

Syllabus | Semester: 5

Course code with name: 13PH0503 Pharmacognosy and Phytochemistry-II

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 to

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.

Teaching and examination scheme:

Teaching scheme (Hours/week)			Total credits	Examination scheme					Total Marks
Theory	Tutorial	Practical		CSE	IA	ESE	Term work	Viva	
3	1	4	6	10	15	75	15	35	150

Theory syllabus:

Teaching hours: 45 Hours

Unit-1

7 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-2

14 Hours

General introduction, composition, chemistry & chemical classes, biosources, 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-3

6 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-4

10 Hours

Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine.

Unit-5

8 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.

Tutorials will be based on above syllabus.

Teaching hours: 15 Hours

Practical syllabus:

Teaching hours: 04 Hours/week

1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander.
2. Exercise involving isolation & detection of active principles:
 - a. Caffeine - from tea dust.
 - b. Diosgenin from Dioscorea
 - c. Atropine from Belladonna
 - d. Sennosides from Senna
3. Separation of sugars by Paper chromatography.
4. TLC of herbal extract.
5. Distillation of volatile oils and detection of phytoconstituents by TLC.
6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh.

Recommended Books (Latest edition):

1. W.C.Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhlae (2007), 37th Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, 11nd edition, Birla publications, New Delhi, 2007.
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.