

SRI A.S.N.M. GOVERNMENT COLLEGE (A), PALAKOLLU
(Accredited with NAAC “B” Grade with 2.61 CGPA points)

DEPARTMENT OF BOTANY

II B. Sc - BOTANY SYLLABUS

SEMESTER- IV THEORY

PAPER – IV

(W.e.f. 2017-18 Admitted Batch)

Paper IV: Plant Physiology and Metabolism

Total hours of teaching 60 hrs @ 4 hrs per week

UNIT – I: Plant – Water relations **(12 hrs)**

1. Importance of water to plant life, physical properties of water.
2. Diffusion, imbibition and osmosis; Concept & Components water potential.
3. Absorption, transport of water, ascent of sap.
4. Transpiration – Definition, types, stomata structure and movements.

UNIT –II: Mineral nutrition and Fertilizers **(12 hrs)**

1. Mineral Nutrition: Essential macro and micro mineral nutrients and their role in plant metabolism, deficiency symptoms
2. Nitrogen metabolism - biological nitrogen fixation in Rhizobium, Protein synthesis (Outlines)
3. Enzymes: Characteristics, mechanism of enzyme action, factors regulating enzyme action.

UNIT –III: PHOTOSYNTHESIS **(12 hrs)**

1. Photosynthesis: Photosynthetic pigments, Photosynthetic light reactions, photophosphorylation, carbon assimilation pathways: C₃, C₄, and CAM.
2. Photorespiration and its significance.
3. Translocation of organic substances: Mechanism of phloem transport, source-sink relationships.

UNIT –IV: PLANT METABOLISM **(12 hrs)**

1. Respiration: Anaerobic, Glycolysis, Krebs cycle, electron transport system, mechanism of oxidative phosphorylation.
2. Lipid Metabolism: Types of lipids, Beta-oxidation.

UNIT –V: GROWTH AND DEVELOPMENT **(12 hrs)**

1. Growth and development: Definition, phases and kinetics of growth,
2. Physiological effects of phytohormones - Auxins, Gibberellins, Cytokinins, ABA, Ethylene and Brassinosteroids.
3. Physiology of flowering - Photoperiodism, role of phytochrome in flowering - Vernalization

Additional Inputs : Stress Physiology: Concept and plant responses to water, salt stresses.

PRACTICAL SYLLABUS

II B. Sc – BOTANY

SEMESTRE- IV

(W.e.f. 2017-18 Admitted Batch)

PAPER- IV - Plant Physiology and metabolism)

Total hours of laboratory Exercises 45 hrs @ 3 per week in 15 sessions

Suggested Laboratory Exercises:

1. Osmosis – by potato osmoscope method
2. Determination of osmotic potential of vacuolar sap by plasmolytic method using leaves of Rhoeo / Tradescantia.
3. Structure of stomata (dicot & monocot)
4. Determination of rate of transpiration using cobalt chloride method.
5. Demonstration of transpiration by Ganongs' photometer
6. Demonstration of ascent of sap/Transpiration pull
6. Effect of Temperature on membrane permeability by colorimetric method
7. Study of mineral deficiency symptoms using plant material/photographs.
8. Separation of chloroplast pigments using paper chromatography technique.
9. Rate of photosynthesis under varying Co₂ concentration
10. Effect of kind of light intensity on oxygen evolution during photosynthesis using Wilmontt' bubbler.