

Institute of Microbiology and Molecular Genetics
Faculty of Life Sciences
University of the Punjab, Lahore
Course Outline



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|---|-----------------|--------------------|---------|---------------------|--------|
| Programme | BS | Course Code | MMG 302 | Credit Hours | 3(2+1) |
| Course Title | VIROLOGY | | | | |
| COURSE INTRODUCTION | | | | | |
| <p>This course introduces the basic principles of Virology which introduces the differences between viruses from prokaryotic and Eukaryotic organisms coupled with different viral genome types and all stages of viral infection. Through theoretical and lab work, students will study important viruses, their infection cycle, genetics, and molecular biology. Overall, students will be able to understand how viruses replicate and will be able to understand the pathogenesis of viral infections in the future.</p> | | | | | |
| LEARNING OUTCOMES | | | | | |
| <p>On the completion of the course, the students will be able to understand:</p> <ol style="list-style-type: none"> 1. Basics of virus and its differences from other microorganisms 2. Genetics and genetic modification of viruses 3. Concepts behind all the stages of viral replication cycle. 4. Pathogenesis, transmission, treatment, diagnosis and prevention strategies of viral infections in humans. | | | | | |
| COURSE CONTENT | | | | | |
| <p>Introduction of viruses: Definition of viruses, host cells, Basic characteristics of viral infections, history and classification of viruses, Prions, Methods in virology: Propagation of viruses, Serological methods , Nucleic acid-based methods, Viral Genetics and Analysis: The Baltimore system of viral classification, The replication strategies of different viruses, wild type and mutants, mapping mutations, Recombination analysis, Reassortment, Complementation, novel translation strategies in viruses, Viral Structure: Functions of viral coat, structure, types, Metastability, Principles of building virions, viral envelope glycoproteins, Viral Assembly and Packaging: Ways to start viral assembly, localization and packaging signals, Self-assembly versus assisted assembly, Sequential and Concerted assembly, Maturation, Viral Entry: Characteristics of viral host cell, affinity, avidity, Viral entry receptors, Attachment factors and co-receptors, different ways of viral entry, patterns of viral disease spread, Role of viruses in oncogenesis, Important viral diseases of humans</p> | | | | | |
| PRACTICALS | | | | | |
| <p>Biological Molecules and concept of biosafety, Classification of biomolecules and precautions to work with them, visual symptoms of viral infections in plants, animals, and humans, Isolation and purification of bacteriophages, quantification of bacteriophages through spot assay and double layer diffusion method, One-step growth curve of bacteriophages, Determining host-range of bacteriophages and Multiplicity of infection, Detection and quantification of viruses and antibodies from clinical specimens, ELISA, PCR</p> | | | | | |

TEXTBOOKS AND READING MATERIAL

1. Flint, S.J., Vincent, R.R., Glenn F. R., Anna, M.S., & Lynn W. E. (2020). *Principles of virology*, 5th Edition, ASM Press, United states.
2. Flint, S.J., Vincent, R.R., Glenn F. R., Anna, M.S., & Lynn W. E. (2015). *Principles of virology*, 4th Edition, ASM Press, United states.
3. John B. C. and Venetia, A. S. (2013). *Virology Principles and applications*, 2nd Edition, John Wiley & Sons Ltd, England, United Kingdom.
4. Jennifer, L. (2016). *Essential Human Virology*, Academic Press, United Kingdom.
5. Teri, S. (2017). *Understanding Viruses*, 3rd Edition, Jones and Bartlett Learning, Burlington MA, United States.
6. John B.C. & Venetia, A.S. (2013). *Virology, Principles and Applications*, John Wiley and Sons Ltd, England, United Kingdom
Dimmock, N.J., Easton, A.J. and Leppard, K.N. (2016). *Introduction to Modern Virology*, 7th Edition, John Wiley and sons Ltd, England, United Kingdom

ASSESSMENT

| Sr. No. | Elements | Weightage | Details |
|---------|----------------------|-----------|--|
| 1. | Midterm Assessment | 35% | Written Assessment at the mid-point of the semester. |
| 2. | Formative Assessment | 25% | Continuous assessment includes Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on activities, short tests, projects, practicals, reflections, readings, quizzes etc. |
| 3. | Final Assessment | 40% | Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, fieldwork, report writing etc. |