

Programme	BS Botany	Course Code	BOT-305	Credit Hours	2
Course Title	Advanced Plant Physiology (Theory)				
Introduction					
Advanced Plant Physiology explores the intricate mechanisms of plant growth regulators, water relations, solute transport, phytochromes, and flowering control. It examines the roles of natural hormones, the movement and properties of water in plants, membrane transport processes, the function of light-sensitive proteins, and the genetic and environmental regulation of flowering. This course provides a comprehensive understanding of plant life's complex physiological processes.					
Learning Outcomes					
On the completion of the course, the students will be able to:					
<ul style="list-style-type: none"> • Understand the physiological processes, photosynthesis and respiration for plant growth and development. • Describe how plants respond to environmental stresses. • Explain the role of hormones in plant growth regulation and their commercial importance. • Use experimental techniques to study plant physiological processes 					
Course Contents					
<ul style="list-style-type: none"> • Plant Growth Regulators: <ul style="list-style-type: none"> ○ Major natural hormones (Auxins, Gibberellins, Cytokinins, Abscisic acid, Ethylene), Structure, biosynthesis, receptors, signal transduction, mode of action, transport, and physiological effects. • Solute Transport: <ul style="list-style-type: none"> ○ The channels and electrogenic pumps, nature of membrane carriers, Passive and active (primary and secondary) transport and their energetics, Membrane transport proteins, Ion traffic into the root. • Phytochromes: <ul style="list-style-type: none"> ▪ Discovery of phytochromes, Physical and chemical properties of phytochromes, Role of phytochromes in biological processes, Phytochromes signaling pathways. 					
<ul style="list-style-type: none"> • Control of Flowering: <ul style="list-style-type: none"> ○ Floral meristem and floral organ development, floral organ identity genes and the ABC model, Circadian rhythms, Photoperiodism, Vernalization • Environmental stresses/abiotic stresses: <ul style="list-style-type: none"> • Defining plant stress, acclimation and adaptation, acclimation allow plants to respond to environmental fluctuation, environmental factors and their biological impacts on plants (water scarcity, salinity stress, light stress, temperature stress, and heavy metals stress generate ROS), signaling pathways activated in response to abiotic stress, developmental and physiological mechanisms in response to abiotic stresses. 					