

B.Pharm 6th Semester

1.6.1: Pharmaceutics-VI(Pharmaceutical Technology-II)

Theory

36 Hours.

UNIT-I

- 1. Capsules: Advantage and disadvantage of capsule dosage form, material for production of hard gelatin capsules, size of capsules, method of capsule filling, soft gelatin capsule shell and capsule content importance of base absorption and minimum/ gm factors in soft capsules, quality control, stability testing and storage of capsule dosage forms.**
- 2. Microencapsulation : types of microcapsules, importance of microencapsulation in Pharmacy, microencapsulation by phase separation, coacervation, multiorifice, spray drying, spray congealing, polymerization, air suspension technique, pan coating and other techniques, evaluation of microcapsules.**
- 3. (a) Tablets: Formulation of different types of tablets, granulation technology on large scale by various techniques, physics of tablets making different types of tablets, compression machinery and the equipments employed, evaluation of tablets, defects of compressed tablets; reasons and remedies.**
(c) Coating of tablets: Types of coating, film forming materials, formulation of coating solution equipments for coating, process evaluation of coated tablets. Defects of coated tablets: reasons and remedies.

UNIT-II

4. PARENTERAL PRODUCTS:

- a. Preformulation factors, Routes of Administration, water for injection, pyrogenicity, non-aqueous vehicles, isotonicity and methods of its adjustment.**

- b. Formulation detail, containers and closures and their selection.
 - c. Pre-filling treatment, washing of containers and closures. Preparation of solution and suspensions, filling and closing of ampoules, vials, infusion fluids, lyophilization and preparation of sterile powders, equipment for large scale manufactures and evaluation of parenterals products. Design of aseptic area, Laminar flow benches services and maintenance.
5. Surgical Products: Definition, primary wound dressings, absorbent surgical cotton, surgical gauze etc. bandages, adhesive tape, protective cellulosic hemostatics, official dressings, absorbable and non-absorbable suture, catgut medical prosthetics and organ replacement materials.
6. 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.
7. Automated process control systems including elements of computer aided manufacturing.

Practical **36 hours**

1. Experiments to illustrate preparation, stabilization, physical and biological evaluation of pharmaceutical products like powders, capsules, tablets, parenterals, microcapsules, surgical dressings etc. Evaluation of materials used in Pharmaceutical packaging.
2. Any other practical to substantiate the theory.

B.Pharm 6th Semester

1.6. 2: Pharmaceutical Chemistry-VI(Medicinal Chemistry-I)

Theory

36 Hours.

UNIT-I.

1. Medicinal Chemistry: Introduction, scope and role in drug research.

- (a) **SCIENCE OF DRUG ACTION:** A Absorption, Rule of administration, importance of partition coefficient, ionization, pH of gut, Henderson-Hasselbach equation, and its significance (workout problems).
- (b) **Transport & Distribution:** Capillary structure, tissue perfusion, drug transport systems, impact of pKa on drug distribution, importance of protein binding, drug partition into fat and its effect on duration and onset of action, blood-brain barrier, placental barrier.
- (c) **Metabolism:** Introduction, phase I & II pathway, discussion on phase I & II pathways will be restricted to the following representative model drugs; amphetamines, phenobarbitone, thiopental, chlorpromazine, haloperidol, lidocaine, terfenadine, tamoxifen, Isoniazid, meperidine, chlordiazepoxide paracetamol, ibuprofen.
- (d) **Excretion:** Renal elimination of drug, urinary pH and drug elimination, passive reabsorption, biliary elimination.

2. SCIENCE OF DRUG ACTION.

- (a) **Receptors:** An overview, specific & nonspecific drug action, binding roles of functional groups chemical bonding and biological activity, theories of drug-receptor interaction.
- (b) **Stereo specific aspects of drug action:** An overview of fundamental concepts – stereo chemical lexicon, projection formulae, elements of symmetry, assigning absolute configuration to chiral molecules, influence of enantiomerism, geometrical isomerism and conformational isomerism on drug action, discuss with illustrative examples.

UNIT-II

3. DRUGS ACTING ON ACETYL CHOLINE AND CHOLINERGIC RECEPTORS.

- (a) Cholinergic agonists: Acetyl choline, methacoline, carbachol, acclidine hydrochloride, pilocarpine (discuss SAR).
- (b) Cholinergic blockers: Trihexethyl bromide, propanthelin, oxyphencyclimine; hexamethonium, Tubocurarine, pancuronium, decamethonium, atracurium, gallamine, triethiodide, hexafluorenium bromide.

4. DRUG ACTING ON ADRENALINE & ADRENERGIC RECEPTORS:

- (a) Adrenergic drugs: Amphetamine, guanethidine, desimipramine, serotonine uptake inhibitor, imipramine, amitriptyline, doxepine.
- (b) Adrenergic agonist agents: Isoproterenol, salbutamol, terbutaline, albuterol, dipivefrin.
- (c) Adrenergic blockers: Dichloroisoproterenol, labetalol, propranolol, timolol, atenolol, practolol(discuss SAR).

5. DRUGS ACTING ON DOPAMINE & DOPAMINERGIC RECEPTORS.

- (a) Introduction, confirmation of dopamine.
- (b) Phenothiazines: Chlorpromazine trifupromazine, prochlorperazine, trifluoperizine fluphenazine, thioridazine (discuss SAR).

(c) Ring Analog of phenothiazine: thioyanthenes; chlorprothixene, flupenthixol, thioxithixene, Dibenzodiazapine, clozapine.

(d) Butyrophenones: Haloperidol benperidol, trifluoperidol, droperidol (discuss SAR).

Practical

36 hours

1. Synthesis of selected drugs from the course content involving two or more steps, monitoring progress of reaction by TLC and spectral analysis.
2. Estimation of partition coefficient, dissociation constant, molar refractivity.
3. Stereo model workshop.
4. Any other exercise to substantiate theory.

B.Pharm 6th Semester

1.6.3: Pharmacognosy-III

Theory

36 Hours.

UNIT-I

- 1. Chemical and spectral approaches to simple molecules of natural origin.**
- 2. Concept of stereoisomerism taking examples of natural products.**
- 3. Chemistry, biogenesis and pharmacological activity of medicinally important monoterpenes, sesquiterpenes, diterpenes and triterpenoids.**
- 4. Carotenoids: α -carotenoids, β -carotenes, vitamin A, xanthophylls of medicinal importance.**
- 5. Glycosides: Chemistry and biogenesis of digitoxin, digoxin, hecogenin, sennosides and diosgenin.**

UNIT-II

- 6. Alkaloids: Chemistry, biogenesis and pharmacological activity of atropine and related compounds; quinine, reserpine, morphine, papaverine, ephedrine, ergot and vinea alkaloids.**
- 7. Chemistry and biogenesis of medicinally important lignans and quassanoids, flavanoids.**
- 8. Natural allergens, photosensitizing agents and fungal toxins.**
- 9. An introduction to plant vaccines, plant bitters and sweeteners.**
- 10. Herbs as health foods(Nutraceuticals)**
- 11. Marine Pharmacognosy: Novel med**

Practical

36 hours

- 1. Identification of crude drugs listed above.**
- 2. Microscopic study of characters of eight- selected drugs given in theory in entire and powdered form.**
- 3. Chemical evaluation of powdered drugs and enzymes.**
- 4. Chromatographic studies of some herbal constituents.**

B.Pharm 6th Semester

1.6.4: Pharmacology-I

Theory

36 Hours.

UNIT-I

1. **General Pharmacology: Introduction to Pharmacology, sources of drugs. Dosage forms and different routes of administration. Factors modifying drug action and dosage form, pharmacodynamics – different types of drug actions and their mechanisms.**
2. **Pharmacokinetics: Absorption distribution, metabolism and excretion of drugs, principles of basic and clinical pharmacokinetics. ADME.**
3. **Pharmacology of ANS: Neurohumoral transmission autonomic and somatic, parasympathomimetic, parasympatholytics, sympathomimetics, adrenergic receptor and neuron blocking agents, ganglion stimulants and blocking agents.**

UNIT-II

4. **Pharmacology of CNS: Neurohumoral transmission in CNS, general anesthetics, alcohol and disulfuram, sedative hypnotics, antianxiety agents and centrally acting muscle agents, psychopharmacological agents (antipsychotics), antidepressants, antimaniacs antiepileptic drugs, antiparkinsonians. Narcotic analgesics and antagonists, drug addiction and drug abuse, local anaesthetics.**
Drugs for neurodegenerative disorders.

Practical

36 hours

1. **Use of computer simulated CD's or videocassettes for pharmacology practical whenever possible.**
2. **Preparation of different solutions for experiments. Drug dilutions, use of molar and w/v solutions in experimental pharmacology. Common laboratory animals and anesthetics used in animal studies. Commonly used instruments in experimental pharmacology.**
3. **Study of different routes of administration of drugs in mice and rats. To study the effect of hepatic microsomal enzymes inhibitors and induction on the pentobarbione sleeping time in mice.**
4. **Effect of autonomic drugs on gastrointestinal tract of rat or guinea pig.**

B.Pharm 6th Semester

1.6.5: Pharmaceutical Biotechnology

Theory

36 Hours.

UNIT-I.

1. Immunology and Immunological Preparations: Principles, antigens and haptens, immune system, cellular humoral immunity, immunological tolerance, antigen-antibody reactions and their applications. Hypersensitivity, Active and passive immunization, vaccines- their preparation, standardization and storage.
2. Genetic Recombination : Transformation, conjugation, transduction, protoplast fusion and gene cloning and their applications, development of hybridoma for monoclonal antibodies, study of drugs protected by biotechnology such as activase, humulin, humatrope.

UNIT-II

3. Antibiotics: Historical development of antibiotics, Antimicrobial spectrum and methods used for their standardization, screening of soil organisms producing antibiotics, fermenter, its design. Control of different parameters Isolation of mutants, factors affecting mutation.
4. Microbial Transformation : Introduction, types of reactions mediated by microorganisms, design of bio-transformation process, selection of organisms, bio-transformation processes and its improvements with special reference to steroids.
5. Enzyme immobilization : Techniques of immobilization of enzymes, factors affecting enzyme kinetics, study of enzymes such as hyaluronidase, penicillinase, streptokinase and streptodaranase, amylases and proteases immobilization of bacteria and plant cells.
6. Biological sources, preparation, identification tests and uses of the following enzymes: Diastase, papain, pepsin, trypsin, pancreatin.
7. Historical development of plant tissue culture: types of tissue cultures, their nutritional requirements, growth and maintenance. Applications of plant tissue culture in pharmacy.

B.Pharm 6th Semester

1.6.6: Pharmaceutical Jurisprudence

Theory

36 Hours.

UNIT-I.

1. Introduction:

- a. History of Drug Legislations in India.
- b. Drugs & Pharmaceutical Industry- brief review.
- c. Pharmaceutical Education- A brief review.

2. (a) Pharmaceutical Ethics.

(b) The Pharmacy Act, 1948

(c) The Drugs and Cosmetics Act, 1940 and Rules, 1945

(d) The Medicinal & Toilet Preparations (Excise Duties) Act, 1955

UNIT-II

3. a. The Narcotic Drugs and Psychotropic Substances Act, 1985 and Rules.
- b. Drugs Price Control Order, 1995.
- d. The Drugs & Magic Remedies (Objectionable Advertisements) Act, 1954.

4. A brief study of the following with special reference to the main provisions.

- a. Medicinal Termination of Pregnancy Act, 1970 and Rules, 1975.
- b. Prevention of Cruelty to Animals Act, 1960.
- c. States shops and Establishments Act & Rules
- d. AICTE Act, 1987.
- e. Factory Act, 1976.