TEACHING PLAN

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DELHI INSTITUTE OF RURAL DEVELOPMENT

1st Year 1st Semester B. Pharm

Lesson Plan

Subject: Pharmaceutical Analysis

Paper Code: 102T

Total Hours: 45

Scope: This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs

Objectives: Upon completion of the course student shall be able to

- Understand the principles of volumetric and electro chemical analysis
- Carryout various volumetric and electrochemical titrations
- Develop analytical skills

S. No.	Unit	Topics to Be Covered	Teaching Hours
1	Unit I	Pharmaceutical analysis: Definition, scope, and different techniques of analysis	1
2	Unit I	Methods of expressing concentration	1
3	Unit I	Primary and secondary standards	1
4	Unit I	Preparation and standardization of molar and normal solutions	2
5	Unit I	Preparation and standardization of oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate, and ceric ammonium sulphate solutions	3
6	Unit I	Errors in pharmaceutical analysis: Sources, types, minimization of errors, accuracy, precision, and significant figures	1
7	Unit I	Pharmacopoeia, sources of impurities in medicinal agents, and limit tests	1
	Unit I Total		**10**

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8	Unit II	Acid–base titration: Theories of acid–base indicators	2
9	Unit II	Classification of acid–base titrations and titration of strong, weak, and very weak acids and bases	4
10	Unit II	Neutralization curves	1
11	Unit II	Non-aqueous titration: Solvents and their classification	1
12	Unit II	Acidimetry and alkalimetry in non-aqueous titration	1
13	Unit II	Estimation of sodium benzoate and ephedrine HCl	1
	Unit II Total		**10**
14	Unit III	Precipitation titrations: Mohr's method, Volhard's method, modified Volhard's method, and Fajans' method	3
15	Unit III	Estimation of sodium chloride	1
16	Unit III	Complexometric titration: Classification and metal-ion indicators	1
17	Unit III	Masking and demasking reagents	1
18	Unit III	Estimation of magnesium sulphate and calcium gluconate	1
19	Unit III	Gravimetry: Principles and steps involved in gravimetric analysis	1
20	Unit III	Purity of precipitates, co-precipitation, post-precipitation, and estimation of barium sulphate	1
21	Unit III	Basic principles, methods, and applications of diazotization titration	1
	Unit III Total		**10**
22	Unit IV	Redox titrations: Concepts of oxidation and reduction	2

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23	Unit IV	Types of redox titrations: Principles and applications	2
24	Unit IV	Cerimetry and iodimetry	1
25	Unit IV	Iodometry and bromatometry	1
26	Unit IV	Dichrometry	1
27	Unit IV	Titration with potassium iodate	1
	Unit IV Total		**8**
28	Unit V	Conductometry: Introduction, conductivity cell, conductometric titrations, and applications	3
29	Unit V	Potentiometry: Electrochemical cell, construction, and working	1
30	Unit V	Reference electrodes: Standard hydrogen electrode, silver chloride electrode, and calomel electrode	1
31	Unit V	Indicator electrodes: Metal electrodes and glass electrode; determination of end point and applications of potentiometry	1
32	Unit V	Polarography: Principle, Ilkovic equation, dropping mercury electrode, rotating platinum electrode, and applications	1
	Unit V Total		**7**
	GRAND TOTAL	**5 Units**	**45 Hours**

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DELHI INSTITUTE OF RURAL DEVELOPMENT

1st Year 1st Semester B. Pharm

Lesson Plan

Subject: Pharmaceutical Inorganic Chemistry

Paper Code: 104T

Total Hours: 45

Scope: This subject deals with the monographs of inorganic drugs and pharmaceuticals.

Objectives: Upon completion of course student shall be able to

- Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- Understand the medicinal and pharmaceutical importance of inorganic compounds

S. No.	Unit	Topics to Be Covered	Teaching Hours
1	Unit I	Impurities in Pharmaceutical Substances: History of Pharmacopoeia, sources and types of impurities, principles involved in limit tests for chloride, sulphate, iron, arsenic, lead, and heavy metals; modified limit tests for chloride and sulphate.	5
2	Unit I	General Methods of Preparation: Preparation, assay, properties, and medicinal uses of compounds marked with an asterisk (*) and compounds belonging to the specified inorganic classes.	5
	Unit I Total		10
3	Unit II	Acids, Bases and Buffers: Buffer equations, buffer capacity, pharmaceutical buffer systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations, and methods of adjusting isotonicity.	4
4	Unit II	Major Extra- and Intracellular Electrolytes: Functions of major physiological ions, electrolytes used in replacement therapy, sodium chloride, potassium chloride, calcium gluconate, oral rehydration salts (ORS), and physiological acid–base balance.	4
5	Unit II	Dental Products: Dentifrices, role of fluoride in dental caries treatment, desensitizing agents, calcium carbonate, sodium fluoride, and zinc eugenol cement.	2
	Unit II Total		10

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6	Unit III	Gastrointestinal Agents – Acidifiers: Ammonium chloride and dilute hydrochloric acid.	1
7	Unit III	Gastrointestinal Agents – Antacids: Ideal properties of antacids, combinations of antacids, sodium bicarbonate, aluminium hydroxide gel, and magnesium hydroxide mixture.	3
8	Unit III	Cathartics: Magnesium sulphate, sodium orthophosphate, kaolin, and bentonite.	2
9	Unit III	Antimicrobials: Mechanism and classification; potassium permanganate, boric acid, hydrogen peroxide, chlorinated lime, iodine, and its preparations.	4
	Unit III Total		10
10	Unit IV	Miscellaneous Compounds – Expectorants: Potassium iodide and ammonium chloride.	2
11	Unit IV	Emetics: Copper sulphate and sodium potassium tartrate.	1
12	Unit IV	Haematinics: Ferrous sulphate and ferrous gluconate.	2
13	Unit IV	Poisons and Antidotes: Sodium thiosulphate, activated charcoal, and sodium nitrite.	2
14	Unit IV	Astringents: Zinc sulphate and potash alum.	1
	Unit IV Total		8
15	Unit V	Radiopharmaceuticals: Radioactivity, measurement of radioactivity, properties of alpha, beta, and gamma radiations, half-life, radioisotopes, study of radioisotopes, sodium iodide (^{131}I), storage conditions, precautions, and pharmaceutical applications of radioactive substances.	7
	Unit V Total		7
	GRAND TOTAL	5 Units	45 Hours

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DELHI INSTITUTE OF RURAL DEVELOPMENT

2nd Year 4th Semester B. Pharm

Lesson Plan

Subject: Biochemistry
Paper Code: 203T
Total Hours: 45 hours

Scope: Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

Objectives: Upon completion of course student shell able to

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.

2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.

3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

Units	Topics	Hours
UNIT-I	**Biomolecules and Bioenergetics**	
	Introduction, classification, chemical nature and biological role of carbohydrates	1
	Lipids: classification, chemical nature and biological role	1
	Amino acids and proteins: classification, chemical nature and biological role	2
	Nucleic acids: chemical nature and biological role	1
	Free energy, endergonic and exergonic reactions; relationship between free energy, enthalpy and entropy; redox potential	1
	Energy-rich compounds: classification and biological significance of ATP and cyclic AMP	2
UNIT-II	**Carbohydrate Metabolism and Biological Oxidation**	
	Glycolysis: pathway, energetics and significance	2
	Citric acid cycle: pathway, energetics and significance	2
	HMP shunt, its significance and G6PD deficiency	1
	Glycogen metabolism: glycogenesis, glycogenolysis and glycogen storage diseases	1
	Gluconeogenesis: pathway and significance	1
	Hormonal regulation of blood glucose level and diabetes mellitus	1
	Electron transport chain and its mechanism	1
	Oxidative phosphorylation, substrate-level phosphorylation, inhibitors and uncouplers	1
UNIT-III	**Lipid Metabolism and Amino Acid Metabolism**	
	β-Oxidation of saturated fatty acids (palmitic acid)	1

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	Formation and utilization of ketone bodies; ketoacidosis	1
	De novo synthesis of fatty acids (palmitic acid)	1
	Biological significance of cholesterol and its conversion into bile acids, steroid hormones and vitamin D	1
	Disorders of lipid metabolism: hypercholesterolemia, atherosclerosis, fatty liver and obesity	1
	General reactions of amino acid metabolism: transamination, deamination and decarboxylation	1
	Urea cycle and its disorders	1
	Catabolism of phenylalanine and tyrosine; phenylketonuria, albinism, alkaptonuria and tyrosinemia	1
	Synthesis and significance of serotonin (5-HT), melatonin, dopamine, noradrenaline and adrenaline	1
	Heme catabolism, hyperbilirubinemia and jaundice	1
UNIT-IV	**Nucleic Acid Metabolism and Genetic Information Transfer**	
	Biosynthesis of purine nucleotides	1
	Biosynthesis of pyrimidine nucleotides	1
	Catabolism of purine nucleotides; hyperuricemia and gout	1
	Organization of the mammalian genome	1
	Structure and functions of DNA and RNA	1
	DNA replication: semiconservative model and mechanism	1
	Transcription or RNA synthesis	1
	Genetic code: characteristics and significance	1
	Translation or protein synthesis	2
UNIT-V	**Enzymes and Coenzymes**	
	Introduction, properties and nomenclature of enzymes	1
	IUB classification of enzymes	1
	Enzyme kinetics: Michaelis plot and Lineweaver–Burk plot	1
	Enzyme inhibitors with examples	1
	Regulation of enzymes: induction, repression and allosteric regulation	1
	Therapeutic and diagnostic applications of enzymes and isoenzymes	1
	Coenzymes: structure and biochemical functions	1

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DELHI INSTITUTE OF RURAL DEVELOPMENT

2nd Year 3rd Semester B. Pharm

Lesson Plan

Subject: Pharmaceutical Organic Chemistry

Paper Code: 301T

Total Hours: 45

Scope: This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

Objectives: Upon completion of the course the student shall be able to

1. Write the structure, name and the type of isomerism of the organic compound
2. Write the reaction, name the reaction and orientation of reactions
3. Account for reactivity/stability of compounds
4. Prepare organic compounds

S. No.	Unit	Topics to Be Covered	Teaching Hours
1	Unit I	Benzene and Its Derivatives	
2	Unit I	Analytical, synthetic, and other evidence for the structure of benzene	1
3	Unit I	Orbital picture, resonance in benzene, aromatic character, and Huckel's rule	2
4	Unit I	Reactions of benzene: nitration, sulphonation, and halogenation	2
5	Unit I	Friedel–Crafts alkylation and acylation: reactivity and limitations	2
6	Unit I	Effect of substituents on reactivity and orientation of monosubstituted benzene towards electrophilic substitution	1
7	Unit I	Structure and uses of DDT, saccharin, BHC, and chloramine	2

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		Total Hours – Unit I	10
8	Unit II	Phenols	
9	Unit II	Acidity of phenols and effect of substituents on acidity	2
10	Unit II	Qualitative tests for phenols	1
11	Unit II	Structure and uses of phenol, cresols, resorcinol, and naphthols	2
12	Unit II	Aromatic Amines: Basicity, effect of substituents on basicity, and synthetic uses of aryl diazonium salts	2
13	Unit II	Aromatic Acids: Acidity, effect of substituents on acidity, and important reactions of benzoic acid	3
		Total Hours – Unit II	10
14	Unit III	Fats and Oils	
15	Unit III	Fatty acids: important reactions	2
16	Unit III	Hydrolysis and hydrogenation of fats and oils	2
17	Unit III	Saponification and rancidity of oils	2
18	Unit III	Drying oils and their properties	1
19	Unit III	Analytical constants: acid value, saponification value, and ester value	1
20	Unit III	Iodine value, acetyl value, and Reichert–Meissl (RM) value: significance and principles involved in their determination	2
		Total Hours – Unit III	10
21	Unit IV	Polynuclear Hydrocarbons	

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22	Unit IV	Naphthalene: synthesis and reactions	2
23	Unit IV	Structure and medicinal uses of naphthalene	1
24	Unit IV	Phenanthrene: synthesis, reactions, and medicinal importance	2
25	Unit IV	Anthracene: synthesis, reactions, and medicinal importance	1
26	Unit IV	Diphenylmethane, triphenylmethane, and their derivatives	2
		Total Hours – Unit IV	8
27	Unit V	Cycloalkanes	
28	Unit V	Stability of cycloalkanes and Baeyer's strain theory	2
29	Unit V	Limitations of Baeyer's strain theory	1
30	Unit V	Coulson and Moffitt's modification	1
31	Unit V	Sachse–Mohr's theory of strain-free rings	1
32	Unit V	Reactions of cyclopropane and cyclobutane	2
		Total Hours – Unit V	7
		GRAND TOTAL	45 HOURS

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DELHI INSTITUTE OF RURAL DEVELOPMENT

2nd Year 4th Semester B. Pharm

Lesson Plan

Subject: Pharmacology I
Paper Code: 404T
Total Hours: 45 hours

Scope: The subject aims to provide fundamental knowledge of pharmacology, including the principles of drug action, pharmacokinetics, pharmacodynamics, drug–receptor interactions, adverse drug reactions, drug interactions, drug discovery and clinical evaluation. It also covers the pharmacology of drugs acting on the peripheral and central nervous systems, emphasizing their mechanisms of action, therapeutic uses and adverse effects. The subject helps students understand the rational use of drugs in the prevention and treatment of diseases

Objective:

1. Understand the pharmacological actions of different categories of drugs.
2. Explain the mechanisms of drug action at organ-system, cellular and molecular levels.
3. Apply basic pharmacological knowledge to the prevention and treatment of various diseases.
4. Observe the effects of drugs through simulated pharmacological experiments.
5. Correlate pharmacology with other biomedical sciences and clinical applications.

Units	Topics	Hours
UNIT-I	**General Pharmacology**	**8 hours**
	Introduction to pharmacology: definition, historical landmarks and scope	1
	Nature and sources of drugs; essential drug concepts	1
	Routes of drug administration	1
	Agonists, competitive and non-competitive antagonists, and spare receptors	1
	Addiction, tolerance, tachyphylaxis, idiosyncrasy and allergy	1
	Pharmacokinetics: membrane transport and drug absorption	1
	Drug distribution and metabolism	1
	Drug excretion, enzyme induction, enzyme inhibition and kinetics of elimination	1
UNIT-II	**General Pharmacology**	**12 hours**
	Pharmacodynamics: principles and mechanisms of drug action	1
	Receptor theories and classification of receptors Regulation of receptors and drug–receptor interactions	2
	Signal transduction mechanisms and G-protein-coupled receptors Ion channel receptors and transmembrane enzyme-linked receptors	2
	JAK–STAT-associated receptors and receptors regulating transcription factors	1

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	Dose–response relationship Therapeutic index, combined effects of drugs and factors modifying drug action	3
	Adverse drug reactions: classification and management Drug interactions: pharmacokinetic interactions Drug interactions: pharmacodynamic interactions	2
	Drug discovery, preclinical evaluation, clinical trial phases and pharmacovigilance	1
UNIT-III	**Pharmacology of Drugs Acting on the Peripheral Nervous System**	**10 hours**
	Organization and functions of the autonomic nervous system	1
	Neurohumoral transmission and co-transmission Classification of neurotransmitters and cholinergic transmission	2
	Parasympathomimetics and parasympatholytics Sympathomimetics	2
	Sympatholytics	1
	Neuromuscular blocking agents Peripheral skeletal muscle relaxants	2
	Local anaesthetic agents	1
	Drugs used in myasthenia gravis and glaucoma	1
UNIT IV	**Pharmacology of Drugs Acting on the Central Nervous System – Part I**	**8 hours**
	CNS neurohumoral transmission and role of GABA Role of glutamate, glycine, serotonin and dopamine in CNS transmission	2
	General anaesthetics: classification and mechanism of action Pre-anaesthetics and pre-anaesthetic medication	2
	Sedatives and hypnotics	1
	Centrally acting muscle relaxants	1
	Antiepileptic drugs: classification and mechanism of action	1
	Alcohols and disulfiram	1
UNIT V	**Pharmacology of Drugs Acting on the Central Nervous System – Part II**	**7 hours**
	Antipsychotic drugs	1
	Antidepressants and anti-anxiety agents Anti-manic drugs and hallucinogens	2
	Drugs used in Parkinson's disease and Alzheimer's disease	1
	CNS stimulants and nootropics	1
	Opioid analgesics and opioid antagonists	1
	Drug addiction, drug abuse, tolerance and dependence	1

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DELHI INSTITUTE OF RURAL DEVELOPMENT

3rd Year 5th Semester B. Pharm

Lesson Plan

Subject: Pharmacology II
Paper Code: 503T
Total Hours: 45 hours

Scope: Pharmacology II provides comprehensive knowledge of drugs acting on the cardiovascular, urinary, endocrine and other physiological systems, including autacoids and related drugs. It focuses on the mechanisms of drug action, therapeutic uses, adverse effects, contraindications and clinical applications of drugs.

Objective:

1. To understand the pharmacological actions, mechanisms of action and therapeutic uses of drugs acting on different body systems.
2. To classify cardiovascular drugs and explain their role in the management of cardiovascular disorders.
3. To describe drugs acting on the blood, urinary and endocrine systems, including their indications and adverse effects.
4. To explain the pharmacological actions of autacoids and related drugs, including NSAIDs, anti-gout and antirheumatic drugs.
5. To understand the principles, types and applications of bioassays and their role in determining drug potency.
6. To develop the ability to evaluate the therapeutic benefits, adverse effects and clinical relevance of drugs.

Units	Topics	Hours
UNIT-I	**Pharmacology of Drug acting on Cardiovascular System**	**10 hours**
	Introduction to haemodynamics and electrophysiology of the heart	2
	Drugs used in congestive heart failure	2
	Antihypertensive drugs	2
	Anti-anginal drugs	1
	Anti-arrhythmic drugs	2
	Anti-hyperlipidaemic drugs	1
UNIT-II	**Pharmacology of Drug acting on Cardiovascular System**	**10 hours**
	Drugs used in the therapy of shock	1
	Haematinics, coagulants and anticoagulants	2
	Fibrinolytics and antiplatelet drugs	2
	Plasma volume expanders	1
	Diuretics	3
	Antidiuretics	1
UNIT-III	**Autocoids and Related Drugs**	**10 hours**
	Introduction to autacoids and classification	1

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	Histamine, 5-HT and their antagonists	2
	Prostaglandins, thromboxanes and leukotrienes	2
	Angiotensin, bradykinin and substance P	1
	Non-steroidal anti-inflammatory agents (NSAIDs)	2
	Anti-gout drugs	1
	Antirheumatic drugs	1
UNIT IV	**Pharmacology of Drug acting on Endocrine System**	**8 hours**
	Basic concepts in endocrine pharmacology	1
	Anterior pituitary hormones, analogues and inhibitors	1
	Thyroid hormones, analogues and inhibitors	1
	Hormones Regulating Plasma Calcium Levels: Parathormone, Calcitonin and Vitamin D	2
	Insulin, oral hypoglycaemic agents and glucagon	2
	ACTH and corticosteroids	1
UNIT V	**Pharmacology of Drug acting on Endocrine System**	**7 hours**
	Androgens and anabolic steroids	1
	Oestrogens, progesterone and oral contraceptives	2
	Drugs acting on the uterus	1
	Principles and applications of bioassay, Types of bioassays	1
	Bioassay of insulin, oxytocin, vasopressin and ACTH	1
	Bioassay of d-tubocurarine, digitalis, histamine and 5-HT	1

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DELHI INSTITUTE OF RURAL DEVELOPMENT

3rd Year 6th Semester B. Pharm

Lesson Plan

Subject: Pharmacology III
Paper Code: 602T
Total Hours: 45 hours

Scope: This subject provides fundamental knowledge of the classification, mechanism of action, therapeutic effects, clinical uses, adverse effects and contraindications of drugs acting on the respiratory and gastrointestinal systems. It also covers antimicrobial chemotherapy, immunopharmacology, principles of toxicology and chrono-pharmacology, emphasizing the rational use of drugs in the prevention and treatment of diseases.

Objective:

1. Understand the mechanisms of drug action and their relevance in the treatment of infectious diseases.
2. Comprehend the principles of toxicology and the treatment of various poisonings.
3. Correlate pharmacology with related medical sciences and clinical applications.

Units	Topics	Hours
UNIT-I	**Pharmacology of Drugs Acting on Respiratory and Gastrointestinal Systems**	**10 hours**
	Anti-asthmatic drugs: classification and mechanism of action	1
	Drugs used in the management of COPD	1
	Expectorants and antitussives Nasal decongestants and respiratory stimulants	2
	Antiulcer agents Drugs used in constipation and diarrhoea	2
	Appetite stimulants and suppressants	1
	Digestants and carminatives	1
	Emetics and anti-emetics	1
	Comparative revision of respiratory and gastrointestinal drugs	1
UNIT-II	**Chemotherapy**	**10 hours**
	General principles of chemotherapy	1
	Selective toxicity, spectrum of activity and antimicrobial resistance Sulfonamides: classification and mechanism of action	2
	Cotrimoxazole: mechanism, uses and adverse effects	1
	Penicillins and cephalosporins	1
	Chloramphenicol and macrolides Quinolones and fluoroquinolones	2
	Tetracyclines Aminoglycosides	2
	Comparative study and revision of antimicrobial agents	1
UNIT-III	**Chemotherapy**	**10 hours**

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	Antitubercular agents: classification and mechanism of action Antitubercular drug regimens, uses and adverse effects	2
	Antileprotic agents	1
	Antifungal agents Anthelmintic drugs	2
	Antiviral drugs	1
	Antimalarial drugs: classification and mechanism of action Antimalarial drugs: therapeutic uses and adverse effects	2
	Anti-amoebic agents	1
	Comparative revision of chemotherapeutic agents	1
UNIT IV	**Chemotherapy and Immunopharmacology**	**8 hours**
	Drugs used in urinary tract infections Drugs used in sexually transmitted diseases	2
	Chemotherapy of malignancy: principles and classification Anticancer drugs: mechanisms of action and adverse effects	2
	Immunostimulants	1
	Immunosuppressants	1
	Protein drugs and monoclonal antibodies	1
	Targeted drugs, antigen-specific therapies and biosimilars	1
UNIT V	**Principles of Toxicology and Chronopharmacology**	**7 hours**
	Introduction to toxicology; acute, subacute and chronic toxicity	1
	Genotoxicity, carcinogenicity, teratogenicity and mutagenicity General principles of poisoning management	2
	Clinical symptoms and management of barbiturate and morphine poisoning	1
	Organophosphorus compound and lead poisoning	1
	Mercury and arsenic poisoning: clinical manifestations and management	1
	Chronopharmacology: biological rhythms, cycles, biological clocks and significance in chronotherapy	1

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Delhi College of Pharmacy (DCP)-DIRD

3rd Year 6th Semester B.Pharm

Lesson Plan

Subject: Biopharmaceutics and Pharmacokinetics (Theory)
Paper Code: BP 604 T
Total Hours: 45 Hours

Scope: This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arised therein.

Objectives: Upon completion of the course student shall be able to:

1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance .
2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
4. Understand various pharmacokinetic parameters, their significance & applications.

Units	Topics	Hours
UNIT-I	**INTRODUCTION TO BIOPHARMACEUTICS, ABSORPTION & DISTRIBUTION**	**10**
a.	Introduction to Biopharmaceutics. Absorption: Mechanisms of drug absorption through GIT, factors influencing drug absorption though GIT, absorption of drug from Non	5

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Units	Topics	Hours
	per oral extra-vascular routes.	
b.	Distribution: Tissue permeability of drugs, binding of drugs, apparent volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding, kinetics of protein binding, clinical significance of protein binding of drugs.	5
UNIT-II	**ELIMINATION, BIOAVAILABILITY AND BIOEQUIVALENCE**	**10**
a.	Elimination: Drug metabolism and basic understanding metabolic pathways, renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, non-renal routes of drug excretion of drugs.	5
b.	Bioavailability and Bioequivalence: Definition and objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, in-vitro drug dissolution models, in-vitro-in-vivo correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.	5

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Units	Topics	Hours
UNIT-III	**PHARMACOKINETICS & COMPARTMENT MODELS**	**10**
a.	Pharmacokinetics: Definition and introduction to pharmacokinetics, compartment models, non-compartment models, physiological models, One compartment open model: (a) Intravenous Injection (Bolus), (b) Intravenous infusion, and (c) Extra vascular administrations.	5
b.	Pharmacokinetics parameters : Definitions, methods of eliminations, understanding of their significance and application.	5
UNIT-IV	**MULTICOMPARTMENT MODELS & MULTIPLE DOSING**	**08**
a.	Multicompartment models: Two compartment open model, IV bolus.	4
b.	Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings.	4
UNIT-V	**NONLINEAR PHARMACOKINETICS**	**07**
a.	Nonlinear Pharmacokinetics: Introduction, factors causing non-linearity,	7

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Units	Topics	Hours
	Michaelis-Menten method of estimating parameters, explanation with example of drugs.	

Recommended Books (Latest Editions):

1. Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi.
2. Biopharmaceutics and Pharmacokinetics by Robert F. Notari.
3. Applied biopharmaceutics and pharmacokinetics by Leon Shargel and Andrew B.C. Yu.
4. Bio pharmaceutics and Pharmacokinetics - A Treatise by D. M. Brahmankar and Sunil B. Jaiswal.
5. Pharmacokinetics by Milo Gibaldi and Donald R.
6. Hand Book of Clinical Pharmacokinetics by Milo Gibaldi and Laurie Prescott.
7. Biopharmaceutics by Swarbrick.
8. Clinical Pharmacokinetics, Concepts and Applications by Malcolm Rowland and Thomas N. Tozer.
9. Dissolution, Bioavailability and Bioequivalence by Abdou H.M.
10. Biopharmaceutics and Clinical Pharmacokinetics - An introduction by Robert F. Notari.
11. Remington's Pharmaceutical Sciences by Mack Publishing Company.

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