

NIRMA UNIVERSITY
Institute of Pharmacy
(B. Pharm)
(Semester - V)

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Course Code	BP504 T				
Course Title	Pharmacognosy and Phytochemistry II-Theory				

Scope:

The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine

Objectives: Upon completion of the course, the student shall be able

1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
2. To understand the preparation and development of herbal formulation.
3. To understand the herbal drug interactions
4. To carryout isolation and identification of phytoconstituents

Course Learning Outcomes (CLO):

At the end of the course, students will be able to -

1. Understand various types of metabolic pathways of medicinal plants
2. Describe Pharmacognosy of different secondary metabolites along with its therapeutic and commercial applications
3. Discuss methods for isolation and estimation of various classes of phytoconstituents
4. Explain industrial application and utilization of phytoconstituents
5. Relate the applications of various chromatographic and spectroscopic techniques for standardization of herbal extracts/formulations
6. Develop hands on experience for isolation and estimation of some phytoconstituents

Syllabus:

Teaching hours: 45 Hours

UNIT-I

07 Hours

Metabolic pathways in higher plants and their determination

- a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway.
- b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.

UNIT-II

14 Hours

General introduction, composition, chemistry & chemical classes, bio sources, therapeutic uses and commercial applications of following secondary metabolites:

Alkaloids: Vinca, Rauwolfia, Belladonna, Opium,

Phenylpropanoids and Flavonoids: Lignans, Tea, Ruta
Steroids, Cardiac Glycosides & Triterpenoids: Liquorice, Dioscorea, Digitalis
Volatile oils: Mentha, Clove, Cinnamon, Fennel, Coriander,
Tannins: Catechu, Pterocarpus
Resins: Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony
Glycosides: Senna, Aloes, Bitter Almond
Iridoids, Other terpenoids & Naphthaquinones: Gentian, Artemisia, taxus, carotenoids

UNIT-III

06 Hours

Isolation, Identification and Analysis of Phytoconstituents

- a) Terpenoids: Menthol, Citral, Artemisin
- b) Glycosides: Glycyrrhetic acid & Rutin
- c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine
- d) Resins: Podophyllotoxin, Curcumin

UNIT-IV

10 Hours

Industrial production, estimation and utilization of the following phytoconstituents:

Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

UNIT V

08 Hours

Basics of Phytochemistry

Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.

Recommended Books: (Latest Editions)

1. Evans, W.C. *Trease and Evans Pharmacognosy*. London, W.B. Saunders & Co.
2. Ali, M. *Pharmacognosy and phytochemistry*, CBS Publication & Distributors, New Delhi.
3. Kokate, C.K. *Text Book of Pharmacognosy*. New Delhi, Nirali Prakashan.
4. Choudhary R.D. *Herbal drug industry*, New Delhi, Eastern Publisher.
5. Ansari, S. H. *Essentials of Pharmacognosy*. New Delhi, Birla Publication.
6. Pande, H. *The Complete Technology Book on Herbal Perfumes & Cosmetics*. National Institute of Industrial Research.
7. Kalia, A. N. *Textbook of Industrial Pharmacognosy*. CBS Publishers & Distributors.
8. Endress, R., & Endress, R. *Plant Cell biotechnology*, Berlin, Springer-Verlag.
9. Remington, J. P., *pharmaceutical sciences*.
10. James Bobbers, Marilyn KS, VE Tylor. *Pharmacognosy & Pharmacobiotechnology*.
11. The formulation and preparation of cosmetic, fragrances and flavours.
12. Vyas, S. P., & Dixit, V. K. *Pharmaceutical biotechnology*. CBS Publishers & Distributors.
13. Dubey, R. C. *A textbook of Biotechnology*. S. Chand Publishing.

L= Lecture, T= Tutorial, P= Practical, C= Credit

^ this is not an exhaustive list