LAHORE MEDICAL & DENTAL COLLEGE

Lahore Medical & Dental College,

Lahore

Department of Pharmacology

Study Guide For

PHARMACOLOGY

(2nd Year B.D.S)

Contents:-

1. ***Introduction*:-**

It is the science that deals with the origin, nature, chemistry, effects, and uses of drugs. it includes pharmacognosy, pharmacokinetics, pharmacodynamics, pharmacotherapeutics and toxicology.

Teaching in Year

2nd Year B.D.S

Duration of Course

One Year

2. Vision and Mission

Vision:

To provide high quality professional education in the field of pharmacology & therapeutics according to international standards

Mission:-

The mission of pharmacology department is to produce highly competent, energetic and empathetic health professionals and researchers who can contribute towards provision of cost-effective health care to the community/society.

3. Learning Objectives: -

A) GOAL: The broad goal of teaching under graduate students in pharmacology is to inculcate rational and scientific basis of therapeutics keeping in view of dental curriculum and Profession.

B) OBJECTIVES:

a) KNOWLEDGE & UNDERSTANDING

At the end of the course the student shall be able to:

i. Describe the pharmacokinetics and pharmacodynamics of essential and commonly used drugs in general and in dentistry in particular,
ii. List the indications, contraindications; interactions, and adverse reactions of commonly used drugs with reason,
iii. Tailor the use of appropriate drugs in disease with consideration to its cost, efficacy, safety for individual and mass therapy needs,
iv. Indicate special care in prescribing common and essential drugs in special medical situations such as pregnancy, lactation, old age, renal, hepatic damage and immunocompromised patients,
v. Integrate the rational drug therapy in clinical pharmacology,
vi. Indicate the principles underlying the concepts of "Essential drugs".

b) SKILLS:

At the end of the course the student shall be able to:

i. Prescribe drugs for common dental and medical ailments.
ii. To appreciate adverse reactions and drug interactions of commonly used drugs.
iii. Observe experiments designed for study of effects of drugs.
iv. Critically evaluate drug formulations and be able to interpret the clinical pharmacology of marketed preparations commonly used in dentistry.

c) INTEGRATION

Practical knowledge of use of drugs in clinical practice will be acquired through integrated teaching with clinical departments.

4. Syllabus (PMDC)

Topic

General Pharmacology:

- Definition of pharmacology and therapeutics, definition of a drug, Pro-drug, etc. and drug nomenclature.
- General principles of pharmacology i.e., of pharmacokinetic & pharmacodynamic.
- Branches /divisions of pharmacology.
- Sources of drugs with examples.
- Active principles of drugs and pharmacopoeias with characteristics and examples.
- Posology, Dose calculations.
- Formulations / preparations of drugs

Pharmacokinetics:

ADME (Absorption, Distribution, Metabolism & Excretion of drugs)

- Different Routes of Drug Administration with their Merits and Demerits.
- Transport of drugs across cell-membrane.
- Absorption of drugs and processes involved in drug absorption.
- Factors Modifying Absorption of Drugs.
- First-Pass Effect, and use of alternative routes of administration.
- Bio-availability, its clinical significance and factors affecting bio- availability.
- Distribution, redistribution of drugs, plasma protein binding, volume of distribution and drug reservoirs.
- The time course of drug effect; the target concentration & a rational dosage regimen; dose individualization- application of pharmacological parameters.
- Metabolism & biotransformation of drugs, enzyme induction, enzyme inhibition, clinical relevance of drug metabolism and entero-hepatic circulation.
- Excretion, elimination, and clearance of drugs.
- Plasma half-life of drugs, steady state concentration, its clinical importance and factors affecting

Pharmacodynamics:

- Definition and various types of receptors
- Mechanisms of drug action (receptor-mediated* & nonreceptor-mediated), second messengers; regulation of receptors.
- Various types of ligands (agonists and antagonists); types of antagonisms
- Plot and explain dose response curves in respect of affinity, potency, efficacy, spare receptors; therapeutic index, therapeutic window; clinical selectivity: beneficial versus toxic effects of drugs.
- Factors modifying action and doses of drugs.
- Relation between Drug Dose & Clinical Response.
- Variation in drug responsiveness.
- Pharmacogenetics of Isoniazid, Succinylcholine, Primaquine, Hydrogen peroxide, Warfarin and Vitamin D, etc.
- Outline of development of new drugs.

* *Transmembrane Signaling Mechanisms*

Basic & Clinical Pharmacology of the Following Systems

Drugs useful in Autonomic Nervous System

(Pharmacological Effects of Drugs on Autonomic Nervous System)

- Introduction to Autonomic Pharmacology with brief Anatomy, Neurotransmitter's Chemistry, Autonomic Receptors, Functional Organization of Autonomic Activity, Pharmacologic Modification of Autonomic Functions.
- Pharmacokinetic & Pharmacodynamics of Cholinoceptor Activating Drugs (Direct- acting and Indirect-acting Cholinoceptor activating Drugs / Parasympathomimetics (including Organophosphorus Compounds).
- Pharmacokinetic & Pharmacodynamics of Cholinoceptor Blocking Drugs, and Anticholinergic like Groups
- Pharmacokinetic & Pharmacodynamics of Adrenoceptor Agonists and Sympathomimetic Drugs.
- Pharmacokinetic & Pharmacodynamics of Adrenoceptor Antagonist Drugs (Sympatholytics).
- Pharmacokinetic & Pharmacodynamics of Ganglion Stimulants and Blockers
- Pharmacokinetic & Pharmacodynamics of Adrenergic Neuron Stimulants and Blockers.

Drugs used in:

- Glaucoma
- Paralytic Ileus, Atonic Bladder, etc.
- Alzheimer's Disease
- Myasthenia Gravis
- Organophosphorus Poisoning
- Smooth Muscles Spasmodic States, Mydriatic State & Parkinsonism, etc.
- Pheochromocytoma
- Prostatic Hyperplasia, etc

Drugs useful as Skeletal Muscle Relaxants:

- Pharmacokinetic & Pharmacodynamics of:
  - Neuromuscular blocking agents / Depolarizing & Non-depolarizing Agents.
  - Spasmolytics / Centrally Acting Muscle Relaxan

Drugs useful / Pharmacological Effects in Cardiology

- Introduction to the Pharmacology of CVS Drugs and Neurotransmitters involved in CVS effects.
- Basic (Pharmacokinetic & Pharmacodynamics) and Clinical Pharmacology of:
  - Diuretics and Antidiuretic Hormone (Agonists and Antagonists),
  - Vasodilators
  - Calcium Channels Blockers
  - Renin Angiotensin Aldosterone System (RAAS),
  - Central Sympathoplegics.
  - (Revisit to) Alpha & Beta Blockers
- Drugs used in:
  - Hypertension
  - Ischemic Heart Diseases (Angina, Acute Coronary Syndrome, Myocardial Infarction).
  - Cardiac Failure, Acute Cardiac Failure & & Acute Pulmonary Edema:
  - Coma.
  - Syncope.
  - Cardiac Arrythmias.

Drugs useful / Pharmacological Effects in Haematology.

- Basic (Pharmacokinetic & Pharmacodynamics) and Clinical Pharmacology of:
  - Anticoagulants and drug used in bleeding disorders.
  - Antiplatelet agents.
  - Fibrinolytics / Thrombolytics esp. use in Acute Myocardial Infarction.
  - Anti-Hyperlipidemics / Anti-Dyslipidemics.

- Drugs for:
  - Drugs used in Deep Veins Thrombosis or Pulmonary Embolism
  - Drugs used in Hemophilias, Vitamin K Deficiency, Warfarin Bleeding. Postsurgical Gastrointestinal Bleeding, Postprostatectomy Bleeding and Bladder Hemorrhage

Drugs useful / Pharmacological Effects in Neurology & Psychiatry.

- Introduction to Central Nervous System (CNS) and neurotransmitters of CNS.
- Basic and Clinical Pharmacology (Pharmacokinetic & Pharmacodynamics) of:
  - Sedative-hypnotics.
  - Anti-Depressants & Mood Stabilizers
  - Anti-Epileptics
  - Local Anesthetics
  - General Anaesthetics
  - Opioids
  - Alcohols and drugs of abuse.
- Drugs used in:
  - Sleep Disorders (Insomnia, Hypersomnia – Excessive Sleepiness,
  - Generalized Anxiety Disorder (GAD) / Persistent Excessive Anxiety / Adjustment Disorders / Sadness/ Fear/ Rage/ Guilt/ and Shame, etc. Post- traumatic Stress Disorder (PTSD) / Post Severe Anxiety or Traumatic or Life- Threatening Events,
  - Epilepsy (Focal / Partial Seizures / Generalized Seizure,
  - Dementia / Alzheimer disease,
  - Bell Palsy,
  - Substance Use Disorders (Alcohol Use Disorder (Alcoholism): Minimal, Mild, Moderate and Severe withdrawal; Opioids (Overdosage, Withdrawal)
  - Local Anesthetics.
  - General Anaesthetics.
  - CNS stimulants.
  - Opioid's agonists and antagonists.

Drugs Useful / Pharmacological Effects in Anaesthesiology:

- Basic (Pharmacokinetic & Pharmacodynamics) and Clinical Pharmacology of:

a) Local Anesthetics:
Articaine, Benzocaine, Bupivacaine, Lidocaine, Mepivacaine, Prilocaine, Chloroprocaine, Cocaine (for procedures requiring high surface activity and vasoconstriction); EMLA (Eutectic Mixture of Local Anesthetics); advantage of Sustained-Release Delivery System.

b) General Anesthetics:
Nitrous Oxide, Halothane, Isoflurane, Sevoflurane, Thiopental, Midazolam, Propofol, Ketamine, Dexmedetomidine, Etomidate, Fentanyl & Droperidol.

c) Skeletal Muscle Relaxants:

- Non-depolarizing neuromuscular blocking agents:
  Prototype: Tubocurarine & Others (only characteristic pharmacokinetic & pharmacodynamic points) of Atracurium, rocuronium, Cisatracurium, Pancuronium, vecuronium.
- Reversal Agents: Neostigmine, Sugammadex
- Depolarizing Neuromuscular Blocking Agents: Succinylcholine.
- Centrally Acting Spasmolytic Drugs: Baclofen, Diazepam, Orphenadrine, Cyclobenzaprine, Tizanidine.
- Direct Acting Muscle Relaxants: Dantrolene.

Drugs useful / Pharmacological Effects in Rheumatology & Painful States

- Basic (Pharmacokinetic & Pharmacodynamics) and Clinical Pharmacology of:
  - Prostaglandins,
  - Eicosanoids,
  - Non-Steroidal Anti-Inflammatory Drugs (NSAIDs),
  - Disease Modifying Anti-Rheumatic Drugs (DMARDs),

- Anti-Gout Drugs.
- Drugs for
  - Rheumatology (Symptomatic and Progressive Treatment), Arthritis (Rheumatoid, Osteoarthritis, etc)
  - Chronic Pain Disorders,
  - Migraine,
  - Trigeminal Neuralgia.

Drugs useful / Pharmacological Effects in Pulmonology & on Smooth Muscles

- Basic (Pharmacokinetic & Pharmacodynamics) and Clinical Pharmacology of:
  - Autacoids (Histamine & Anti-Histamines, Serotonin Agonists and Serotonin Antagonists, Ergot Alkaloids, etc)
  - Eicosanoids.
  - Vasoactive peptides.
  - Nitric oxides.
  - Expectorants, Mucolytics, Antitussives – Drugs used for Cough (Dry & Productive) etc.
- Drugs for:
  - Bronchial Asthma, COPD, Bronchiectasis, etc.
  - Acute Respiratory Distress Syndrome / Acute Respiratory Failure / High-Altitude Illness
  - Pulmonary Infections (Community-Acquired Pneumonia, Hospitalized and ICU Ventilator-Associated Patients / Nosocomial Pneumonia, Pleural Effusion, Pleuritis, etc).
  - Pulmonary Tuberculosis (simple and complicated),
  - Allergic & Immunologic Disorders.

Drugs useful / Pharmacological Effects in Gastroenterology

- Basic (Pharmacokinetic & Pharmacodynamics) and Clinical Pharmacology of:
  - Antacids
  - H_2 Receptor Blockers
  - Proton Pump Inhibitors & Eradication of H. Pylori
  - Mucosal Protective Agents
  - Prokinetic Agents
  - Emetics & Anti-Emetics
  - Laxatives
  - Anti-Diarrheal Drugs
- Drugs for:
  - Functional Dyspepsia,
  - Drugs Used in Acid Peptic Disease,
  - Drugs Stimulating Gastrointestinal Motility,
  - Nausea / Vomiting,
  - Hiccups,
  - Constipation.

Drugs useful / Pharmacological Effects as Chemotherapy

- Introduction to chemotherapy
- Basic (Pharmacokinetic & Pharmacodynamics) and Clinical Pharmacology of:
  - Beta Lactam and Other Cell Wall Synthesis Inhibitors
  - Protein Synthesis Inhibitors
  - Nucleic Acid Synthesis Inhibitors
  - Folic Acid Synthesis Inhibitors
  - Anti-Mycobacterial Drugs.
  - Antifungal Drugs.
    - Antiviral Drugs, esp. Used in Herpes, Hepatitis B & C, AIDS, Bird Flu, COVID- 19, etc. (Clinical Classification and Common Adverse Effects Only)
  - Anti-Protozoal Drugs.
    - Anti- Malarial.
    - Anti-Amoebic.

- Anthelmintics

- Drugs for:
  1. Bacterial Infections:
     - Skin & Soft Tissue Infections:
     - Pharyngitis,
     - Enteric Fever (Typhoid Fever),
     - Cholera,
     - Urinary Tract Infection,
     - Gonococcal Infections,
     - Anaerobic Infections,
     - Diphtheria,
     - Pertussis Infection (Whooping Cough),
     - Meningitis,
     - Clostridial Myonecrosis (Gas Gangrene),
     - Tetanus,
     - Leprosy (Hansen Disease),
     - Chlamydial Infections,
     - Urethritis, etc.
     - Infections in the Immunocompromised Patient,
     - Fever of Unknown Origin (FUO):
     - Health Care–Associated Infections
     - Meningitis, Encephalitis, etc,
     - Infections in Drug Abusers,
     - Infectious & Traveler's Diarrhea,
  2. Rickettsial Diseases:
     - Rocky Mountain Spotted Fever
  3. Spirochetal Infections:
     - Syphilis,
     - Rat-Bite Fever,
  4. Protozoal Infections:
     - Malaria like Chloroquine-sensitive or resistant P. Falciparum or P. Malariae, P. Vivax and P. Ovale infection
     - Amebiasis,
     - Giardiasis, Trichomoniasis,
     - Helminthiasis (Ascariasis, Hookworm, Enterobiasis, etc.
  5. Viral Infections:
     - Influenzae (Seasonal Influenza, Avian Influenza – Bird Flu, COVID-19,
     - Herpes Simplex,
     - Herpes Zoster (Shingles),
     - Varicella (Chickenpox),
     - Preventable Viral Infections (Measles, Mumps, Rubella, Poliomyelitis, Tetanus, Rabies, etc.
     - HIV infection,
     - Viral Hemorrhagic Fever, (Dengue, Ebola, Yellow Fever, etc)
     - Cytomegalovirus,
  6. Fungal Infections:
     - Candidiasis: Mucosal (Esophageal / Vulvovaginal Candidiasis), Invasive, Endocarditis,
     - Mucormycosis,
     - Mycetoma,
     - Other Opportunistic Mold Infections.

Drugs useful / Pharmacological Effects in Oncology.

- Basic & Brief Clinical Pharmacology (Pharmacokinetic & Pharmacodynamics) of:
  - Methotrexate, Cyclophosphamide, Bleomycin,
- Drugs for:
  - The Leukemias,
  - Hodgkin's & Non-Hodgkin's Lymphomas,

- Breast Cancer,
- Prostate Cancer,
- Secondary Malignancies & Cancer Chemotherapy.
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Drugs useful / Pharmacological Effects in Endocrinology

- Basic and Clinical Pharmacology (Pharmacokinetic & Pharmacodynamics) of:
  - Thyroid and anti-thyroid drugs.,
  - Pancreatic hormones (Insulin & Glucagon, etc) and oral anti diabetic drugs.
  - Adrenocorticoids and their antagonists.
  - Male & Female Sex Hormones.
- Drugs for:
  - Acromegaly (Jaw Involvement)
  - Inflammatory Systemic Diseases, Allergic Reactions, and Immunosuppression
  - Hypothyroidism, Hyperthyroidism
  - Diabetes Mellitus.
  - Drugs useful / Pharmacological Effects in Obstetrics & Gynaecology
    - Drugs contraindicated during Pregnancy (Teratogenic or Fetotoxic) & Lactation.
    - Drugs causing uterine contraction & relaxation.
    - Drugs for Contraception.
    - Anabolic steroids.
    - Vomiting of Pregnancy & Hyperemesis Gravidarum
  - Drugs for Neonates & Children:
    - Specific bioavailability in neonates,
    - Specific elimination half-lives in neonates.
    - Drug effects during lactation.
    - Paediatric Dosage Calculation.
  - Specific Problems during Pregnancy:
    - Anemia,
    - Diabetes Mellitus,
    - Chronic Hypertension & Heart Disease,
    - Asthma,
    - Thyroid Disease,
    - Seizure Disorders,
    - Urinary Tract Infection,
    - Tuberculosis,
    - HIV/AIDS During Pregnancy,
    - Maternal Hepatitis B & C Carrier State,
    - Herpes Genitalis, Syphilis, Gonorrhea, etc

Drugs useful / Pharmacological Effects in Immune Response Disorders,

- Allergies/Allergic Disorders/ Reactions: Anaphylaxis, Food Allergy, Drug Allergy,
- Atopic Disease,
- Autoimmune Disorders,
  - Immunosuppressive agents' esp. useful in organ transplants. (classification and common therapeutic uses and adverse effects only).
- Hypersensitivity,
- Immunodeficiency.

Miscellaneous Topics

a) Drugs useful / Pharmacological Effects in Geriatric Problems

- Importance of Pharmacokinetic and Pharmacodynamic changes with aging.
- Precautions in Administering Medications for:
  - Sedative-Hypnotics, Analgesics, Antidepressant Drugs, Drugs Used in Alzheimer's Disease,
  - Antihypertensive Drugs,

- Antimicrobial Therapy,
- Anti-Inflammatory Drugs,
- Drugs Used in Glaucoma,

- Adverse Drug Reactions in The Elderly
- Drugs for:
  - Dementia
  - Depression
  - Delirium
  - Involuntary Weight Loss

b) Drugs useful / Pharmacological Effects in Surgery

i. Pre surgical.
- Pre-anesthetic Medication:
  - Acepromazine – for psychic sedation primarily.
  - Atropine – to minimize secretions.
  - Diazepam – to fortify impotent anesthetics
  - Scopolamine – for prophylaxis for suppression of vagal and other autonomic reflex activity.
- Specific control of comorbid diseases like Diabetes Mellitus, Cardiac Problems, etc.

ii. During Surgery.
- Local Anesthetics:
  - Basic and Clinical Pharmacology (Pharmacokinetic & Pharmacodynamics) of Esters & Amides.
- General Anesthetics:
  - Basic and Clinical Pharmacology (Pharmacokinetic & Pharmacodynamics) of Neuromuscular Blockers.
  - Basic and Clinical Pharmacology (Pharmacokinetic & Pharmacodynamics) of Gaseous & Parenteral General anesthetics.
- Special care for infective surgeries, etc.

iii. Post-surgical.
- Opioids – Postoperative Pain.
- Diphenhydramine, Dimenhydrinate – Postoperative Nausea & Vomiting,
- Avoid NSAIDs, Warfarin, or Antiplatelets, etc. – to avoid Postoperative Bleeding.

c) Drugs useful / Pharmacological Effects as Nutritional Supplements.

- Basic and Clinical Pharmacology (Pharmacokinetic & Pharmacodynamics) of:
  - Iron,
  - Vitamin B_{12}, and Folic Acid,
  - Vitamin B_1, Vitamin B_2, Vitamin B_6, Vitamin C, Vitamin D Vitamin D_3, Vitamin D_2, Vitamin E, Calcium, Phosphate, and Other Supplements
- Drugs for:
  - Anemia, Thalassemia, Sickle Cell Anemia, Aplastic Anemia.
  - Vit B_{12} & Folic Acid Deficiency,
  - Neutropenia, Thrombocytopenia.

d) Drugs useful / Pharmacological Effects in Sports

- Drugs for:
  - Pain in Neck, Jaw, Cervical Disk Herniation, etc.

e) Antidotes.

- Dimercaprol, Ethylenediaminetetraacetic Acid, Penicillamine, Deferoxamine.

f) Drug Interactions.

- Predictability of Drug Interactions:
- Pharmacokinetic and Pharmacodynamic Mechanisms of Drug Interactions.
- Combined Toxicity.

Dental Pharmacology

- Antiseptics, Disinfectants
- Agents used for Dental Caries

- Agents used for the maintenance of Oral Hygiene
- Agents used for Root Canal Therapy
- Hemostatic agents used in dentistry
- Desensitizing agents
- Artificial Salivary Preparations.

Clinico-Pharmacological Scenario / Multidisciplinary Seminars

- Acid Peptic Disease
- Acute attack of asthma & Status Asthmaticus
- Status Epilepticus
- Rheumatoid Arthritis
- Acute Angina and Prophylaxis
- Hypertension and Acute Hypertensive Crisis
- Anaphylactic and Cardiogenic Shocks
- Tuberculosis,
- Malaria
- Typhoid Fever, with resistant cases management.
- Amoebiasis
- Urinary Tract Infection
- Acute watery diarrhea
- Bacillary dysentery
- Iron deficiency anemia
- Allergic rhinitis
- Migraine
- Hepatitis B / C
- Bird-Flu,
- Dengue,
- COVID - 19 etc.

Rational Prescribing, P-drug & Prescription Writing

- General Principles and Guideline for Prescription Writing & Drugs Rational Use
- Elements of the Prescription,
- Prescribing Errors,
- Omission of Information
- Poor Prescription Writing,
- Inappropriate Drug Prescriptions,
- E-Prescribing,
- Compliance,
- Legal Factors, Socioeconomic Factors (The Cost of Prescriptions, Generic Prescribing, Other Cost Factors).

Drug Treatment, Prescription Writing and P-drug for the following clinical scenario:

- Acid Peptic Disease
- Acute attack of asthma & Status Asthmaticus
- Acute Angina and Prophylaxis
- Mild & Moderate Hypertension
- Anaphylactic and Cardiogenic Shocks
- Tuberculosis
- Typhoid Fever
- Amoebiasis
- Urinary Tract Infection
- Bacillary dysentery

- Iron deficiency anemia
- Hepatitis B / C

Recommended Books

1. Basic and Clinical Pharmacology by Katzung, Latest Edition, Mc Graw-Hill.
2. Pharmacology Examination and Board Review by Katzung and Trevor, Latest Edition, Mc Graw-Hill. (for MCQs)
3. Pre-test pharmacology – self assessment and review. (for MCQs)
4. Current Medical Diagnosis & Treatment, Latest Edition (for Clinical Pharmacology).

Reference Book

5. Goodman & Gilman's The Pharmacology Basis of Therapeutics, Latest Edition.

5. PRACTICALS

Experimental Pharmacology

- Biostatistics including calculation of mean, mode, median, range, standard deviation, standard error of mean and Student t-test and their significance (Heart Rate, BP, Wt. & Height).

Pharmacy

1. Weights and measures used clinically.
2. Abbreviations used clinically.
3. Definitions with examples of various dosage forms available for clinical use.
4. Routes of Drug Administration.
5. Calculations for preparation of:
    a. Saline and Dextrose (different strengths) / Ringer's Lactate Solutions
    b. ORS powder.
    c. Sulphur ointment
    d. Carminative mixture.
    e. $KMnO_4$ lotion.
6. Dose calculation for clinical uses, according to age, weight, body surface area.
7. Pharmacokinetic calculations – Loading Dose and Maintenance Dose, Half-Life and Volume of Distribution.
8. Calculation of rate of IV infusions.

6. ***Teaching & Learning Methodologies***

a) Interactive Lectures
b) Tutorials
c) Practicals
d) Small Group Discussions
e) Batch Wise Viva Voce
f) Monthly bases tests (MCQ's and SEQ's)
g) Long Tutorial Sessions
h) Topic Wise Practice Test
i) Using Latest Techniques of electronic facilities like Audio Visual and Multimedia
j) Recommended E. Books

7. Attendance Required

a) 75% Attendance is mandatory in (Lectures, Practical and Tutorials)

b) A minimum 75% Attendance is required for eligibility to appear in Annual Examination according to University of Health Sciences, Lahore

c) Attendance will be marked through the Bio- Metric Attendance Systems (thumb Impression) and also record in Attendance Registers.

d) Absences due to Sickness/ Illness must be certified by a Medical Officer and approved by Principal and Head of Department also.

8. Learning Resources

Recommended Books:-

1. Goodman & Gilman's - The Pharmacological Basis of Therapeutics
2. Basic & Clinical Pharmacology by Bertram G, Katzung
3. Clinical Pharmacology by DR Lawrence, PN Bennett & MJ Brown
4. Essentials of Medical Pharmacology by K.D. Tripathi
5. Lippincott Illustrated Review Pharmacology
6. Lecture Notes on Drugs for Dental Students by Wilkin & Davidson
7. Clinical Pharmacology in Dental Practice by S V Holroyd
8. Clinical Dental Pharmacology Kamran Ali

1) Technologies to be Used: -

1) Text Books are the Most Important source to learn for this Subject

2) Hand Outs (by Senior Faculty Members)

3) E. Books (Available)

4) Multimedia (Power Point)

5) Tables of Drugs Chart

6) Discussions

7) Viva Voce type Practice

8) Departmental Library

9. Assessments Methods

Formative:-

- MCQ's and SEQ's type Test will be held at the end of the every topic.
- Viva Voce will be held at the end of every major topic.
- Assignments given, checked and marked for 10 % Internal Assessment marks
- Summer Vacation work (assignments type)

10. Exam Rules and Regulation

Examination will be held at the end of the session of the year

Marks Distribution According to University of Health Sciences Rules and Regulation:-

Total Marks of the subject in Professional examination----**200 Marks**

Theory Examination:

- 45 Multiple Choice Questions (1 Mark for Each Question) ----------– 45 Marks
- 15 Short Essay Questions (3 marks for Each Question) ----------45 Marks
- Internal Assessment ----------10 Marks

Total Marks 100 Marks

Oral//Practical & Viva Voce Examination:

Viva Voce Examination:-

- Viva Voce will be held after Theory Examination
- Viva Voce (Internal Examiner): 30 Marks and 05 Marks for Note Book ---35 Marks
- Viva Voce (External Examiner): 30 Marks----------30 Marks

OSPE Examination: -

- 04 non-Observed Stations (Each Station having 04 Marks)-- ----------16 Marks
- Biostatics Practical ---04 Marks
- Pharmacy Practical: (30 minutes) ---05 Marks
- Internal Assessment: ----10 Marks

Total Marks: 100 Marks

11.Schedule / Planner / Timetable

Schedule / Planner for the Year 2018-2019

Topic	Teacher	No of Lect
General Pharmacology		
Introduction	Dr. Ajaz Fatima	01
Routes of Administration	Dr. Ajaz Fatima	02
Absorption+ Bioavailability	Dr.Shazia Asim	01
Distribution	Dr. Ajaz Fatima	02
Biotransformation	Dr. Shazia Asim	02
Excretion, 1/2 Life, Kinetics	Dr. Asia Firdous	02
Pharmacodynamics	Dr. Awais	04
Dose response curve + Therapeutic Index	Dr. Awais	
Drug allergy & Adverse effects	Dr.Awais Qarni	02
Drug dependence, addiction	Dr.Awais Qarni	02
Posology	Dr. Wardah	01
Pharmacogenetics	Dr. Ajaz Fatima	01
Bioassay & Standardisation	Dr.Wardah	01
Locally acting drugs & Chelating agents	Dr. Awais	02
Disinfectants & Antiseptics + Phenol	Dr. Awais	02
Autonomic Nervous System		
Introduction	Dr. Asia Firdous	01
Cholinergic Drugs	Dr. Asia Firdous	01
Anticholinergic	Dr. Ajaz Fatima	02
Muscle Relaxants	Dr. Awais Qarni	01
Ganglion Blockers	Dr. Wardah	01
Catecholamines	Dr. Ajaz Fatima	03

Non-Catecholeamines	Dr. Asia Firdous	02
Beta Blockers	Dr. Asia Firdous	02
Alpha Blockers	Dr. Asia Firdous	01
Adrenergic Neuron Blockers	Dr.Wardah	02
Ergot Alkaloids & Bromocryptine	Dr. Wardah	01
Centrally acting sympathoplegics	Dr. Wardah	01

GIT Drugs

Emetics & Anti emetics	Dr. Asia Firdous	01
Purgatives & Laxatives	Dr. Wardah	01
Treatment of P.U & Antacids	Dr. Wardah	03

Cardiovascular System Drugs

Vasodilators: Direct & Ca^{++} Channel Blockers	Dr. Ajaz Fatima	03
Antihypertensive drugs & Treatment of Hypertension	Dr. Ajaz Fatima	02
ACE Inhibitors	Dr. Ajaz Fatima	02
Antianginal Drugs	Dr. Awais Qarni	03
Treatment of CCF	Dr. Ajaz FAtima	03
Anti arrythmic Drugs	Dr. Asia Firdous	03
Diuretics	Dr. Wardah	02

DRUGS ACTING ONBLOOD

Antihyperlipidemic Drugs	Dr. Asia Firdous	01
Coagulants, Anti coagulants & Thrombolytic agents	Dr.Awais	**02**
Anti Platelets	Dr. Awais Qarni	01

Autocoids:-

Histamine & Anti histamine	Dr. AsiaFirdous	02
Prostaglandins & Serotonins	Dr. Wardah	02

Drugs acting on CNS

Introduction	Dr. Ajaz Fatima	01
General Anesthetics	Dr. Ajaz Fatima	03
Local Anesthetics	Dr. Wardah	02
Anti Psychotic drugs	Dr. Awais	02
Antidepressants	Dr. Ajaz Fatima	02
Antimaniacs	Dr. Asia Firdous	01
Sedative & Hypnotics + Anti anxiety Drugs	Dr. Ajaz Fatima	03
Alcohol & Drug abuse	Dr. Awais Qarni	02
Treatment of Epilepsy	Dr. Asia Firdous	02
Narcotic Analgesics	Dr. Asia Firdous	02
Non-narcotic Analgesics	Dr. Ajaz Fatima	03
Treatment of Rheumatoid arthritis	Dr. Ajaz Fatima	01
Treatment of gout	Dr. Wardah	01

Drugs acting on Endocrine System

Pituitary hormones& Parathyroid drugs	Dr. Wardah Siddique	01
Antithyroid	Dr. Wardah	02
Corticosterroids	Dr. Ajaz Fatima	02
Antidiabetic Drugs	Dr. Awais Qarni	03

Therapeutics

Antibiotics: Introduction	Dr. Asia Firdous	01

Cell wall synthesis inhibitors

Penicillins & Cephalosporins	Dr. Wardah	02
Bacitracin, Vancomycin, Monobactam, carbapenems,aztreonam	Dr. Wardah	01

Protein Synthesis Inhibitors

Aminoglycosides Macrolides	Dr. Asia Firdous	02
Tetracyclines & Chloramphenicol	Dr. Asia Firdous	01

Antifolates Drugs

Sulphonamides & Cotrimoxazole+ Trimethoprine and Pyrimethamine	Dr. Ajaz Fatima	02

DNA Synthesis Inhibitors

Urinary Antiseptics & Quinolone derivatives	Dr. Ajaz Fatima	01
Anti Cancer Drugs	Dr. Wardah	03
Anti Viral Drugs	Dr. Ajaz Fatima	02
Antifungal Drugs	Dr. Asia Firdous	01
Anti TB & Leprosy drugs	Dr. Awais	02
Antimalarial	Dr. Asia Firdous	02
Anti amoebic Drugs	Dr. Ajaz Fatima	02
Drug Interactions	Dr. Wardah	01

Time Table for 2nd Year B.D.S (Weekly Schedule)

Lahore Medical & Dental College, Lahore.
2nd Year BDS
Weekly Lectures Schedule
Date: from: to:

Day	TIME	TOPIC	TEACHER
Monday	**09:30am to 10:15 am**		
Tuesday	**11:30am To 12:15pm**		
Wednesday	**09:30am To 10:15am**		
Friday	**08:15am To 09:00am**		

Weekly Practical Schedule
Time: 07:30AM to 09:30AM

Day	Batch	Practical Topic	Teacher
Monday	**Batch B**		
Tuesday	**Batch A**		
Wednesday	**Batch B**		
Thursday	**Batch A**		

Teaching Hours:-

For 2nd Year B.D.S
For Lectures: 108 hours
For Practical & Tutorials: 288 hours

12. ***ORGANOGRAM OF PHARMACOLOGY DEPARTMENT***

Prof. Dr. Ajaz Fatima
MBBS, M Phil
Head of department of Pharmacology

1) Dr. Ajaz Fatima
MBBS, M.Phil Professor (H.O.D)

Dr. Shazia Asim
MBBS, M.Phil Professor

Dr. Asia Firdous
MBBS, M.Phil Assisstant Professor

Dr. Ghulam Awais Qarni
MBBS, M.Phil (part 1) Senior Lecturer

Dr. Rubina Raza (MBBS)
Dr. Bushra Haider (MBBS)
Dr. Usama Javed (MBBS)

1) Khalid Masood(computer operator)
2) Saif ul Mulook (lab technician)
3) Mohammad Amin (lab assistant)
4) Jan Mohammad (office boy)
5) Mohammad Kashif (store keeper)