South Central College

MDLT 2811 Microbiology I

Course Outcome Summary

Course Information

Description This course covers the isolation and identification of clinically significant microorganisms. Emphasis is placed on specimen sources, growth characteristics, techniques for identification, and quality control. (Prerequisite: MDLT 1810 may be taken concurrently or with Program Director permission)

Total Credits 3

Total Hours 80

Types of Instruction

Instruction Type	Credits/Hours
Lecture	1/16
Laboratory	2/32

Pre/Corequisites

May be taken concurrently with MDLT 1810 or with Program Director permission.

Institutional Core Competencies

Communication - Students will be able to demonstrate appropriate and effective interactions with others to achieve their personal, academic, and professional objectives.

Critical and Creative Thinking - Students will be able to demonstrate purposeful thinking with the goal of using a creative process for developing and building upon ideas and/or the goal of using a critical process for the analyzing and evaluating of ideas.

Course Competencies

1. Apply laboratory safety practices.

Learning Objectives

Explain management and disposal of hazardous and regular waste.
Discuss management of a safe laboratory environment.
Describe collection, transportation, handling, packaging, processing precautions of microbiology specimens
Describe the practice of sterilization and disinfection.

2. Demonstrate standard quality assurance practices to ensure quality patient outcomes.

Learning Objectives

List components of a microbiology QA program.
Interpret QA data.
Discuss using and reporting QA data.
Discuss corrective action measures for QA data.

3. List and describe prokaryotic and eukaryotic cells. Their possible morphologies and arrangements, nomenclature, and cell wall structure.

Learning Objectives

Explain the binomial system of nomenclature for microorganisms.
List differences and similarities of prokaryotic and eukaryotic ultrastructure.
List and describe morphology and general arrangement of the three basic types of bacterial cells.
Discuss existence and distinction of the two types of bacterial walls.

4. Summarize the infectious disease process.

Learning Objectives

Define and discuss innate and adaptive immunity.
Distinguish between colonization, infection, and disease.
Describe how endotoxin differs from exotoxin, and their effect on the host.

5. Summarize the general microscopic, cultural, and other techniques for microbial identification.

Learning Objectives

Demonstrate microscopic methods for identifying microorganisms.
Demonstrate aseptic techniques to ensure quality patient outcomes.
Interpret bacterial culture growth outcomes by macroscopic and microscopic examination.
Perform basic techniques to identify microorganisms.
Discuss factors to consider in choosing a culture protocol.
Explain use of presumptive and definitive identification, and reports of culture results.

6. Describe the microbial mechanisms of pathogenicity and microbial avoidance of host immunity.

Learning Objectives

List common routes of entry by microorganisms.
Discuss mechanisms of adherence and invasion.
Discuss common microbial evasion mechanisms to host defense mechanisms.

7. Discuss pathologic effects of microbial invasion in the host.

Learning Objectives

Discuss minimal cellular damage.
Explain direct damage by microorganisms.
List and discuss the four types of hypersensitivity reactions by the host.

8. Explain and demonstrate proper microbiology specimen collection, transportation, and processing procedures.

Learning Objectives

List and explain the common types of microbiology specimen collection, transportation, and processing procedures.
Discuss common pre-analytical variables that affect microbiology collection, transportation, and processing.

9. Discuss organism characteristics, clinical significance, cultural characteristics and identification, antibiotic susceptibility characteristics, habitat, and transmission of Staphylococcus organisms.

Learning Objectives

Identify nonpathogenic, pathogenic, and opportunistic Staphylcoccus organisms.
Correlate clinically significant Staphylococcus organisms with the diseases they cause, and the nature of the illness.
Describe the modes of transmission and habitats of the most commonly isolated Staphylococcus species.
Describe distinguishing features of major Staphylococcus species important to human infections.
Discuss major virulence factor(s), if known, that are associated with Staphylococcus organisms, and their importance in the disease process.

List and describe major physiologic and serologic assays used to differentiate and identify Staphylococcus organisms.
Discuss the significance of emerging multiple resistant Staphylococcus organisms.

10. Discuss organism characteristics, clinical significance, cultural characteristics and identification, antibiotic susceptibility characteristics, habitat, and transmission of Streptococcus organisms.

Learning Objectives

Identify nonpathogenic, pathogenic, and opportunistic Streptococcus organisms.
Correlate clinically significant Streptococcus organisms with the diseases they cause, and the nature of the illness.
Describe the modes of transmission and habitats of the most commonly isolated Streptococcus species.
Describe distinguishing features of major Streptococcus species important to human infections.
Discuss major virulence factor(s), if known, that are associated with Streptococcus organisms, and their importance in the disease process.
List and describe major physiologic and serologic assays used to differentiate and identify Streptococcus organisms.
Discuss the significance of emerging multiple resistant Streptococcus organisms.

11. Discuss organism characteristics, clinical significance, cultural characteristics and identification, antibiotic susceptibility characteristics, habitat, and transmission of Gram Negative Enteric organisms.

Learning Objectives

Identify nonpathogenic, pathogenic, and opportunistic Gram Negative Enteric organisms.
Correlate clinically significant Gram Negative Enteric organisms with the diseases they cause, and the nature of the illness.
Describe the modes of transmission and habitats of the most commonly isolated Gram Negative Enteric organisms.
Describe distinguishing features of major Gram Negative Enteric organisms important to human infections.
Discuss major virulence factor(s), if known, that are associated with Gram Negative Enteric organisms, and their importance in the disease process.
List and describe major physiologic and serologic assays used to differentiate and identify Gram Negative Enteric organisms.
Discuss the significance of emerging multiple resistant Gram Negative Enteric organisms.

12. Discuss organism characteristics, clinical significance, cultural characteristics and identification, antibiotic susceptibility characteristics, habitat, and transmission of Non-fermenting aerobic gram negative bacilli.

Learning Objectives

Identify non-pathogenic, pathogenic, and opportunistic Non-fermenting aerobic gram negative organisms.
Correlate clinically significant Non-fermenting aerobic gram negative organisms with the diseases they cause, and the nature of the illness.
Describe the modes of transmission and habitats of the most commonly isolated Non-fermenting aerobic gram negative organisms.
Describe distinguishing features of major Non-fermenting aerobic gram negative organisms important to human infections.
Discuss major virulence factor(s), if known, that are associated with Non-fermenting aerobic gram negative organisms, and their importance in the disease process.
List and describe major physiologic and serologic assays used to differentiate and identify Non-fermenting aerobic gram negative organisms.
Discuss the significance of emerging multiple resistant Non-fermenting aerobic gram negative organisms.

13. Discuss organism characteristics, clinical significance, cultural characteristics and identification, antibiotic susceptibility characteristics, habitat, and transmission of Neisseria organisms.

Learning Objectives

Identify nonpathogenic, pathogenic, and opportunistic Neisseria organisms.
Correlate clinically significant Neisseria organisms with the diseases they cause, and the nature of the illness.
Describe the modes of transmission and habitats of the most commonly isolated Neisseria organisms.

Describe distinguishing features of major Neisseria organisms important to human infections.
Discuss major virulence factor(s), if known, that are associated with Neisseria organisms, and their importance in the disease process.
List and describe major physiologic and serologic assays used to differentiate and identify Neisseria organisms.
Discuss the significance of emerging multiple resistant Neisseria organisms.

14. Discuss organism characteristics, clinical significance, cultural characteristics and identification, antibiotic susceptibility characteristics, habitat, and transmission of Hemophilus organisms.

Learning Objectives

Identify nonpathogenic, pathogenic, and opportunistic Hemophilus organisms.
Correlate clinically significant Hemophilus organisms with the diseases they cause, and the nature of the illness.
Describe the modes of transmission and habitats of the most commonly isolated Hemophilus organisms.
Describe distinguishing features of major Hemophilus organisms important to human infections.
Discuss major virulence factor(s), if known, that are associated with Hemophilus organisms, and their importance in the disease process.
List and describe major physiologic and serologic assays used to differentiate and identify Hemophilus organisms.
Discuss the significance of emerging multiple resistant Hemohilus organisms.

15. Discuss organism characteristics, clinical significance, cultural characteristics and identification, antibiotic susceptibility characteristics, habitat, and transmission of Aerobic gram positive bacilli.

Learning Objectives

Identify nonpathogenic, pathogenic, and opportunistic Aerobic gram positive bacilli.
Correlate clinically significant Aerobic gram positive bacilli with the diseases they cause, and the nature of the illness.
Describe the modes of transmission and habitats of the most commonly isolated Aerobic gram positive bacilli.
Describe distinguishing features of major Aerobic gram positive bacilli important to human infections.
Discuss major virulence factor(s), if known, that are associated with Aerobic gram positive bacilli and their importance in the disease process.
List and describe major physiologic and serologic assays used to differentiate and identify Aerobic gram positive bacilli.
Discuss the significance of emerging multiple resistant Aerobic gram positive bacilli.

16. Discuss and perform Kirby-Bauer susceptibility testing.

Learning Objectives

Discuss basic pharmokinetics of antimicrobial agents.
Explain bacterial resistance to antimicrobial agents.
List and explain common susceptibility testing techniques.
Discuss special considerations in antimicrobial susceptibility testing.

17. Discuss and perform blood cultures.

Learning Objectives

Discuss the clinical patterns associated with how microorganisms cause blood stream infections.
State the basic characteristics of blood culture media, including additives and environment.
State and demonstrate proper blood culture collection, including collection site, and number and timing of specimens.
Discuss blood culture specimen processing, when using both manual and automated methods.
Discuss the detection and processing of positive blood culture specimens, including visible signs, sub-culturing techniques and media, microscopic examination, and identifying techniques.

SCC Accessibility Statement

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