GUJARAT TECHNOLOGICAL UNIVERSITY

M.Pharm

PHARMACOGNOSY

SEMESTER: II

Subject Name: MEDICINAL PLANT BIOTECHNOLOGY
Subject Code: MPG201T

Scope: To explore the knowledge of Biotechnology and its application in the improvement of quality of medicinal plants..

Objectives: After Completion of course student will be able to know:

1. Know the process like genetic engineering in medicinal plants for higher yield of Phytopharmaceuticals
2. Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants

Sr No	Course Contents	Total Hrs
1	Introduction to Plant biotechnology: Historical perspectives, prospects for development of plant biotechnology as a source of medicinal agents. Applications in pharmacy and allied fields. Genetic and molecular biology as applied to pharmacognosy, study of DNA, RNA and protein replication, genetic code, regulation of gene expression, structure and complicity of genome, cell signaling ,DNA recombinant technology	12
2	Different tissue culture techniques: Organogenesis and embryogenesis, synthetic seed and monoclonal variation, Protoplast fusion, Hairy root multiple shoot cultures and their applications. Micro propagation of medicinal and aromatic plants. Sterilization methods involved in tissue culture, gene transfer in plants and their applications	15
3	Immobilisation techniques & Secondary Metabolite Production: Immobilization techniques of plant cell and its application on secondary metabolite Production. Cloning of plant cell: Different methods of cloning and its applications. Advantages and disadvantages of plant cell cloning. Secondary metabolism in tissue cultures with emphasis on production of medicinal agents. Precursors and elicitorson production of secondary metabolites	15
4	Biotransformation and Transgenesis: Biotransformation, bioreactors for pilot and large scale cultures of plant cells and retention of biosynthetic potential in cell culture. Transgenic plants, methods used in gene identification, localization and sequencing of genes. Application of PCR in plant genome analysis	13
5	Fermentation technology: Application of Fermentation technology, Production of ergot alkaloids, single cell proteins, enzymes ofpharmaceuticalinterest	5

References:

1. Plant Tissue Culture: Theory and Practice, Volume 5 - S.S. Bhojwani M.K. Razdan Elsevier Publishers, 1996
2. Plant Cell and Tissue Culture: A Laboratory Manual - J. Reinert and M.M. Yeoman, 1st Edition, Springer, 2012
3. Elements in Biotechnology – P. K.Gupta, 2nd Edition, Rastogi Publications, New Delhi., 2015-16.
4. An introduction to Plant Tissue Culture – M.K. Razdan, 2nd Edition, Oxford & Ibh Publishing Co. Pvt Ltd, 2010
5. Experiments in Plant Tissue Culture - J. Heslop-Harrison (Foreword), John H. Dodds (Author), Lorin W. Roberts (Author), 3rd Edition, Cambridge University Press, 1955.
6. Pharmaceutical Biotechnology – S.P. Vyas and V.K. Dixit, 1st Edition, CBS Publishers & Distributors, 2016
7. Plant Cell and Tissue Culture (Methods in Molecular Biology) Vol. 6 - Jeffrey W. Pollard and John M Walker, Humana press, 2014.
8. Plant cell culture: a practical approach by R. A. Dixon, Robert A. Gonzales, 2, illustrated, reprint, Oxford University Press, 1994
9. Plant tissue and cell culture by Street. H E, 2 nd Edition University of California Press, 1977
10. Trease and Evans' Pharmacognosy - William Charles Evans, 16th Edition, Elsevier Health Sciences, 2009
11. Biotechnology: Fundamentals and Applications - S. S. Purohit and S.K. Mathur (Author) 2nd Revised edition, Agro- Bios, 1998.
12. Biotechnological applications of tissue culture by Peter D. Shargool, That Tjien Ngo, CRC Press, 1994
13. Pharmacognosy-Tyler, Brady, Robbers, 9th Edition, Wolters Kluwer New Delhi, 1988.
14. Plant Biotechnology - Ciddi Veeresham, CBS Publishers and Distributers, New Delhi 2004.