

SARDAR PATEL UNIVERSITY
Programme: MSc (Biochemistry)
Semester: III
Syllabus with effect from: June 2011

Paper Code: PS03EBIC01	Total Credits: 4
Title Of Paper: Plant Biochemistry	

Unit	Description in detail	Weightage (%)
1	<p>Introduction - The aim and scope of Plant Biochemistry</p> <p>Structure and biochemical aspects of specialized plant cell organelles – cell plate, primary and secondary cell walls, plasmodesmata, importance of vacuoles, characteristics of meristematic cells.</p> <p>Water relations of plants – role of water, absorption, adsorption, conduction and transpiration, guttation, water balance and stress.</p> <p>Mineral metabolism – role of different minerals absorption and translocation of inorganic and organic substances.</p>	25 %
2	<p>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 photo assimilates, Photorespiration, Factors affecting the rate of photosynthesis.</p> <p>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.</p> <p>Nitrogen assimilation and Biological nitrogen fixation.</p>	25 %
3	<p>Plant Hormones - Growth regulating substances and their mode of action. Role of auxins, gibberelic acid, abscisic acid, cytokinins and brassinosteroids in the regulatory cell extension, germination, growth and development. Signal transduction and gene expression.</p> <p>Secondary metabolism - Special features, formation and functions of phenolic acids, tannins, lignins, flavonoid pigments, surface waxes, cutin and suberin – the plant protective waxes, terpenes.</p> <p>Signaling molecules in defense system in plants (ethylene, Jasmonic acid and Salicylic acid), Pathogenesis Related (PR) Proteins</p>	25 %
4	<p>Photomorphogenesis and Physiology of flowering & Vernalization</p> <p>Responding to light: Photomorphogenesis: Phytochrome, Phytochrome in dark grown seeding, Physiological effects of Phytochrome, Phytochrome in green plants, Phytochrome under natural conditions, mechanism of Phytochrome action.</p> <p>Temperature and Plant Development: Temperature in the Plant environment, Influence of temperature on growth and plant distribution, and development.</p> <p>Photoperiodism and Rhythmic Phenomena: Photoperiodism; the Biological Clock, Genetic approaches to photoperiodism, and rhythms; Photoperiodism in nature.</p> <p>Biochemistry of fruit ripening, senescence and abscission</p> <p>Seed Germination and Dormancy</p>	25 %



Basic Text & Reference Books:

- Heldt, H. 2005. Plant Biochemistry (3rd Edn.) Indian Reprint, Elsevier, New Delhi.
- Dey, P. M. & Harborne, J. B. (Eds.) 1997. Plant Biochemistry, Academic Press, London
- Buchanan et al. 2004. Biochemistry & Molecular Biology of Plants.
- Taiz, L. and Zeiger, E. Plant Physiology, 4th Edition.
- 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.
- Lehninger, A. L., D. L. Nelson and M. M. Cox 2000: Principles of Biochemistry. CBS Publishers and Distributors, New Delhi.
- 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. & 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.

