



Western Technical College

10513140 Advanced Microbiology

Course Outcome Summary

Course Information

Description	This course provides an overview of acid fast organisms, fungi, parasites, and anaerobic bacteria. The organisms, their pathophysiology, epidemiology, the diseases and conditions that they cause, laboratory methods of handling, culturing and identification will be discussed.
Career Cluster	Health Science
Instructional Level	Associate Degree Courses
Total Credits	2
Total Hours	36

Pre/Corequisites

Prerequisite 10513133 Clinical Microbiology

Textbooks

Textbook of Diagnostic Microbiology. 7th Edition. Copyright 2023. Mahon, Connie R., Donald C. Lehman, and George Manuseelis Jr. Publisher: Elsevier Science. **ISBN-13**: 978-0-323-82997-7. Required.

Learner Supplies

Lab Coat - \$20. **Vendor**: Campus Shop. Required.

Safety Glasses. **Vendor**: Campus Shop. Required.

Sharpie Permanent Marker - Black. **Vendor**: Campus Shop. Required.

Three-ring binder. **Vendor:** Campus Shop. Required.

Program Outcomes

1. Practice laboratory safety and regulatory compliance
2. Monitor and evaluate quality control in the laboratory
3. Apply modern clinical methodologies including problem solving and troubleshooting according to predetermined criteria
4. Correlate laboratory results to diagnosis of clinical conditions and/or diseases

Course Competencies

1. Identify fungi

Assessment Strategies

- 1.1. through written, graphic, or oral exercise
- 1.2. and/or by a written examination

Criteria

You will know you are successful when your

- 1.1. response demonstrates identification of the fungus and the disease/s associated with the fungus/infection
- 1.2. identification is supported by relevant evidence
- 1.3. identification outlines in detail the epidemiology and pathology of the disease

Learning Objectives

- 1.a. Describe the medical classification of the fungi
- 1.b. Identify the basic morphological characteristics of the fungi
- 1.c. Review the clinical aspects of the superficial mycoses
- 1.d. Review the clinical aspects for *Sporothrix schenckii*
- 1.e. Review the clinical aspects for the systemic mycosis
- 1.f. Review the clinical aspects for the opportunistic fungi
- 1.g. Discuss diseases/conditions associated with the medically significant fungi

2. Identify parasitic helminths

Assessment Strategies

- 2.1. through written, oral, or graphic exercise
- 2.2. and/or by a written examination

Criteria

You will know you are successful when your

- 2.1. response demonstrates identification of the parasite and the disease/s associated with the parasite/infection
- 2.2. identification is supported by relevant evidence
- 2.3. identification outlines in detail the epidemiology, pathology, life cycle, and identification of the parasite/disease

Learning Objectives

- 2.a. Identify the geographic distribution for the nematodes
- 2.b. Identify sources/modes of infection for the nematodes
- 2.c. Summarize the life cycle of nematodes
- 2.d. Describe the diseases/conditions associated with nematode infections
- 2.e. Describe the method of diagnosis for Nematode infections
- 2.f. Identify the characteristic morphological details associated with the microscopic identification of

- nematode larva and ova
- 2.g. Describe the morphology of an adult tapeworm

3. Identify parasitic protozoa

Assessment Strategies

- 3.1. through written, oral, or graphic exercise
- 3.2. and/or by a written examination

Criteria

You will know you are successful when your

- 3.1. response includes identification of the parasite and the disease/s associated with the parasite/infection
- 3.2. identification is supported by relevant evidence
- 3.3. identification outlines in detail the epidemiology, pathology, life cycle and identification of the parasite/disease

Learning Objectives

- 3.a. Identify the geographic distribution of the protozoans
- 3.b. Identify sources/modes of infection for the protozoans
- 3.c. Summarize the life cycle of protozoans
- 3.d. Describe the diseases/conditions associated with protozoan infections
- 3.e. Describe the method of diagnosis for protozoan infections
- 3.f. Identify the characteristic morphological details associated with microscopic identification of protozoan trophozoites and cysts
- 3.g. Summarize the life cycle of malaria
- 3.h. Describe the method of diagnosis for *Plasmodium vivax* and *Plasmodium falciparum*
- 3.i. Summarize the diseases associated with sporozoa/coccidia other than *Plasmodium*

4. Identify acid-fast organisms

Assessment Strategies

- 4.1. through written, oral, or graphic exercise
- 4.2. and/or by a written examination

Criteria

You will know you are successful when your

- 4.1. response includes an identification of the bacteria and the disease/s associated with the bacteria/infection
- 4.2. identification is supported by relevant evidence
- 4.3. identification outlines in detail the epidemiology and pathology of the disease

Learning Objectives

- 4.a. Discuss the pathophysiology of tuberculosis
- 4.b. Summarize the methods used for specimen processing for mycobacteria
- 4.c. Describe the media used for the cultivation of mycobacteria
- 4.d. Explain the procedure for acid fast staining
- 4.e. Explain the auramine-rhodamine stain
- 4.f. Discuss 2 Step TB skin testing
- 4.g. Summarize the Mantoux TB skin test

5. Identify anaerobic bacteria

Assessment Strategies

- 5.1. through written, oral, or graphic exercise
- 5.2. and/or by a written examination

Criteria

You will know you are successful when your

- 5.1. response includes identification of the bacteria and the disease/s associated with the bacteria/infection
- 5.2. identification is supported by relevant evidence
- 5.3. identification outlines in detail the epidemiology and pathology of the disease

Learning Objectives

- 5.a. Identify the body sites that would harbor normal anaerobic flora
- 5.b. Identify the ubiquitous habitat of anaerobes
- 5.c. Describe the conditions/sites which would be ideal for an anaerobic infection in man
- 5.d. Identify the sites/specimens that would be acceptable for anaerobic culture
- 5.e. Discuss macroscopic, microscopic and cultural indications of anaerobic infection
- 5.f. Summarize the different types of anaerobic media and their uses
- 5.g. Describe the different types of systems used for the incubation of anaerobic cultures
- 5.h. Recognize the unique gram stain associated with *Clostridium perfringens* and *Clostridium tetani* and *Fusobacterium nucleatum*
- 5.i. Recognize the distinct colonial morphology of *Clostridium perfringens* and *Prevotella melaninogenica*
- 5.j. Recognize the characteristic infection/disease/condition associated with anaerobic bacteria

6. Assess viruses

Assessment Strategies

- 6.1. through written, graphic, or oral exercise
- 6.2. and/or by a written examination

Criteria

You will know you are successful when your

- 6.1. response demonstrates assessment of viruses and viral pathology
- 6.2. assessment is supported by relevant evidence
- 6.3. assessment includes the epidemiology and pathology of clinically relevant viruses

Learning Objectives

- 6.a. Describe the characteristics of viruses and differentiate them from bacteria.
- 6.b. Describe how viruses multiply.
- 6.c. Describe the proper procedures for collection and transport of viral specimens.
- 6.d. Name the appropriate specimen for maximum recovery of the suspected viral agent.
- 6.e. Compare the different methods used in the diagnosis of viral infections.
- 6.f. Explain the advantages and limitations of conventional cell cultures for diagnosing viral infections.
- 6.g. Explain the advantages and limitations of rapid viral antigen and molecular detection methods.
- 6.h. Discuss the indications and limitations of serologic assays in the diagnosis of viral infections.
- 6.i. Define cytopathic effect and describe how it is used to presumptively identify viral agents.
- 6.j. Compare the genomes and mode of transmission of the human hepatitis viruses.
- 6.k. Discuss how clinically significant viral agents are transmitted or acquired, the infection the virus produces, and the most effective method of laboratory diagnosis.