. Epidemiology
- C. Pathogenicity and Virulence

VI. Cocci
- A. Staphylococci
- B. Streptococci
- C. *Neisseria meningitidis*, *N. gonorrhoeae*, and *Moraxella*

VII. Enterobacteriaceae and Non-Enterobacteriaceae – Gram Negative Bacilli
- A. Relationship to Normal Flora of the Large Intestine
- B. Opportunistic Genera
- C. Pathogenic Genera
- D. Identification

VIII. Vibriods and Fastidious Gram Negative Bacilli
- A. *V. cholerae*
- B. *C. jejuni*, *H. pylori*
- C. *Legionella, Bordetella*
- D. *Eikenella, Pasteurella, Haemophilus*

IX. Gram Positive Bacilli
- A. Non Sporeformers
- B. *Bacillus*

X. Anaerobes
- A. Gram Negatives
- B. Gram Positives Including *Clostridium*

XI. *Mycobacterium tuberculosis*
- A. Pathogenesis
- B. Identification and Susceptibility Testing
- C. Prevention, Control
- D. Treatment

XII. Antibiotics
- A. Microbial Production of Antibiotics
- B. Spectra of Antibiotic Activity
- C. Modes of Action of Antibiotics
- D. Antibiotic Sensitivity Tests

XIII. Bacterial Diseases

A. Urinary Tract Infections
B. Genital Tract Infections
C. Respiratory Infections
D. Cardiovascular and Lymphatic System Infections
E. Skin and Eye Infections
F. Central Nervous System Infections

LEARNING MATERIALS:

Forbes, Sahm, and Weiss. (2007). Bailey & Scott's *Diagnostic Microbiology* (12th ed.). C.V. Mosby Co.

Tortora, Funke and Case. (2013). *Microbiology, An Introduction* (11th ed.). Pearson Benjamin Cummings Publishing Company, Inc.

Supplemental readings, handouts, outlines, lab manual, and course objectives 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: 2/16/2006
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: 2/18/2013
Revised by:	Debbie Dalrymple .	Date: 06/27/2016
VPAA/Provost or designee Compliance Verification:	Victoria L. Bastecki-Perez, Ed.D.	Date: 06/27/2016

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.