

**SARDAR PATEL UNIVERSITY**  
**Programme: MSC (Botany)**  
**Semester: III**  
**Syllabus with effect from: June 2011**

<b>Paper Code:</b> PS03CBOT02	<b>Total Credits: 4</b>
<b>Title Of Paper:</b> Plant Physiology & Biochemistry	

Unit	Description in detail	Weightage (%)
<b>1</b>	<p><b>Plant Physiology:</b>  <b>Plant and water relations</b> - Water potential, Absorption of water by land plants, Transpiration.  <b>Mineral Nutrition and Translocation in plants</b>            General functions of Essential elements, Nutrient roles and deficiency symptoms; Mineral salt absorption and transport. Ascent of sap, Mechanism of ascent of sap, phloem transport.  <b>Photosynthesis</b> - 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, Photorespiration, Factors affecting the rate of photosynthesis .  <b>Respiration</b> - 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.  <b>Physiology of flowering &amp; Vernalization</b>            Photomorphogenesis: Phytochrome, Physiological effects of Phytochrome, mechanism of Phytochrome action. Temperature and Plant Development: Influence of temperature on growth and plant distribution and development. Photoperiodism and Rhythmic Phenomena: the Biological Clock, Genetic approaches to photoperiodism, and rhythms  <b>Plant growth regulators</b> : Physiological effects and mechanism of action of auxins, gibberellins, Cytokinins, ethylene, abscisic acid, brassinosteroids, Polyamines, Salicylic acid hormone receptors, signal transduction and gene expression.  <b>Physiology of fruit ripening, senescence and abscission.</b>  <b>Physiology of plants under stress:</b> Water stress, Temperature stress, Salt stress,</p>	<b>50 %</b>
<b>2</b>	<p><b>Plant Biochemistry:</b>  <b>Carbohydrates</b> - Structural interconversions and functions. Biosynthesis and metabolism of polysaccharides., Cell wall architecture and its componenets  <b>Lipids</b>- Biosynthesis and metabolism of lipids with reference to membrane, structural and storage lipids. Storage and mobilization of lipids.  <b>Proteins</b> –Biosynthesis, translocation, storage and degradation  <b>Enzymes</b> – Major groups; distribution of plant enzymes; functional</p>	<b>50 %</b>



compartmentation; soluble and membrane bound enzymes; purification; localization of enzymes <b>Phenolic metabolism</b> – Shikimate /arogenate pathway, Phenylamine / hydroxycinnamate pathway, Flavonoids, Lignins, Tannins and quinines <b>Nitrogen metabolism</b> – Non-Biological and Biological Nitrogen fixation, Biochemistry of Nitrogen Fixation, Nitrogen fixation in Cyanobacteria.	
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### Basic Text & Reference Books:

- Hopkins, W. G., Introduction to Plant Physiology. 3rd Edition. John Wiley & Sons, New York.
- Salisbury, F. B. and Ross, C. W., Plant Physiology, 4th Edition. Wadsworth Publishing Company, California.
- Marschner, H., Water relations of plants. Academic Press, New York.
- Briggs, W. R. (ed.) Plant hormones. Klywer Academic Publishers, Dordrecht.
- Kendrick, R. E. and Kroenber, G. H. M., Photomorphogenesis in plants, 2nd Edition, Kluwer Academic Publishers, Dordrecht.
- Thomas, B. and Vince-Prue, D. Photoperodism in plants, 2nd Edition. Academic Press, San Dieo.
- Thimann, K. V. Senescence in plants, CRC Press, Florida.
- Bewley, J. D. and Black, M. Seeds: Physiology of development and germination. Plenum, New York.
- Levitt, J. Responses of plants to environmental stresses. Academic Press, New York.
- Dey, P. M. & Harborne, J. B. (Eds.) 1997. Plant Biochemistry, Academic Press, London
- Heldt, H. 2005. Plant Biochemistry (3rd Edn.) Indian Reprint, Elsevier, New Delhi.
- Dennis, D. T., D. H. Turpin, D. D. Lefebvre and D. B. Layzell : Plant Metabolism.
- Addison Wesley Longman Ltd. England.
- Doby, G.: Plant Biochemistry. Inter Science Publishers, New York
- Lehninger, A. L., D. L. Nelson and M. M. cox 2000: Principles of Biochemistry. CBS Publishers and Distributors, New Delhi.
- Witham et. al. Experiments in Plant Physiology. Van Nostrand Renhold Company, New York.
- Meidner, H. Class experiments in Physiology. George Allen & Unwin Publishers Ltd. London
- Kalra, Y. P. (ed.). Hand book of reference methods for plant analysis. CRC Press, USA.

