# Contents

# STUDY GUIDE
# BDS 2nd year
# Dental Material Medica (Pharmacology)

## Description:

**The main goal of teaching pharmacology is to understand origin of drug, their clinical uses, drugs interaction, and adverse effects on patients. On completion of pharmacology course students will be able to proper of drug in clinical practice**

## Overview:

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| Program | Bachelor of Dentistry |
| Course Name | Pharmacology |
| Contact Hours | 200 |
| Infrastructure Requirements | Lecture Hall<br>Museum<br>Histology Lab |

## Faculty Responsible for Course Conduction:

| Sr. No | Faculty | Designation |
|---|---|---|
| **1.** | Dr. Gul Mehnaza | Associate Professor |
| **2.** | Dr. Sahar Amin | Demonstrator |
| **3.** | Dr. Dur-e-Saman | Demonstrator |
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## Details Of Supporting Staff:

| Sr. No | Staff | Designation |
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| 1. | Dilawar Shah | Lab Attendant |
| 2. | Nosheen | Computer operator |
| 3. | Yasir Hussain | Office boy |

## Objectives & Learning Strategies/TOS:

| Topic | Learning Outcomes | Teaching Hours | Mode of Teaching | Assessment Tools |
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| **Pharmacology: Introduction** | At the end of the session students should be able to;<br>1. Define Pharmacology, branches of Pharmacology.<br>2. Explain Rational drug therapy.<br>3. Briefly describe Modern pharmacology | Lecture presented in form presentation | 1hour | 5MCQs/ 1SEQ Summative |
| **Pharmacology: Branches/division of Pharmacology, Role in Medicine Sources & active principles of drugs** | At the end of the session the students should be able to;<br>1. Define Pharmacokinetics.<br>2. Define Pharmacodynamics.<br>3. Define Therapeutics. | In form of lecture | 1hour | MCQ/SEQ |
| **Routes of administration of drugs** | At the end of the session the students should be able to;<br>1. Classify routes of administration of drugs.<br>Discuss advantages &disadvantages of different routes of administration of drugs. | Lecture delivered to students | 2hours | MCQ/SEQ |

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| **Absorption of drugs: processes**<br>**Factors modifying drug absorption** | At the end of the session the students should be able to;<br>1. Define absorption of drugs.<br>2. Describe the processes by which drugs are absorbed through different barriers.<br>3. Discuss different factors affecting absorption of drugs.<br>Evaluate role of ionization in absorption of drugs from G.I.T. | Lecture delivered | 1hour | MCQ/SEQ |
| **Distribution &plasma protein binding of drugs** | At the end of the session students should be able to;<br>1. Define distribution & redistribution.<br>2. Explain volume of distribution & signify its clinical importance.<br>3. Describe relationship among volume of distribution & PPB.<br>4. Discuss the characteristics of plasma protein binding & their clinical significance.<br>Discuss the drug reservoirs in the body. | | 1hour | MCQ/SEQ |
| **Biotransformation of drugs** | At the end of the session the students should be able to:<br>1. Define biotransformation.<br>2. Explain the role of biotransformation /aims & types<br>3. Describe reactions of biotransformation. | | 2 hours hour | |
| **Factors modifying biotransformation** | At the end of the session the students should be able to:<br>Enumerate & briefly explain the determinants of biotransformation. | | | |
| **Bioavailability: clinical significance & factors** | At the end of the session the students should be able:<br>1. Define bioavailability. How it is calculated? | | 1 hour | |

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| **affecting** | 2. Discuss the factors affecting bioavailability of drugs & its clinical significance.<br>3. Differentiate between bioequivalence, therapeutic equivalence & chemical equivalence. | | | |
| **Half-life of drugs: factors affecting &clinical significance** | At the end of the session the students should be able to;<br>1. Define half-life & identify the formula for half-life.<br>2. Discuss phases with graphical representation of half-life.<br>3. Describe factors affecting half-life.<br>Depict the clinical significance of half-life. | | 1 hour | |
| **Excretion of drugs: Drug clearance** | At the end of the session the students should be able to;<br>1. Define excretion of drug<br>2. Classify major & minor routes of excretion<br>3. Enumerate processes involved in renal excretion<br>4. Express the role of enterohepatic circulation in excretion of drug<br>5. Define drug clearance also give its calculation and factors affecting CL.<br>6. Outline the significance of clearance | | 1 hour | |
| **Mechanism of drug action** | At the end of the session the students should be able to;<br>1. Enumerate mechanisms of cellular- drug interaction.<br>2. Define receptor, its types &distribution.<br>3. Define ligands and describe its types. | | 1 hour | |

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| | 4. Describe types of drug receptor interaction.<br>5. Comprehend the concept of second messenger | | | |
| **Factors modifying actions & doses of drugs** | At the end of the session the students should be able to;<br>1. Classify the determinants affecting action of drug.<br>2. Explain factors affecting pharmacokinetics of drugs (age, body size, genetic &environmental factors, diseases & co-morbid states, concomitantly administered drugs).<br>3. Assess the role of tolerance, synergism, antagonism, Allergy & idiosyncrasy, on pharmacodynamic variability of response to drugs.<br>4. special consideration pregnant patient (FDA pregnancy categories A, B, C, D, X)<br>pediatric patient<br>Geriatric patients<br>5. Dose adjustment in case of Renal failure for drugs eliminated through kidney.<br>6.Dose response curve | | 1 hour | |
| **AUTONOMIC NERVOUS SYSTEM** | | | | |
| **A N S: Introduction Parasympathomimetic** | At the end of the session the students should be able to;<br>1. Describe characteristics of Parasympathetic & Sympathetic nervous system | | 1 hour | 5MCQS/1SEQ Summative |

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| | with their NT.<br>Discuss important autonomic receptors with their location. | | | |
| **Cholinergic drugs: Classification, Cholinesterase, alkaloids etc**<br>**Anti Cholinesterases** | At the end of the session the students should be able to.<br>1. Classify cholinergic drugs.<br>2. Describe in detail cholinergic receptors<br>3. Explain the MOA, pharmacological effects, therapeutic uses & adverse effects of cholinergic drugs.<br>4. Enumerate anti-cholinesterase.<br>5. Discuss reversible & irreversible anti-cholinesterase's.<br>6. Outline the treatment of myasthenia gravis. | | 2hours | |
| **Organophosphate poisoning & Oximes** | At the end of the session the students should be able to;<br>1. Recognize the clinical feature of Organophosphate Poisoning.<br>2. Enlist the oximes & evaluate their role in organophosphate poisoning.<br>3. Design the management plan for organophosphate poisoning.<br>4. Explain Acute & Chronic nicotinic toxicity &their management. | | | |
| **Cholinergic blockers** | At the end of the session the students should be able to;<br>1. Classify cholinergic Receptors blockers (chemical & | | 1hour | |

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| | therapeutic).<br>2. Discuss in detail pharmacokinetics, mechanism of action, pharmacological action, therapeutic uses & adverse effects of cholinergic receptors blockers.<br>3. Compare & contrast Hyoscine & Atropine. | | | |
| **Catecholamines : Adrenaline., Nor adrenaline, Dopamine & Dobutamine** | At the end of the session the students should be able to;<br>Classify adrenergic/ Sympathomimetic drugs<br>1. Define catecholamine.<br>2. Describe characteristics of catecholamines.<br>3. Enumerate catecholamines.<br>4. Discuss chemistry, metabolism, mechanism of action, pharmacological actions, therapeutic uses & adverse effects of epinephrine (adrenaline).<br>Differentiate Nor-epinephrine, Isoprenaline, dopamine & dobutamine from epinephrine, in relation to their route of administration, organ system effects, therapeutic uses & adverse effects. | | 1hour | |
| **Adrenergic Blockers: Alpha- receptor Blockers** | At the end of the session the students should be able to;<br>1. Classify alpha receptors blockers.<br>2. Discuss different alpha blockers with their clinical uses.<br>3. Explain important untoward effects & give in detail the conditions in which alpha blockers should not be used. | | 1hour | |

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| | 4. Give the management of pheochromocytoma.<br>Explain “Epinephrine reversal”. | | | |
| **Adrenergic Blockers: Beta receptor Blockers** | At the end of the session the students should be able to;<br>1. Classify beta receptors blockers according to receptor selectivity, intrinsic sympathomimetic (ISA) & membrane stabilizing activity (MSA).<br>2. Discuss different beta receptors blockers with their clinical uses.<br>3. Signify the clinical use of cardioselective beta blockers/ beta blockers with ISA & MSA.<br>4. Describe adverse effects & contraindications of beta blockers. | | 1hour | |
| **Skeletal Muscle Relaxants** | At the end of the session the students should be able to;<br>1. Classify skeletal muscle relaxants.<br>2. Describe in detail Non depolarizing neuromuscular blockers.<br>3. Discuss Depolarizing neuromuscular blockers<br>4. Enlist Centrally acting skeletal muscle relaxants.<br>5. Describe individual drug briefly.<br>6. Identify the management of malignant hyperthermia. | | 1hour | |
| **Cardiovascular System** | | | | |

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| **Physiology of CVS** | At the end of the session the students should be able to;<br>1. Summarize structure & functions of the heart.<br>2. Recap cardiac cycle & electro physiologic properties of the heart.<br>3. Discuss briefly heart rate, stroke volume & blood pressure.<br>4. Recapitulate the structure & function of blood vessels.<br>Discuss the receptor location & their action in cardiovascular system. | | 1 hour | 5MCQS/2SEQ Summative |
| **Antihypertensive drugs** | At the end of the session the students should be able to;<br>1. Define blood pressure, high blood pressure & determinants of blood pressure.<br>2. Classify antihypertensive drugs.<br>3. Describe mechanism of beta blockers as antihypertensive agent.<br>4. State in detail MOA, pharmacological effects, indications, adverse effects & contraindications of ACEIs in high blood pressure.<br>5. Give advantages of ARBs over ACEIs.<br>6. Classify direct vasodilators.<br>7. Explain MOA of vasodilators with their therapeutic uses & adverse effects.<br>8. Discuss the rationale of polypharmacy in hypertensive patient.<br>9. Develop a management plan of hypertensive emergencies. | | 2 hour | |

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| | 10. Revise the role of methyldopa & clonidine in hypertension.<br>11. Describe briefly role of reserpine & guanethidine in hypertension.<br>Rationalize the role of diuretics in hypertension | | | |
| **Anti arrhythmic drugs** | At the end of the session the students should be able to;<br>1. Recall physiology of action potential in heart.<br>2. Explain types & causes of arrhythmias.<br>3. Classify anti arrhythmic drugs.<br>4. Discuss MOA of class I anti arrhythmic drugs with their indications & adverse effects.<br>5. Describe in detail MOA of class II &class III anti arrhythmic drugs, clinical uses & adverse effects.<br>Justify the use of calcium channel blockers & miscellaneous drugs in supraventricular arrhythmias | | 1 hour | |
| **Diuretics** | At the end of the session the students should be able to;<br>1. Recall the physiology of nephron.<br>2. Classify diuretics.<br>3. Describe in detail MOA of different diuretics at different levels of a nephron.<br>4. Explain therapeutic uses & adverse effects of different diuretics.<br>Justify the use of combination of K+ sparing diuretics with loop & | | 1 hour | |

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| | thiazide diuretics. | | | |
| **Blood** | | | | |
| **Anticoagulants.** | 1. Outline the mechanism of hemostasis & coagulation pathways &trace the role of coagulating factors &platelets in it<br>2. Classify anticoagulant drugs<br>3. Describe the mechanism of action of heparin<br>4. Tabulate the difference between un-fractionated heparin &low molecular weight heparin<br>5. Summarize the indications, precautions & potential adverse effects of heparin<br>6. Discuss management of heparin induced bleeding /thrombocytopenia<br>7. Enumerate direct thrombin inhibitors<br>8. Describe the mechanism of action of warfarin<br>9. Outline the major drug interactions of warfarin<br>10. Comprehend the concept of INR | | 1 hour | |

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| | (International Normalized Ratio)<br>11. Enlist the clinical uses of warfarin<br>12. Identify the adverse effects of warfarin &suggest treatment of warfarin toxicity<br>Compare newer oral anticoagulants to warfarin | | | |
| **Thrombolytic**<br>**Anti-platelets** | 1. Enumerate thrombolytic drugs<br>2. Describe the mechanism of action, indications & adverse effects of thrombolytic (fibrinolytic) agents<br>3. Name anti-fibrinolytic agents/agents used for neutralizing action of thrombolytic drugs<br>4. Revise the role of platelets in the coagulation<br>5. Classify anti-platelet drugs.<br>6. Discuss the mechanism of action of various groups of antiplatelet drugs<br>Describe the clinical uses &adverse effects of different anti-platelet drugs. | | 1 hour | |
| **Anti Hyperlipidemic** | At the end of the session the students should be able to;<br>1. Classify anti hyperlipidemic.<br>2. Discuss MOA, pharmacological effects, therapeutic uses & adverse effects of | | 1 hour | |

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| | different anti-hyperlipidemic.<br>Recommend the combination therapies used in different conditions of hyperlipidemias | | | |
| **Central Nervous System** | | | | |
| **Central Neurotransmission** | At the end of the session the students should be able to;<br>1. Describe briefly neurotransmitters in central nervous system.<br>Identify types of ion channels in central nervous system. | | 1 hour | 5MCQ/1SEQ Summative |
| **General Anesthetics** | At the end of the session the students should be able to;<br>1. Classify general anesthetics.<br>2. Define Gen principles of surgical anesthesia.<br>3. Outline pre-anesthetic medications.<br>4. Describe stages of general anesthesia.<br>5. Discuss MOA of inhalational anesthetic, pharmacokinetic characters affecting induction & recovery.<br>6. Describe acute & chronic toxicity of inhalational general anesthetics<br>7. Explain briefly Mechanism of action, their specific uses & untoward effects of I/V anesthetics.<br>8. Compare the advantages & disadvantages of individual I/V agent.<br>9. Explain briefly Conscious sedation<br>Explain briefly Neuroleptic Anesthesia | | 1 hour | |

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| | Explain briefly Malignant hyperthermia | | | |
| **Local Anesthetics (LA** | At the end of the session the students should be able to:<br>1. Recall Physiology of pain.<br>2. Classify LA according to chemistry &Therapeutic uses.<br>3. Discuss in detail MOA, pharmacokinetics, clinical uses, adverse effects and factors affecting LA action.<br>4. Write the advantages of addition of Vasoconstrictor with LA. | | 1 hour | |
| **Alcohols** | At the end of the session the students should be able to;<br>1. Enlist different types of alcohols.<br>2. Discuss pharmacokinetics, pharmacodynamics & uses of ethanol.<br>Design a management plan for toxicity & addiction of alcohols, including drugs used for it. | | 1 hour | |
| **Sedatives/ Anxiolytics & Hypnotics** | At the end of the session the students should be able to;<br>1. Differentiate between sedation anxiety & hypnosis.<br>2. Classify sedative/anxiolytics & hypnotics.<br>3. Discuss the mechanism of action of BDZ & barbiturates & differentiate between their MOA.<br>4. Describe the therapeutic uses of BDZ & barbiturates.<br>5. Enlist the side effects of BDZ & barbiturates<br>6. Identify the reason for better safety profile of BDZ over | | 2 hours | |

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| | barbiturates. | | | |
| **Anti-epilepsy drugs** | At the end of the session the students should be able to;<br>1. Define seizure & epilepsy.<br>2. Categorize types of epilepsy.<br>3. Write therapeutic classification of anti-epileptic drugs.<br>4. Describe the MOA of major anti-epileptic drugs with their clinical indications, adverse effects & contraindications.<br>5. Outline the management of status epilepticus.<br>6. Other clinical uses of anti-epileptic drugs. | | 1 hour | |
| **Antipsychotic drugs** | At the end of the session the students should be able to;<br>1. Outline different theories of psychosis.<br>2. Classify antipsychotic drugs.<br>3. Discuss different anti-psychotic agents with their MOA, therapeutic uses & adverse effects.<br>4. Differentiate between typical & atypical antipsychotic agents.<br>5. Enlist drugs used in bipolar effective disorder.<br>Describe lithium in detail. | | 1 hour | |
| **Anti-depressants** | 1. Define depression & outline its types.<br>2. Identify main neurotransmitters in the pathology of depression.<br>3. Classify anti-depressant drugs.<br>4. Describe the mechanism of | | 1 hour | |

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| | action of various classes of anti –depressant drugs<br>5. Enlist the therapeutic uses & adverse effect of anti-depressant drugs.<br>Indicate the important drug interactions of antidepressants & precautionary measures. | | | |
| **Drugs used in Parkinsonism** | At the end of the session the students should be able to;<br>1. Recall physiology of cholinergic & dopaminergic balance in CNS.<br>2. Classify drugs used in Parkinsonism.<br>3. Discuss in detail role of levodopa in Parkinsonism.<br>4. Justify combining carbidopa with levodopa.<br>5. Explain adverse effects of levodopa & their management.<br>6. Express the role of other drugs in parkinsonism. | | 1 hour | |
| **Opioids** | 1. Recall definition of pain<br>2. Outline afferent & efferent pain pathways<br>3. Enlist opioid receptors, give their distribution & effects mediated.<br>4. Classify opioid analgesics<br>5. Describe the mechanism of analgesic action of opioids & differentiate it from NSAIDs .<br>6. Describe the therapeutic uses, adverse effects & contraindication of opioids.<br>7. Describe briefly endogenous opiopeptides | | 1 hour | |
| **Non-steroidal Anti-inflammatory drugs (NSAIDs)** | | | | |

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| **Non-steroidal Anti-inflammatory drugs (NSAIDs** | 1. Define pain<br>2. Recognize the role of cyclo-oxygenase (COX) & prostaglandins in the pathology of pain, inflammation & fever.<br>3. Identify the role of prostaglandins in the homeostatic regulation of:<br>a) Gastric function<br>b) Renal function<br>c) Regulation of vasomotor tone & platelet functions<br>4. Define the term NSAIDs.<br>5. Classify NSAIDs.<br>6. Describe the general mechanism of action of NSAIDs & differentiating points of selective & non selective COX2 Inhibitors.<br>7. Discuss the pharmacokinetics, therapeutic uses & adverse effects of aspirin & paracetamol<br>8. Differentiate aspirin & paracetamol<br>9. Describe paracetamol toxicity & design its management plan.<br>Identify the indications for preferring COX-2 inhibitors over COX-1 | | 2 hours | 5 MCQs/ 1 SEQ Summative |
| **Drugs used in gout**. | Classify drugs used in gout.<br>2.Describe MOA, therapeutic uses & adverse effects of anti gout drugs<br>3.Give the management plan for acute gout/ chronic gout | | 1 hour | |

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| **DMARDs** | 1. Classify DMARDs<br>2. Describe MOA, therapeutic uses & adverse effects of various DMARDs | | 2 hours | |
| **Chemotherapy** | | | | |
| **Introduction & General Principles of Chemotherapy cell wall inhibitors** | the end of the session the students should be able to;<br>1. Define antimicrobial, antibiotic & outline the difference between the two.<br>2. Define bacteriostatic & bactericidal antimicrobials.<br>3. Identify the difference between concentration & time dependent killing.<br>4. Discuss the post antibiotic effect.<br>5. Describe the differences among narrow, extended & broad-spectrum antibiotics.<br>6. Explain empirical therapy in detail.<br>Classify antimicrobials according to their MOA | | 3 hours | 10MCQS/2SEQS |
| **Penicillins** | At the end of the session the students should be able to;<br>1. Give a brief introduction of history &chemistry of penicilins.<br>2. Classify penicillins.<br>3. Discuss MOA of penicillins.<br>4. Describe mechanism of resistance.<br>Describe pharmacokinetics, antimicrobial spectrum, therapeutic uses & adverse effects of various groups of pencillins | | | |
| **Cephalosporins** | At the end of the session the students should be able to;<br>1. Differentiate structure of | | 1 hour | |

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| | cephalosporin from penicillins.<br>2. Classify cephalosporin.<br>Describe Pharmacokinetics, mechanism of action, antimicrobial spectrum, therapeutic uses &adverse effects of cephalosporin | | | |
| **Sulfonamides** | At the end of the session the students should be able;<br>1. Outline briefly historic review of sulphonamides.<br>2. Summarize the chemistry of sulphonamides.<br>3. Give therapeutic classification of sulphonamides.<br>4. Express in detail MOA of sulphonamides, pharmacokinetics, antimicrobial spectrum, clinical indications & adverse effects.<br>5. Discuss Co-trimoxazole (trimethoprim/sulfamethoxazole), pharmacokinetics, antimicrobial spectrum, therapeutic uses & adverse effects | | 1 hour | |
| **Macrolides** | At the end of the session the students should be able to;<br>1. Describe the Spectrum of activity, mechanism of resistance &mechanism of action of macrolides.<br>2. Compare newer macrolide agents in respect to their pharmacokinetics, clinical uses & adverse effects to erythromycin. | | 1 hour | |

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| **Tetracyclines** | At the end of the session the students should be able to;<br>1. Classify tetracyclines.<br>2. Outline the spectrum of activity, mechanism of resistance & pharmacokinetics of tetracyclines.<br>Explain MOA, therapeutic uses, adverse effects, drug interaction & contraindications of tetracyclines. | | 1 hour | |
| **Chloramphenicol** | At the end of the session the students should be able to;<br>1. Explain MOA of chloramphenicol.<br>Describe antimicrobial spectrum, mechanism of resistance, clinical uses & adverse effects. | | 1 hour | |
| **Aminoglycosides** | At the end of the session the students should be able to;<br>1. Classify aminoglycosides.<br>2. Enlist characteristics of aminoglycosides.<br>3. Outline Spectrum &mechanism of resistance.<br>4. Discuss pharmacokinetics of aminoglycosides.<br>Describe MOA, clinical uses &adverse effects of aminoglycosides | | 1 hour | |
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| **Quinolones** | At the end of the session the students should be able to;<br>1. Classify quinolones.<br>2. Enlist characteristics of fluoroquinolones & their differences from simple quinolones.<br>3. Explain pharmacokinetics, | | 1 hour | |

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| | spectrum of activity, MOA & mechanism of resistance.<br>4. Describe clinical indications, adverse effects & contraindications of fluoroquinolones. | | | |
| **Anti-tuberculosis drugs** | At the end of the session the students should be able to;<br>*1.* Outline Introduction &features of *Mycobacterium tuberculosis.*<br>2. Enlist first line &second line anti-tuberculosis drugs.<br>3. Tabulate various regimens of anti-TB drugs with their duration of therapy<br>4. Justify combination therapy in TB<br>5. Describe in detail MOA, therapeutic uses, adverse effects, dose &contraindications of first line anti-T.B drugs.<br>6. Enlist the indications of 2nd line anti- T.B drugs.<br>7. Outline DOT &WHO recommended regimens for T.B.<br>8. Enumerate drugs used in leprosy.<br>Give MOA, therapeutic uses &adverse effects of drugs used in leprosy | | 1 hour | |
| **Anti -fungal drugs** | At the end of the session the students should be able to;<br>1. Classify anti- fungal drugs.<br>2. Describe pharmacokinetics, spectrum, MOA, therapeutic uses & | | 1 hour | |

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| | adverse effects of amphotericin B.<br>3. Write down the spectrum, MOA, indications & adverse effects of azoles.<br>Discuss in detail miscellaneous anti- fungal drugs with their MOA, therapeutic uses & adverse effects | | | |
| **Anti-viral drugs** | At the end of the session the students should be able to;<br>1. Outline the structure & life cycle of a virus.<br>2. Classify anti- viral drugs.<br>3. Discuss acyclovir, valacyclovir, famciclovir, penciclovir, ganciclovir, foscarnet, cidofovir, with their MoA, pharmacokinetics, therapeutic uses & adverse effects).<br>4. Describe Amantadine, rimantadine, zanamivir, oseltamivir & ribavirin in detail.<br>5. Enlist NRTIS, NNRTIS, Protease inhibitors, fusion inhibitors, integrase inhibitors & give brief description of all these.<br>6. Describe the drug treatment of hepatitis C (interferon ribavirin, sofosbuvir).<br>Discuss the drug treatment of hepatitis B, (Lamivudine, adefovir, telbivudine). | | 2 hour | |
| **Anti Malarials** | At the end of the session the students should be able to;<br>1. Revise species, life cycle | | 1 hour | |

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| | of malarial parasite<br>2. Give therapeutic classification & Chemical classification of anti-malarial drugs.<br>3. Describe MOA, pharmacokinetics, indications adverse effects of different anti-malarial agents.<br>4. List the drugs used in chloroquine resistant malaria recommended by WHO.<br>Summarize chemoprophylaxis of malaria. | | | |
| **Anti Amoebic** | At the end of the session the students should be able to;<br>1. Recall Amoebiasis, life cycle of *Entamoeaba histolytica* & pathogenesis.<br>2. Classify anti-amoebic drugs.<br>3. Explain mechanism of action, pharmacokinetics, spectrum, dose, adverse effects & contraindication of metronidazole.<br>Briefly explain other anti-amoebic agents | | 1 hour | |
| **Anthelmintics** | At the end of the session the students should be able to;<br>1. Recall classification of Helminths,.<br>2. Classify Anthelmintics.<br>Explain in detail MOA, pharmacokinetics, clinical indications & adverse effects of different anthelmintics | | 1 hour | |

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| **Antineoplastics** | At the end of the session the students should able to;<br>1. Classify anti-cancer agents on the basis of cell cycle specific & non cell cycle specific.<br>2. Enlist antimetabolites. Describe their MOA, pharmacokinetics, therapeutic uses, adverse effects & development of resistance.<br>3. Discuss hormones/ antagonist, cyclophosphamide, vinca alkaloids &anthracyclines in detail<br>4. Outline briefly other anti-cancer drugs.<br>5. Describe the general adverse effects produced by<br>anti-cancer agents | | 1 hour | |
| **Endocrinology** | | | | |
| **Antidiabetic drugs** | At the end of the session the students should be able to;<br>1. Outline DM, Types of DM &Sign & symptoms of DM.<br>2. Recall release &structure of insulin.<br>3. Classify insulin depending upon its onset & duration of action.<br>4. Describe in detail the structure of insulin receptors, pharmacokinetics, MOA, indications & adverse effects. | | 2 hour | 5MCQS/1SEQ Summative |

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| | 5. Give the management of hypoglycemia.<br>6. Outline methods of delivery of insulin.<br>7. Explain briefly DKA pathophysiology & management.<br>8. Give classification of non-insulin (oral / newer) anti diabetic drugs.<br>9. Express in detail pharmacokinetics, MOA, uses &adverse effects of different oral anti diabetic agents.<br>10. Enlist different combinations of anti-diabetic drugs used in type II diabetes. | | | |
| **Thyroid/Anti-thyroid drugs** | At the end of the session the students should be able to;<br>1. Reproduce Thyroid hormones briefly.<br>2. Classify anti thyroid drugs.<br>3. Discuss MOA of different anti-thyroid drugs with their indications &adverse effects.<br>4. Discuss the management of hyperthyroid crisis & Grave's disease.<br>5. Outline the management of myxedema.<br>Describe briefly thyroxine with its indications & adverse effects. | | 1 hour | |
| **contraceptives** | At the end of the session the students should be able to;<br>1. Classify hormonal contraceptives.<br>2. Enlist monophasic, | | 1 hour | |

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| | biphasic & triphasic contraceptive pills<br>Describe mechanism of action, pharmacological actions, adverse effects, benefits &contraindications of contraceptive pills. | | | |
| **Respiratory System** | | | | |
| **Expectorants & Antitussives** | 1. Define cough & classify it<br>2. Outline the important components of cough reflex<br>3. Define the term antitussives, mucolytic & expectorants<br>4. Classify drugs used as antitussives, expectorants & mucolytic agents<br>5. Describe the mechanism of action of respective drug groups<br>Identify different respiratory conditions requiring the use of antitussives, mucolytic & expectorants | | 1 hour | 5 MCQS / 1 SEQs Summative |
| **Drugs used in Bronchial Asthma** | At the end of the session the students should be able to;<br>1. Recall the distribution of autonomic receptors in lungs &their role in control of bronchial smooth muscle tone<br>2. Define asthma & identify its types & pathological basis | | 1 hour | |

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| | 3. Classify drugs used in bronchial asthma into bronchodilators & anti-inflammatory drugs<br>4. Discuss the mechanism of action of different groups/drugs used in bronchial asthma<br>5. Describe the adverse effects & special considerations associated with these drugs.<br>Give the management of acute severe asthma (status asthmaticus) | | | |
| **Antihistamines**<br>($H_1$ antagonists) | 1. Recall the site of action, physiologic & pathophysiologic role of histamine<br>2. Identify conditions causing release of histamine<br>3. Classify antihistamine drugs ($H_1$ antagonists).<br>4. Differentiate the two generations of antihistamines with examples.<br>5. Describe the mechanism of action &pharmacological effects of antihistamines.<br>6. Identify the various therapeutic uses of antihistamine therapy<br>7. Discuss the adverse effects of both generations of antihistamines. | | 1 hour | |

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| **Prostaglandins** | 1. Describe the biosynthesis of prostaglandin<br>2. Classify Prostaglandins.<br>Describe the therapeutic uses of prostaglandins with examples of drug used | | 1 hour | |
| **Dental Pharma** | | | | |
| Dental Pharma | Mouthwash<br>Astringents<br>Obtundents<br>Mummifying agents<br>Antiseptics<br>Dental caries<br>Dental a brasives<br>Dentrifices<br>Root canal filling material<br>Bleaching agents<br>Dental protective and dressing<br>Demulcents and protective<br>Caustics<br>Treatment of alveolar of abscess<br>Chemoprophylaxis in dental<br>General dental considerations in the use of drugs<br>Therapeutics agents commonly prescribed in dental practice.<br>Tooth brushing techniques | | 20 hours | 10MCQ/ 2 SEQS Summative |
| | | | | |

## Learning Resources:

| Sr.No | Text/ Reference Books | Edition |
|---|---|---|
| 1. | Basic and Clinical Pharmacology by Katzung, Latest Edition, Mc Graw-Hill. | Latest edition |
| | Pharmacology Examination and Board Review by Katzung and Trevor, Latest Edition, Mc Graw-Hill. (for MCQs) | Latest edition |
| | Lippincott Illustrated Reviews: Pharmacology | 9th edition |

## Additional Learning Resources:

| | | |
|---|---|---|
| Hands on | Students will be involved in practical session and hands-on activities to enhance learning. | |
| Skills Lab | Utilize the lab to relate knowledge to specimens and models available, pharmacodynamic of the drugs on live organism (Rabbits), explain the pharmacokinetics of drugs. | |
| Videos | Animated videos drugs action to clear the concepts of the students shown during interactive lecture sessions | |
| Internet Resources | To increase the knowledge, students should utilize the available internet resources and CDs/DVDs in main IT lab/personal laptops | |

## Assessment Methods:

**MCQs**:

Multiple Choice questions; Single best Type

**OSPE/OSCE**: Objective Structured Practical/Clinical examination

**Presentation:**

### Multiple Choice Questions:

1. Single best type MCQs having five options with one correct answer and four distractors are part of assessment.
2. Correct answer carries one mark, and incorrect will be marked zero. Rule of negative marking is not applicable.
3. Students mark their responses on specified computer-based designed sheet.

### Objective Structured Practical/Clinical Examination

1. Nine OSCE stations are used for formative as well as summative assessment.
2. Time allocated for each station is five minutes as per Examination rules of Khyber Medical University, Peshawar.
3. All students are rotated through the same stations.
4. Stations used are unobserved, observed, interactive and rest stations.
5. On unobserved stations, models, lab reports, radiographs, flowcharts, case scenarios may be used to assess cognitive domain.
6. On observed station, examiners don't interact with candidate and just observe the performance of skills /procedures.
7. On interactive station, examiner ask questions related to the task within the allocated time.
8. On rest station, students are not given any task. They just wait to move to the next station.

### Presentation:

Students are given topics for presentation either individually or in groups.They are encouraged to prepare presentations on power point to enhance their understanding of the topic.

## Internal Assessment Criteria:

1. 10% weightage of Internal Assessment in professional exam is policy of Khyber Medical University.
2. This Internal Assessment will comprise of following components

a) Attendance
b) Class presentations
c) Monthly tests
d) Midterms
e) Pre-Prof

## Examination Rules & Regulations:

1. One class test of the subject may be held monthly, marks of which will be included in internal assessment. Marks for class test can vary according to syllabus and teachers' choice.
2. Mid-Term exam comprising 45 MCQs of single best type and 45 marks SEQs will be held in the middle of the session.
3. Pre-prof Exam comprising 45 MCQs of single best type and 45 marks SEQs will be conducted at the end of session before prep leaves.
4. The pattern of class tests, Mid-term & Pre-prof will be same as the Professional Exam taken by Khyber Medical University, Peshawar.
5. OSPEs will be conducted at the end of Mid-term & pre-prof Exam.

## Feedback On Examination:

1. Students' feedback on assessment strategies will be taken in a preformed proforma for feedback twice a year i.e., Mid-term and pre-prof exams.
2. Feedback of theory as well as OSPE & Viva will be taken.
3. Department of Medical Education & Quality Enhancement Cell in collaboration with Exam Cell of WDC is responsible to conduct this exercise.

## Model Questions:

### Multiple Choice Question

Question:

***The study of absorption, distribution, metabolism and excretion of drug is known as-***

(a) Pharmacy

(b) Pharmacokinetics

(c) Pharmacodynamics

(d) Pharmacopoeia

(e) biochemistry

## Short Answer Question:

Classification, nomenclature (at least 3 drugs), mechanism of action, effects, indications, side effects and contraindications of such pharmacological groups:
- drugs that stimulate afferent innervation
- drugs that suppress afferent innervation (local anesthetics, coating, astringent, adsorbing)
- direct cholinomimetics and anticholinesterase drugs;
- anticholinergics (M-cholinoblockers, ganglionic blockers, muscle relaxants)
- direct and indirect action adrenomimetics;
- adrenergic blockers and sympatholytics;
- antiallergic drugs;
- pain and inflammation correctors (narcotic analgesics, non-narcotic analgesics, antipyretic analgesics, non-steroidal anti-inflammatory drugs);
- drugs that stimulate the central nervous system (antidepressants, nootropics, analeptics,)

## Suggestions For Next Academic Year:

## Prepared By:

Dr. Gul Mehnaz (Associate Professor)