



STUDY GUIDE	
PROGRAM	BDS
COURSE TITLE	Pharmacology
ACADEMIC YEAR	2nd Year BDS
INTRODUCTION	<p>Pharmacology is the science of drugs, focusing on their origin, chemical properties, mechanism of action, therapeutic uses, and toxicological effects. It explores how drugs affect biological processes, and how factors like absorption, distribution, metabolism, and excretion (pharmacokinetics) influence drug action (pharmacodynamics). It provides the foundation for understanding drug actions, enabling healthcare professionals to prescribe medications effectively, manage therapy, and optimize patient care. The study of pharmacology links basic sciences with clinical practice, helping students understand the mechanisms behind drug effects, interactions, and the safe use of medications.</p>
LEARNING OUTCOMES	<p>Upon completing pharmacology course, 2nd Year BDS students will:</p> <ol style="list-style-type: none">1. Understand how drugs interact with biological targets to produce therapeutic and adverse effects.2. Classify drugs based on their effects and mechanisms of action.3. Apply knowledge of pharmacokinetics and pharmacodynamics in clinical settings.4. Recognize and manage adverse drug reactions and understand toxicology.5. Identify drug interactions and contraindications.6. Safely and effectively prescribe medications, considering patient-specific factors.7. Use pharmacological knowledge to manage drug therapy in clinical practice.8. Counsel patients on safe drug use and potential side effects.9. Understand the ethical and legal aspects of drug regulation and use.10. Stay updated with new drug developments and research.



CHAPTER I: BASIC PRICIPLES OF PHARMACOLOGY	
The Subject	<ul style="list-style-type: none"> • Definition of important terms • Significance of the subject • Scope of the subject
<ul style="list-style-type: none"> • Define Pharmacology • Describe different branches of Pharmacology and their significance. 	
Routes of Drugs Administration	<ul style="list-style-type: none"> • Different routes of drug administration • Comparison of the routes • Hospital staff involved in drug administration • Rational prescribing and prescription writing
<ul style="list-style-type: none"> • List the different routes of drug administration. • Describe enteral route of administration and their importance. • Discuss merits and demerits of enteral route. • Describe parenteral route of administration and their importance. • Discuss merits and demerits of parenteral route. 	
Concept of Dose and Dosage	<ul style="list-style-type: none"> • Definition of important concepts • Important parameters used for calculation • Disease required dose calculation • Disease requiring
Correction of dose and dosage Overdosage of drugs	<ul style="list-style-type: none"> • Estimate the half-life of a drug based on its clearance and volume of distribution or from a graph of its plasma concentration over time. • Calculate loading and maintenance dosage regimens for oral or intravenous administration of a drug when given the following information: minimum therapeutic concentration, minimum toxic concentration, oral bioavailability, clearance, and volume of distribution
General Pharmacology (I)	<ul style="list-style-type: none"> • Drugs absorption and factors modifying absorption • Mechanism of drug distribution in the body and factors affecting the mechanism • Drug biotransformation • Drug receptor and Pharmacodynamics
<ul style="list-style-type: none"> • Discuss the transport of drugs across the cell membrane (osmotic active and passive drug transport). • Discuss the absorption of drugs and factors which increase and decrease it. • Discuss bioavailability of drugs in systemic circulation, its importance, and factors affecting it. • Explain the concept of agonist and antagonist. 	



- Describe different types of drug antagonism and their role in drug efficacy.
- Describe the drug reservoirs, distribution, and redistribution of drugs.
- Describe plasma protein binding, tissue binding, and volume of distribution.
- Discuss efficacy of drugs, role of protein binding with drugs.
- Discuss the design and optimization of dosage regimens like continuous infusion, fixed dose/fixed time, maintenance dose, loading dose.
- Discuss the half-life and steady state concentration.
- Describe total body clearance.
- Describe first-order kinetics and zero-order kinetics of elimination.
- Discuss receptor upregulation and receptor downregulation.

TUTORIAL

Distribution of Drug:

- Describe the distribution of drug.
- List and understand the characteristics of receptors.
- Define Spare receptor.
- Describe drug-drug interaction.
- Discuss the examples of drug-drug interaction.

General Pharmacology(II)

- Evaluation of the therapeutic response Clinical trials

- Discuss and differentiate pathological and pharmacological factors which affect drug response.
- What are the phases of clinical trials and its importance?

CHAPTER II: DRUGS FOR AUTONOMIC NERVOUS SYSTEM

Parasympathomimetic and Parasympatholytics

- Cholinoceptors
- Direct acting cholinceptor stimulants
- Indirect acting cholinomimetics
- Muscarinic receptors blocking drugs
- Ganglion blocking drugs

- Discuss the synthesis and release of acetylcholine
- Enlist cholinergic agonist drugs
- Describe mechanism of action of each group with clinical applications.
- Discuss pharmacokinetics of each group with their adverse effects.
- Enlist cholinergic antagonist drugs
- Describe mechanism of action of each group and their clinical applications and uses.
- Discuss pharmacokinetics of each group with their adverse effects.

TUTORIAL

Parasympathomimetic

- List the locations and types of acetylcholine receptors in the major organ systems (CNS, autonomic ganglia, eye, heart, vessels, bronchi, gut, genitourinary tract,



skeletal muscle, exocrine glands).

- Describe the second messengers involved and the effects of acetylcholine on the major organ

Parasympatholytics

- Describe the effects of atropine on the major organ systems (CNS, eye, heart, vessels, bronchi, gut, genitourinary tract, exocrine glands, and skeletal muscle).
- List the signs, symptoms, and treatment of atropine overdose.

Sympathomimetic and Sympatholytics	<ul style="list-style-type: none"> • Adrenoceptors • Pharmacology of sympathomimetic drugs • Alpha receptor antagonist drugs • Beta receptor antagonist drugs
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- Discuss the synthesis and release of nor-epinephrine.
- Discuss major effects mediated by α and β adrenoreceptors.
- List adrenergic agonist drugs.
- Describe characteristics of adrenergic agonists.
- List adrenergic antagonist drugs.
- Describe adrenergic blocking drugs.
- Describe mechanism of action and their application.
- Discuss pharmacokinetics of each group and their application.
- Describe contraindications of each group.

TUTORIAL

Sympathomimetic

- List tissues that contain significant numbers of α_1 or α_2 receptors.
- List tissues that contain significant numbers of β_1 or β_2 receptors.
- Describe the major organ system effects of a pure α agonist, a pure β agonist, and a mixed α and β agonist.

Sympatholytics

- Describe and compare the effects of an α blocker on the blood pressure and heart rate responses to epinephrine, norepinephrine, and phenylephrine.

CHAPTER III : DRUGS OF CARDIOVASCULAR SYSTEM

Anti-Hypertensive Agents	<ul style="list-style-type: none"> • Cardiovascular-Renal Drugs • Regulation of blood pressure • Drugs that alter sodium and water balance • Drugs that alter the sympathetic nervous system • Vasodilators
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- Classify anti-hypertensive drugs.
- Discuss use of diuretics in the treatment of hypertension.



<ul style="list-style-type: none"> Describe their mechanism of actions. 	
Drugs used in CHF	<ul style="list-style-type: none"> Cardiac Glycosides Digitalis Other positive Inotropic drugs
<ul style="list-style-type: none"> Discuss heart failure & compensatory physiological responses in heart failure. Classify drugs used in heart failure. Discuss the role of β-blockers and diuretics in the treatment of heart failure. Describe their pharmacokinetic properties. Describe adverse effects produced by these drugs and their contraindications. Discuss the role of inotropic drugs and the renin–angiotensin-aldosterone system in the treatment of heart failure. Describe their pharmacokinetic properties. Describe adverse effects produced by these drugs and their contraindications. 	
Drugs used in Angina Pectoris	<ul style="list-style-type: none"> Angina Pectoris Pharmacology of drugs used in Angina Pectoris
<ul style="list-style-type: none"> Classify Anti-Anginal drugs. Describe their mechanism of action. Describe their pharmacokinetic properties and adverse effects. 	
Drugs used in Cardiac Arrhythmias	<ul style="list-style-type: none"> Electrophysiology of normal cardiac rhythm Pharmacology of Antiarrhythmic drugs
<ul style="list-style-type: none"> Classify Anti-Arrhythmic drugs. Discuss class I antiarrhythmic drug and their mechanism of action. Describe their pharmacokinetic properties and adverse effects produced by these drugs. Discuss class I, II, III, IV drugs used in the treatment of arrhythmia. Describe their mechanism of action. Describe their pharmacokinetic properties and adverse effects produced by these drugs. 	
Diuretics Agents	
<ul style="list-style-type: none"> Classify Diuretic drugs on the basis of their action. Describe their organic acid and base secretory system of drugs. List carbonic anhydrase inhibitor drugs. Describe their mechanism of action of these drugs. Discuss their therapeutic uses along with adverse effects and contraindications. Classify Osmotic diuretic drugs. Describe their mechanism of action. Discuss therapeutic uses along with adverse effects and contraindications of these drugs. Enlist loop diuretics. Describe their mechanism of action. Discuss therapeutic uses along with adverse effects and contraindications. 	



TUTORIAL

Antihypertensive Drugs:

- Describe the compensatory responses, if any, to each of the 4 major types of antihypertensive drugs.
- List the major sites of action of sympathoplegic drugs in clinical use, and give examples of drugs that act at each site.

Antiarrhythmic Drugs:

- Describe the mechanism of selective depression by local anesthetic antiarrhythmic agents.
- Explain how hyperkalemia, hypokalemia, or an antiarrhythmic drug can cause an arrhythmia.

COURSE TITLE: DRUGS WITH IMPORTANT ACTIONS ON SMOOTH MUSCLE

Histamine, Serotonin and the Ergot alkaloids	<ul style="list-style-type: none"> • Classify Anti-Histamine drugs • Describe their mechanism of action. • Describe pharmacokinetic properties of these drugs. • Describe adverse effects and contraindications of these drugs.
Eicosanoids	<ul style="list-style-type: none"> • List of major effects of prostaglandins and leukotrienes. • List of cellular sites of synthesis and effects of thromboxane and prostacyclin in the vascular system.
Vaso active peptides	<ul style="list-style-type: none"> • Name an antagonist in angiotensin receptor and drugs that reduce the formation of angiotensin II. • Describe the major effects of bradykinin and brain Natriuretic Peptide (BNP).
Bronchodilators and other agents used in Asthma	<ul style="list-style-type: none"> • Drugs used in Asthma
	<ul style="list-style-type: none"> • Classify antiasthmatic drugs. • Describe their mechanism of action. • Describe pharmacokinetic properties of these drugs. • Describe adverse effects and contraindications of these drugs.
Nitric Oxide Donor and Inhibitors	<ul style="list-style-type: none"> • Drug based on Nitric Oxide
	<ul style="list-style-type: none"> • Mechanism of action of NO. • List of major beneficial and toxic effects of endogenous NO.

TUTORIAL



- Name the enzyme responsible for the synthesis of NO in tissues.
- List the major beneficial and toxic effects of endogenous NO.
- List drugs that cause release of endogenous NO.

CHAPTERV : CHEMOTHERAPEUTIC DRUGS

Cell wall synthesis Inhibitors

- Penicillin
- Cephalosporin
- Vancomycin
- Other agents of same class

- Describe the mechanism of antibacterial action of beta-lactam antibiotics.
- Describe the mechanisms underlying the resistance of bacteria to beta-lactam antibiotics.
- Identify the prototype drugs in each subclass of penicillins, and describe their antibacterial activity and clinical uses.
- Identify the 4 subclasses of cephalosporins, and describe their antibacterial activities and clinical uses.
- List the major adverse effects of the penicillins and the cephalosporins.
- Identify the important features of aztreonam, imipenem, and meropenem.
- Describe the clinical uses and toxicities of vancomycin.

Protein Synthesis Inhibitors

- Amino glycosides
- Chloramphenicol
- Macrolides
- Clindamycin, Streptogramins

- Explain how the Aminoglycosides, Chloramphenicol, Macrolides, Clindamycin, and Streptogramins agents inhibit bacterial protein synthesis.
- Identify the primary mechanisms of resistance to each of these drug classes.
- Name the most important agents in each drug class, and list 3 clinical uses of each.
- Recall distinctive pharmacokinetic features of the major drugs.
- List the characteristic toxic effects of the major drugs in each class.
- Describe actions of aminoglycosides on protein synthesis and mechanisms of resistance to this class of drugs.
- List the major clinical applications of aminoglycosides and identify their main toxicities.

TUTORIAL

- Describe aminoglycoside pharmacokinetic characteristics with reference to their renal clearance and potential toxicity.
- Understand time-dependent and concentration-dependent killing actions of antibiotics.
- What is meant by post-antibiotic effect?

Anti Folate Drugs

- Sulphonamides and Trimethoprin
- Flouroquinolones



- Describe how sulfonamides and trimethoprim affect bacterial folic acid synthesis and how resistance to the antifolate drugs occurs.
- Identify major clinical uses of sulfonamides and trimethoprim, singly and in combination, and describe their characteristic pharmacokinetic properties and toxic effects.
- Describe how fluoroquinolones inhibit nucleic acid synthesis and identify mechanisms involved in bacterial resistance to these agents.
- List the major clinical uses of fluoroquinolones and describe their characteristic pharmacokinetic properties and toxic effects

Antifungal Agents	<ul style="list-style-type: none"> • Amphotericin B, Flucytosine • Azole Antifungal agents
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- Describe the mechanisms of action of the azole, polyene, and echinocandin antifungal drugs.
- Identify the clinical uses of amphotericin B, flucytosine, individual azoles, caspofungin, griseofulvin, and terbinafine.
- Describe the pharmacokinetics and toxicities of amphotericin B.
- Describe the pharmacokinetics, toxicities, and drug interactions of the azoles.
- Identify the main topical antifungal agents

Antiviral Agents	<ul style="list-style-type: none"> • Non Antiretroviral agents • Antiretroviral agents
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- Identify the main targets for antiviral action in viral replication.
- Describe the mechanisms of action of anti-herpes drugs and the mechanisms of HSV and CMV resistance.
- List the main pharmacokinetic properties and toxic effects of acyclovir, ganciclovir, cidofovir, and foscarnet.
- Describe the mechanisms of anti-HIV action of zidovudine, indinavir, and enfuvirtide.
- Identify the significant properties of 4 drugs active against HBV and HCV.

TUTORIAL

- Match a specific antiretroviral drug with each of the following: to be avoided in pregnancy; hyperpigmentation; neutropenia; pancreatitis; peripheral neuropathy; inhibition of P450; severe hypersensitivity reaction; injection site reactions.
- Identify the significant properties of anti-influenza drug acting at the stage of viral uncoating and acting at the stage of viral release

Anti mycobacterial	<ul style="list-style-type: none"> • Drugs for Tuberculosis • Leprosy
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- Classify antituberculous drugs.
- List 5 special problems associated with chemotherapy of mycobacterial infections.
- Identify the characteristic pharmacodynamic and pharmacokinetic properties of isoniazid and rifampin.



<ul style="list-style-type: none"> List the typical adverse effects of ethambutol, pyrazinamide, and streptomycin. Identify the drugs used in leprosy and in the prophylaxis and treatment of Mycobacterium avium-intracellulare complex disease. 	
TUTORIAL	
<ul style="list-style-type: none"> Describe the standard protocols for drug management of latent tuberculosis, pulmonary tuberculosis, and multidrug-resistant tuberculosis. Describe the standard protocols for drug management of latent tuberculosis, pulmonary tuberculosis, and multidrug-resistant tuberculosis. 	
Antiprotozoal Drugs	Ant malarial Drugs
<ul style="list-style-type: none"> Name the major antimalarial drugs. Know which are used for chemoprophylaxis, which are effective in chloroquine resistance, and which are exoerythrocytic schizonticides. Identify the characteristic adverse effects of the major antimalarial drugs. Describe the clinical uses and adverse effects of metronidazole. Identify the intestinal amebicides. Identify the drugs used for prophylaxis and treatment of pneumocystosis and toxoplasmosis, and know their characteristic toxic effects. Identify the major drugs used for trypanosomiasis and leishmaniasis, and know their characteristic toxic effects. 	
Cancer Chemotherapy	<ul style="list-style-type: none"> Alkylating agent Antimetabolites Miscellaneous
Immuno modulators	<ul style="list-style-type: none"> Immuno suppressants Immuno potentiators
<ul style="list-style-type: none"> Describe the primary features of cell-mediated and humoral immunity. Name 7 immunosuppressants and, for each, describe the mechanism of action, clinical uses, and toxicities. Describe the mechanisms of action, clinical uses, and toxicities of antibodies used as immunosuppressants. Identify the major cytokines and other immunomodulating agents and know their clinical applications. Describe the different types of allergic reactions to drugs. 	
Disinfectants	<ul style="list-style-type: none"> Antiseptics Sterilants
<ul style="list-style-type: none"> Classify disinfectants, sterilants, and antiseptics based on their chemical nature (e.g., alcohol, chlorine compounds, phenols, quaternary ammonium compounds). Identify potential side effects and toxicities associated with the use of disinfectants, sterilants, and antiseptics. 	



CHAPTER VI: DRUGS FOR CENTRAL NERVOUS SYSTEM	
Drugs for CNS Disorders	<ul style="list-style-type: none">• Introduction to CNS
Topic: Introduction to CNS <ul style="list-style-type: none">• What characteristics of drug molecules afford access to the CNS?• What concerns do you have regarding CNS drug use in the pregnant patient?• How are most CNS drugs usually eliminated from the body?	
Anti depressants <ul style="list-style-type: none">• Classify Antidepressant drugs.• Discuss selective serotonin reuptake inhibitors (SSRIs) and SNRIs.• Describe their mechanism of action.• Describe pharmacokinetics of these drugs.• Describe adverse effects produced by these drugs and their contraindications.• Discuss atypical and tricyclic antidepressants for the treatment of depression and their contraindications.	
Anti Epileptic Drugs <ul style="list-style-type: none">• Classify anti-epileptic drugs.• Discuss the role of carbamazepine and gabapentin in the treatment of epilepsy.• Describe the mechanism of action of these drugs.• Describe pharmacokinetic properties of these drugs.• Describe proper selection of these drugs in different types of Epilepsies.• Describe adverse effects produced by these drugs and their contraindications.	
Antipsychoticdrugs <ul style="list-style-type: none">• List Antipsychotic drugs.• Describe their mechanism of action.• Describe pharmacokinetics of these drugs.• Describe adverse effects produced by these drugs and their contraindications.• Discuss the drugs used for the management of Schizophrenia.	
TUTORIAL	
<ul style="list-style-type: none">• Describe tardive dyskinesia and the neuroleptic malignant syndrome.• Identify the distinctive pharmacokinetic features of lithium, and list its adverse effects and toxicities.• List the alternative drugs used in bipolar disorder.	
Drugs for Neuro degenerative Disorder <ul style="list-style-type: none">• Classify antiparkinsonism drugs.• Describe the mechanism of action.• Describe pharmacokinetic properties of these drugs.• Describe adverse effects produced by these drugs and their contraindications.• Identify the mechanism by which antiparkinsonism agents alleviate parkinsonism.• Describe the neurochemical imbalance underlying the symptoms of Parkinsonism disease.	



Drug Abuse	
<ul style="list-style-type: none"> • Describe the effects of alcohol on the body. • Describe the mechanism of action of alcohol. • Describe pharmacokinetic properties of these drugs. • Describe adverse effects produced by these drugs and their contraindications. 	
Anesthesia and adjuvant drugs	<ul style="list-style-type: none"> • General Anesthetics • Local anesthetics • Opioid Analgesics • Skeletal Muscler elaxants
<ul style="list-style-type: none"> • Discuss stages and depth of anesthesia. • List factors in selection of anesthesia. • Classify general anesthetic and local anesthetic drugs. • Describe their mechanism of action. • Describe adverse effects produced by these drugs and their contraindications. • Classify opioid drugs. • Discuss opioid agonists and opioid receptors. • Discuss partial agonists and antagonists of opioid receptors. • Describe mechanism of action of opioid drugs. • Describe pharmacokinetic properties and clinical uses of these drugs. • Describe adverse effects produced by these drugs and their contraindications. • Identify the major non-depolarizing neuromuscular blockers and depolarizing neuromuscular blockers. • Compare their pharmacokinetics. • Difference between non-depolarizing neuromuscular blockers and depolarizing neuromuscular blockers from their standpoint of tetanic and post-tetanic twitch strength. 	
TUTORIAL	
<ul style="list-style-type: none"> • Skeletal Muscle Relaxants • Which sedative agent causes retrograde amnesia? • Explain the difference between voltage-gated and ligand-gated ion channels. • Describe the transmission process at the skeletal neuromuscular junction and the points at which drugs can modify this process. • How does succinylcholine act on the neuromuscular junction? 	
CHAPTER VII: ENDOCRINE DRUGS	
Important drugs used in hypothalamic and pituitary diseases	<ul style="list-style-type: none"> • Anterior Pituitary Hormones • Posterior Pituitary • Hormones
<ul style="list-style-type: none"> • Describe the drugs used as substitutes for the natural pituitary hormones, and list their clinical uses. • List the gonadotropin analogs and GnRH agonists and antagonists, and describe 	



<p>their clinical use in treating male and female infertility, endometriosis, and prostate cancer.</p> <ul style="list-style-type: none"> • Clinical indication and toxicities of oxytocin agonists. • Classify the types of oxytocin antagonists and their uses. 	
Thyroid Gland	<ul style="list-style-type: none"> • Thyroid and Anti thyroid • Agents affecting calcification and bone turnover • Parathyroid hormone
<ul style="list-style-type: none"> • Discuss thyroid hormone synthesis and secretion. • Classify anti-thyroid drugs and their significance. • Discuss drugs used in the treatment of hypothyroidism and hyperthyroidism. • Describe the mechanism of action of these drugs. • Describe pharmacokinetic properties and therapeutic uses of these drugs. • Describe adverse effects produced by these drugs and their contraindications. • Discuss parathyroid hormone and calcitonin. • Discuss drugs that affect bone mineral homeostasis. • Describe the mechanism of action of these drugs. 	
Gonadal Hormones	<ul style="list-style-type: none"> ▪ Estrogen and Progestins ▪ Androgens ▪ Contraceptive pills
<ul style="list-style-type: none"> • Describe the hormonal changes that occur during the menstrual cycle. • Name 3 estrogens and 4 progestins. • Describe their pharmacologic effects, clinical uses, and toxicity. List the benefits and hazards of hormonal contraceptives. • List the benefits and hazards of postmenopausal estrogen therapy. 	
Adrenal Hormones	<ul style="list-style-type: none"> • Adrenocorticotrophic hormones • Synthetic analogues of adrenocortical steroids • Adrenocortical steroids • inhibitors
<ul style="list-style-type: none"> • Describe the major naturally occurring glucocorticosteroid and its actions. • List several synthetic glucocorticoids, and describe differences between these agents and the naturally occurring hormone. • Describe the actions of the naturally occurring mineralocorticoid and synthetic agents in this subgroup. • List the indications for the use of corticosteroids in adrenal and nonadrenal disorders. • Discuss drugs that act as inhibitors of adrenocorticoid biosynthesis. • Describe their mechanism of action. • Discuss their pharmacokinetics and their therapeutic uses. 	



- Describe adverse effects produced by these drugs and their contraindications.

Pancreatic hormones	<ul style="list-style-type: none"> • Oral hypo glyceemic agents • Insulin & other drugs
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- Classify Oral Hypoglycemic agents.
- Discuss different types of oral hypoglycemic agents used in the treatment of diabetes.
- Describe the mechanism of action of each group.
- Describe Pharmacokinetics of each group.
- Describe adverse effects produced by these drugs.
- Discuss the role of Insulin administration in the treatment of diabetes.
- List types of Insulin.
- Describe their Pharmacokinetics and therapeutic uses.
- Describe adverse effects produced by Insulin.

TUTORIAL

- Insulin**
- Describe the effects of insulin on hepatocytes, muscle, and adipose tissue.
 - List the types of insulin preparations and their durations of action.
 - Describe the major hazards of insulin therapy. .

CHAPTER VIII: DRUGSUSEDTOTREATDISEASESOFBLOODDISORDERS

Drugs used to treat diseases of blood disorders	Hematopoietic agents
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- Explain the major hazard involved in the use of folic acid as sole therapy for megaloblastic anemia and indicate on a sketch of the dTMP cycle the biochemical basis of the hazard.
- Name major hematopoietic growth factors that are used clinically and describe the clinical uses and toxicity of each.

- Coagulants**
- Explain the use of coagulants in specific clinical situations, such as hemophilia.
 - Describe how coagulants promote blood clotting
 - Describe their contraindications

- Anticoagulants, Thrombolytic and Antiplatelets**
- Classify various drugs which inhibit platelet aggregation.
 - Describe their mechanism of action.
 - Describe their pharmacokinetic properties of these drugs.
 - Describe adverse effects produced by these drugs.
 - List drugs to treat bleeding.
 - Describe their mechanism of action.
 - Discuss their pharmacokinetics.
 - Describe adverse effects produced by these drugs and their contraindications.



Anti Hyper lipidemic drugs	
<ul style="list-style-type: none"> Describe the proposed role of lipoproteins in the formation of atherosclerotic plaques. Describe the dietary management of hyperlipidemia. List the 5 main classes of drugs used to treat hyperlipidemia. For each, describe the mechanism of action, effects on serum lipid concentrations, and adverse effects. 	
Non-Steroidal Anti inflammatory drugs	
<ul style="list-style-type: none"> Describe the effects of NSAIDs on prostaglandin synthesis. Contrast the functions of COX-1 and COX-2. Compare the actions and toxicity of aspirin, the older nonselective NSAIDs, and the COX-2-selective drugs. Explain why several of the highly selective COX-2 inhibitors have been withdrawn from the market. Describe the toxic effects of aspirin. Describe the effects and the major toxicity of acetaminophen. 	
Drugs used to treat Rheumatic diseases	<ul style="list-style-type: none"> Disease modify in Anti rheumatic drugs Drugs of Gout
<ul style="list-style-type: none"> Classify disease-modifying antirheumatic drugs (DMARDs). Describe the mechanism of action and their toxicity. Contrast the pharmacologic treatment of acute and chronic gout. Describe the mechanisms of action and toxicity of different drug groups used in gout. 	
CHAPTER IX: DRUGS USED FOR GASTRO-INTESTINAL DISORDERS	
Drugs used in Acid Peptic Disease	<ul style="list-style-type: none"> Drugs used in acid peptic Disease Antacids H2receptor Antagonist Proton pump Inhibitors Mucosal protective Agents
Topic: Drugs Used to Treat Peptic Ulcer Disease	
<ul style="list-style-type: none"> Classify drugs used to treat peptic ulcer disease. List the H2 receptor blockers and anti-microbial agents. Describe their mechanism of action and its pharmacokinetic properties. Describe adverse effects produced by these drugs and their contraindications. List PPI drugs. 	
Drugs used for GI Disorders	<ul style="list-style-type: none"> Drugs stimulating Gastro intestinal motility Laxatives Anti diarrheal Agents Antiemetic Agents



List Antacids

- Describe their mechanism of action.
- Describe pharmacokinetic properties of these drugs.
- Discuss their therapeutic uses along with adverse effects and contraindications.
- Classify Anti diarrheal drugs
- Describe their mechanism of action.
- Describe pharmacokinetic properties of these drugs.
- Discuss their therapeutic uses along with adverse effects and contraindications.
- Define Laxatives
- Classify laxative drugs.
- Describe their mechanism of action.
- Describe pharmacokinetic properties of these drugs.
- Describe adverse effects produced by these drugs and their contraindications.

Drugs used to treat various GI pathologies

- Treatment of Irritable Bowel Syndrome
- Treatment of Inflammatory Bowel Disease
- Bile Acid Therapy of
- Gallstones

- Define Irritable Bowel Syndrome
- List drugs used in Irritable Bowel Syndrome.
- Describe pharmacokinetic properties of these drugs.
- Describe adverse effects produced by these drugs and their contraindications.
- Identify drugs used in the management of inflammatory bowel disease and irritable bowel syndrome.
- Describe the principles of bile acid therapy for gallstones.
- Identify the primary medications used in this therapy.
- Explain how bile acids work to dissolve gallstones

CHAPTER X: TOXICOLOGY

Toxicology

- Environmental and Occupational Toxicology
- Heavy Metals

- Describe the signs and symptoms of carbon monoxide poisoning.
- Identify the major organ system toxicities of common solvents.
- Describe the signs, symptoms, and treatment of toxicity resulting from cholinesterase inhibitor insecticides.
- Identify the toxic effects of chlorinated hydrocarbons and botanical insecticides.
- List 2 important herbicides and their major toxicities.
- Describe the toxicologic significance of environmental pollution resulting from dioxins and polychlorinated biphenyls (PCBs).
- Describe the general mechanism of metal chelation.
- Identify the clinically useful chelators and know their indications and their adverse effects.



- Describe the major clinical features and treatment of acute and chronic lead poisoning.
- Describe the major clinical features and treatment of arsenic poisoning.
- Describe the major clinical features and treatment of inorganic and organic mercury poisoning.
- Describe the major clinical features and treatment of iron poisoning.

BOOKS

Recommended Books

- Lippincott Illustrated Reviews: Pharmacology 9th edition Whalen, Karen, Panavelil, Thomas A., Ph. D (Lippincott Illustrated Reviews Series)
- Katzung & Trevor's Pharmacology Examination and Board Review, 11th Edition Textbook by Anthony J Trevor, Bertram G. Katzung, and Marieke Knuidering-Hall
- Goodman and Gilman Manual of Pharmacology and Therapeutics, Authors, Randa Hilal-Dandan, Laurence Brunton, Louis Sanford

Reference Books

- Rang Dale's Pharmacology 10th Edition, James M. Ritter, Rod J.
- BRS Pharmacology Board Review Series, Gary C. Rosenfeld
- Essentials of Medical Pharmacology, Author : KD Tripathi

Assessment

Internal Assessment

Internal assessment will be according to institution policy
Internal Evaluation carries 20% weight age in summative examination.

Annual Examination

Theory: Annual exam will be consist of MCQs (one best answer)
Practical: OSPE (observed and un observed stations) + Viva+ Practical