BS 5th Semester

Semester – V		
Course Code	**Subjects**	**Credit Hours**
Bot-301 & 302	Bacteriology & Virology	2 + 1
Bot-303 & 304	Plant Systematics	2 + 1
Bot-305 & 306	Autecology	2 + 1
Bot-307 & 308	Evolutionary Trends among Vascular Cryptogams	2 + 1
Bot-309 & 310	Plant Biochemistry (Structure and Catalysis)	2 + 1
Bot-311 & 312	Lower Fungi	2 + 1
Semester Credit Hours		**18**

Bot-301 & 302 BACTERIOLOGY AND VIROLOGY Credit Hours: 3 (2+1)

Theory:

Introduction of the Course:

The course is organized to provide basic knowledge of viruses and bacteria along with their importance. This is aimed to solve the problems of plant virus and bacteria associated with crops to evaluate the plant-microbes interaction and demonstrate diagnosis of viral and bacterial diseases in plants.

Course Objectives:

The course is designed:

1. To provide an adequate knowledge about morphological/anatomical characteristics of bacteria and viruses.
2. To give an insight into bacteria and viruses with an emphasis on their Biochemistry, Genetics and Evolution.

Contents:

1. Viruses

1.1 General features of viruses, viral architecture, biology, taxonomy, classification and replication of viruses.
1.2 Virus transmission and dissemination
1.3 Molecular biology of plant virus transmission.
1.4 Symptomatology of virus-infected plants.
1.5 Metabolism of virus-infected plants.
1.6 Resistance to viral infection.
1.7 Methods in molecular virology.

2. Bacteria

1.1 History, characteristics, taxonomy, Genetic and classification.
1.2 Evolutionary tendencies in Monera (Bacteria, Actinomycetes and Cyanobacteria)
1.3 Morphology, locomotion and reproduction in bacteria
1.4 Bacterial metabolism (Respiration, Fermentation, Photosynthesis and Nitrogen fixation)
1.5 Importance of bacteria with special reference to application in agriculture e.g Plant microbe interaction and biotechnology.
1.6 Symptoms and control of major bacterial diseases on plants of Pakistan.

Practicals:

1. Viruses

1. Observation of symptoms of some viral infected plant specimens.

2. Bacteria, Actinomycetes and Cyanobacteria

1. Methods of sterilization of glassware and media preparation.
2. Growth of bacteria, subculturing and identification of bacteria on morphological and biochemical basis (using available techniques).
3. Microscopic observation of bacteria. Different types of staining like simple and Differential (capsule, spores, and Gram-staining).
4. Microscopic study of Actinomycetes and Cyanobacteria.

Teaching-learning Strategies

1. Lectures
2. Group Discussion
3. Laboratory work
4. Seminar/ Workshop

Learning Outcomes:

1. Students will learn about the morphological and systematic knowledge about different microorganisms.
2. They will be able to describe, apply and integrate the basic concepts of Microbiology including Genetics and Evolution, Biochemistry, Physiology as well as Structure and Functions of different Bacteria and Viruses.
3. The obtained knowledge shall also enable the students to enter into various entrepreneurial activities involving general Microbiology, Plant Pathology.

Assessment Strategies:

1. Lecture Based Examination (Objective and Subjective)
2. Assignments
3. Class discussion
4. Quiz
5. Tests

Recommended Readings:

1. Agrios, G.N. (2004). *Plant Pathology*. 6th Edition, Elsevier.
2. Arora, D. R. (2004). *Textbook of Microbiology*. CBS Publishers and Distributors, New Delhi.
3. *Bergey' Manual of systematic Bacteriology*.
4. Black, J. G. (2005). *Microbiology - Principles and Exploration*. John Wiley and Sons, Inc.
5. Bouarab, K., Brisson, N. & Daayf, F. (2009). *Molecular Plant-Microbe Interactions.* MPG Books Group, Bodmin, UK.
6. Hull, R. (2009). *Comparative Plant Virology*. Academic Press.
7. Khan, J. A. & Dijkstra J. (2009). *Plant Viruses as Molecular Pathogens.* The Haworth Press, Inc.
8. Prescott, L. M., Harley, J. P. & Klein, D. A. (2005). *Microbiology*. McGraw-Hill Companies, Inc.
9. Ross F. C. (1995). Fundamentals of Microbiology. John Willey & Sons, New York.
10. Stacey, G. & Keen, N.T. (2011). *Plant-Microbe Interactions.* Springer London.
11. Tortora, G.J., Funke, B. R. & Case C. L. (2004). *Microbiology*. Pearson Education.

****