

D. Pharmacy Second Year Syllabus 2025

As per Pharmacy Council of India (PCI) Education Regulations ER-2020

PHARMACOLOGY

Chapter 1: General Pharmacology

Introduction and scope of Pharmacology. Various routes of drug administration - advantages and disadvantages. Drug absorption - definition, types, factors affecting drug absorption. Bioavailability and the factors affecting bioavailability. Drug distribution - definition, factors affecting drug distribution. Biotransformation of drugs - Definition, types of biotransformation reactions, factors influencing drug metabolisms. Excretion of drugs - Definition, routes of drug excretion. General mechanisms of drug action and factors modifying drug action.

Chapter 2: Drugs Acting on the Peripheral Nervous System

Steps involved in neurohumoral transmission. Definition, classification, pharmacological actions, dose, indications, and contraindications of:

- Cholinergic drugs
- Anti-Cholinergic drugs
- Adrenergic drugs
- Anti-adrenergic drugs
- Neuromuscular blocking agents
- Drugs used in Myasthenia gravis
- Local anaesthetic agents
- Non-Steroidal Anti-Inflammatory drugs (NSAIDs)

Chapter 3: Drugs Acting on the Eye

Definition, classification, pharmacological actions, dose, indications and contraindications of:

- Miotics
- Mydriatics
- Drugs used in Glaucoma

Chapter 4: Drugs Acting on the Central Nervous System

Definition, classification, pharmacological actions, dose, indications, and contraindications of:

- General anaesthetics
- Hypnotics and sedatives
- Anti-Convulsant drugs
- Anti-anxiety drugs
- Anti-depressant drugs
- Anti-psychotics
- Nootropic agents
- Centrally acting muscle relaxants
- Opioid analgesics

Chapter 5: Drugs Acting on the Cardiovascular System

Definition, classification, pharmacological actions, dose, indications, and contraindications of:

- Anti-hypertensive drugs
- Anti-anginal drugs
- Anti-arrhythmic drugs
- Drugs used in atherosclerosis and Congestive heart failure
- Drug therapy for shock

Chapter 6: Drugs Acting on Blood and Blood Forming Organs

Definition, classification, pharmacological actions, dose, indications, and contraindications of:

- Hematinic agents
- Anti-coagulants
- Anti-platelet agents
- Thrombolytic drugs

Chapter 7: Drugs Acting on the Respiratory System

Definition, classification, pharmacological actions, dose, indications, and contraindications of:

- Bronchodilators
- Expectorants
- Anti-tussive agents

- Mucolytic agents

Chapter 8: Drugs Acting on the Gastro Intestinal Tract

Definition, classification, pharmacological actions, dose, indications, and contraindications of:

- Anti-ulcer drugs
- Anti-emetics
- Laxatives and purgatives
- Anti-diarrheal drugs

Chapter 9: Drugs Acting on the Kidney

Definition, classification, pharmacological actions, dose, indications, and contraindications of:

- Diuretics
- Anti-Diuretics

Chapter 10: Hormones and Hormone Antagonists

Physiological and pathological role and clinical uses of:

- Thyroid hormones
- Anti-thyroid drugs
- Parathormone
- Calcitonin
- Vitamin D
- Insulin
- Oral hypoglycemic agents
- Estrogen
- Progesterone
- Oxytocin
- Corticosteroids

Chapter 11: Autocoids

Physiological role of Histamine, 5 HT and Prostaglandins. Classification, clinical uses, and adverse effects of antihistamines and 5 HT antagonists.

Chapter 12: Chemotherapeutic Agents

Introduction, basic principles of chemotherapy of infections, infestations and neoplastic diseases, Classification, dose, indication and contraindications of drugs belonging to following classes:

- Penicillins
- Cephalosporins
- Aminoglycosides
- Fluoroquinolones
- Macrolides
- Tetracyclines
- Sulphonamides
- Anti-tubercular drugs
- Anti-fungal drugs
- Anti-viral drugs
- Anti-amoebic agents
- Anthelmintics
- Anti-malarial agents
- Anti-neoplastic agents



Chapter 13: Biologicals

Definition, types, and indications of biological agents with examples.

COMMUNITY PHARMACY AND MANAGEMENT

Chapter 1: Introduction to Community Pharmacy Practice

Definition, history and development of community pharmacy - International and Indian scenarios.

Chapter 2: Professional Responsibilities

Professional responsibilities of community pharmacists. Introduction to the concept of Good Pharmacy Practice and SOPs.

Chapter 3: Prescription Handling

Definition, parts of prescriptions, legality of prescriptions, prescription handling, labelling of dispensed medications (Main label, ancillary label, pictograms), brief instructions on medication usage. Dispensing process, Good Dispensing Practices, dispensing errors and strategies to minimize them.

Chapter 4: Communication Skills

Definition, types of communication skills. Interactions with professionals and patients. Verbal communication skills (one-to-one, over the telephone). Written communication skills. Body language. Patient interview techniques.

Chapter 5: Patient Counselling

Definition and benefits of patient counselling. Stages of patient counselling - Introduction, counselling content, counselling process, and closing the counselling session. Barriers to effective counseling - Types and strategies to overcome the barriers. Patient counselling points for chronic diseases/disorders - Hypertension, Diabetes, Asthma, Tuberculosis, Chronic obstructive pulmonary disease, and AIDS. Patient Package Inserts - Definition, importance and benefits, Scenarios of PPI use in India and other countries. Patient Information leaflets - Definition and uses.

Chapter 6: Medication Adherence

Definition, factors influencing non-adherence, strategies to overcome non-adherence.

Chapter 7: Health Screening Services

Introduction, scope, and importance of various health screening services - for routine monitoring of patients, early detection, and referral of undiagnosed cases.

Chapter 8: Over The Counter (OTC) Medications

Definition, need and role of Pharmacists in OTC medication dispensing. OTC medications in India, counseling for OTC products. Self-medication and role of pharmacists in promoting the safe practices during self-medication. Responding to symptoms, minor ailments, and advice for self-care in conditions such as - Pain management, Cough, Cold, Diarrhea, Constipation, Vomiting, Fever, Sore throat, Skin disorders, Oral health (mouth ulcers, dental pain, gum swelling).

Chapter 9: Community Pharmacy Management

Legal requirements to set up a community pharmacy. Site selection requirements. Pharmacy designs and interiors. Vendor selection and ordering. Procurement, inventory control methods, and inventory management. Financial planning and management. Accountancy in community pharmacy – Day book, Cash book. Introduction to pharmacy operation softwares – usefulness and availability. Customer Relation Management (CRM). Audits in Pharmacies.

BIOCHEMISTRY AND CLINICAL PATHOLOGY

Chapter 1: Introduction to Biochemistry

Scope of biochemistry in pharmacy; Cell and its biochemical organization.

Chapter 2: Carbohydrates

Definition, classification with examples, chemical properties. Monosaccharides - Structure of glucose, fructose, and galactose. Disaccharides - structure of maltose, lactose, and sucrose. Polysaccharides - chemical nature of starch and glycogen. Qualitative tests and biological role of carbohydrates.

Chapter 3: Proteins

Definition, classification of proteins based on composition and solubility with examples. Definition, classification of amino acids based on chemical nature and nutritional requirements with examples. Structure of proteins (four levels of organization of protein structure). Qualitative tests and biological role of proteins and amino acids. Diseases related to malnutrition of proteins.

Chapter 4: Lipids

Definition, classification with examples. Structure and properties of triglycerides (oils and fats). Fatty acid classification - Based on chemical and nutritional requirements with examples. Structure and functions of cholesterol in the body. Lipoproteins - types, composition and functions in the body. Qualitative tests and functions of lipids.

Chapter 5: Nucleic Acids

Definition, purine and pyrimidine bases. Components of nucleosides and nucleotides with examples. Structure of DNA (Watson and Crick model), RNA and their functions.

Chapter 6: Enzymes

Definition, properties and IUB and MB classification. Factors affecting enzyme activity. Mechanism of action of enzymes, Enzyme inhibitors. Therapeutic and pharmaceutical importance of enzymes.

Chapter 7: Vitamins

Definition and classification with examples. Sources, chemical nature, functions, coenzyme form, recommended dietary requirements, deficiency diseases of fat-and water-soluble vitamins.

Chapter 8: Metabolism

Study of cycle/pathways without chemical structures:

- **Metabolism of Carbohydrates:** Glycolysis, TCA cycle and glycogen metabolism, regulation of blood glucose level. Diseases related to abnormal metabolism of Carbohydrates
- **Metabolism of lipids:** Lipolysis, β -oxidation of Fatty acid (Palmitic acid) ketogenesis and ketolysis. Diseases related to abnormal metabolism of lipids such as Ketoacidosis, Fatty liver, Hypercholesterolemia
- **Metabolism of Amino acids (Proteins):** General reactions of amino acids and its significance–Transamination, deamination, Urea cycle and decarboxylation. Diseases related to abnormal metabolism of amino acids, Disorders of ammonia metabolism, phenylketonuria, alkaptonuria and Jaundice
- **Biological oxidation:** Electron transport chain and Oxidative phosphorylation

Chapter 9: Minerals

Types, Functions, Deficiency diseases, recommended dietary requirements.

Chapter 10: Water and Electrolytes

Distribution, functions of water in the body. Water turnover and balance. Electrolyte composition of the body fluids, Dietary intake of electrolyte and Electrolyte balance. Dehydration, causes of dehydration and oral rehydration therapy.

Chapter 11: Introduction to Biotechnology

Basic concepts and applications in pharmacy.

Chapter 12: Organ Function Tests

Functions of kidney and routinely performed tests to assess the functions of kidney and their clinical significances. Functions of liver and routinely performed tests to assess the functions of liver and their clinical significances. Lipid profile tests and its clinical significances.

Chapter 13: Pathology of Blood and Urine

Lymphocytes and Platelets, their role in health and disease. Erythrocytes - Abnormal cells and their significance. Normal and Abnormal constituents of Urine and their significance.

PHARMACOTHERAPEUTICS

Chapter 1: Introduction to Pharmacotherapeutics

Pharmacotherapeutics – Introduction, scope, and objectives. Rational use of Medicines, Evidence Based Medicine, Essential Medicines List, Standard Treatment Guidelines (STGs).

Chapter 2: Cardiovascular System Diseases

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Hypertension
- Angina and Myocardial infarction
- Hyperlipidaemia
- Congestive Heart Failure

Chapter 3: Respiratory System Diseases

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Asthma
- COPD

Chapter 4: Endocrine System Diseases

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Diabetes
- Thyroid disorders - Hypo and Hyperthyroidism

Chapter 5: Central Nervous System Diseases

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Epilepsy
- Parkinson's disease
- Alzheimer's disease
- Stroke
- Migraine

Chapter 6: Gastro Intestinal Disorders

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Gastro oesophageal reflux disease
- Peptic Ulcer Disease
- Alcoholic liver disease
- Inflammatory Bowel Diseases (Crohn's Disease and Ulcerative Colitis)

Chapter 7: Haematological Disorders

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Iron deficiency anaemia
- Megaloblastic anaemia

Chapter 8: Infectious Diseases

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Tuberculosis
- Pneumonia
- Urinary tract infections
- Hepatitis
- Gonorrhoea and Syphilis
- Malaria
- HIV and Opportunistic infections
- Viral Infections (SARS, CoV2)



Chapter 9: Musculoskeletal Disorders

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Rheumatoid arthritis
- Osteoarthritis

Chapter 10: Dermatology

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Psoriasis
- Scabies

- Eczema

Chapter 11: Psychiatric Disorders

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Depression
- Anxiety
- Psychosis

Chapter 12: Ophthalmology

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Conjunctivitis (bacterial and viral)
- Glaucoma

Chapter 13: Anti-microbial Resistance

Causes, prevention, and management strategies for antimicrobial resistance.

Chapter 14: Women's Health

Definition, etiopathogenesis, clinical manifestations, non-pharmacological and pharmacological management of:

- Polycystic Ovary Syndrome
- Dysmenorrhea
- Premenstrual Syndrome

HOSPITAL AND CLINICAL PHARMACY

Chapter 1: Hospital Pharmacy Organization

Definition, scope, national and international scenario. Organisational structure. Professional responsibilities, Qualification and experience requirements, job specifications, work load requirements and inter professional relationships. Good Pharmacy Practice (GPP) in hospital. Hospital Pharmacy Standards (FIP Basel Statements, AHSP). Introduction to NAQS guidelines and NABH Accreditation and Role of Pharmacists.

Chapter 2: Hospital Committees

Pharmacy and Therapeutics Committee: Objectives, Composition, and functions. **Hospital Formulary:** Definition, procedure for development and use of hospital formulary. **Infection Control Committee:** Role of Pharmacist in preventing Antimicrobial Resistance.

Chapter 3: Supply Chain and Inventory Control

Preparation of Drug lists - High Risk drugs, Emergency drugs, Schedule H1 drugs, NDPS drugs, reserved antibiotics. Procedures of Drug Purchases – Drug selection, short term, long term, and tender/e-tender process, quotations, etc. Inventory control techniques: Economic Order Quantity, Reorder Quantity Level, Inventory Turnover etc. Inventory Management of Central Drug Store – Storage conditions, Methods of storage, Distribution, Maintaining Cold Chain, Devices used for cold storage (Refrigerator, ILR, Walk-in-Cold rooms). FEFO, FIFO methods. Expiry drug removal and handling, and disposal. Disposal of Narcotics, cytotoxic drugs. Documentation - purchase and inventory.

Chapter 4: Drug Distribution

Drug distribution (in-patients and out-patients) – Definition, advantages and disadvantages of individual prescription order method, Floor Stock Method, Unit Dose Drug Distribution Method, Drug Basket Method. Distribution of drugs to ICCU/ICU/NICU/Emergency wards. Automated drug dispensing systems and devices. Distribution of Narcotic and Psychotropic substances and their storage.

Chapter 5: Hospital Compounding

Bulk compounding, IV admixture services and incompatibilities, Total parenteral nutrition.

Chapter 6: Radiopharmaceuticals

Storage, dispensing and disposal of radiopharmaceuticals.

Chapter 7: Hospital Information Systems

Application of computers in Hospital Pharmacy Practice, Electronic health records, Softwares used in hospital pharmacy.

Chapter 8: Clinical Pharmacy Services

Definition, scope, and development - in India and other countries. Technical definitions, common terminologies used in clinical settings and their significance such as Paediatrics, Geriatric, Anti-natal Care, Post-natal Care, etc.

Chapter 9: Clinical Pharmacist Activities

Daily activities of clinical pharmacists: Definition, goal, and procedure of:

- Ward round participation
- Treatment Chart Review

- Adverse drug reaction monitoring
- Drug information and poisons information
- Medication history
- Patient counselling
- Interprofessional collaboration

Chapter 10: Pharmaceutical Care

Definition, classification of drug related problems. Principles and procedure to provide pharmaceutical care. Medication Therapy Management, Home Medication Review.

Chapter 11: Clinical Laboratory Tests

Clinical laboratory tests used in the evaluation of disease states - significance and interpretation of test results:

- Haematological, Liver function, Renal function, thyroid function tests
- Tests associated with cardiac disorders
- Fluid and electrolyte balance
- Pulmonary Function Tests

Chapter 12: Poisoning and Drug Information

Types of poisoning: Clinical manifestations and Antidotes. Drugs and Poison Information Centre and their services – Definition, Requirements, Information resources with examples, and their advantages and disadvantages.

Chapter 13: Pharmacovigilance and Medication Safety

Definition, aim and scope. Overview of Pharmacovigilance. Medication errors: Definition, types, consequences, and strategies to minimize medication errors, LASA drugs and Tallman lettering as per ISMP. Drug Interactions: Definition, types, clinical significance of drug interactions.

PHARMACY LAW AND ETHICS

Chapter 1: Introduction to Pharmacy Law

General Principles of Law, History and various Acts related to Drugs and Pharmacy profession.

Chapter 2: Pharmacy Act 1948 and Rules

Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils, Registration of Pharmacists, Offences and Penalties. Pharmacy Practice Regulations 2015.

Chapter 3: Drugs and Cosmetics Act 1940 and Rules 1945

Objectives, Definitions, Legal definitions of schedules to the Act and Rules. Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Manufacture of drugs – Prohibition of manufacture and sale of certain drugs, Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license. Study of schedule C and C1, G, H, H1, K, P, M, N, and X. Sale of Drugs – Wholesale, Retail sale and Restricted license, Records to be kept in a pharmacy. Drugs Prohibited for manufacture and sale in India. Administration of the Act and Rules – Drugs Technical Advisory Board, Central Drugs Laboratory, Drugs Consultative Committee, Government analysts, licensing authorities, controlling authorities, Drug Inspectors.

Chapter 4: Narcotic Drugs and Psychotropic Substances Act 1985

Objectives, Definitions, Authorities and Officers, Prohibition, Control and Regulation, Offences and Penalties.

Chapter 5: Drug Advertisement Laws

Drugs and Magic Remedies (Objectionable Advertisements) Act 1954. Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties.

Chapter 6: Animal Protection Laws

Prevention of Cruelty to Animals Act-1960: Objectives, Definitions, CPCSEA - brief overview, Institutional Animal Ethics Committee, Breeding and Stocking of Animals, Performance of Experiments, Transfer and Acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties.

Chapter 7: Poisons Act 1919

Introduction, objective, definition, possession, possession for sales and regulation of poisons.

Chapter 8: Intellectual Property Rights

Introduction to Patent laws - Definition, patentable and non-patentable drugs and pharmaceuticals, Brief introduction to Trade and Design marks, Copy rights.

Chapter 9: Professional Ethics

Pharmacy profession ethics, Standards for professional conduct for community, hospital, industrial pharmacists. International ethics: FIP Code of Ethics.

Chapter 10: Professional Organizations

WHO, FIP, Commonwealth, Pharmaceutical Association, Indian Pharmaceutical Association, All India Chemists and Druggists Association. Functions and role in promotion of profession of Pharmacy.

Chapter 11: Investigational Drug Studies

Procedure and legal requirements for conducting clinical trials of investigational drug studies and post marketing surveillance.

