Plant growth regulators: major natural hormones and their synthetic analogues. Bioassay, structure, biosynthesis, receptors Bioassay, structure, biosynthesis, receptors. Signal transduction and mode of action, transport physiol. effect of auxins Gibberellins, cytokinins, abscisicacid acid, ethylene, polyamines, Brassinosteriods, jasmonates, and salicylic acid. Water relations: the soil- plant- atmosphere continuum- an overview. Structure of water, physio chemical properties of water. Water in soil and its potential, water in cell components. Absorption of water in plants, Aquaporins their structure and types. Cell water relations terminology, Hofler diagram. Analysis of change in turgor, water and osmotic potential with change in cell volume, Osmoregulation, Methods for measurement of water, osmotic and turgor potential, pressure chamber, psychrometery, pressure probe, pressure volume curve. Plant mineral nutrition: Absorption of mineral nutrients- roots, mycorrhizae. Effect of soil pH on nutrient availability, Passive and active transport and their energetics. Essential and beneficial elements- their function and deficiency symptoms in plants. Fertilizers and their significance in Agriculture. Phytochromes: Discovery of phytochromes and cryptochromes. Physical and chemical properties of phytochromes and their role in biological processes. Control of flowering: Autonomous versus environmental regulation. Circadian rhythms. Classification of plants according to photoperiodic reaction and induction. Role of photoperiodism in flowering. Biochemical signaling involved in flowering. Vernalization and its effect on flowering. Floral meristem and floral organ development. Floral organ identity genes and the ABC model. Gene regulation and Signal transduction. Gene regulation in prokaryotes and eukaryotes.

**Practical:**

Determination of K uptake by excised roots. To investigates the preferential absorption of ions by corn seedlings and potato slices. To determine osmotic potential of massive tissue by freezing point depression method or by osmometer. To investigate water potential of a plant tissue by dye method and water potential apparatus.