

**B.Tech. Biotechnology: Semester-III**  
**BBT 307: PLANT BIOLOGY**

Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

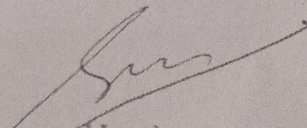
**Course Objective**

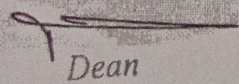
To give extensive knowledge of physiological behavior of different plant under different environmental conditions. To give complete knowledge of mechanism of trapping sun light by the plant to prepare food and other useful metabolites and the mechanism of energy consumption are the main highlights of the course. To explain the process of growth and development of plants and their movement. To explain the importance of relationship between soil, water and plants. To explain and emphasize on the common physiological processes such as diffusion, osmosis, transpiration, photosynthesis and respiration.

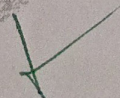
**Course Learning Outcomes**

After completing the course, the student shall be able to:

- CO1: To define physiological mechanisms involved in the uptake and transport of water and the translocation of food by plants.
- CO2: To understand the mechanisms for procurement of mineral ions by plants and mineral nutrition and the role these minerals play in organic molecule synthesis and use. To evaluate major affects on physiological and biochemical mechanisms of growth regulators (hormones) in plants.
- CO3: To determine the interrelationships among plants and micro-organisms, symbiosis in nitrogen and phosphorous acquisition by plants
- CO4: To analyze different factors involved in water absorption (like DPD, OP, TP etc.) and the role of environmental and plant factors in photosynthesis and influence upon carbon metabolism in plants (e.g. with respect to alternative fixation pathways photoinhibition, and photorespiration)
- CO5: To explain and construct growth curve for investigating the growth pattern. To explain the electron transport chain, phosphorylation and ATP production, Comparison of photosynthetic systems of plants and bacteria. Photorespiration. Respiration; Glycolytic pathway. Citric acid cycle, glyoxylate cycle, Pentose phosphate pathway, their significance, energetics and enzymology.

  
Head

  
Dean  
Faculty of Science  
Invertis University, Bareilly (U.P.)

  
Registrar  
Invertis University  
Bareilly

**Unit 1: Plant –Water Relations**

Water Relations, Osmosis, and Water movement, Transpiration, Stomatal Behavior, Mineral nutrition/Absorption of minerals/Assimilation of nitrogen and sulfur, The Soil as a Nutrient Reservoir: Nutrient Uptake, Selective Accumulation of Ions by Roots, Electrochemical Gradients and Ion Movement, Electrogenic Pumps are Critical for Cellular Active Transport, Cellular Ion Uptake Processes are Interactive, Root Architecture is Important to Maximize Ion Uptake, The Radial Path of Ion Movement Through Roots, Root-Microbe Interactions.

**Unit 2: Photosynthesis**

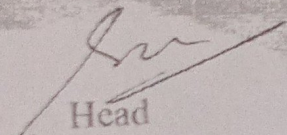
Diversity of Phototrophs. Chloroplast structure. Pigments involved in photosynthesis chlorophylls, carotenoids, xanthophylls and phycobillins. Light and dark reaction. C3 and C4 pathways. Electron transport chain, phosphorylation and ATP production, Comparison of photosynthetic systems of plants and bacteria. Photorespiration. Respiration; Glycolytic pathway .Citric acid cycle, glyoxylate cycle, Pentose phosphate pathway, their significance, energetics and enzymology.

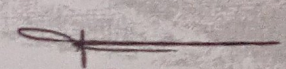
**Unit 3: Hormones**

Auxins, Gibberellins, Cytokinins, Abscisic Acid, Ethylene, and Brassinosteroids, Photomorphogenesis: Responding to Light, Tropisms and Nastic Movements: Orienting Plants in Space, Secondary Metabolites: A.K.A Natural Products, Terpenes, Glycosides, Phenylpropanoids, Alkaloids.

**Suggested Readings**

- Maheswari P. Introduction to Embryology of Angiosperms
- Datta, S. C. (1989) Plant Physiology , Central Book Depot, Allahabad.
- Hopkins, W.G. (1999) Introduction to Plant Physiology, John Wiley & Son Inc. New York
- Levitt, J. (1969) Introduction to plant physiology , C. V. Koshy Co. Tokyo.
- Malik, C.P. (1980) Plant Physiology, Kalyani Publishers, New Delhi.

  
Head  
Department of Biotechnology  
Invertis University, Bareilly (U.P.)

  
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