M. Sc. (Botany)
Semester- III

Course Code	PS03CBOT22	Title of the Course	Plant Physiology
Total Credits of the Course	4	Hours per Week	4

Main Focus of the Course outcomes	Employability	Skill Development	Entrepreneurship
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Course Objectives:	1. To ensure the learning of the plant-water relation, importance and significance of water in plant growth and involvement of water in the different respiratory and metabolic processes of plant. 2. To learn the different aspects of food synthesis via photosynthesis, and breakdown of synthesized food vid respiratory processes in plants. 3. To learn about the physiology of flowering and involvement and activation of different flowering pathways, and hormonal effect on plant growth and development. 4. To ensure learning of different biotic and abiotic factors on the plant growth and crop yield, fruit setting and ripening; seeds dormancy and germination processes and plant movement according to environmental stimuli.

Course Content		
Unit	Description	Weightage* (%)
1.	**Introduction** - The scope of Plant Physiology **Plant and water relations** - Water potential, Absorption of water by land plants, Transpiration **Mineral Nutrition and Translocation in plants** General functions of Essential elements, Nutrient roles and deficiency symptoms; Toxicity of micronutrients; Criteria of essentiality, chemical analysis, detection of mineral elements, Mineral salt absorption and transport. Ascent of sap, Mechanism of ascent of sap, phloem transport	25%
2.	**Photosynthesis** - Light and pigments; Light dependent reactions of Photosynthesis; Carbon metabolism – The Photosynthetic Carbon Reduction (PCR) cycle; Activation and regulation of the PCR cycle, The C4 syndrome, Crustacean Acid Metabolism (CAM), Regulation of C4 photosynthesis and CAM; Translocation and distribution of photoassimilates,	25%

	Photorespiration, Factors affecting the rate of photosynthesis . **Respiration** - Organization of mitochondrial electron transport system in plants, cyanide resistant pathway and alternative oxidase, its role in regulation of mitochondrial electron transport. Transport of metabolites across mitochondrial membrane. Regulation of pentose phosphate pathway and its significance. Gluconeogenesis. Anaerobic respiration.	
3.	Physiology of flowering &Vernalization Photomorphogenesis: Phytochrome, Phytochrome in dark grown seeding, Physiological effects of Phytochrome, Phytochrome in green plants, Phytochrome under natural conditions, mechanism of Phytochrome action. Temperature and Plant Development: Temperature in the Plant environment, Influence of temperature on growth and plant distribution and development. Photoperiodism and Rhythmic Phenomena: Photoperodism; the Biological Clock, Genetic approaches to photoperiodism, and rhythms; Photoperiodism in nature. **Plant growth regulators and elicitors**: Physiological effects and mechanism of action of auxins, gibberellins, Cytokinins, ethylene, abscisic acid, brassinosteroids, Polyamines, Salicylic acid hormone receptors, signal transduction and gene expression.	25%
4.	Physiology of flowering &Vernalization Photomorphogenesis: Phytochrome, Phytochrome in dark grown seeding, Physiological effects of Phytochrome, Phytochrome in green plants, Phytochrome under natural conditions, mechanism of Phytochrome action. Temperature and Plant Development: Temperature in the Plant environment, Influence of temperature on growth and plant distribution and development. Photoperiodism and Rhythmic Phenomena: Photoperodism; the Biological Clock, Genetic approaches to photoperiodism, and rhythms; Photoperiodism in nature. **Plant growth regulators and elicitors**: Physiological effects and mechanism of action of auxins, gibberellins, Cytokinins, ethylene, abscisic acid, brassinosteroids, Polyamines, Salicylic acid hormone receptors, signal transduction and gene expression.	25%

Teaching-Learning Methodology	Regular classes, Remedial classes, Seminar presentation

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Plant relations with water properties, mineral nutrition, different symptoms of mineral deficiency and their remedies.
2.	Energy fixation through photosynthesis, Carbon metabolism, Regulation of PCR Cycle, CAM and C_4 syndrome, Photorespiration. Mitochondrial electron transport system, pentose phosphate pathway, gluconeogenesis
3.	Physiology of flowering, photoperiodism, biological clock, plant growth regulators and regulation factors of flowering.
4.	Stress physiology, fruit ripening processing, regulating factors.

Suggested References:	
Sr. No.	References
1.	Hopkins, W. G., Introduction to Plant Physiology. 3rd Edition. John Wiley & Sons, New York.
2.	Salisbury, F. B. and Ross, C. W., Plant Physiology, 4th Edition. Wadsworth Publishing Company, California.
3.	Thomas, B. and Vince-Prue, D. Photoperodism in plants, 2nd Edition. Academic Press, San Dieo
4.	Thomas, B. and Vince-Prue, D. Photoperodism in plants, 2nd Edition. Academic

	Press, San Dieo
5.	Marschner, H., Water relations of plants. Academic Press, New York.
6.	Briggs, W. R. (ed.) Plant hormones. Klywer Academic Publishers, Dordrecht.

On-line resources to be used if available as reference material
On-line Resources

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