



CHHATTISGARH SWAMI VIVEKANAND TECHNICAL UNIVERSITY, BHILAI

Course of study and scheme of Examination
Diploma in Pharmacy (Part-II) Examination

SECOND YEAR

S. No	Subject Code	Board of Study	Subject	Periods Per Week			Scheme of Examination				Total Marks
				L	T	P	Theory		Practical		
							EYE	Sessional	EYE	Sessional	
1	241211	Pharmacy	Pharmaceutics-II	3	-	-	80	20	-	-	100
2	241212	Pharmacy	Pharmaceutical Chemistry -II	4	-	-	80	20	-	-	100
3	241213	Pharmacy	Pharmacology and Toxicology	3	-	-	80	20	-	-	100
4	241214	Pharmacy	Pharmaceutical Jurisprudence	2	-	-	80	20	-	-	100
5	241215	Pharmacy	Drug Store and Business Management	3	-	-	80	20	-	-	100
6	241216	Pharmacy	Hospital and Clinical Pharmacy	3	-	-	80	20	-	-	100
7	241221	Pharmacy	Pharmaceutics-II Lab	-	-	4	-	-	80	20	100
8	241222	Pharmacy	Pharm. Chem-II Lab	-	-	3	-	-	80	20	100
9	241223	Pharmacy	Pharmacology and Toxicology Lab	-	-	2	-	-	80	20	100
10	241224	Pharmacy	Hospital and Clinical Pharmacy Lab	-	-	2	-	-	80	20	100
Total				18		11	480	120	320	80	1000

L – Lecturer,

T – Tutorial,

P – Practical,

EYE- End Year Exam

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

Year : 2nd

Branch : Diploma in Pharmacy

Subject : Pharmaceutics II

Code : 241211

Theory : 75 hrs.

Total Marks in End Semester Exam :

1. Dispensing Pharmacy

- (i) Prescription- Reading and understanding of prescription : Latin terms commonly used (detailed study is not necessary) Modern methods of prescribing, Adoption of metric system, Calculation involved in dispensing.
- (ii) Incompatibilities in prescription : Study of various types of incompatibilities-physical, chemical and therapeutic.
- (iii) Posology : Does and dosage of drugs, factors influencing does, calculation of does on the basis if age, sex and surface area, veterinary does.

2. Dispensed Medication :

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

- (i) Powders – Type of powders, advantage and disadvantage of powders, granules, cachets and tablet triturates, preparation of different types of powders encountered in prescription, weighing methods, possible errors in weighing, minimum weighable amounts and weighing of 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 vehicle, essential adjuvant like stabilizers, colorants and flavors with examples.

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

Liquids for internal administration	Liquids for external administration or used on mucus membranes
Mixtures and concentrates syrups	Gargles
Elixirs	Mouth washes
	Throat-paints
	Douches
	Ear Drops
	Nasal drops & sprays
	Liniments
	Lotions

(b) Biphasic Liquid Dosage Forms :

(i) Suspensions (elementary study)- Suspensions containing diffusible solids and liquids and their preparations. Study of the adjuvant 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.

(ii) Emulsions- Types of emulsions, identification of emulsion system, formulation of emulsions, selection of emulsifying agents, instabilities in emulsion, preservation of emulsions.

(III) 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 – Difference 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 pessaries – Their relative merits and demerits. Types of suppositories. Suppository bases, classification, properties. Preparation and packing of suppositories. Use of suppositories for drug absorption.

(iv) Dental and Cosmetic preparation:

Introduction to Dentrifices . Facial cosmetics. Deodorants, Antiperspirants, Shampoos, Hair dressings and Hair removers

(v) Sterile Dosage Forms:

(a) Parenteral dosage forms – Definitions, General requirement 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 packing.

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

PRACTICAL (100 Hours) CODE - 241221

Dispensing of at least 100 products covering a wide range of preparations such as mixtures, emulsions, lotions, liniments, E.N.T. preparations, ointments, suppositories, powders, incompatible prescriptions etc. Books recommended: (Latest editions)

1. Indian – Pharmacopoeia.
2. British Pharmacopoeia .
3. National Formularies (N.F.I. B.N.F.)
4. Remington’s Pharmaceutical Sciences.
5. Martindale Extra Pharmacopoeia.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
UNIVERSITY, BHILAI**

Year : 2nd

Branch : Diploma in Pharmacy

Subject : Pharmaceutical Chemistry II

Code : 241212

Theory : 100 hrs.

Total Marks in End Semester Exam :.....

Minimum number of class tests to be conducted : 02

1. Introduction to the nomenclature of organic chemical systems with particular reference to heterocyclic system containing up to 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 type of Pharmaceutical formulations of these drugs and their popular brand names.

Antiseptics and Disinfectants – Proflavine, Benzal koniumchloride, Cetrimide, Chloroeresol*, Chloroxylene, Formaldehyde solution, Hexachlorophene. Liquified phenol, Nitrofurantoin.

Sulfonamides – Sulfadiazine, Sulfaguanidine*, Phthalylsulfathiazole, Suceinylsulfathiazole, Sulfadimethoxine, Sulfamethoxyipyridazine. Sulfamethoxazol. Co-trimoxazole, Sulfacetamide*.

Antileprotic Drugs – Clofazimine. Thiambutosine. Dapsone* Solapsone.

Anti-tubercular Drugs – Isoniazid* PAS Streptomycin Rifampicin, Ethambutol, Thiacetazone, Ethionamide, Cycloserine, Pyrazinamide*,

Antiamoebic and Anthelmintic Drugs – Emetine, Metronidazole*, Halogenated hydroxyquiolines, diloxanidefuroate, paramomycin Piperazine, Mebendazole, D.E.C*.

Antibiotics – Benzyl Penicillin* Phenoxy methyl Penicillin*, Benzathine, Penicillin, Ampicillin, Cloxacillin, Carbenicillin, Gentamicin, Neomycin, Erythromycin, Tetracycline, Cephalexin, Cephaloridine, Cephalothin, Griseofulvin, Chloramphenicol.

Antifungal agents – Undeeylenic acid, Tolnaftate, Nystatin, Amphotericin, Hamycin.

Antimalarial Drugs – Chloroquine*, Amodiaquine, Primaquine, Proguanil, Pyrimethamine*, Quinine. Trimethoprim.

Tranquilizers – Chlorpromazine*, Prochlorperazine, Trifluoperazine, Thiothixene, Haloperidol*,

Hypnotics:- Phenobarbitone, Butobarbitone, Cyclobarbitone, Nitrazepam, Glutethimide, Methyprylone, Paraldehyde, Triclofos sodium.

General Anesthetics – Halothane, Cyclopropane*, Diethyl ether*, Methohexital sodium, Thiopental sodium, Trichloroethylene.

Antidepressant Drug – Amitriptyline, Nortriptyline, Imipramine*, Phenelzine, Tranylcypromine.

Analeptics – Theophylline, Caffeine*, Coramine* Dextroamphetamine,

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*.

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 Anti-Coagulants – Heparin, Thrombin, Menadione*, Bishydroxycoumarin, Warfarin Sodium.

Local Anesthetics – Lignocaine*, Procaine*, Benzocaine

Histamine and Anti-histamine Agents – Histamine, Diphenhydramine*, Promethazine, Cyprohetadine, Mepyramine, Pheniramine, Chlorpheniramine*.

Analgesics and Anti-pyretics-Morphine, Pethidine*, Codeine, Methadone, Aspirin*, Paracetamol*, Analgin, Dextropropoxyphene, Pentazocine.

Non-steroidal anti-inflammatory Agents - Indomethacin*, phenylbutazone*, oxyphenbutazone, Ibuprofen, Thyroxine and Antithyroids-Thyroxine, Methimazole, Methylthiouracil, Propylthiouracil.

Diagnostic Agents – Iopanoic Acid, Propylidone, Sulfobromophthalcin.

Sodium Indigotindisulfonate, Indigo Carmine, Evans blue, Congo Red, Fluorescein Sodium.

Anticonvulsants, cardiac glycosides, Antiarrhythmic antihypertensives & vitamins.

Steroidial Drugs – Betamethazone, Cortisone, Hydrocortisone, prednisolone, progesterone, Testosterone, Oestradiol, Nandrolone.

Anti-Neoplastic Drugs-Actinomycins, Azathioprine, Busulphan, Chlorambucil, Cisplatin cyclophosphamide, Daunorubicin hydrochloride, Flurouracil, Mercaptopurine, methotrexate, Mytomycin.

Books Recommended : (Latest editions)

1. Pharmacopocia of India
2. British Pharmaceutical Codex
3. Martindale The Extra Pharmacopocia

PRACTICAL (75 HOURS)
CODE ; 241222

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

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
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Year : 2nd

Branch : Diploma in Pharmacy

Subject : Pharmacology & Toxicology

Code : 241213

Theory : 75 Hours

Total Marks in End Semester Exam :

Minimum number of class tests to be conducted : 02

1. Introduction to Pharmacology, scope of Pharmacology.
2. Routes of administration of drugs, their advantages and disadvantages.
3. Various process 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 drug action.
5. Pharmacological classification of drugs, The discussion drugs should emphasize the following aspect :
 - (i) Drugs acting on the Central Nervous System
 - (a) General anaesthetics adjuction of anaesthesia, intravenous anasesthetics.
 - (b) Analgesic antipyretics and non-steroidal anti-inflammatory durgs, Narcotic analgesics, Antirheumatic and antigout remedies, Sedatives and Hyponotics, Psychopharmacological agents, anti convulsants, analeptics.
 - (c) Centrally acting muscle relaxants and ant parkinsonism agents
 - (ii) Local anesthetics
 - (iii) Drug acting on autonomic nervous system.
 - (a) Cholinergic drug, Anticholinergic drugs, anticholinesterase drugs.
 - (b) Adrenergic drugs and adrenergic receptor blockers
 - (c) Neuron blockers and ganglion blockers
 - (d) Neuromuscular blockers, drugs used in myasthenia gravis
 - (iv) Drugs acting on eye, mydriatics, drugs used in glaucoma
 - (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) Cardio Vascular drugs, Cardiotonics, Antiarrhythmic agents, Antianginal agents, Antihypertensive agents, Perpheral Vasodilators and drugs used in atherosclerosis.
 - (viii) Drugs acting on the blood and blood forming organs, haematinics, Coagulants and anti-coagulants, 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, Antidiarrhoeals, Emetics, Antiemetics, Anti-spasmodics.
6. Chemotherapy of microbial disease : Urinary antiseptics, Sulphonamides, Penicillin's, Streptomycin, Tetracycline's and other antibiotics, Antitubercular agents, Antifungal agents, antiviral drugs, antileprotic drugs.
 7. Chemotherapy of protozoal diseases, Anthelmintic drugs
 8. Chemotherapy of cancer
 9. Disinfectants and antiseptics
- A detailed study of the action of drugs on each organ is not necessary.

PHARMACOLOGY PRACTICAL CODE -241223 (50 Hours)

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 K^+ , Ca^{++} , 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 rabbits eye.
6. To study the action of strychnine on frog.
7. Effect of digitals on frog's heart.
8. Effect of hypnotics in mice.
9. Effect of convulsants and anticonvulsant in mice of rats.
10. Test of pyrogen.
11. Taming and hypnosis potentiating effect of chlorpromazine in mice/rats.
12. Effect of diphenhydramine in experimentally produced asthma in guinea pigs.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
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Year : 2nd

Branch : Diploma in Pharmacy

Subject : Pharmaceutical Jurisprudence

Code : 241214

Theory Periods : 50 hours

Total Marks in End Semester Exam :

Minimum number of class tests to be conducted : 02

1. Origin and nature of Pharmaceutical legislation in India, its scope and objective. Evolution of the "Concept of Pharmacy" as an integral part of the health Care System.
2. Principles and significance of Professional Ethics. Critical study of the code of Pharmaceutical Ethics drafted by Pharmacy Council in India.
3. 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.
4. 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. The powers of Inspectors, the sampling procedures and the procedure and formalities in obtaining licenses under the rule. Facilities to be provided for running a Pharmacy effectively. General study of the Schedules with special reference of schedules C, C₁, F, G, J, H, P and X and salient features of labling and storage condition of drugs.
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-disease 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.
7. Brief introduction to the study of the following acts.
 - i. Latest Drugs (price Control) order in force.
 - ii. Poisons Act 1919 (as amended to date)
 - iii. Medicinal and Toilet Preparati0ons (Excise Duties) Act, 1955 (as amended to date)
 - iv. Medical Termination of Pregnancy Act. 1971 (as amended to date)

Books Recommended (Latest edition) :

Bare Acts of the said laws published by the Government.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
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Year : 2nd

Branch : Diploma in Pharmacy

Subject : Drug Store and Business Management

Code : 241215

Total Theory Periods : 75 hours

Total Marks in End Semester Exam :

Minimum number of class tests to be conducted : 02

Part-I Commerce (50 hours)

1. Introduction – Trade, Industry and Commerce Functions and subdivision of Commerce, introduction to Elements of Economics and Management.
2. Forms of Business Organizations.
3. Channels of Distribution.
4. 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
5. 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.
6. Sales promotion, Market Research, Salesmanship, qualities of a salesman, Advertising and Window Display.
7. Recruitment, training, evaluation and compensation of the pharmacist.
8. Banking an Finance Service and functions of bank. Finance Planning and sources of finance

Part-II Accountancy (25 hours)

- i. Introduction to the accounting concepts and convention. Double entry book keeping different kinds of accounts.
- ii. Cash Book.
- iii. General Léger an trial balance.
- iv. Profit and loss account and balance sheet.
- v. Simple technique of analyzing financial statements.

Introduction to Budgeting

Books Recommended (latest edition)

Remington's Pharmaceutical Sciences.

**CHHATTISGARH SWAMI VIVEKANAND TECHNICAL
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Year : 2nd

Branch : Diploma in Pharmacy

Subject : Hospital and Clinical Pharmacy

Code : 241216

Total Theory Periods : 75 hrs

Total Marks in End Semester Exam :

Minimum number of class tests to be conducted : 02

Part I : Hospital Pharmacy :

1. Hospitals 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 material 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.
4. Manufacturing :
 - (a) Economical consideration, 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 e.g. I. V. sets B. G. sets, Ryals tubes, Catheters, Syringes etc.
9. Application of computer in maintenance of records, inventory control, medication monitoring, Drug information and data storage and retrieval in hospital and retail pharmacy establishments.

Part – II : Clinical Pharmacy :

1. Introduction to Clinical Pharmacy Practice – Definition, scope.
2. Modern dispensing aspects – Pharmacists and patient counseling and advice for the use of common drugs, medication history.
3. Common daily terminology used in the Practice of Medicine.
4. Disease, manifestation and pathophysiology including salient symptoms to understand the disease like Tuberculosis, Hepatitis, Rheumatoid, Arthritis, Cardiovascular diseases, Epilepsy, Diabetes, Peptic Ulcer, Hypertension.
5. Physiological parameters with their significance.
6. 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.
7. Adverse Drug Reactions :
 - (a) Definition and Significance
 - (b) Drug-induced diseases and Teratogenicity
8. Drugs in Clinical Toxicity- Introduction, general treatment of poisoning, systematic antidotes, Treatment of insecticide poisoning, heavy metal poison, Narcotic drugs, Barbiturate, Organophosphorus poisons.
9. Drug dependences, drug abuse, addictive drugs and their treatment, complications.
10. Bio-availability of drugs, including factors affecting it.

Books recommended (latest editors)

1. Remington's Pharmaceutical Sciences
2. Martindale The Extra Pharmacopocia

PRACTICAL CODE : 241224

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