SEMESTER - III
VIROLOGY

THEORY MARKS: 100

Unit 1 Nature and Properties of Viruses **No. of lectures: 10**

1.1 Introduction: Discovery of viruses, nature and definition of viruses, general properties concept of viroids, virusoids, satellite viruses and Prions. Theories of viral origin

1.2 Structure of Viruses: Capsid symmetry, enveloped and non-enveloped viruses

1.3 Isolation, purification and cultivation of viruses

1.4 Viral taxonomy: Classification and nomenclature of different groups of viruses

(Chapters 1-3, Introduction to Modern Virology, 6th Ed., by Dimmock NJ, Easton AL, Leppard KN; Blackwell Publishing Ltd, 2007, Pages: 3-48, 444-479)
(Chapters 2, 3 & 10, Virology: Principles and Applications, by Carter J and Saunders V; John Wiley and Sons, 2007, Pages: 9-29, 39-48, 116-119)
(Chapter 19, Understanding Viruses, by Shors Teri; Jones & Bartlett Learning USA, 2013, Pages: 588-595, 605-608)

Unit 2 Bacteriophages **No. of lectures: 10**

Diversity, classification, one step multiplication curve, lytic and lysogenic phages (lambda phage) concept of early and late proteins, regulation of transcription in lambda phage

(Chapter 19, Virology: Principles and Applications, by Carter J and Saunders V; John Wiley and Sons, 2007, Pages: 229-254)
(Chapter 21, Understanding Viruses, by Shors Teri; Jones & Bartlett Learning USA, 2013, Pages: 647-652)

Unit 3 Viral Transmission, Salient features of viral nucleic acids and Replication **No. of lectures: 15**

3.1 Modes of viral transmission: Persistent, non-persistent, vertical and horizontal

3.2 Salient features of viral Nucleic acid : Unusual bases (TMV,T4 phage), overlapping genes (ϕX174, Hepatitis B virus), alternate splicing (HIV), terminal redundancy (T4 phage), terminal cohesive ends (lambda phage), partial double stranded genomes (Hepatitis B), long terminal repeats (retrovirus), segmented (Influenza virus), and non-segmented genomes (picornavirus), capping and tailing (TMV)

3.3 Viral multiplication and replication strategies: Interaction of viruses with cellular receptors and entry of viruses. Replication strategies of viruses as per Baltimore classification (phi X 174, Retroviridae, Vaccinia, Picorna)
Assembly, maturation and release of virions

(Chapters 4-8, Virology: Principles and Applications, by Carter J and Saunders V; John Wiley and Sons, 2007, Pages: 50-101)
(Chapters 6-11, Introduction to Modern Virology, 6th Ed.,, by Dimmock NJ, Easton AL, Leppard KN; Blackwell Publishing Ltd, 2007, Pages: 79-189)
(Chapters 4, 6 & 20, Understanding Viruses, by Shors Teri; Jones & Bartlett Learning USA, 2013, Pages: 68-85, 616-620)

Unit 4 Viruses and Cancer **No. of lectures: 6**

4.1 Introduction to oncogenic viruses

4.2 Types of oncogenic DNA and RNA viruses: Concepts of oncogenes and proto-oncogenes

(Chapter 22, Virology: Principles and Applications, by Carter J and Saunders V; John Wiley and Sons, 2007, Pages: 286-296)

(Chapter 10, Understanding Viruses, by Shors Teri; Jones & Bartlett Learning USA, 2013, Pages: 268-292)

(Chapter 20, Introduction to Modern Virology, 6th Ed., by Dimmock NJ, Easton AL, Leppard KN; Blackwell Publishing Ltd, 2007, Pages: 341-361)

Unit 5 Prevention & control of viral diseases **No. of lectures: 7**

5.1 Antiviral compounds and their mode of action

5.2 Interferon and their mode of action

5.3 General principles of viral vaccination

(Chapters 9, 24 & 25, Virology: Principles and Applications, by Carter J and Saunders V; John Wiley and Sons, 2007, Pages: 105-106, 181-213, 306-322)

(Chapter 21, Introduction to Modern Virology, 6th Ed., by Dimmock NJ, Easton AL, Leppard KN; Blackwell Publishing Ltd, 2007, Pages: 364-399)

PRACTICALS MARKS: 50

1. To study structure of important animal viruses (rhabdo, influenza, paramyxo hepatitis B and retroviruses) using electron micrographs
2. To study structure of important plant viruses (caulimo, Gemini, tobacco ring spot, cucumber mosaic and alpha-alpha mosaic viruses) using electron micrographs
3. To study structure of important bacterial viruses (ϕX 174, T4, λ) using electron micrograph.
4. Isolation and enumeration of bacteriophages from water/sewage sample using double agar layer technique
5. Studying isolation and propagation of animal viruses by chick embryo technique
6. Study of cytopathic effects using photographs
7. To perform local lesion technique for assaying plant viruses

SUGGESTED READING

1. Cann AJ (2012) Principles of Molecular Virology, Academic Press Oxford UK
2. Wagner EK, Hewlett MJ, Bloom DC, Camerini D (2008) Basic Virology 3rd edition. Blackwell publishing. Malden USA
3. Mathews. (2004) Plant Virology. Hull R. Academic Press New York USA
4. Nayudu MV (2008) Plant Viruses. Tata Mc Graw Hill, India

ONLINE READING MATERIAL

1. http://www.virology.net
2. http://ictvonline.org/