

Name of the Programme: M.Sc. Biotechnology

Course Code: GBT-623

Title of the Course: VIROLOGY

Number of Credits: 2

Effective from AY: 2022-23

Pre-requisites for the Course:	Basic knowledge in Microbiology.	
Course Objectives:	Upon completion of this course the students will be able to 1) develop an understanding of how the perception of microbes (bacteria and viruses) is limited by technology: only metagenomic analyses allow to now start studying in depth the dark matter. 2) gain an appreciation for viruses as essential drivers of the evolution of life on Earth. 3) Gain theoretical knowledge in virology virus transmission processes, illness and etiology.	
Content:	<u>MODULE I</u> ● General Virology ● The structure of virus particles: subunits, filamentous viruses, and nucleoproteins, isometric virus particles, Enveloped (membrane-bound) virus particles , Virus particles with head–tail morphology. ● Frequency of occurrence of different virus particle morphologies. ● Classification of viruses based on disease , host organism , virus particle morphology , viral nucleic acids , taxonomy. ● Satellites, Viroids, and prions ● Replication of Viral DNA and RNA ● Containment facilities, maintenance and handling of pathogenic viruses. ● Viral Enteric Diseases and Oncogenic viruses, Rotavirus diversity, emerging strains, ● Other viruses associated with diarrhoea and gastroenteritis: Adenoviruses,	No. of hours 15

	● Astroviruses, Norwalk and Sapporo-like viruses and other enteroviral diseases. ● Polio; Non-polio Enteroviruses, hepatic viruses ● Biology of Measles, mumps, rubella, Parvovirus B-Chicken pox and other viral pox diseases ● Viral respiratory diseases Biology and pathogenesis of SARS, ● Metapneumovirus, Human rhino virus and Corona virus etc. ● Viral Haemorrhagic Fevers Yellow Fever, Kyasanur forest, disease, Chikungunya, Rift Valley Fever, Crimean Congo.	
	<u>MODULE II</u> ● Haemorrhagic fever, Hanta, Marburg and Ebola, and Rickettsial fevers. ● Viral encephalitis: Japanese encephalitis and West Nile viral infection, endemic areas. ● Biology of HIV viruses. ● Vaccines and antivirals. ● Methods of culturing viruses ● Human Virome, assembly, composition and host interaction ● Marine Virome. Ecological role of viruses in marine ecosystem. ● Lysogeny strategy adopted by marine viruses ● Metagenomic methods to study the virome and the dark matter. ● Phage serotyping ● Phage therapy for combating diseases, Case studies	15
Pedagogy:	Lectures, tutorials, Case studies, Assignments	
References/ Readings:	1. R. Ananthanarayan, Ananthanarayan and Paniker's, Textbook of Microbiology. Universities Press, 2020. 2. J. Carter and V. A. Saunders, Virology: principles and applications, Wiley, 2007. 3. N. Dimmock, A. Easton and K. Leppard, Introduction to Modern Virology, John Wiley and Sons, 2006. 4. J. Flint, L W Enquist, V.R. Racaniello and A.M. Skalka, Principles	

	of Virology: Molecular Biology, Pathogenesis, and Control. ASM Press, 2000. 5. R. Khare, Guide to Clinical and Diagnostic Virology, ASM Books, 2019. 6. S. N. J Korsman, M. I Andersson, L. Nutt, G. Van Zyl and W. Preiser, Virology E-Book: An Illustrated Colour, Text. Elsevier Health Sciences, 2012. 7. G. Kudesia and T. Wreghitt, Clinical and Diagnostic Virology, Cambridge University Press, 2009. 8. B. Mishra, Textbook of Medical Virology, CBS, Publishers and Distributors, 2020. 9. D. D. Richman, F.G. Hayden and R. J. Whitley , Clinical Virology, Wiley, 2020. 10. A. M. Skalka, J. Flint, G. F. Rall, V. R. Racaniello and T. Hatziioannou, Principles of Virology, Wiley, 2020. 11. R. Warom, Virology, Titan Books, 2017. 12. D. O. White and F. J. Fenner, Medical Virology, Elsevier Science, 2016. 13. C. J. Woolverton, L. Sherwood and J. Willey, Prescott's Microbiology. McGraw-Hill Education, 2016.
Course Outcomes:	The student will be able to 1. identify the different viral diseases and correlate with the virus morphology, classification and containment facilities. 2. able to employ methodology to study the diversity of unculturable viruses. 3. devise applications such as phage therapy for combating infection 4. appreciate and understand the role of virome in environment