

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

Paper Code: PS04CBOT01	Total Credits: 4
Title Of Paper: Plant Biotechnology	

Unit	Description in detail	Weightage (%)
1	Concepts and scope of Biotechnology: Cell & tissue culture in plants; callus cultures, in-vitro morphogenesis- Organogenesis and embryogenesis; Artificial Seeds Micropropagation; Haploidy; Embryo cultures; Protoplast isolation, culture and protoplast fusion and somatic hybridization, Cybrids Somaclonal Variation; in-vitro mutation methods; Virus elimination, pathogen indexing; Cryopreservation; Production of secondary metabolites and Biotransformation.	25 %
2	Principles and methods of genetic engineering, and its applications in Agriculture. Recombinant DNA technology; major events; methodologies and rationale of cloning a gene; Concept of restriction and modification; restriction endonucleases; modifying enzymes, Ligases, Host-Vector system; Plasmids, Phage vectors, M13, cosmids and expression vectors; Different strategies of cloning; genomic libraries, C-DNA libraries, gene tagging, Sequencing and sequence analysis, expression of the cloned genes, isolation and purification of the expressed product, PCR technology	25 %
3	Methods for transformation and transgenic plant production. PEG-mediated, microinjection, particle bombardment, electroporation, Agrobacterium tumefaciens and A. rhizogenes; Gene transfer methods in plants; transgenic plants production, principles and methods of genetic engineering and applications in Agriculture.	25 %
4	Algal and fungal Biotechnology – degree and production of single cell protein for food, feed and fuels; mushroom cultivation; Algae in Agriculture; algal biofertilizers Seaweed for industrial production. Biotechnology and intellectual property rights (IPR); Plant genetic resources GATT & TRIPS; Patent for higher plant genes and DNA sequence; International convention; Plant breeder's rights and farmers rights.	25 %

Basic Text & Reference Books:

- Plant biotechnology –J Hammond, et. al, Springer Verlag.
- Plant cell and tissue culture for production of food ingredients – T J Fu, G Singh, et.al.
- Biotechnology in crop improvement – H S Chawla.
- Practical application of plant molecular biology – R J Henry, Chapman & Hall.
- Elements of biotechnology – P K Gupta.
- An introduction to plant tissue culture – M K Razdan.
- Plant propagation by tissue culture: The technology (Vols. 1 & 2) – Edwin George.
- Handbook of plant cell culture (Vols. 1 to 4) – Evans et. al. , Macmillan.



- Plant tissue and cell culture – H E Street, Blackwell Scientific.
- Cell culture and somatic cell genetics of plants (Vols. 1 to 3) – A K Vasil, A. Press.
- Plant cell culture technology – M M Yeoman.
- Plant tissue culture and its biotechnological applications – W Bary, et. al., Springer Verlag.
- Principles of plant biotechnology: An introduction to genetic engineering in plants – S H Mantell, et. al.
- Advances in biochemical engineering / Biotechnology – Anderson, et. al.
- Applied and fundamental aspects of plant cell tissue and organ culture edited by Reinert & Bajaj Y P S, Springer Verlag.
- Plant cell and tissue culture – S Narayanswamy, Tata Mc Graw Hill Co.

