

SARDAR PATEL UNIVERSITY
Programme & Subject: M.Sc (Industrial Biotechnology)
Semester: IV
Syllabus with effect from: December - 2011

Paper Code: PS04CIBT01	Total Credit: 4
Title Of Paper: Animal & Plant Biotechnology	

Unit	Description in Detail	Weightage (%)
	<p>Structure and organization of animal cells, tissues and biology of cultured cells. General out-line of epithelial tissue, connective tissue, muscular tissue and nerve tissue. Cell adhesion; Junctions; Extracellular matrix; Cytoskeleton; Cell cycle; Differentiation; Cell signalling; Energy metabolism</p> <p>Introduction to the balanced salt solutions and growth medium: Media –Physical properties, balance salt solutions, complete media, serum, Serum-Free media, Chemical, physical and metabolic functions of different constituents of culture medium. Role of carbon dioxide. Role of serum and supplements. Serum and protein free media and their application.</p> <p>Primary and established cell line culture. Measurement of viability and cytotoxicity. Biology, Characterization and growth of the cultured cells; Disaggregation of tissue and primary culture; Maintenance of cell culture; Cell cloning and cell separation; Cell differentiation; Cell synchronization and transformation; Measurement of cell death and apoptosis.</p> <p>Embryonic stem cells, stem cell culture and their applications. Embryo technology and transgenic animals</p> <p>Cell & tissue culture in plants; callus cultures; <i>in-vitro</i> 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,</p> <p>Somaclonal Variation; <i>in-vitro</i> mutation methods; Virus elimination, pathogen indexing; Cryopreservation; 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;</p> <p>Principles and methods of genetic engineering, and its applications in Agriculture. Methods for genetic transformation and transgenic plants production through <i>Agrobacterim tumefaciens</i> and <i>A. rhiozogenes</i>; Gene transfer methods in plants; PEG-mediated, microinjection, particle bombardment, electroporation, Molecular markers and their importance in plant breeding. Biotechnology and intellectual property rights (IPR); Plant genetic resources GATT & TRIPS; Patent for higher plant genes and DNA sequence</p>	

Basic Text & Reference Books:-

- Freshney, R. I: Culture of Animal Cells. Wiley-Liss.
- Masters, J. R. W. (ed.): Animal Cell Culture – Practical Approach, Oxford Univ. Press.
- Basega, R. (ed): Cell Growth and Division: A Practical Approach. IRL Press.



- Butler, M and Dawson, M. (eds.): Cell Culture Lab Fax, Eds., Bios Scientific Publications Ltd., Oxford.
- Clynes, M. (ed): Animal Cell Culture Techniques. Springer.
- Mather, J.P and Barnes, D. (eds). : Methods in Cell Biology, Vol. 57, Animal Cell Culture Methods. Academic Press.
- 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.

