STUDY GUIDE	
PROGRAM	**BDS**
COURSE TITLE	**Pharmacology**
ACADEMIC YEAR	**2nd Year, 2023**
INTRODUCTION	Pharmacology is one of the essential basic science disciplines which dental students across Pakistan and outside study. This discipline helps students learn about details of various medications that practitioners administer in regular clinical practice. This discipline will inform the students of the modes of actions, side effects. Uses and contraindications of medications along with how they are metabolized and distributed in the body.
OUTCOMES	By the end of the course, students will be able to describe details of various classes of drugs
DEPARTMENTS INVOLVED	Department of Pharmacology
COURSE OBJECTIVES	By the end of the course, the students will be able to: <u>GENERAL PHARMACOLOGY</u> • Define Pharmacology, absorption, bioavailability, plasma half-life, drug distribution, volume of distribution, plasma protein binding, biotransformation, excretion of drugs, drug kinetics, half-life, drug elimination, steady-state concentration, receptor, agonists, antagonist, efficacy, potency • List the types of receptors • List the disadvantages of various routes of drug administration • Discuss the nomenclature of drugs. • Describe various branches and divisions of pharmacology • Discuss the development of the drugs. • Classify various sources of drugs with their examples. • Discuss various active principles of drugs • Describe various routes of drug administration. • Discuss the advantages of various routes of drug administration

	• Discuss various mechanisms by which drugs cross the biological membranes in the body • Discuss the factors affecting the process of drug absorption • Explain the factors affecting bioavailability • Explain the clinical importance of plasma • Discuss the mechanism of drug distribution and volume of distribution • Enumerate the factors affecting drug distribution • Discuss the clinical importance of drug distribution • Discuss the influence of plasma protein binding on drug distribution • Enumerate the phases of biotransformation • Discuss the principles of drug biotransformation • Discuss entero-hepatic circulation • Discuss the clinical significance of biotransformation • Discuss P450 enzyme induction and inhibition • Discuss the clinical significance of excretion of drugs • Explain the routes of drug excretion • Discuss the factors affecting drug excretion • Discuss the factors affecting half-life, drug elimination, and steady-state concentration • Discuss the relation of half-life with drug dosing • Explain drug dosing and achievement of steady-state concentration • Discuss the kinetics of drug elimination • Discuss the properties of receptors • Describe the clinical significance of receptors • Explain various mechanisms for obtaining the therapeutic effect of drugs • Explain types of agonists • Explain types of antagonists • Describe various types of mechanisms of drug

	• Explain the modes of action of different drugs at the molecular level • Describe dose-response relationship • Discuss the drug dose relationship to the drug effect and their graphic presentations • Enumerate therapeutic index • Discuss the clinical significance of the therapeutic index • Discuss adverse drug reactions with examples. • Discuss various types of drug interactions. • Describe the terminologies related to drug interaction such as summation, potentiation, synergism, additive effects and antagonism with examples • Write prescription writing following a standard format <u>DRUGS ACTING ON AUTONOMIC NERVOUS SYSTEM (ANS)</u> • List effects & contra-indications of sympathomimetic drugs • List the clinical uses & side effects of Parasympathomimetic drugs • List the side effects & contra-indications of antimuscarinic drugs • Classify sympathomimetic & Sympatholytic drugs • Classify Parasympathomimetic & parasympatholytic drugs • Classify anti-muscarinic drugs • Classify skeletal muscle relaxants • Discuss the organization of the autonomic nervous system • Explain sympathetic and parasympathetic nervous with innervations • Discuss the neurotransmitters of sympathetic and parasympathetic nervous systems • Describe adrenergic receptor types and subtypes • Discuss the clinical uses of sympathomimetic drugs • Describe adrenoceptor antagonists. • Explain the pharmacokinetics of adrenergic antagonists. • Discuss pharmacodynamics of adrenergic antagonists. • Explain modes of action of parasympathomimetic drugs.

	• Discuss the pharmacokinetics and pharmacodynamics of these drugs • Explain the clinical uses of antimuscarinics • Describe the basic and clinical pharmacology of skeletal muscle relaxants. <u>CARDIOVASCULAR DRUGS</u> Define diuresis Classify diuretics, anti- angina drugs, drugs used in cardiac failure, anti-arrhythmic drugs, anti-hypertensive drugs List the side effects of anti-anginal drugs. Define hypertension and its types, arrhythmia and its types, cardiac failure Describe the clinical role of diuretics Discuss clinical pharmacology of diuretics Describe the basic and clinical pharmacology of the drug from different groups Discuss angina and its types. Discuss the mode of action of anti-anginal drugs Describe the clinical approach in the treatment of Ischemic Heart Disease Discuss the basic and clinical pharmacology of drugs used to treat cardiac failure Discuss side effects of anti-arrhythmic drugs <u>BLOOD</u> • Classify hematopoietic agents, anticoagulant drugs, thrombolytic drugs, anti-hyperlipidemic drugs • Discuss various types of anemia • Describe drugs used to treat anemia • Explain the clinical pharmacology of different anemic drugs • Describe coagulation process • Discuss the clinical pharmacology of anticoagulants • Describe thrombolysis • Explain the pharmacokinetics of thrombolytics.

	• Discuss pharmacodynamics of drugs from different groups • Describe hyperlipidemia. • Explain the pharmacokinetics of anti-hyperlipidemic drugs. • Explain the mode of action of anti-hyperlipidemics. • Discuss the importance of various types of vitamins used for iron deficiency anemia • Explain the clinical pharmacology of main vitamin preparations used for iron deficiency anemia • Discuss clinical pharmacology of various drugs used for megaloblastic anemia <u>ANALGESICS</u> • Classify NSAIDs, opioids and drugs used for arthritis • List the side effects of DMARDS • List the side effect of drugs used for the treatment of gout • Discuss the general properties of NSAIDs • Describe the clinical pharmacology of NSAIDs • Discuss the mechanism of action and • Describe the clinical significance of Opioids • Discuss the adverse effects of opioids • Discuss the pharmacokinetics of opioids • Explain the mode of action of DMARDs • Discuss the treatment of acute and chronic gout the mode of action of drugs Describe the used for the treatment of gout <u>DRUGS ACTING ON GASTROINTESTINAL TRACT</u> • Define Peptic ulcer disease, emesis, • Classify various drugs used to treat PUDs • Discuss the clinical significance of drugs used to treat PUDs • Enumerate the mode of action of PUDs • List the side effects of peptic ulcer disease. • Discuss the effects of given drugs on the intestine of rabbit (Acetylcholine, epinephrine, histamine)

	• Define • Describe the anti-emetic agents • Discuss the clinical significance of anti-emetics • Explain clinical pharmacology of antiemetics • Discuss the use of prokinetic drugs • Classify laxatives/purgatives • Explain the kinetics of laxatives • Discuss the dynamics of laxative drugs • Classify anti-diarrheal drugs • Discuss the mode of action of the anti-diarrheal drugs • List the side effects of anti-diarrheal drugs • Discuss the clinical significance of anti-diarrheal drugs <u>RESPIRATORY SYSTEM</u> • Classify the drugs used for the management of asthma and COPD, anti-tuberculosis drugs • List the side effects of anti-tuberculosis drugs. • Discuss the pharmacokinetics of the drugs used for the treatment of asthma • Enumerate the dynamic properties of drugs used for the treatment of asthma and COPD • Discuss the pathophysiology of Asthma. • Discuss the approach used in the treatment of bronchial asthma • Explain the clinical importance of nebulizers and inhalers • Demonstrate the procedure of the use of nebulizers and inhalers • Explain the mode of action of important drugs used in the treatment of tuberculosis • Explain the clinical significance of anti-tuberculosis drugs. <u>AUTACOIDS</u> • Define autacoids • Classify Anti-Histamines, Serotonin Agonists, Serotonin Antagonists

	• Explain the Pharmacodynamics of anti-histamines • Discuss the clinical pharmacology of anti-histamines • Describe the mode of action of serotonin agonist and antagonist • Discuss the clinical pharmacology of serotonin agonists and antagonists • Explain the Pharmacodynamics of prostaglandins • Discuss the clinical pharmacology of prostaglandins • Explain the Pharmacodynamics of leukotrienes • Discuss the clinical pharmacology of leukotrienes <u>DRUGS ACTING ON CENTRAL NERVOUS SYSTEM</u> • Define epilepsy and its types, anesthesia with its types, psychosis • Classify anti-epileptic drugs, anti-Parkinson drugs, general anesthetics, sedative-hypnotic drugs, local anesthetics, alcohols, CNS stimulants, anti-psychotic drugs, antidepressant drugs, anti-migraine drugs • List the side effects of sedative and hypnotics drugs, side effects of anti-epileptic drug, contraindications of antiepileptic drugs, side effects of anti-Parkinson drugs, side effects of general anesthetics • Discuss the mode of action & clinical pharmacology of sedative and hypnotics • Describe the mode of action & clinical significance of antiepileptic drugs • Discuss the pathophysiology of Parkinson's disease • Describe the mode of action of Anti-Parkinson drugs • Describe the properties of general anesthesia. • Discuss the clinical pharmacology of inhalational and I/V anesthetic drugs • Discuss the pharmacokinetics & pharmacodynamics of local anesthetics. • Discuss the pharmacodynamics of alcohols • Discuss the pathophysiology of migraine

	• Discuss the clinical pharmacology of anti-migraine drugs • Describe the modes of action & clinical aspects of CNS stimulants • Describe the mode of action & clinical pharmacology of Anti-Psychotics. • Describe depression and its types of depression • Explain the clinical aspects of the use of main Anti-Depressant drugs <u>DRUGS ACTING ON ENDOCRINE SYSTEM</u> • List the types of different adrenocorticoids • Define hypoglycemia • Classify glucocorticoids, anti-thyroid drugs, drugs used for the treatment of hypothyroidism, insulin preparations, Oral hypoglycemic agents, Gonadal hormones agonists and antagonist drugs • Describe pituitary hormones • Discuss the release of pituitary hormones under the influence of the hypothalamus • Discuss the importance of hormone supplementation related to the pituitary gland • Discuss the drug therapy of hormonal disorders related to pituitary gland • Describe adrenocorticoids • Enumerate the mode of action of steroids in the body at the cellular level • Discuss the uses of corticosteroids • Enumerate the uses of mineralocorticoids Discuss the pharmacodynamics of agonists of adrenocortical hormones • Discuss the pharmacodynamics of antagonists of adrenocortical hormones • Describe thyroid disorders • Enumerate the mode of action of anti-thyroid drugs • Explain the clinical pharmacology of different anti-thyroid drugs

	• Describe hypothyroidism • Explain the kinetics and dynamics of the main drugs used for the treatment of hypothyroidism • Discuss the pharmacology of drugs used for the treatment of parathyroid disorders • Discuss the mode of action & clinical aspects of insulin • Discuss the clinical significance of oral hypoglycemic agents • Describe the physiology of the gonadal hormones • Explain the basic and clinical pharmacology of gonadal agonists and antagonists <u>CHEMOTHERAPEUTIC DRUGS</u> • List the uses, side effects and drug interaction of all classes of antimicrobial agents • Classify the following classes of Antimicrobial drugs i. Cell wall synthesis inhibitors: Penicillin, β-lactam antibiotics, Cephalosporins and others ii. Protein Synthesis Inhibitors, Aminoglycosides, Macrolides, Tetracyclines and others iii. Antimetabolites: Sulfonamides, Fluoroquinolones and others iv. Anti-Protozoal drugs including Anti-amoebic and Antimalarial Drugs v. Anti-viral drugs based on the type of infecting viruses vi. Anti-Fungal drugs on the basis of the types of infection • Classify different anticancer drugs according to function and cell cycle specificity. • Explain the life cycle of malarial parasites and its importance • Explain the general principles of antimicrobial therapy • Discuss the various types of fungal infections • Describe various types of viral infections according to the different phases of infection • Discuss Chemotherapeutic spectra of different drug classes,

	• Discuss rational of antimicrobial drug dosing. • Discuss selection of anti-microbial agents, incidence of drugs resistance, combination therapy and complication of these agents • Explain the basic and clinical pharmacology of above all antimicrobial agents • Discuss the rationale of Anti-Microbial therapy • Discuss various types of Anti-Microbial drugs along with their importance • Describe causes of cancer and discuss rationale of cancer chemotherapy. • Discuss basic and clinical pharmacology of anticancer drugs <u>LOCALLY ACTING DRUGS</u> • Define demulcents, emollients, irritants, counter-irritants , astringents, antiseptics, disinfectants • Discuss various types of topical drug preparations with examples Describe the basic and clinical pharmacology of locally acting drugs • Explain various types of antiseptics and disinfectants Describe the clinical uses of antiseptic sand disinfectants.
PRACTICALS	Demonstrate a brief introduction to Power Lab Demonstrate the preparation of Tyrode Solution
INTERNAL ASSESSMENT	10% (Pre-professional Examination, Midterm Examination, Assignments and Class Presentations)
ANNUAL EXAMINATION	90% (MCQS, OSPE)
COURSE EVALUATION	This course will be evaluated as per JSMU & HEC policies