JYOTI NIVAS COLLEGE AUTONOMOUS SYLLABUS FOR 2018 BATCH AND THEREAFTER

Programme: B.Sc. Semester: VI

BOTANY PAPER VIII

PLANT PHYSIOLOGY II

Course Code: 18VIBO8 No. of Hours: 45

COURSE OBJECTIVES:

- Know scope and importance of plant physiology.
- To Understand process of photosynthesis, C3, C4, CAM pathways.
- To Understand the process of respiration, growth and developmental process in plant.

LEARNING OUTCOMES:

- Critically understand the light reactions and carbon assimilation processes responsible for synthesis of food in plants.
- Evaluate the physiological factors that regulate growth and development in plants.
- Examine the role of light on flowering and explain physiology of plants under stress conditions.

UNIT I Nitrogen metabolism

10 HRS

Biological nitrogen fixation – symbiotic and asymbiotic, nitrate metabolism. Synthesis of amino acids, Transammination and reductive amination. A brief mention of Nitrogen cycle.

Enzymes - Nomenclature, classification, structure and composition. Mechanism of enzyme action – Lock and Key model and Induced fit theory. Enzyme kinetics and factors affecting enzyme activity, Industrial application of Enzymes (In brief).

UNIT II Photosynthesis

11 HRS

Introduction (brief) and photosynthetic apparatus (Ultra structure of Chloroplast, mention of tetra pyrrole ring structure of cholorophyll molecule). visible spectrum, quantosome, quantum yield, Red drop & Emerson enhancement effect, Photosystems I & II, photophosphorylation (Cyclic and Non – cyclic), Calvin cycle, C4 pathway, CAM pathway, Photorespiration (C₂ pathway)- mechanism and significance. Factors affecting photosynthesis.

UNIT III Respiration

9 HRS

Introduction and ultrastructure of mitochondrion. Respiratory Quotient and its significance.

Aerobic respiration- Glycolysis, TCA cycle, ETS and Oxidative Phosphorylation. **Anaerobic respiration** - Alcoholic Fermentation, Pentose Phosphate Pathway & its significance. Factors affecting respiration.

UNIT IV Stress physiology

5 HRS

Water stress, heat stress and salt stress.

UNIT V Plant growth and development

10 HRS

Definition, kinetics-growth curve, regions and phases of growth. Growth regulators and their applications- Auxins, Gibberllins, Cytokinins, Ethylene, Abscisic acid and a brief account of Brassinosteroids. Seed dormancy, Photoperiodism, Phytochrome and its role, the Florigen concept, Vernalization, Biological clocks and Biorhythms.

A brief account of Plant Movements-Definition, Flow chart and Examples.

REFERENCES

- 1. Denton, Allenh and Qarmer. Photosynthesis.
- 2. Devlin and Witham. Plant Physiology.
- 3. Hall. Photosynthesis.4th Ed. Atlas Publishers, New Delhi.
- 4. Hopkins, W G(1995).Introduction to Plant Physiology, John Wiely& Sons, New York.
- 5. Jain. Plant Physiology.
- 6. Kumar. Plant Physiology, Education Supplier, Bangalore.
- 7. Purohit .Photosynthesis-Physiology & Biochemistry, Agropublishers.
- 8. Pandey & Sinha. Plant Physiology, Vikas Publication.
- 9. Rabinowitch&Govindjee, Photosynthesis.
- 10. Salisbury and Ross .Plant Physiology.
- 11. Sunderajan, S. (1997) College Botany Vol. III, Himalaya Publication.
- 12. Taiz,C& Zeiger, E.(1998) Plant Physiology. 2nd Ed. Sinauer Associates,Inc. Publishers,
- 13. Massachusetts, USA.
- 14. Verma. Plant Physiology.
- 15. Wilkins. (1998). Advanced Physiology, ELBS, Longman.

BOTANY PRACTICAL – VIII

- 1. Separation of Photosynthetic pigments by paper chromatography and measurement of Rf values.
- 2. Determination of rate of photosynthesis at different wavelengths of light.
- 3. Determination of rate of photosynthesis at various concentrations of CO₂.
- 4. Determination of RQ of carbohydrates, fats and proteins.
- 5. Study of Anaerobic respiration using Kuhne's fermentation flask.
- 6. Determination of Ascorbic acid content in the plant material.
- 7. Effect of phytohormones Leaf senescence, initiation of axillary bud (potato), seed germination (green gram),
- 8. Plant movements Geo, Hydro & phototropism

ACTIVITY FOR VISEMESTER: Project work