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

Paper Code: PS03EMIC01	**Total Credits: 4**
Title Of Paper: Plant Biotechnology	

Unit	Description in detail	Weightage (%)
1	Cell & tissue culture in plants; callus cultures; in- vitro morphogenesis - organogenesis and embryogenesis; Artificial Seeds, Micropropagation (Clonal propagation); Haploidy; anther and ovule cultures, Embryo cultures; Protoplast isolation, culture and protoplast fusion and somatic hybridization, Cybrids,	
2	Somaclonal Variation; in-vitro mutation methods; Virus elimination, pathogen indexing; Cryopreservation	
3	Production of secondary metabolites; Sources of plant secondary metabolites; criteria for cell selection, factors affecting the culture of cells; different bioreactors and their use in secondary metabolite production; biochemical pathways for the production of different secondary metabolites; and biotransformation.	
4	Principles and methods of genetic engineering, and its applications in Agriculture. Methods for genetic transformation and transgenic plants production through Agrobacterim tumefaciens and A. rhizogenes; Gene transfer methods in plants; PEG - mediated, microinjection, particle bombardment, electroporation, Molecular markers and their importance in plant breeding, Marker Assisted Selection (MAS).	
5	Molecular plant pathology: Mechanisms of disease resistance in plants against pathogens; Signalling pathways and molecular events during pathogen – plant interaction. Biotechnology and intellectual property rights (IPR); Plant genetic resources GATT & TRIPS; Patent for higher plant genes and DNA sequence	

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 Mantel, 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.