

# Gujarat Technological University

## M. Pharm. Syllabus

### Semester I

#### Paper Code 910205

#### Biotechnology and Cultivation of Medicinal Plants

#### Theory

(Four hours per week, 6 Credits)

Course Content:	Hours
1. Factors affecting quality of plant drugs, safe and economical methods for documentation and preservation of herbs and herbal products detection of common adulterants, microbial contamination, toxic trace metals, pesticides and insect infestation in whole and powdered drugs.	15
2. Cultivation of <i>Taxus baccata</i> , <i>Ginseng</i> , <i>Artemisia annua</i> , <i>Boswellia serrata</i> , <i>Curcuma longa</i> .	08
3. Importance of monographs of standards of medicinal plants and Their parts, comparative study of BHP, API, Chinese, Japanese Herbal Pharmacopoeia, European pharmacopoeia, US formulary, WHO, EMEA and ESCOP guidelines for herbal medicinal products.	15
4. Medicinal Plant Biotechnology.	08
5. Plant tissue culture techniques: including types, media, methodology, micropropagation, hairy root culture, protoplast culture, biotransformation, immobilization, Role of elicitors, artificial seeds, transgenic plants and commercial applications.	12
6. Phytomics and metabolomics	08

#### Reference Books:

1. Recent progress in medicinal plants: Volumes-1 to 22.
2. Ramstad-Modern pharmacognosy
3. Herskowitz- Principles of Genetics
4. Strickner- Genetics
5. Hess-Plant Physiology
6. Kruse Patterson- Tissue culture methods and Applications
7. Handa SS and Kaul KS – Supplement to cultivation and utilization of medicinal plants
8. Wealth of India, raw materials
9. Atal & Kappor- Cultivation and utilization of medicinal plants.
10. Purthi JS- Major spices of India.
11. Alan T, Howard Dalton and Murray Mao-Young—Comprehensive Biotechnology, 'The Principles, application and regulation of biotechnology in Industry, agriculture and Medicine. Vol-1 to 4.
12. Pharmacognosy and Pharmacobiotechnology. Robbers JE, Speedie MK, Tyler VE. William and Wilkins, USA; 1996.
13. Medicinal Natural Products a biosynthetic Approach. Dewick PM. John Wiley and Sons, Toronto, 1998.
14. Chemistry of Natural products. Bhat SV, Nagasampagi BA, Meenakshi S. Narosa Publishing house, New Delhi, 2005.
15. Recent Progress in medicinal Plants. Volumes 1-25. Govil JN, Singh VK, Siddiqui NT. Studim press, LLC USA; 2007.
16. Pharmacodynamic basis of herbal medicines. Ebadi M, CRC press Washington; 2002.
17. Laboratory handbook for fractionation of Natural Products. Houghton PJ and Raman A. Chapman and Hall New York; 1998.

18. Pharmacognosy and Pharmacobiotechnology. Kar A. New Age International Pvt. Ltd.; New Delhi 2003.
19. Pharmacognosy and Phytochemistry of medicinal Plants. 2<sup>nd</sup> edition. Brunreton J. Intercept Ltd.; New York; 1999.
20. Quality Control, Herbal Drugs, An approach to evaluation of Botanicals. Dr. Pulok K. Mukherjee. Business Horizons Pharmaceutical Publishers; 2002.
21. Herbs of Choice, The Therapeutic use of Phytomedicinals. Robbers JE, Tyler VE. Haworth Press Inc., USA; 2002.