D.Pharm Part II

D.Ph. 201T	Pharmaceutics-II, Theory	75 Hrs

Unit-I

1. Dispensing Pharmacy:

(i) Prescriptions: Reading and understanding of prescription; latin terms commonly used (detailed study is not necessary), modern methods of prescribing, adoption of metric system, calculations involved in dispensing.

(ii) Incompatibilities in prescriptions: Study of various types of incompatibilities—physical, chemical and therapeutic.

(iii) Posology: Dose and dosage of drugs, factors influencing dose, calculations of doses on the basis of age, sex and surface area, veterinary doses.

Unit-II

2. Dispensed Medications:

(Note: A detailed study of the following dispensed medication is necessary. Methods of preparation with theoretical and practical aspects, use of appropriate containers and closures, special labeling requirements and storage conditions should be highlighted).

(i) Powders: Types of powders, advantages and disadvantages of powders, granules, cachets and tablet triturates. Preparation of different types of powders encountered in prescriptions. Weighing methods, possible errors in weighing, minimum weighable amount and weighing of a material below the minimum weighable amount, geometric dilution and proper usage and care of dispensing balance.

(ii) Liquid oral dosage forms:

(a) Monophasic—theoretical aspects including commonly used vehicles, essential adjuvants like stabilizers, colourants and flavours, with examples.

Review of the following monophasic liquids with details of formulation and practical methods.

Liquids for internal administration	*Liquids for external administration or used on mucous membranes*
Mixtures and concentrates,	Gargles
Syrups	Mouth washes
	Throat paints
Elixirs	Douches
	Ear drops
	Nasal drops & sprays
	Liniments
	Lotions

Unit-III

(b) Biphasic liquid dosage forms:

- Suspensions (elementary study)—suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvants used like thickening agents, wetting agents, their necessity and quantity to be incorporated. Suspensions of precipitate forming liquids like tinctures, their preparations and stability. Suspensions produced by chemical reaction. An introduction to flocculated / non-flocculated suspension system.
- Emulsions—types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agents. Instabilities in emulsions. Preservation of emulsions.

(iii) Dental and cosmetic preparations:

Introduction to dentifrices, facial cosmetics, deodorants, antiperspirants, shampoos, hair dressings and hair removers.

Unit-IV

(iv) Semi-solid dosage forms:

(a) Ointments—types of ointments, classification and selection of dermatological vehicles. Preparation and stability of ointments by the following processes: (i) trituration (ii) fusion (iii) chemical reaction (iv) emulsification.

(b) Pastes—differences between ointments and pastes, bases of pastes, preparation of pastes and their preservation.

(c) Jellies—an introduction to the different types of jellies and their preparation.

(d) An elementary study of poultice.

(e) Suppositories and passaries—their relative merits and demerits, types of suppositories, suppository bases, classification, properties. Preparation and packing of suppositories. Use of suppositories for drug absorption.

Unit-V

(v) Sterile dosage forms:

(a) Parenteral dosage forms—definition, general requirements for parenteral dosage forms, types of parenteral formulations, vehicles, adjuvants, processing, personnel, facilities and quality control. Preparation of intravenous fluids and admixtures—total parenteral nutrition, dialysis fluids.

(b) Sterility testing, particulate matter monitoring, faulty seal packaging.

(c) Ophthalmic products—study of essential characteristics of different ophthalmic preparations. Formulation additives, special precautions in handling and storage of ophthalmic products.

D.Ph. 202P	Pharmaceutics-II, Practical	100 Hrs

Dispensing of at least 100 products covering a wide range of preparations such as mixtures, emulsions, lotions, liniments, ENT preparations, ointments, suppositories, powders, incompatible prescriptions etc.

D.Ph. 203T	Pharmaceutical Chemistry-II, Theory	100 Hrs

Unit-I

1. Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic system containing upto 3 rings.
2. The chemistry of following pharmaceutical organic compounds covering their nomenclature, chemical structure, uses and the important physical and chemical properties (chemical structure of only those compounds marked with asterisk(*).

The stability and storage conditions and the different types of pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and disinfectants—proflavine*, benzalkoniumchloride, cetrimide, chlorocresol*, chloroxylene, formaldehyde solution, hexachlorophene, liquified phenol, nitrofurantoin.

Sulfonamides—sulfadiazine, sulfaguanidine*, phthalylsulfathiazole, succinylsulfathiazole, sulfadimethoxine, sulfamethoxypyridazine, sulfamethoxazole, co-trimoxazole, sulfacetamide*.

Antileprotic drugs—clofazimine, thiambutosine, dapsone*, solapsone.

Anti-tubercular drugs—isoniazid*, PAS*, streptomycin, rifampicin, ethambutol*, thiacetazone, ethionamide, cycloserine, pyrazinamide*.

Antiamoebic and anthelminitic drugs—emetine, metronidazole*, halogenated hydroxyquinolines, diloxanide furoate, paromomycin, piperazine*, mebendazole, D.E.C.*.

Antimalarial drugs—chloroquine*, amodiaquine, primaquine, proguanil, pyrimethamine*, quinine, trimethoprim.

Unit-II

Antibiotics—benzyl penicillin*, phenoxy methyl penicillin*, benzathine penicillin, ampicillin*, cloxacillin, carbenicillin, gentamicin, neomycin, erythromycin, tetracycline, cephalexin, cephaloridine, cephalothin, griseofulvin, chloramphenicol.

Antifungal agents—undecyclenic acid, tolnaftate, nystatin, amphotericin B, hamycin.

Tranquilizers—chlorpromazine*, prochlorperazine, trifluoperazine, thiothixene, haloperidol*, triperiodol, oxypertine, chlordizepoxide, diazepam* lorazepam, meprobamate.

Hypnotics—phenobarbitone*, butobarbitone, cyclobarbitone, nitrazepam, glutethimide*, methyprylone, paraldehyde, triclofos sodium.

Unit-III

General anaesthetics—halothane*, cyclopropane*, diethyl ether*, methohexital sodium, thiopental sodium, trichloroethylene.

Antidepressant drugs—amitriptyline, nortryptyline, imipramine*, phenelzine, tranylcypromine.

Analeptics—theophylline, caffeine*, coramine*, dextro-amphetamine.

Adrenergic drugs—adrenaline*, noradrenaline, isoprenaline*, phenylephrine, salbutamol, terbutaline, ephedrine*, pseudoephedrine.

Adrenergic antagonist—tolazoline, propranolol*, practolol.

Cholinergic drugs—neostigmine*, pyridostigmine, pralidoxime, pilocarpine, physostigmine*.

Cholinergic antagonists—atropine*, hyoscine, homatropine, propantheline*, benztropine, tropicamide, biperiden*.

Unit-IV

Diuretic drugs—furosemide*, chlorothiazide, hydrochlorothiazide* benzthiazide, urea*, mannitol*, ethacrynic acid.

Cardiovascular drugs—ethyl nitrite*, glyceryl trinitrate, alpha methyl dopa, guanethidine, clofibrate, quinidine.

Hypoglycemic agents—insulin, chlorpropamide*, tolbutamide, glibenclamide, phenformin*, metformin.

Coagulants and anticoagulants—heparin, thrombin, menadione*, bishydroxycoumarin, warfarin sodium.

Local anaesthetics—lignocaine*, procaine*, benzocaine,

Histamine and antihistaminic agents—histamine, diphenhydramine*, promethazine, cyproheptadine, mepyramine, pheniramine, chlorpheniramine*.

Unit-V

Analgesics and antipyretics—morphine, pethidine*, codeine, methadone, aspirin*, paracetamol*, analgin, dextropropoxyphene, pentazocine.

Nonsteroidal antiinflammatory agents—indomethacin*, phenylbutazone*, oxyphenbutazone, ibuprofen.

Thyroxine and antithyroids—thyroxine*, methimazloe, methylthiouracil, propylthiouracil.

Diagnostic agents—iopanoic acid, propyliodone, sulfobrompthalein, sodium indigotindisulfonate, indigocarmine, evans blue, congo red, fluorescein sodium.

*Anticonvulsants, cardiac glycosides, antiarrhythmics, antihypertensives and vitamins.

Steroidal drugs—betamethasone, cortisone, hydrocortisone, prednisolone, progesterone, testosterone, oestradiol, nandrolone.

Antineoplastic drugs—actinomycin, azathioprine, busulphan, chloramubucil, cisplatin, cyclophosphamide, daunorubicin hydrochloride, fluorouracil, mercaptopurine, methotrexate, mytomycin.

D.Ph. 204P	Pharmaceutical Chemistry-II, Practical	75 Hrs

1. Systematic qualitative testing of organic drugs involving solubility determination, melting point and/or boiling point, detection of elements and functional groups (10 compounds).
2. Official identification tests for certain groups of drugs included in the I.P., like barbiturates, sulfonamides, phenothiazines, antibiotics etc. (8 compounds).
3. Preparation of three simple organic preparations.

D.Ph. 205T	Pharmacology and Toxicology, Theory	75 Hrs

Unit-I

1. Introduction to pharmacology, scope of pharmacology.
2. Routes of administration of drugs, their advantages and disadvantages.
3. Various processes of absorption of drugs and the factors affecting them. Metabolism, distribution and excretion of drugs.
4. General mechanism of drugs action and the factors which modify drugs action.

Unit-II

5. Pharmacological classification of drugs. The discussion of drugs should emphasise the following aspects:
   (i) Drugs acting on the central nervous system:
      (a) General anaesthetics, adjunction to anaesthesia, intravenous anesthetics.
      (b) Analgesic, antipyritic and non-steroridal antiinflammatory drugs, narcotic analgesics, antirheumatic and antigout remedies, sedatives and hypnotics, psychopharmacological agents, anti-convulsants, analeptics.
      (c) Centrally acting muscle relaxants and antiparkinsonism agents.

Unit-III

   (ii) Local anaesthetics.
   (iii) Drugs acting on autonomic nervous system.
      (a) Cholinergic drugs, anticholinergic drugs, anticholinesterase drugs.
      (b) Adrenergic drugs and adrenergic receptor blockers.
      (c) Neurone blockers and ganglion blockers.
      (d) Neuromuscular blockers, drugs used in myasthenia gravis.
   (iv) Drugs acting one eye, mydriactics, drugs used in glaucoma.

Unit-IV

   (v) Drugs acting on respiratory system-respiratory stimulants, bronchodilators, nasal decongestants, expectorants and antitussive agents.
   (vi) Antacids, physiological role of histamine and serotonin, histamine and antihistamines, prostaglandins.
   (vii) Cardiovascular drugs, cardiotonics, antiarrhythmic agents, antianginal agents, antihypertensive agents, peripheral vasodilators and drugs used in atherosclerosis.
   (viii) Drugs acting on the blood and blood forming organs. Haematinics, coagulants and anticoagulants, haemostatics, blood substitutes and plasma expanders.
   (ix) Drugs affecting renal function—diuretics and antidiuretics.
   (x) Hormones and hormone antagonists—hypoglycemic agents, antithyroid drugs, sex hormones and oral contraceptives, corticosteroids.
   (xi) Drugs acting on digestive system—carminatives, digestants, bitters, antacids and drugs used in peptic ulcer, purgatives, and laxatives, antidiarrohoeals, emetics, antiemetics, antispasmodics.

Unit-V

6. Chemotherapy of microbial disease: urinary antiseptics, sulfonamides, penicillins, streptomycin, tetracyclines and other antibiotics, antitubercular agents, antifungal agents, antiviral drugs, antileprotic drugs.
7. Chemotherapy of protozoal diseases, anthelminitc drugs.
8. Chemotherapy of cancer.
9. Disinfectants and antiseptics.
   A detailed study of the action of drugs on each organ is not necessary.

D.Ph. 206P	Pharmacology and Toxicology, Practical	50 Hrs

The first six of the following experiments will be done by the students while the remaining will be demonstrated by the teacher.

1. Effect of potassium and calcium, acetylcholine and adrenaline on frog's heart.
2. Effect of acetylcholine on rectus abdominis muscle of frog and guinea pig ileum.
3. Effect of spasmogens and relaxants on rabbits intestine.
4. Effect of local anaesthetics on rabbit cornea.
5. Effect of mydriatics and miotics on rabbit eye.
6. To study the action of strychnine on frog.
7. Effect of digitalis on frogs heart.
8. Effect of hypnotics in mice.
9. Effect of convulsants and anticonvulsants in mice or rats.
10. Test for pyrogens.
11. Taming and hypnosis potentiating effect of chlorpormazine in mice/rats.
12. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.

D.Ph. 207T	Pharmaceutical Jurisprudence, Theory	50 Hrs

Unit-I

1. Origin and nature of pharmaceutical legislation in India, its scope and objectives. Evolution of the "Concept of Pharmacy" as an integral part of the health care system.
2. Brief introduction to the study of the following acts:
   (i) Poisons Act 1919 (as amended to date)
   (ii) Medicinal and toilet preparations (excise duties) Act, 1955 (as amended to date).
   (iii) Medical termination of pregnancy act, 1971 (as amended to date).

Unit-II

3. Principles and significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by Pharmacy Council of India.
4. Pharmacy Act, 1948—the general study of the Pharmacy Act with special reference to education regulations, working of state and central councils, constitution of these councils and functions, registration procedures under the Act.

Unit-III

5. The Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954—general study of the act, objectives, special reference to be laid on advertisements, magic remedies and objectionable and permitted advertisements, diseases which cannot be claimed to be cured.
6. Narcotic Drugs and Psychotropic Substances Act, 1985-a brief study of the act with special reference to its objectives, offences and punishment.

Unit-IV

7. The Drugs and Cosmetics Act, 1940—general study of the Drugs and Cosmetics Act and the rules there under. Definitions and salient features related to retail and wholesale distribution of drugs. Procedure and formalities in obtaining licences under the rule.

Unit-V

8. The powers of inspectors, the sampling procedures.
9. Facilities to be provided for running a pharmacy effectively. General study of the schedules with special reference to schedules C, C1, F, G, J, H, P and X and salient features of labeling and storage conditions of drugs.
10. Latest drugs (price control) order in force.

D.Ph. 208T	Drug Store and Business Management, Theory	50 Hrs

PART-I COMMERCE (50 hours)

Unit-I

1. Introduction—trade, industry and commerce, functions and subdivision of commerce, introduction to elements of economics and management.
2. Channels of distribution.
3. Drug house management—selection of site, space lay out and legal requirements.
   Importance and objectives of purchasing, selection of suppliers, credit information, tenders, contracts and price determination and legal requirements thereto.
   Codification, handling of drug stores and other hospital supplies.

Unit-II

4. Forms of business organizations.
5. Recruitment, training, evaluation and compensation of the pharmacist.

6. Banking and finance-service and functions of bank, finance planning and sources of finance.

Unit-III

7. Inventory control—objects and importance, modern techniques like ABC, VED analysis, the lead time, inventory carrying cost, safety stock, minimum and maximum stock levels, economic order quantity, scrap and surplus disposal.
8. Sales promotion, market research, salesmanship, qualities of a salesman, advertising and window display.

PART-II ACCOUNTANCY (25 hours)

Unit-IV

9. Introduction to the accounting concepts and conventions. Double entry book keeping, different kinds of accounts.
10. Cash book.

Unit-V

11. General ledger and trial balance.
12. Profit and loss account and balance sheet.
13. Simple techniques of analyzing financial statements. Introduction to budgeting.

Start of session: 03.08.09 End of Session:

D.Ph. 209T	Hospital and Clinical Pharmacy , Theory	75 Hrs

PART-I HOSPITAL PHARMACY:

Unit-I

1. Hospital—definition, function, classification based on various criteria, organization, management and health delivery system in India.
2. Hospital pharmacy:
   (a) Definition
   (b) Functions and objectives of hospital pharmaceutical services.
   (c) Location, layout, flow chart of materials and men.
   (d) Personnel and facilities requirements including equipments based on individual and basic needs.
   (e) Requirements and abilities required for hospital pharmacists.
3. Drug distribution system in hospitals.
   (a) Out-patient services
   (b) In-patient services—(a) types of services (b) detailed discussion of unit dose system, floor ward stock system, satellite pharmacy services, central sterile services, bed side pharmacy.

Unit-II

4. Manufacturing:
   (a) Economical considerations, estimation of demand.
   (b) Sterile manufacture—large and small volume parenterals, facilities, requirements, layout, production planning, man-power requirements.
   (c) Non-sterile manufacture—liquid orals, externals, bulk concentrates.
   (d) Procurement of stores and testing of raw materials.
5. Nomenclature and uses of surgical instruments and hospital equipments and health accessories.
6. P.T.C. (Pharmacy Therapeutic Committee), hospital formulary system and their organization, functioning, composition.
7. Drug information service and drug information bulletin.
8. Surgical dressing like cotton, gauze, bandages and adhesive tapes including their pharmacopoeial tests for quality. Other hospital supply eg. I.V. sets, B.G. sets, Ryals tubes, catheters, syringes etc.

PART II CLINICAL PHARMACY:

Unit-III

9. Introduction to clinical pharmacy practice—definition, scope.
10. Modern dispensing aspects—pharmacists and patient counseling and advice for the use of common drugs, medication history.
11. Common daily terminology used in the practice of medicine.
12. Disease, manifestation and pathophysiology including salient symptoms to understand the disease like tuberculosis, hepatitis, rheumatoid arthritis, cardiovascular diseases, epilepsy, diabetes, Peptic ulcer, hypertension.
13. Bioavailability of drugs, including factors affecting it.

Unit-IV

14. Physiological parameters with their significance.
15. Drug interactions:
    (a) Definition and introduction.
    (b) Mechanism of drug interaction.
    (c) Drug—drug interaction with reference to analgesics, diuretics, cardiovascular drugs, gastro intestinal agents, vitamins and hypoglycemic agents.
    (d) Drug-food interaction.
16. Adverse drug reactions.
    (a) Definition and significance.
    (b) Drug-induced diseases and teratogenicity.

Unit-V

17. Drugs in clinical toxicity—introduction, general treatment of poisoning, systemic antidotes, treatment of insecticide poisoning, heavy metal poison, narcotic drugs, barbiturate, organophosphorus poisons.
18. Drug dependences, drug abuse, addictive drugs and their treatment, complications.
19. Application of computers in maintenance of records, inventory control, medication monitoring, drug information and data storage and retrieval in hospital retail pharmacy establishment.

D.Ph. 210P	Hospital and Clinical Pharmacy, Practical	75 Hrs

1. Preparation of transfusion fluids.
2. Testing of raw materials used in (1)
3. Evaluation of surgical dressings.
4. Sterilization of surgical instruments, glassware and other hospital supplies.
5. Handling and use of data processing equipments.