Virginia Western Community College
MDL 236
Parasitology and Virology

Prerequisites
None

Course Description
This course will introduce the student to human viruses and parasites of medical importance. This course will complement the Clinical Bacteriology Course, since most clinical sites consolidate bacteriology, virology and parasitology in the same lab area. Students will learn the molecular biology of viruses, replication of viruses, and antiviral therapy. Medically important parasites will be discussed, along with their replication cycles and treatment methods.

Semester Credits: 2 **Lecture Hours: 1** **Lab/Clinical/Internship Hours:)**

Required Materials

Textbook:
Medical Microbiology. P. Murray, et al. 8th Edition. Elsevier (Bundled with Diagnostic Microbiology book Mahon)

Other Required Materials:
Internet Access

Course Outcomes
At the completion of this course, the student should be able to:

- Describe the nature of a DNA or RNA virus and their replication
- Describe the mechanism of antiviral agents
- Diagnose viral and parasitic diseases
- Differentiate between the medically relevant viruses, such as adenovirus, poxvirus, and reoviruses
- Identify viruses in the laboratory
- Differentiate between various human parasites and know the life cycles of each
- Determine the primary organs/systems affected by the various viruses and parasites
- Determine how parasites are transmitted and identify the vector of the parasite
- Study laboratory techniques to isolate viruses and parasites from biological samples
- Differentiate prion diseases from viral diseases

Topical Description

I. Viral Classification, Structure and Replication

- Classification
- Virion Structure
- Viral Replication
- Viral Genetics
- Viral Vectors for Therapy

II. Mechanisms of Viral Pathogenesis

- Basic Steps in Viral disease
- Infection of the Target Tissue
- Viral Pathogenesis
- Viral Disease
- Epidemiology
- Control of Viral Spread

III. Role of Viruses in Disease

Viral Diseases

- Chronic and Potentially Oncogenic Infections
- Infections in Immunocompromised Patients
- Congenital, Neonatal, and Perinatal Infections

IV. Laboratory Diagnosis of Viral Diseases

- Specimen Collection
- Cytology
- Electron Microscopy
- Viral Isolation and Growth
- Detection of Viral Proteins
- Detection of Viral Genetic Material
- Viral Serology

V. Antiviral Agents and Infection Control

- Targets for Antiviral Drugs
- Nucleoside Analogs
- Nonnucleated Polymerase Inhibitors
- Protease Inhibitors
- Antiinfluenza Drugs
- Immunomodulators
- Infection control

VI. Papillomavirus and Polyomaviruses

- Human Papillomaviruses
  - Pathogenesis
  - Epidemiology
  - Laboratory Diagnosis
  - Treatment, Prevention and Control
- Polyomaviridae
  - Structure and Replication
  - Pathogenesis
  - Epidemiology
  - Laboratory Diagnosis
  - Treatment, Prevention and Control

VII. Adenoviruses

- Structure and Replication
- Pathogenesis and Immunity
- Epidemiology
- Clinical Syndromes
- Laboratory Diagnosis
- Treatment, Prevention, and Control

VIII. Human Herpesviruses

- Structure of Herpesviruses
- Herpes Simplex Virus
- Varicella-Zoster Virus
- Epstein-Barr Virus
- Cytomegalovirus
- Human Herpesviruses 6 and 7
- Other Human Herpesviruses

IX. Poxviruses

- Structure and Replication
- Pathogenesis and Immunity
- Epidemiology
- Clinical Syndromes

X. Parvoviruses

- Structure and Replication
- Pathogenesis and Immunity
- Epidemiology
- Clinical Syndromes
- Laboratory Diagnosis

XI. Picornaviruses

- Structure
- Replication
- Enteroviruses
- Rhinoviruses

XI. Coronaviruses and Noroviruses

- Coronaviruses
  - Structure and Replication
  - Pathogenesis and Clinical Syndromes
  - Laboratory Diagnosis
  - Treatment, Prevention, and Control
- Noroviruses
  - Structure and Replication
  - Pathogenesis
  - Epidemiology

XII. Paramyxoviruses

- Structure and Replication
- Measles Virus
- Parainfluenza Viruses
- Mumps Virus
- Respiratory Syncytial Virus
- Human Metapneumovirus
- Nipah and Hendra Viruses

XIII. Orthomyxoviruses

- Structure and Replication

XIV. Rhabdoviruses, Filoviruses and Bornaviruses

- Rhabdoviruses
  - Physiology, Structure and Replication
- Filoviruses
  - Physiology, Structure and Replication
- Borna Disease Virus
  - Physiology, Structure and Replication

XV. Reoviruses

- Structure
- Replication
- Orthoreoviruses
- Rotaviruses
- Coltiviruses and Orbiviruses

XVI. Togaviruses and Flaviviruses

- Alphavirus and Flaviviruses
- Rubella Virus

XVII. Bunyavirdae and Arenaviridae

- Bunyavirdae
  - Structure and Replication of Flaviviruses
- Arenaviruses
  - Structure and Replication of Arenaviruses

XVIII. Retroviruses

- Classification
- Structure
- Replication
- Human Immunodeficiency Virus
- Human T-cell Lymphotropic Virus and Other Oncogenic Retroviruses

XIX. Hepatitis Viruses

- Hepatitis A Virus
- Hepatitis B Virus
- Hepatitis C and G Viruses
- Hepatitis D Virus

XX. Prion Diseases

- Structure and Physiology
- Pathogenesis
- Epidemiology
- Clinical Syndromes
- Laboratory Diagnosis
- Treatment, Prevention and Control

Parasitology

I. Parasitic Classification, Structure and Replication

- Importance of Parasites
- Classification and Structure
- Physiology and Replication

II. Pathogenesis of Parasitic Diseases

- Exposure and Entry
- Adherence and Replication
- Cell and Tissue Damage
- Disruption, Evasion, and Inactivation of Host Defenses

III. Role of Parasitic Diseases

- Summary of Parasites Associated with Human Disease

IV. Laboratory Diagnosis of Parasitic Diseases

- Parasitic Life Cycle as an Aid to Diagnosis
- General Diagnostic Considerations
- Parasitic Infections of the Intestinal and Urogenital Tracts
- Parasitic Infections of Blood and Tissue
- Alternatives to Microscopy

V. Antiparasitic Agents

- Targets for Antiparasitic Drug Action
- Drug Resistance
- Antiparasitic agents

VI. Intestinal and Urogenital Protozoa

- Amebae
- Flagellates
- Ciliates
- Sporozoa (Coccidia)

VII. Blood and Tissue Protozoa

- Plasmodium Species
- Babesia Species
- Toxoplasma Gondii
- Sarcocystis lindemanni
- Free-Living Amebae
- Leishmania
- Trypanosomes

VIII. Nematodes

- Enterobius vermicularis
- Ascaris lumbricoides
- Toxcara and Baylisascaris
- Trichuris trichiura
- Hookworms
- Ancylostoma braziliense
- Strongyloides stercoralis
- Trichinella spiralis
- Wuchereria bancrofti and Brugia malayi
- Loa loa
- Onchocerca volvulus
- Dirofilara immitis
- Dracunculus mediensis

IX. Trematodes

- Fasciolopsis buski
- Fasciola hepatica
- Clonorchis sinesis
- Paragonimus westermani
- Schistosomes

X. Cestodes

- Taenia solium
- Cysticercosis
- Taenia saginata
- Diphyllobothrium latum
- Sparganosis
- Echinococcus multlocularis
- Hymenolepis nana
- Hymenolepis diminuta
- Dipylidium caninum

XI. Arthropods

- Mites
- Ticks
- Insecta

Lab Schedule

- Collecting and Processing Specimens for Parasite Identification
- Microscopic Methods of Detecting Intestinal Parasites
- Preparing and Staining Smears for Blood Parasites
- Parasitic Protozoa
- Parasitic Worms
- Vectors of Disease

Note to Instructors