

**Generic Elective**  
**Plant Physiology and Metabolism**

(Credits: Theory-4, Practical-2)

**THEORY**  
**Lectures: 60**

**Unit 1: Plant-water relations**

(8 lectures)

Importance of water, water potential and its components; Transpiration and its significance. Factors affecting transpiration; Root pressure and guttation.

**Unit 2: Mineral nutrition**

(8 lectures)

Essential elements, macro and micronutrients; Criteria of essentiality of elements; Role of essential elements; Transport of ions across cell membrane, active and passive transport, carriers, channels and pumps.

**Unit 3: Translocation in phloem.**

(6 lectures)

Composition of phloem sap, girdling experiment; Pressure flow model; Phloem loading and unloading

**Unit 4: Photosynthesis**

(12 lectures)

Photosynthetic Pigments (Chl a, b, xanthophylls, carotene); Photosystem I and II, reaction center, antenna molecules; Electron transport and mechanism of ATP synthesis; C<sub>3</sub>, C<sub>4</sub> and CAM pathways of carbon fixation; Photorespiration.

**Unit 5: Respiration**

(6 lectures)

Glycolysis, anaerobic respiration, TCA cycle; Oxidative phosphorylation, Glyoxylate, Oxidative Pentose Phosphate Pathway.

**Unit 6: Enzymes**

(4 lectures)

Structure and properties; Mechanism of enzyme catalysis and enzyme inhibition.

**Unit 7: Nitrogen metabolism**

(4 lectures)

Biological nitrogen fixation; Nitrate and ammonia assimilation.

**Unit 8: Plant growth regulators**

(6 lectures)

Discovery and physiological roles of auxins, gibberellins, cytokinins, ABA, ethylene.

**Unit 9: Plant response to light and temperature**

(6 lectures)

Photoperiodism (SDP, LDP, Day neutral plants); Phytochrome (discovery and structure), red and far red light responses on photomorphogenesis; Vernalization.