

6th SEMESTER

PHARMACEUTICS – V (Pharmaceutical Technology II)

PH. 6.1 THEORY 3 hours / Week
UNIT -I

1. **Micro-encapsulation:** Types of microcapsule, applications of microencapsulation in pharmacy, microencapsulation by co-acervation phase separation, multi orifice, spray drying, spray congealing, polymerization complex emulsion, air suspension technique and pan coating, evaluation of microcapsules.
2. **Pharmaceutical Aerosols:** Definition, applications, components of aerosol package: Propellants, container, valve, general formulation, manufacturing and filling methods, evaluation.

UNIT-II

3. **Parenteral Products:**
 - a. Routes of administration,
 - b. Formulation: Vehicles, additives. containers and closures ,
 - c. Facilities: Design of aseptic area, environmental control, traffic control, house keeping, surface disinfection, air control, personnel.
 - d. Processing: Cleaning of equipment, containers and closures, filling, sealing , sterilization, packaging and labeling.
 - e. Evaluation of parenteral products.

UNIT -III

4. **Ophthalmic Preparations:** Types, Requirements, packaging, proper administration of ophthalmic preparations, contact lenses & care and use solutions.

UNIT -IV

5. **Packaging of Pharmaceutical Products:** Packaging components, types, specifications and methods of evaluation, stability aspects of packaging. Packaging equipments, factors influencing choice of containers, legal and other official requirements for containers, package testing.

PHARMACEUTICS – V (Pharmaceutical Technology II)

PH. 6.2 PRACTICAL 3 hours/week
(A minimum of 15 experiments shall be conducted)

Experiments to illustrate preparation, stabilization, physical and biological evaluation of pharmaceutical products like, parenterals, micro capsules, Ophthalmic products etc.

Evaluation of materials used in pharmaceutical packaging.

RECOMMENDED BOOKS :

Bentley's Textbook of pharmaceuticals edited by E.A. Rawlins
The Theory and Practice of Industrial Pharmacy by Lachmann, Libermann and Kanig
Pharmaceutical Dosage Forms and Drug Delivery Systems by Ansel, Allen and Popovich
REMYNGTON : The Science and Practice of Pharmacy, 20th Edition
Pharmaceuticals : The Science of Dosage Form Design by Aulton

PHARMACEUTICAL CHEMISTRY – VI
(Medicinal Chemistry – II)

PH. 6.3 THEORY

3 hours/week

UNIT -I

1. Classification, mode of action, uses and structure activity relationship of the following classes of drugs. Synthesis of those compounds only exemplified against each class.

Steroids and Related Drugs: General study on Steroidal nomenclature and stereochemistry, Androgens and anabolic agents, Estrogens and progestational agents, : synthesis of Progesterone from diosgenin, Diethyl stilboestrol, Synthesis of Testosterone from Cholesterol, General study of structural formula and therapeutic uses of steroidal antiinflammatory agents.

UNIT -II

2. **Drugs acting on the Central Nervous System:**

General Anaesthetics : Anesthetic ether, Halothane, Thiopental sodium.
Local Anaesthetics : Benzocaine, Procaine, Lignocaine, Dibucaine.
Hypnotics and Sedatives: Phenobarbitone, Cyclobarbitone, Glutethimide,
Diazepam
Opioid analgesics : Pethidine, Methadone.

UNIT -III

Anticonvulsants : Phenytoin, Ethosuximide, Primidone,
Carbamazepine
Antiparkinsonism drugs: Levodopa, Amantidine
CNS stimulants : Nikethemide, Ethamivan, Amphetamine

3. **Psychopharmacological agents** (neuroleptics, antidepressants, anxiolytics):
Chlorpromazine, Haloperidol, Impiramine, Phenelzine, Chlordiazepoxide, Alprazolam.

UNIT -IV

4. **Diuretics:** Acetazolamide, Chlorthiazide, Furosemide, Mersalyl.
Cardiovascular drugs: Clonidine, Methyldopa, Procainamide, Nifedipine,

Isosorbide dinitrate, Prazocin, clofibrate.

PHARMACEUTICAL CHEMISTRY – VI

(Medicinal Chemistry – II)

PH. 6.4 PRACTICAL 3 hours/week
(A minimum of 15 experiments shall be conducted)

1. Synthesis of selected drugs from the course content
2. Monographs of selected official drugs including identification tests and tests for purity.

RECOMMENDED BOOKS:

1. Wilson and Grisvold's Text Book of Organic Medicinal and Pharmaceutical Chemistry
2. Principles of Medicinal Chemistry by William O.Foye
3. A Text Book of Medicinal Chemistry by S.N.Pandeya
4. Medicinal Chemistry by Ashutoshkar
5. Bentley's and Driver's Text Book of Pharmaceutical Chemistry.

PHYTOCHEMISTRY

PH. 6.5 THEORY 3 hours/ week

UNIT -I

Chemical and spectral approaches to simple molecules of natural origin. Application of I.R., N.M.R. and Mass spectroscopy in the structural elucidation of organic compounds. Concept of stereoisomerism taking examples of natural products (citral, menthol, camphor, ephedrine and atropine).

UNIT -II

Cardiac Glycosides: Source, structures, Pharmacological properties and study of interrelationship between cardenolides and bufadienolides (Chemistry of digoxin & digitoxin). Introduction to Scillaren A and ouabain.

Terpenes : Classification, General methods of extraction and separation (Mono and sesquiterpenes), special isoprene rule and Structural elucidation of citral carvone, menthol & camphor

UNIT -III

Vitamins : Classification, Chemistry of vitamin A, B₁, Folic acid and vitamin C.

Alkaloids : Classification, isolation, structural elucidation of atropine, ephedrine, reserpine and morphine.

UNIT -IV

Chemistry and therapeutic activity of penicillin (includes structural elucidation), streptomycin and tetracyclines.

Flavonoids: Classification, pharmacological properties and chemistry of quercetin .

PHYTOCHEMISTRY

PH. 6.6 PRACTICAL 3 hours/ week
(A minimum of 15 experiments shall be conducted)

1. Analysis of fixed oils including acid value, saponification value, iodine value.
2. Determination of hydroxyl compounds (phenolic and alcoholic).
3. Isolation of active principles from natural sources (at least four).
4. Determination of aldehydes and ketones in essential oils.
5. Exercises on paper and thin layer chromatographic evaluations of herbal drug constituents.

RECOMMENDED BOOKS :

1. Chemistry of Organic Natural Products (Vol.-1 & 2) by O.P. Agarwal.
2. Organic Chemistry of Natural Products (Vol.-1 & 2) by Gurdeep Chatwal.
3. Organic Chemistry (Vol.-2) by I.L. Finar.

PHARMACOGNOSY-IV

PH. 6.7 THEORY 3 hours/ week

UNIT -I

1. General methods of extraction, isolation and chemical tests of alkaloids.
2. Systematic study of source, cultivation, collection, chemical constituents, adulterants, uses, macroscopic, microscopic features and chemical tests of the following alkaloids containing drugs.

Pyridine-Piperidine	Tobacco, arica and lobelia
Tropane	Belladonna, hyoscyamus, daturas coca and withania.
Quinoline and Isoquinoline	Cinchona, Ipecac, opium
Indole	Ergot, rauwolfia, catharanthus nux-vomica and physostigma
Imidazole	Pilocarpus
Steroidal	Veratrum and kurchi
Alkaloid amines	Ephedra and colchicum
Glycoalkaloid	Solanum
Xanthine alkaloid	Coffee, tea and coca

UNIT -II

3. Study of traditional drugs, common vernacular names, botanical source, chemical constituents, uses and marketed formulations (any two) of the following drugs :
4. Amla, Satavari, Bhilwua, bael, bach, rasna, punarnava, gokhru, shankhapusphi, brahmi adusa, arjuna, lahsun, guggul, gymnema, neem ,tulsi, Shilajit and Spirulina.

UNIT -III

5. Holistic concept in traditional system of medicine. Introduction of ayurvedic preparation like asvas, aristas, guticas, tailas, lehyas and bhasmas.

UNIT -IV

6. Utilization and production of phytoconstituents such as quinine, calcium sennosides, podophyllotoxin, diosgenin and tropane alkaloids.

PHARMACOGNOSY-IV

PH. 6.8 PRACTICAL 3 hours/week
(A minimum of 15 experiments shall be conducted)

1. Identifications of crude drugs listed in theory. (any five)
2. Microscopic study of characters of six – selected drugs given in theory in entire and powder form.
3. Specific chemical tests of some alkaloidal crude drugs listed in theory.
4. Standardization of some traditional drug formulations.
5. Chromatographic study of some herbal constituents.

RECOMMENDED BOOKS:

1. Trease G.E. and Evans W E., Pharmacognosy.
2. Pharmacognosy by T.E. Wallis.
3. Pharmacognosy by C.K. Kokate.
4. Kalia A N., Text book of Industrial Pharmacognosy.
5. Rangari V D., Text book of Pharmacognosy Vol-I & II.
6. Atal C K., Cultivation and utilization of medicinal and aromatic plants of India.

PHARMACOLOGY – II

PH. 6.9 THEORY 3 hours / week

UNIT -I

1. Pharmacology of drugs acting on Cardiovascular System:

- a) Digitalis and cardiac glycosides
- b) Antihypertensive drugs
- c) Antianginal and vasodilator drugs
- d) Antiarrhythmic drugs

UNIT -II

2. Drugs Acting on the Haemopoetic System:

- (a) Haematinics
- (b) Anticoagulants, Fibrinolytic and anti-platelet drugs
- (c) Vitamin K and haemostatic agents
- (d) Blood and Plasma volume expanders

3. Drugs acting on urinary system:

- (a) Diuretics,
- (b) Anti-diuretics

UNIT -III

4. Autacoids :

- (a) Histamine, 5-HT and their antagonists

PHARMACEUTICAL JURISPRUDENCE & ETHICS

PH. 6.11

THEORY

3 hours/week

UNIT -1

1. Pharmaceutical Legislations – A brief review
2. Code of Pharmaceutical Ethics.
3. Pharmacy Act – 1948

UNIT -2

4. Drugs and Cosmetics Act 1940 and Rules 1945

UNIT -3

5. Medicinal & Toilet Preparations (Excise Duties) Act 1955
6. Narcotic Drugs & Psychotropic Substances Act 1985 & Rules
7. Drugs Price Control Order 1995
8. Drugs and Magic Remedies (Objectionable Advertisements) Acts 1954

UNIT -4

9. A brief study of the following with special reference to the main provisions only
10. Poisons Act 1919
11. Medical Termination of Pregnancy Act 1970 & Rules 1975
12. Prevention of Cruelty of Animals Act 1960
13. Factories Act 1948
14. Patents Act 1970

RECOMMENDED BOOKS:

1. A Textbook of Forensic Pharmacy by B.M.Mithal
2. A Textbook of Forensic Pharmacy by N.K.Jain
3. Drugs and Cosmetics Act and Rules published by Government of India
4. Pharmacy Act, Published by Government of India
5. Law of Drugs
6. Drug Cases published by International Law Book Co. Delhi (Reference)