

C-9: VIROLOGY (THEORY)
SEMESTER –IV HMBCR4092T

TOTAL HOURS: 52

CREDITS: 4

Module 1

Marks 25

Unit 1 Nature and Properties of Viruses

No. of Hours: 10

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

Structure of Viruses: Capsid symmetry, enveloped and non-enveloped viruses, Isolation, purification and cultivation of viruses, Viral taxonomy: Classification and nomenclature of different groups of viruses

Unit 2 Bacteriophages

No. of Hours: 16

Diversity, classification, one step multiplication curve, lytic and lysogenic phages (lambda phage)

concept of early and late proteins, regulation of transcription in lambda phage, terminal redundancy (T4 phage), terminal cohesive ends (lambda phage), overlapping genes (ϕ X174)

Module 2

Marks 25

Unit 3 Viral Transmission, Salient features of viral nucleic acids and Replication

No. of Hours: 14

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

Salient features of viral Nucleic acid : Unusual bases (TMV, T4 phage), overlapping genes (Hepatitis B virus), partial double stranded genomes (Hepatitis B), long terminal repeats (retrovirus),

segmented (Influenza virus), and non-segmented genomes (picornavirus), capping and tailing (TMV)

Viral multiplication and replication strategies: Interaction of viruses with cellular receptors and entry

of viruses. Replication strategies of viruses as per Baltimore classification (Retroviridae, Vaccinia, Picorna) , Assembly, maturation and release of virions

Unit 4 Viruses and Cancer**No. of Hours: 10**

Introduction to oncogenic viruses

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

Unit 5 Prevention, control of viral diseases and applications of virology No. of Hours: 2

General principles of viral vaccination, Phage display

C-9: VIROLOGY (PRACTICAL)**HMBCR4092P****TOTAL HOURS: 39****CREDITS: 2**

1. Study of the structure of important animal viruses (rhabdo, influenza, paramyxo hepatitis B and retroviruses) using electron micrographs
2. Study of the structure of important plant viruses (caulimo, Gemini, tobacco ring spot, cucumber mosaic and alpha-alpha mosaic viruses) using electron micrographs
3. Study of the structure of important bacterial viruses (ϕ X 174, T4, λ) using electron micrograph.
4. Isolation and enumeration of bacteriophages (PFU) 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 of viruses using photographs
7. Perform local lesion technique for assaying plant viruses.

SUGGESTED READING

1. Dimmock, NJ, Easton, AL, Leppard, KN (2007). Introduction to Modern Virology. 6th edition, Blackwell Publishing Ltd.
2. Carter J and Saunders V (2007). Virology: Principles and Applications. John Wiley and Sons.
3. Flint SJ, Enquist, LW, Krug, RM, Racaniello, VR, Skalka, AM (2004). Principles of Virology, Molecular biology, Pathogenesis and Control. 2nd edition. ASM press Washington DC.
4. Levy JA, Conrat HF, Owens RA. (2000). Virology. 3rd edition. Prentice Hall publication, New Jersey..
9. Versteeg J. (1985). A Color Atlas of Virology. Wolfe Medical Publication.
10. Padmanavan and Shastri. Virology
11. David Friefilder. Molecular Biology

