

Educational Objectives:

This course is designed to present an overview of the major viruses causing important diseases in humans. The course focuses on the molecular mechanisms of viral pathogenesis, determinants of viral virulence and the host response to infections. Diagnosis of viral infections, development of novel vaccines and controls of viral infections will also be discussed. The first part of the course will cover the basic principles and concepts used in the study of viral diseases, modern diagnostic methods and recent advances in the application of molecular virology to combat viral diseases. The second half of the course will include material on the individual diseases and causative viruses. Each virus will be discussed with its basic molecular biology, pathogenesis, transmission, epidemiology and control. By the end of the course, the students will appreciate that viruses are not merely disease-causing agents, but are extremely useful molecular tools in many areas of modern medicine.

Course Outcomes:

On successful completion of this course, students would:

1. Understand the molecular structure, replication, transcription, translation, virulence, pathogenesis and transmission of various viruses.
2. Think of novel potential vaccine and antiviral drugs development options.
3. Comprehend the principles and application of diagnostic tools in virology.
4. Understand the mechanism of pathogenesis of major disease causing viruses.
5. Appreciate that viruses are not merely disease-causing agents, but are extremely useful molecular tools in many areas of modern medicine.
6. Prepare written objective reports describing and interpreting experimental and observational results.

Course Contents:

- Diagnostic Tools in Modern Virology:
 - Virus isolation, Electron Microscopy, Serology: Immunofluorescence, ELISA. Nucleic Acids detection: PCR & its variants including real-time PCR. Clinical use of molecular techniques: diagnosis of infection, diagnosis of disease, staging of Infection, qualitative, quantitative and genotyping tests. Use of molecular assay to evaluate antiviral therapy.

- DNA Enveloped Viruses
 - Herpes Viruses (Herpes Simplex, Varicella Zoster, Cytomegalovirus, Epstein-Barr virus, Human Herpes Viruses 6, 7 and 8.)
 - Hepatitis B Virus
 - POX Viruses
- DNA Non-Enveloped Viruses
 - Adenovirus
 - Papilloma viruses
 - Parvovirus
- RNA Enveloped Viruses
 - Hepatitis C Virus
 - Respiratory Viruses (Influenza and parainfluenza viruses, Respiratory Syncytial virus and Rhinoviruses)
 - Measles, Mumps and Rubella Virus
 - Rabies Virus
 - Human T-Cell Leukemia Virus (HTLV)
 - HIV
- RNA Non-Enveloped Viruses
 - Enteroviruses
 - Rhinoviruses
 - Reoviruses
 - Hepatitis A Virus
- Other Categories
 - Rotaviruses, Enteric adenoviruses, SRSVs, Classic human caliciviruses,
 - Astroviruses
 - Viral Hemorrhagic Fevers: Dengue, Ebola virus, Yellow fever virus
 - Viral Encephalitis: West Nile virus.

Recommended Book:

1. **Desk Encyclopedia of Human and Medical Virology.** Brian W J Mahy and Marc H V Van Regenmortel. Academic Press Elsevier 2010
2. **Principles and Practice of Clinical Virology** (6th edition) A.J. Zuckerman (au) and editors J.E. Banatvala, P. Griffiths, B. Schoub, P. Mortimer. Wiley 2009

3. **Field's Virology.** 6th edition David M. Knipe, PhD; Peter M. Howley, MD; Diane E. Griffin, MD, PhD; Robert A. Lamb, PhD, ScD; Malcolm A. Martin, MD; Bernard Roizman, ScD; Stephen E. Straus, MD Raven Press 2007
4. **Principles of Virology** (3rd edition): By S. J. Flint, L. W. Enquist, V. R. Racaniello, and A. M. Skalka, ASM 2009
5. **Principles of Molecular Virology**, 4th edition by A.J. Cann, Academic Press, 2005
6. **Understanding Viruses** by Teri Shors. Jones and Bartlett Publishers 2008
7. **Introduction to Modern Virology** 6th ed by N.J. Dimmock, A. Easton, K. Leppard.. Wiley-Blackwell 2007
8. **How Pathogenic Viruses Work** by L. Sompayrac. Published by Jones and Bartlett 2002.
9. **Clinical and Diagnostic Virology** by G. Kudesia and T.Wreghitt (Cambridge Clinical Guides) 2009