Programme	BS Botany	Course Code	BOT-307	Credit Hours	2
Course Title	**Plant Microbe Interactions (Theory)**				

Introduction

The course is organized to provide basic knowledge of different microbes including bacteria, fungi and viruses, their importance and interactions with plants. This is aimed to understand the interactions of microbes associated with crops to evaluate plant-microbe interactions and demonstrate beneficial and hazardous impacts on plants. This course provides information about the intricate relationship between microbes and plants, exploring their symbiotic, pathogenic, and endophytic interactions. It will cover their taxonomy, physiology, and ecology, as well as the molecular mechanisms underlying microbe-plant interactions. Emphasis will be placed on the ecological and agricultural significance of these interactions.

Learning Outcomes

By the end of this course, students will be able to:

- Understand the diversity and roles of microorganisms associated with plants.
- Understand the importance of the plant-microbe interactions.
- Use biological techniques to study plant-microbe interactions

Course Contents

- Introduction about microorganisms with reference to plants
- Bacteria: History, characteristics, taxonomy, genetics and classification.
- Structure and types of bacteria
- Recombination in Bacteria – Transformation, Transduction and Conjugation
- Role of bacteria in mineral transformations with special emphasis on nitrogen transformations
- Importance of bacteria with special reference to application in agriculture i.e., Plant microbe interaction and biotechnology
- Hazardous impact of bacteria on plants: Symptoms and control of major bacterial diseases in plants.
- Plant-microbe interactions and microbe-microbe interactions with reference to bacteria and their impact on soil fertility.
- General structure of viruses, types of viruses and modes of viral multiplication and classification.
- Symptomatology and Metabolism of virus-infected plants.
- Virus transmission and dissemination
- Molecular biology of plant virus transmission.
- Symbiotic pathogenic and Endophytic Fungal-Plant Interactions: Mycorrhizal associations (arbuscular, ectomycorrhizal, ericoid), Benefits for plants and fungi, Ecological significance of mycorrhizas, their role in agriculture and forestry. Major fungal diseases, Disease epidemiology and management, Plant defense mechanisms against fungal pathogens, Global epidemics caused by parasitic fungi, Molecular basis of plant- pathogen interactions.
- Endophytic Fungal-Plant Interactions: Endophytic fungi and their diversity, Benefits for plants and fungi, Role of endophytes in plant growth promotion and stress tolerance, Endophytes in biocontrol and sustainable agriculture.
- Soil Fungi: Types, their role in rhizosphere.
- Applied Aspects of Fungal-Plant Interactions