GUJARAT TECHNOLOGICAL UNIVERSITY

M.Pharm

PHARMACOGNOSY

SEMESTER: I

Subject Name: Phytochemistry
Subject Code: MPG103T

Scope: Students shall be equipped with the knowledge of natural product drug discovery and will be able to isolate, identify and extract and the phytoconstituents

Objectives: Upon completion of this course the student should be able to

- different classes of phytoconstituents, their biosynthetic pathways, their properties, extraction and general process of natural product drug discovery
- phytochemical fingerprinting and structure elucidation of phytoconstituents

Sr No	Course Contents	Total Hrs
1	Biosynthetic pathways and Radio tracing techniques: Constituents & their Biosynthesis, Isolation, Characterization and purification with a special reference to their importance in herbal industries of following phyto pharmaceuticals containing drugs: a) Alkaloids: Ephedrine, Quinine, Strychynine, Piperine, Berberine, Taxol, Vinca alkoloids. b) Glycosides: Digitoxin, Glycyrrhizin, Sennosides, Bacosides, Quercitin. c) Steroids: Hecogenin, guggulosterone and withanolides d) Coumarin: Umbelliferone. e) Terpenoids: Cucurbitacins	12
2	Drug discovery and development: History of herbs as source of drugs and drug discovery, the lead structure selection process, structure development, product discovery process and drug registration, Selection and optimization of lead compounds with suitable examples from the following source : artemesin, andrographolides. Clinical studies emphasising on phases of clinical trials, protocol design for lead molecules.	12
3	Extraction and Phytochemical studies: Recent advances in extractions with emphasis on selection of method and choice of solvent for extraction, successive and exhaustive extraction and other methods of extraction commonly used like microwave assisted extraction, Methods of fractionation. Separation of phytoconstituents by latest CCCET, SCFE techniques including preparative HPLC and Flash column chromatography	12
4	Phytochemical finger printing: HPTLC and LCMS/GCMS applications in the characterization of herbal extracts. Structure elucidation of phytoconstituents.	12
5	Structure elucidation of the following compounds by spectroscopic techniques like UV, IR, MS, NMR (1H, 13C) a. Carvone, Citral, Menthol b. Luteolin, Kaempferol c. Nicotine, Caffeine iv) Glycyrrhizin.	12

REFERENCES (Latest Editions of)

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2. Trease and Evans' Pharmacognosy - William Charles Evans, 16th Edition, Elsevier Health Sciences, 2009
3. Pharmacognosy-Tyler, Brady, Robbers, 9th Edition, Wolters Kluwer New Delhi, 1988
4. Text Book of Pharmacognosy - T.E. Wallis, 5th Edition, CBS Publishers, New Delhi, 2005
5. Clarke's Isolation and Identification of Drugs: In Pharmaceuticals, Body Fluids and Post Mortem Material - E.G.C. Clarke
   and A.C. Moffat., 2nd Revised Edition, Pharmaceutical Press, 1986
6. Plant Drug Analysis - Hildebert Wagner and Sabine Bladt, 2nd Edition, Springer, NY, 1996
7. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry, Lippincott Williams & Wilkins, 2010
   Deorge. R.F. and John H. Block, 12th Edition, Lippincott Williams & Wilkin, 2010
8. The Chemistry of Natural Products - Edited by R.H. Thomson, Springer International Edn. 1993
9. Natural Products Chemistry Practical Manual by Anees A Siddiqui and SeemiSiddiqui
10. Organic Chemistry of Natural Products, Vol. 1 & 2. - Gurdeep R Chatwal, 4th Edition, Himalaya Publishing House, 2016
11. Modem Methods of Plant Analysis Vol. I & II – Peach K. and M.V. Tracey, Springer-Verlag Berlin Heidelberg, 1956
12. Medicinal Natural Products: A Biosynthetic Approach - Paul M. Dewick, 3rd Edition, John Wiley & Sons Ltd., England, 2009.
13. Chemistry of Natural Products - S. V. Bhat, B. A. Naga Sampagi, M. Shivakumar, Narosa Publishing House, New Delhi, 2015
14. Pharmacognosy, Phytochemistry, Medicinal Plants - Jean-Noel Bruneton, 2nd Edition, Interceptt Ltd., New York, 1999.
15. **Phytochemical Methods A Guide to Modern Techniques of Plant Analysis by** A.J. Harborne, 3 rd Edition, Chapman & Hall, London, 1998