



**3rd Year MBBS Curriculum
(1ST Module)**

**CMH INSTITUTE OF MEDICAL SCIENCES (CIMS)
BAHAWALPUR**

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CALENDAR OF 3rd YEAR MBBS CLASS (2018 / 2019)

Events	Class	
	3 rd Year	
Start of Session	03 Dec 2018 (Mon)	
1st Module	Duration:	12 Week
	From:	03 Dec 2018 (Mon)
	To:	17 Feb 2019 (Sun)
	End Module Exam:	11 Feb 2019 (Mon) To 16 Feb 2019 (Sat)
2nd Module	Duration:	10 Week
	From:	18 Feb 2019 (Mon)
	To:	21 April 2019 (Sun)
	End Module Exam:	15 April 2019 (Mon) To 20 April 2019 (Sat)
3rd Module	Duration:	09 Week
	From:	22 April 2019 (Mon)
	To:	25 July 2019 (Thur)
	End Module Exam:	15 July 2019 (Mon) To 25 July 2019 (Thur)
Revision Module	29 July 2019 (Mon) To 06 Sep 2019 (Fri)	
Winter Vacation	22 Dec 2018 (Sat) To 30 Dec 2018 (Sun) (09 Days)	
Sports Week	25 March 2019 (Mon) To 29 March 2019 (Fri) There will be ½ day Activity in the morning before sports activities	
Summer Vacation & Eid ul Fitr Leave	18 May 2019 (Sat) To 16 June 2019 (Sun) (30 Days)	
Eid ul Azha Leave	10 Aug 2019 (Sat) To 18 Aug 2019 (Sun) (09 Days)	
Prep Leave Pre-Annual Exam	07 Sep 2019 (Sat) To 24 Sep 2019 (Tue) (18 Days)	
Pre-Annual Exam	25 Sep 2019 (Wed) To 04 Oct 2019 (Fri)	
Prep Leave Annual Exam	05 Oct 2019 (Sat) To 07 Nov 2019 (Thur) (34 Days)	
Annual Exam	08 Nov 2019 (Fri) To 23 Nov 2019 (Sat)	
Post Prof Leave	24 Nov 2019 (Sun) To 01 Dec 2019 (Sun) (08 Days)	

WEEKLY TIME TABLE**3rd YEAR MBBS CLASS (FIRST MODULE)****2018 / 2019**

Days	0830-0930	0935-1030	1030-1100	1100-1200	1200-1300	1300-1315	1315-1400	1400-1500
Mon	General Pathology Lecture	Pharmacology Lecture	Break	Forensic Medicines Lecture	CBL Pharma / Path Forensic Med	Prayer Break	Practical Pharmacology / Pathology/Forensic	
Tue	Pharmacology Lecture	Pathology Lecture		Clinical rotation			Practical Pharmacology / Pathology / Forensic Medicines	
Wed	Pathology Lecture	Pharmacology Lecture		Clinical rotation			Practical Pharmacology / Pathology / Forensic	
Thur	Pharmacology Lecture	Pathology Lecture		Clinical rotation			CBL Pharmacology / Pathology / Forensic	
Fri	Pathology Lecture	Pharmacology Lecture		Forensic Medicines Lecture	CBL Pharma / Path Forensic Med		Fri Prayer	SDL

MODULE THEME

BLOCKS THEMES		
Pathology	Pharmacology	Forensic Medicine
<ul style="list-style-type: none"> • Cell Injury, Cell death & Adaptations • Inflammation and wound healing • Hemodynamic disorders, thromboembolism and shock • General Microbiology • Special Bacteriology (Gram positive cocci, gram-negative cocci and gram-negative bacteria) 	<ul style="list-style-type: none"> • Basic principles of pharmacology • Autonomic drugs • Cardio vascular drugs • Diuretics 	<ul style="list-style-type: none"> • Introduction to forensic medicine • Thanatology • Personal identity • Biological specimen • General traumatology
Learning Objectives		
Pathology	Pharmacology	Forensic Medicine
<ul style="list-style-type: none"> • Introduction to Pathology • Cellular adaptations • Ischemia & cell injury • Mechanisms of cell injury • Cellular aging • Necrosis & apoptosis • Intracellular accumulations • Acute Inflammation • Chemical Mediators • Chronic inflammation • Specific types of chronic inflammation • Wound healing & tissue repair ➤ Edema, hyperemia & congestion ➤ Thrombosis ➤ Embolism ➤ Hemorrhage ➤ Shock ➤ Infarction ➤ Amyloidosis 	<ul style="list-style-type: none"> • Pharmacology: Introduction, • Branches/division of Pharmacology, • Sources & active principles of drugs • Pharmacokinetic • Biotransformation • Pharmacogenomics <ul style="list-style-type: none"> • A N S: Introduction • Parasympathomimetics or cholinergic Drugs • Anti Cholinesterases, Myasthenia gravis • Organophosphate poisoning & Oximes • Cholinergic blocker • Adrenergic agonist • Adrenergic antagonist • Catecholamines: Adrenaline, Nor adrenaline, Dopamine & Dobutamine 	<ul style="list-style-type: none"> • Role of Forensic Medicine /Sciences in Crime detection, especially in crimes involving human life & body • Scientific concepts regarding death, medico-legal aspect of Brain death, Indicators of Death, medico-legal aspects of Sudden and unexpected deaths, causes, manner, mode and mechanisms of death. Physicochemical changes subsequent to death occurring in various body tissues and organs under various environmental conditions. • To write a Certification of death according to WHO guidelines • Autopsy: Types, objectives, rules, and techniques and describe procedure for post-mortem; Methods for Assessment of Fatal period and post-mortem interval. Post-mortem artefacts. Risks and Hazards of autopsy, and Autopsy

<ul style="list-style-type: none"> • Introduction to microbiology and biohazards in microbiology • lab and infection control measure • Bacterial anatomy, physiology, bacterial growth and genetics • Sterilization and disinfection by physical methods • Sterilization and disinfection by chemical methods • Bacterial pathogenesis • Normal Flora • Gram positive cocci and gram-negative bacteria Staphylococci <ul style="list-style-type: none"> ➤ Antibiotics resistance mechanism ➤ Streptococci, classification and Streptococcus pyogenes ➤ Streptococcus pneumoniae ➤ Other streptococci and enterococci ➤ Neisseria meningitidis ➤ Neisseria gonorrhoeae ➤ Coliform organisms & family ➤ Enterobacteriaceae: General characteristics ➤ E. coli, Klebsiella, Enterobacter, Proteus, Providentia and Morganella ➤ Salmonella ➤ Shigella ➤ Vibrio ➤ Pseudomonas ➤ Haemophilus, Bordetella, Legionella ➤ Campylobacter, Helicobacter ➤ Brucella, Pasteurella, Yersinia 		<p>Protocol. Procedure for selection and reservation, labelling and dispatch of Biological and non- Biological materials for laboratory examination; and collect relevant samples.</p> <ul style="list-style-type: none"> • Exhumation procedures, and its value and limitations. • Mechanical Injuries: • Mechanisms of wound production, classification of wounds, wounds produced by conventional weapons and their medico-legal aspects. • Firearms, Ammunition, Classification, Nomenclature, wound Ballistics and medico- legal aspects. • Medico-Legal Considerations: • Suicide, homicide and accident. • Parameters of personal identity, methods of identifying living, dead, decomposed, mutilated and burnt bodies, and skeletal and fragmentary remains, • Special techniques (Dentistry: Radiology, Neutron Activation Analysis etc.), and objective methods of identification (Osteometry, Dactyloscopy, DNA Technique, Super imposition photography etc.). • Methods of determination of age, sex and race by various methods with their medico-legal aspects. • Methods to trace evidence, Locard's Principle of exchange and its medico-legal significance.
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TEACHING HOURS**Total Weeks/Hours: 8 weeks/ 260 Hours (0800-1500)****• Pathology :**

○ Lectures :	40	5/Week	40 Hours
○ Practical:	08	1/Week	36 Hours

Total 76 hours**• Pharmacology:**

○ Lectures :	40	5/Week	40 Hours
○ Practical:	08	1/Week	36 Hours

Total 76 hours**Total Weeks/Hours: 8 weeks/ 34 Hours (0800-1500)****• Forensic Medicine:**

○ Lectures :	16	2/Week	16 Hours
○ Practical:	08	1/Week	10 Hours

Total 26 hours**• CBLs :**

○ CBLs :	8	1/Week	12 hours
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DEPARTMENT OF PATHOLOGY

S.No	Faculty	Topic
1.	Professor Principal Brig (Retd) Ch Altaf Hussain	<ul style="list-style-type: none"> ▪ General Microbiology ▪ Hemodynamic disorders, thromboembolism and shock
2.	Associate Professor Lt Col Ayesha Hafeez	<ul style="list-style-type: none"> ▪ Inflammation and Wound Healing
3.	Assistant Professor	
	Lt Col Adeel Arif	<ul style="list-style-type: none"> ▪ Inflammation and Wound Healing
	Maj Shan-e-Rauf	<ul style="list-style-type: none"> ▪ Inflammation and Wound Healing
	Dr Sara Khan	<ul style="list-style-type: none"> ▪ Cell Injury, Cell death & Adaptations
	Dr Rabia Saeed	<ul style="list-style-type: none"> ▪ Special Bacteriology (Gram positive cocci, gram-negative cocci and gram-negative bacteria)
	Lt Col Ali Nadeem	<ul style="list-style-type: none"> ▪ Hemodynamic disorders, thromboembolism and shock
Lecturers		
4.	Dr. Daniyal	<ul style="list-style-type: none"> ▪ Acute inflammation, Chronic inflammation, Chronic granulomatous inflammation

		<ul style="list-style-type: none">▪ Hydropic change, Fatty Change
5.	Dr Ramsha	<ul style="list-style-type: none">▪ Culture media▪ Calcification, Intracellular accumulation (melanin, hemosiderin)
6.	Dr Feroza Yaqoob	<ul style="list-style-type: none">▪ Hyperplasia, Atrophy, Metaplasia▪ Study of microscope, Gram stain
7.	Dr Haider	<ul style="list-style-type: none">▪ Ziehl Nelson stain▪ Coagulative Necrosis, Caseous Necrosis

RECOMMENDED BOOKS (PATHOLOGY)

- Pathologic Basis of Disease (Tenth Edition) by Vinay Kumar.
- Review of Medical Microbiology and Immunology 13th Edition by Warren Levinson.
- Jawetz, Melnick, & Adelberg's Medical Microbiology (27th edition) by Karen C. Carroll, M. T.
- A Photographic Atlas for The Microbiologic Laboratory (4th edition) by Michael J. Leboffe, B. E.
- High-Yield Histopathology by Lippincott Williams & Wilkins.
- 100 Cases in Clinical Pathology by Shamil, E., Ravi, P., & Chandra, A.
- Lecture Notes Kaplan
- USMLE step -1 Kaplan.
- USMLE First Aid.

PATHOLOGY**First Module (5 x Lectures / Week)****Subject: Pathology**

Lectures	Week	Topics	Learning Objectives
1.	I.	Introduction to General pathology	<ul style="list-style-type: none"> Explain the basic concepts of General pathology
2.		Introduction to Microbiology.	<ul style="list-style-type: none"> Describe the basic concept of Bacterial anatomy, physiology, bacterial growth and genetics
3.		Cellular Adaptations	<ul style="list-style-type: none"> Describe Cellular Adaptations Correlate the mechanism of different types of pathological cellular adaptations with the micro and macroscopic structure
4.		Acute Inflammation	<ul style="list-style-type: none"> Define Acute Inflammation Critically analyze the pathological basis of acute inflammation Describe the basis of etiology, pathogenesis and morphology of acute inflammation
5.		Hyperemia, congestion and edema	<ul style="list-style-type: none"> Define Hyperemia, congestion and edema Describe the types of edema (Inflammation related, non-inflammation related), pathophysiologic categories, morphological and clinical features of edema, hyperemia and congestion. Assess the hemodynamic disorders including hyperemia, congestion and edema along with the pathogenesis and contributing factors
6.		Mechanism of Cell Injury	<ul style="list-style-type: none"> Differentiate between reversible and irreversible cell injury. (definition, causes, morphology, mechanism, examples)

7.	II.	Ischemia and oxidative stress	<ul style="list-style-type: none"> ▪ Describe ischemia reperfusion injury ▪ Explain the role of reactive oxygen species ▪ Correlate ischemic changes to its morphology
8.		Necrosis	<ul style="list-style-type: none"> ▪ Define necrosis and different types of necrosis ▪ Critically analyze the pathological basis of Necrosis ▪ Compare different types of necrosis on the basis of causes, morphology, mechanism and examples
9.		Outcome of Morphological pattern of Acute Inflammation	<ul style="list-style-type: none"> ▪ Summarize the Outcomes of Acute Inflammation ▪ Explain the morphological features of all outcomes of acute inflammation.
10.		Thrombosis	<ul style="list-style-type: none"> ▪ Define Thrombosis ▪ Describe Virchows triad ▪ Describe the pathophysiology of thrombosis and Hypercoagulable states ▪ Differentiate the types of Thrombosis (Arterial and venous thrombosis) ▪ List the complications of Thrombosis with emphasis on Disseminated intravascular coagulation ▪ Explain the fate of thrombus
11.	III.	Pathogenesis of Bacterial Disease/Virulence	<ul style="list-style-type: none"> ▪ Correlate the basic morphological, physiological and genetic characteristics of bacteria with their pathological mechanism
12.		Apoptosis & its causes	<ul style="list-style-type: none"> ▪ Define Apoptosis ▪ List the Causes of Apoptosis (Physiological and pathological) ▪ Critically analyze the pathological basis of apoptosis
13.		Apoptosis Mechanism	<ul style="list-style-type: none"> ▪ Explain the intrinsic and extrinsic mechanism of Apoptosis

14.		Chronic Inflammation	<ul style="list-style-type: none"> ▪ Define Chronic Inflammation ▪ Explain the pathological basis of Chronic inflammation and explain its etiology, pathogenesis and morphology. ▪ Interpret the pathways of macrophage activation ▪ Role of macrophages/lymphocytes and other cells in chronic inflammation ▪ List the outcomes of Chronic Inflammation
15.		Embolism	<ul style="list-style-type: none"> ▪ Define Embolism ▪ Describe the pathophysiology of embolism ▪ List the complications of Embolism
16.	IV.	Disinfection & Sterilization	<ul style="list-style-type: none"> ▪ Appraise the concept of sterilization ▪ Describe different methods of sterilization and disinfection in detail.
17.		Autophagy & other Mech of cell Death	<ul style="list-style-type: none"> ▪ Define Autophagy ▪ Explain the process of autophagy ▪ Describe the other pathways of cell death
18.		Gram Positive Cocci I (Staphylococci)	<ul style="list-style-type: none"> ▪ Correlate the important morphological and pathogenic characteristics, laboratory diagnosis, prevention and virulence factors produced by Staphylococci with their clinical significance
19.		Specific Types of Chronic inflammation	<ul style="list-style-type: none"> ▪ Define Chronic granulomatous inflammation. ▪ List the causes of Chronic granulomatous inflammation ▪ Explain the morphological features of Chronic granulomatous Inflammation ▪ Enumerate the causes of Caseating and non-caseating granulomas with examples
20.		Shock	<ul style="list-style-type: none"> ▪ Define shock ▪ Describe the pathological factors involved in the process of shock ▪ Differentiate the types of shock

			<ul style="list-style-type: none"> List the complications of shock
21.	V.	Normal Flora	<ul style="list-style-type: none"> Define normal flora Define commensals, carriers, colonization and colonization resistance Determine Normal flora of various anatomical locations Match the members of normal flora with their appropriate anatomical locations
22.		Intracellular Accumulations	<ul style="list-style-type: none"> Determine the causes , mechanisms and clinical correlations of the abnormal accumulations in cells and tissues (Fatty change, Cholesterol & cholesteryl esters, Proteins, Glycogen and Pigments) Describe the cellular accumulations with the pathological basis of diseases
23.		Gram Negative Cocci (Neisseria meningitidis, Neisseria gonorrhoeae and others)	<ul style="list-style-type: none"> Describe the important morphological, pathogenic characteristics, laboratory diagnosis and virulence factors produced by gram negative cocci (Neisseria meningitidis, Neisseria gonorrhoeae and others) with their clinical significance
24.		Bio Hazards and infections control measures	<ul style="list-style-type: none"> Apply the methods of health professional and patient safety in laboratory and clinical settings. (infection control measures)
25.		Antibiotics resistance mechanism	<ul style="list-style-type: none"> Outline the mechanism of bacterial resistance to antibiotics
26.		Culture Media	<ul style="list-style-type: none"> Classify culture media Outline their important characteristics list the organisms growing on different media
27.		Enterobacteriaceae I	<ul style="list-style-type: none"> Describe the important morphological, pathogenic characteristics, laboratory diagnosis, clinical findings and virulence factors produced by E. coli, Klebsiella,

	VI.	(E. coli, Klebsiella, Enterobacter, Proteus, Providentia and Morganella)	Enterobacter, Proteus, Providentia and Morganella with their clinical significance
28.		Enterobacteriaceae II (Salmonella Shigella Vibrio Pseudomonas Haemophilus, Bordetella, Legionella)	<ul style="list-style-type: none"> ▪ Describe the important morphological, pathogenic characteristics, laboratory diagnosis, clinical findings and virulence factors produced by Salmonella Shigella Vibrio Pseudomonas Haemophilus, Bordetella, Legionella with their clinical significance.
29.		Enterobacteriaceae III (Campylobacter, Helicobacter Brucella, Pasteurella, Yersinia)	<ul style="list-style-type: none"> ▪ Describe the important morphological, pathogenic characteristics, laboratory diagnosis, clinical findings and virulence factors produced by Campylobacter, Helicobacter Brucella, Pasteurella, Yersinia with their clinical significance
30.		Mediators of Acute Inflammation & chronic Inflammation	<ul style="list-style-type: none"> ▪ Explain the modes of production and actions of chemical mediators in local inflammation and systemic inflammation ▪ Describe the role of mediators of Acute Inflammation ▪ Describe the role of mediators of Chronic Inflammation ▪ Describe the role of drugs in modifying action of chemical mediators
31.		Infarction	<ul style="list-style-type: none"> ▪ Define infarction ▪ Describe the pathological factors involved in the process of infarction ▪ Explain the pathophysiology of infarction ▪ Differentiate the types of infarction
32.		Gram Positive Cocci II	<ul style="list-style-type: none"> ▪ Correlate the important morphological and pathogenic characteristics, laboratory diagnosis, prevention and virulence factors produced by streptococci and

	VII.	(Streptococci, enterococci and others)	enterococci with their clinical significance
33.		Aging	<ul style="list-style-type: none"> Relate the genetic aspects of aging with its current theories
34.		Wound healing	<ul style="list-style-type: none"> List the factors affecting wound healing Describe healing by primary and secondary intentions Explain Wound contraction and Formation of granulation tissue. List the Complications of wound healing.
35.		Amyloidosis	<ul style="list-style-type: none"> Define Amyloidosis Explain the pathophysiology of Amyloidosis Describe different types of amyloidosis Explain the laboratory diagnosis of amyloidosis with emphasis on the staining techniques.
36.	VIII.	Hemorrhage	<ul style="list-style-type: none"> Define Hemorrhage Describe the pathological factors involved in the process of hemorrhage Explain the pathophysiology hemorrhage with its types. Appraise the Concept of Petechiae, ecchymosis and bruises
37.		Tissue repair	<ul style="list-style-type: none"> Differentiate between regeneration and repair Summarize the systemic effects of inflammation with the variants of tissue repair
38.		Pathologic calcifications	<ul style="list-style-type: none"> Determine the causes , mechanisms and clinical correlations of the pathologic calcifications (metastatic and dystrophic) Differentiate between different types of calcifications (metastatic and dystrophic)

PATHOLOGY**First Module (1 x Practical / Week)****Subject: Pathology Practical**

Practical	Week	Topic	Learning Objectives
1.	I.	Study of microscope Gram stain	<p>Knowledge:</p> <ul style="list-style-type: none"> ▪ Correlate the different parts of the microscope with their function. ▪ Differentiate between gram positive and gram-negative bacteria. ▪ Enumerate Gram positive and Gram-negative organism. ▪ List causes false Gram positive and Gram-negative staining. <p>Skills:</p> <ul style="list-style-type: none"> ▪ Identify the types of lenses, their power (low power, high power and oil immersion) and their magnification. ▪ Perform Gram staining technique and express the principle ▪ Identify the slide. ▪ Interpret results of Gram stain.
2.	II.	Ziehl Nelson stain	<p>Knowledge:</p> <ul style="list-style-type: none"> ▪ Express the principal of ZN Staining. ▪ Enumerate acid fast bacteria. <p>Skills:</p> <ul style="list-style-type: none"> ▪ Perform ZN Staining ▪ Interpret result of staining.

3.	III.	Culture media	<p>Knowledge:</p> <ul style="list-style-type: none"> ▪ Classify culture media. ▪ Indicate why different organisms need different culture media and have different growth requirements <p>Skills:</p> <ul style="list-style-type: none"> ▪ Identify culture media and outline their important characteristics. ▪ Match organisms with the media on which they are cultured.
4.	IV.	Hyperplasia Atrophy Metaplasia	<p>Knowledge:</p> <ul style="list-style-type: none"> ▪ Define Hyperplasia Atrophy Metaplasia ▪ Enumerate causes of hyperplasia may be physiological / pathological or compensatory ▪ Enumerate the causes of atrophy ▪ Categorize types of Metaplasia and assess its causes <p>Skills:</p> <ul style="list-style-type: none"> ▪ Identify the slide in endometrial hyperplasia and morphological changes ▪ Identify microscopic and gross appearance of testicular atrophy. ▪ Identify the slide of metaplasia
5.	V.	Hydropic change Fatty Change	<p>Knowledge :</p> <ul style="list-style-type: none"> ▪ Define hydropic change and cellular swelling / vacuolar degeneration. ▪ Explain the causes of hydropic changes. ▪ Definition of fatty change. ▪ Describe the causes of fatty changes.

			<p>Skills :</p> <ul style="list-style-type: none"> ▪ Identify the morphology and Microscopic appearance of hydropic changes. ▪ Identify the fatty changes in liver on the slide.
6.	VI.	<p>Calcification</p> <p>Intracellular accumulation (melanin, hemosiderin)</p>	<p>Knowledge:</p> <ul style="list-style-type: none"> ▪ Define calcification. ▪ Enumerate various causes and types of calcification ▪ Illustrate the substances that accumulate in the living matter. ▪ Explain the various types of pigments <p>Skills:</p> <ul style="list-style-type: none"> ▪ Identify the slide of malignant melanoma. ▪ Identify the slide of calcification
7.	VII.	<p>Coagulative Necrosis</p> <p>Caseous Necrosis</p>	<p>Knowlegde:</p> <ul style="list-style-type: none"> ▪ Define coagulative necrosis ▪ Outline the important characteristics. ▪ Define caseous necrosis. ▪ Outline the important characteristics. <p>Skills:</p> <ul style="list-style-type: none"> ▪ Identify the slides of coagulative necrosis in kidney. ▪ Identify the slides of caseous necrosis.

8.	VIII.	Acute inflammation Chronic inflammation Chronic granulomatous inflammation	Knowledge: <ul style="list-style-type: none">▪ Define acute inflammation▪ Describe various types and causes of acute inflammation▪ Define chronic inflammation.▪ Describe the causes and types of chronic inflammation▪ Describe the concept of granulomatous inflammation and granuloma formation.▪ Assess various chronic granulomatous infections that are important clinically. Skills: <ul style="list-style-type: none">▪ Identify the slide of acute appendicitis▪ Identify the slides of chronic cholecystitis▪ Identify granuloma on slide microscopically.
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DEPARTMENT OF PHARMACOLOGY

S.No	Faculty	Topics
1.	Professor: Dr. Syed Asif Jahanzeb Kazmi	<ul style="list-style-type: none"> • How to improve learning skill & Attitude in pharmacology-I • Pharmacology: Introduction, Historical overview • ANS-III • ANS drugs-I • CVS-I • Diuretics
2.	Assistant Professor: Dr. Jawad Mumtaz	<ul style="list-style-type: none"> • ANS-I • ANS-II • Pharmacogenomics • ANS drugs-II • CVS-II • Antiglaucoma drugs
Lecturer		<ul style="list-style-type: none"> • Introduction to lab equipment+ metrology • Physiological salt solution +serial dilution • Introduction to dosage forms • Types of solution • Introduction to biostatistics • Dose calculation • Prescription Writing/ Graphs interpretation • Revision • Revision
1.	Dr. Mehwish Khan	
2.	Dr. Sana Memon	
3.	Fayyaz anjum	
4.	Memoona gillani	
5.	Irsah maqbool	

RECOMMENDED BOOKS (PHARMACOLOGY)

- Basic & Clinical Pharmacology 12th Edition
Katzung. Edited by Bertram G. Katzung, MD, PhD
- Rang & Dale's Pharmacology 9th Edition
Authors: James Ritter Rod Flower Graeme Henderson Yoon Kong Loke David MacEwanHumphrey Rang.
- Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 13th Edition
Authors. Laurence L. Brunton, Randa Hilal-Dandan, Björn C. Knollman
- Katzung & Trevor's Pharmacology Examination and Board Review 14th Edition
by Anthony J. Trevor (Author), Bertram G. Katzung (Author), Marieke Knuidering-Hall
- Lippincott's Illustrated Reviews: 7th Edition Pharmacology.
by Whalen PharmD BCPS, Karen

PHARMACOLOGY**First Module (5 x Lecture / Week)****Subject: General Pharmacology**

Week	Pharmacology	Learning Objectives
I.	<p>How to improve learning skill & Attitude in pharmacology-I</p> <p>How to improve learning skill & Attitude in pharmacology-II</p> <p>Pharmacology: Introduction, Historical overview</p> <p>Branches/division of Pharmacology,</p> <p>Pharmacokinetic I</p> <p>Pharmacokinetic II</p>	<ul style="list-style-type: none"> • Analyze process of learning • List determinants of mental performance • Formulate the barrier of effective learning • Analyze emotional competence framework • Determine effortful processing strategies, chunking, skimming & scanning • Identify the role of different Scientist • Analyze the significance of pharmacology in medical sciences • Explain different branches of pharmacology • Explain types of clinical trials • Discuss types of animal testing process • List sources of drug information • Outline component of a drug profile • Explain drug development and regulation • List and categorize FDA rating of drug safety in pregnancy • Explain safety efficacy and toxicity of drug • Analyze nature of different drugs • Analyze different forms of drugs • Compare various routes of drug administration • Identify different mechanisms of drug movement in the body • Analyze factors effecting drug response • Explain fick's law of diffusion • Illustrate lipid solubility of drugs and ionization of weak acids and bases
II.	<p>Pharmacokinetic III</p> <p>Biotransformation I</p>	<ul style="list-style-type: none"> • Define dosage regimen • Interpret therapeutic window • Understand need for drug metabolism

	Biotransformation II Biotransformation III Pharmacogenomics	<ul style="list-style-type: none"> • Classify metabolic reactions • Identify sites of drug metabolism • Summarize determinants of biotransformation reaction • Explain 1st order kinetics and zero order kinetic • Define toxic metabolism • Demonstrate elimination of drugs • Infer adjustment of dosage when elimination is altered by disease • Explain phase I and Phase II enzymes • Define transporters • Understand human leukocyte antigen polymorphisms
III.	Pharmacodynamics-I Pharmacodynamics-II Pharmacodynamics-III A N S: Introduction –I A N S: Introduction -II	<ul style="list-style-type: none"> • Understand the terms receptors, Effectors, graded dose response, binding affinity, spare receptors • Illustrate Quantal dose response • Compare Efficacy and potency • Interpret concept of antagonists • Discuss therapeutic index and therapeutic window • Identify signaling mechanisms Receptor regulation • Recall anatomy of autonomic nervous system • Analyze different neurotransmitter of ANS.
IV.	A N S: Introduction –III Parasympathomimetics or cholinergic Drugs Anti Cholinesterases, Myasthenia gravis Organophosphate poisoning & Oximes Cholinergic blocker –I	<ul style="list-style-type: none"> • Explain cholinergic transmission • Explain adrenergic transmission • Identify the location of major autonomic receptor type • Explain presynaptic and postsynaptic regulation • Categorize Distribution of receptors type in autonomic nervous system & its effects • Classify cholinergic agonist drugs • Discuss organ system effects of cholinergic agonist drugs. • Discuss pharmacodynamics and pharmacokinetic and clinical pharmacology of cholinomimetics • Explain basic and clinical pharmacology of ganglion blocking

		<ul style="list-style-type: none"> • Explain subtype and characteristic of cholinceptor • Brief pathophysiology of myasthenia gravis • Explain Signs and symptoms of myasthenia gravis • Discuss Treatment plan myasthenia gravis • Classify Organophosphate and its mechanism of action • explain signs & symptoms and treatment of organophosphate poisoning
V.	<p>Cholinergic blockers-II</p> <p>Adrenergic agonist-I</p> <p>Catecholamines: Adrenaline, Nor adrenaline, Dopamine & Dobutamine</p> <p>Adrenergic agonist-II</p> <p>Non Catecholamines: Ephedrine, Amphetamines α/β2 receptor agonists etc</p> <p>Adrenergic blocker-I</p> <p>Adrenergic Blockers: Alpha-receptor Blockers, Beta receptor Blockers</p> <p>Adrenergic Blocker-II</p> <p>Alpha-receptor Blockers, Beta receptor Blockers</p>	<ul style="list-style-type: none"> • Classify cholinceptor blocking drugs • Discuss organ system effects of cholinceptor blocking drugs. • Discuss pharmacodynamics and pharmacokinetic and clinical pharmacology of adrenergic agonist • Explain basic and clinical pharmacology of ganglion blocking drugs • Classify indirect and direct acting adrenoceptor stimulants • Discuss organ system effects produced by direct and indirect acting adrenoceptor stimulant • Explain subtypes and characteristics of adrenoceptors blocker • Classify indirect and direct acting adrenoceptor blockers • Discuss organ system effects produce by direct and indirect acting adrenoceptor • Discuss pharmacodynamics, pharmacokinetics and clinical pharmacology (toxicity + selectivity) of adrenoceptor blockers.
VI.	<p>Skeletal Muscle Relaxants-II</p> <p>Drug treatment of glaucoma-I</p> <p>Revision of ANS</p> <p>Drug used in heart failure-I</p> <p>Drug used in heart failure –II</p>	<ul style="list-style-type: none"> • Recall normal neuromuscular function • Discuss basic pharmacology of following neuromuscular blocking drugs <ul style="list-style-type: none"> a) Non-depolarizing relaxant drugs b) Depolarizing relaxant drugs. • Discuss clinical pharmacological of neuromuscular blocking drugs • Classify & name spasmolytic drugs • Discuss clinical pharmacology of spasmolytic drugs

		<p>Revision of ANS</p> <ul style="list-style-type: none"> • Explain control of normal cardiac contractility • Discuss pathophysiology of heart failure • Explain pathophysiology of cardiac performance • Discuss basic pharmacology of following drug used in heart failure <ul style="list-style-type: none"> a) Digitalis b) Bipyridines c) Beta adrenoceptor agonist d) Investigational positive inotropic drugs e) Drug without positive inotropic effects f) Angiotensin converting enzyme inhibitors & agents <ul style="list-style-type: none"> • Beta adrenoceptor blocker(selectivity) • Discuss clinical pharmacology of drug used in heart failure • Discuss management of chronic heart failure • Discuss management of diastolic heart failure • Discuss management of acute heart failure
VII.	<p>Drug used in heart failure –III Antihypertensive drugs-I Antihypertensive drugs-II Antihypertensive drugs-III</p>	<ul style="list-style-type: none"> • Analyze normal regulation of blood pressure. • Discuss drug rational to treat hypertension • Identify the sites of action of the major classes of antihypertensive drugs • Discuss the pharmacokinetic, pharmacodynamics of following drugs <ul style="list-style-type: none"> a) Centrally acting sympathoplegic drugs. b) Adrenergic neuron blocking agents. c) Adrenoceptor antagonist. d) Vasodilators e) Ca-channel blockers f) Inhibitors of angiotensin • Discuss clinical pharmacology of antihypertensive agents • Discuss treatment of hypertensive emergencies. • Discuss Treatment of hypertension with concomitant condition.

VIII.	<p>Drug Treatment of IHD –I Drug Treatment of IHD –II Drug Treatment of IHD -III Anti-arrhythmic drugs-I</p>	<ul style="list-style-type: none"> • Explain the pathophysiology of angina • Analyze the drug rational to treat angina • Discuss basic pharmacology of drugs used to treat angina <ul style="list-style-type: none"> a) Nitrates and nitrites b) Other nitro vasodilators c) Calcium channel blocking drugs. d) Beta blocking drugs e) Newer antianginal drugs. • Explain clinical pharmacology of drugs used to treat angina (Angina of effort, vasospastic, unstable angina and acute coronary syndromes) • Explain treatment of peripheral artery disease (PAD) and intermittent claudication.
IX.	<p>Agents used in cytopenios, hematopotic, growth factors Drugs used in disorders of coagulation-I Drugs used in disorder of coagulation-II Agents used in dyslipidemia-I Agents used in dyslipidemia-II</p>	<ul style="list-style-type: none"> • Recall electrophysiology of normal cardiac rhythm • Identify possible mechanisms of arrhythmias • Analyze drug rational to treat arrhythmias • Discuss basic pharmacology of following antiarrhythmic agents <ul style="list-style-type: none"> a) Sodium channel blocking drugs (class 1) b) Beta adrenoceptors blocking drugs (class 2) c) Drugs that prolong effective refractive period by prolonging the action potential (class 3) d) Calcium channel blocking drugs (class 4) e) Discuss the principles in the clinical use of antiarrhythmic agents. • Brief introduction of anemia • Classify and list agents used in anemias • Discuss clinical pharmacology of agents used in anemias • Discuss hemotopoitic growth factors <ul style="list-style-type: none"> a) Erythropoietion b) Myeloid growth factors c) Megakaryocyte growth factors d) Recall the mechanism of coagulation • Summarize blood coagulation cascade • Enlist blood clotting factors and drugs that effect them

		<ul style="list-style-type: none"> • Discuss the basic pharmacology of following anticoagulant <ol style="list-style-type: none"> a) Indirect thrombin inhibitors b) Warfarin and other coumarinanti coagulants c) Oral direct factors d) inhibitors e) Direct thrombin inhibitors • Explain basic pharmacology of the fibrinolytic • Drugs and antiplatelet agents • Explain clinical pharmacology of drugs used to prevent clotting • Explain drugs used in bleeding disorders • Explain pathophysiology of hyperlipoproteinemia • List lipoprotein disorders and their treatment • Summarize dietary management of hyperlipoproteinemia • Discuss the basic and clinical pharmacology of following drugs. <ol style="list-style-type: none"> a) HMG- COA reductase inhibitors b) Fibric acid derivatives c) NIACIN d) BICE ACID-BINDING RESINS e) Inhibitors of intestinal sterol absorption f) Newer agents for treatment of dyslipidemia
X.	<p>Diuretic agents-I</p> <p>Diuretic agents-II</p> <p>Diuretic agents-III</p>	<ul style="list-style-type: none"> • Recall renal tubular transport mechanism • List major segment of the nephron and their functions • Explain renal autocooids. (adenosine, prostaglandins and peptides) • Discuss drug rational for diuretic therapy • Describe basic pharmacology of following diuretic agents <ol style="list-style-type: none"> a) Carbonic anhydrase inhibitors b) Sodium glucose co-transporter 2(SGLT 2) c) Adenosine A1-receptor antagonist d) Loop diuretics e) Thiazides f) Potassium-sparing diuretics g) Agents that alter water excretion (osmotic diuretics)

		h) Antidiuretic hormone agonist e- aldosterone • Clinical pharmacology of diuretic agents
XI.	Revision	Revision
XII.	Exams	Exams

Pharmacology

First Module (1 x Practical / Week)

Subject: Pharmacology Practical

S.No	Week	Practical	Learning Objectives
1.	I.	Introduction to lab equipment+ metrology	Skill: <ul style="list-style-type: none"> • Demonstrate the uses of kymograph in laboratory • Demonstrate the functions of various parts of the Kymograph • Demonstrate the different parts of organ bath assembly.
			Knowledge: <ul style="list-style-type: none"> • Explain the most commonly used equipment in undergraduate pharmacology laboratory to study the effects of various drugs on GIT, isolated tissues and heart is kymograph attached with organ bath assembly.
2.	II.	Physiological salt solution+ Serial dilution	Skill: <ul style="list-style-type: none"> • Estimate the dilution of minute dose of drug preparation

			<p>Knowledge:</p> <ul style="list-style-type: none"> • An artificially prepared solution similar to blood plasma in salt composition and osmotic pressure. Physiological solutions are used in physiological experiments with isolated organs and in clinical practice. It is important to select a particular solution in which a tissue survives longest. The functions of a salt solution are: <ul style="list-style-type: none"> ➤ To maintain the medium within physiological pH range ➤ To maintain intracellular and extra cellular osmotic balance ➤ Modified with a carbohydrate, such as glucose serves as an energy source • Serial dilutions are used to accurately create highly diluted solutions as well as solutions for <u>experiments</u> resulting in <u>concentration curves</u> with a <u>logarithmic scale</u>
3.	III.	Types of solution	<p>Skill:</p> <ul style="list-style-type: none"> • Demonstrate the concentration of bulk solution <p>Knowledge:</p> <ul style="list-style-type: none"> • Explain Percentage. • Explain Fractional • Explain Moles / Millimoles • Explain Equivalents/milli-equivalents. • Explain Osmole/milli-osmoles

4.	IV.	Introduction to dosage forms	<p>Skills:</p> <ul style="list-style-type: none"> Estimate the exact route and method of administration of dosage forms. <p>Knowledge:</p> <ul style="list-style-type: none"> The Dosage forms are the means by which drug molecules are delivered to sites of action within the body. Dosage forms are also known as the drug delivery systems
5.	V.	Introduction to biostatistics	<p>Skills:</p> <ul style="list-style-type: none"> Demonstrate and calculate mean, median, mode <p>Knowledge:</p> <ul style="list-style-type: none"> It is the science of compiling, classifying & tabulating numerical data & expressing results in mathematical or graphical form Standard deviation, Standard error of mean between different population
6.	VI.	Dose calculation	<p>Skill:</p> <ul style="list-style-type: none"> Calculate the Pediatric dose calculation <p>Knowledge:</p> <ul style="list-style-type: none"> Describe Young's rule Explain Clark's formula Mention Fried's rule
7.	VII.	Prescription Writing/ Graphs interpretation	<p>Skill:</p> <ul style="list-style-type: none"> Demonstrate How to write a complete prescription

			Knowledge: <ul style="list-style-type: none"> • A prescription is written order from the physician to the pharmacist so that a drug or a combination of drugs from pharmacy is dispensed to patient. It contains directions to the pharmacist and also for the patient regarding its use. • Explain Inotropic and chronotropic effects of drugs • Describe How to interpret inotropic and chronotropic effect of drugs
8.	VIII.	OSPE (ANS/GP)	
9.	IX.	Exam Module I+ holidays	

DEPARTMENT OF FORENSIC MEDICINE

S.No	Faculty	Course
1.	Professor:	
2.	Associate Professor: Dr. Aslam Baig	Introduction, Traumatology, Firearm
3.	Assistant Professor: Dr. Sobia	Thanatology, Personal Identity, Biological specimen
Lecturers		
1.	Dr. Afifa Javaid	Practical Semen examination Examination of hair Examination of blood Examination of blood
2.	Dr. Samia Sumbal	Examination of urine, saliva, and milk Forensic Radiology age certification by x-rays Forensic Radiology Sex and race identification

RECOMMENDED BOOKS (FORENSIC MEDICINE)

- Parikh Text book of Medical Jurisprudence, Forensic Medicine and toxicology
- Naseeb.R Awan Forensic Medicine and toxicology
- Basics of Forensic Medicine by Prof Dr. Aijaz Ali
- Forensic Medicine and toxicology multi authors short text book by Y.D Chebli, A.H.AL Omary, N. Ashraf
- Reference Books
 - Bernard knight ForensicPathology
 - NG Rao Forensic Medicine and toxicology
 - Gradwohl legal medicine
 - Essential of toxicology by Klassen
 - Forensic Atlis by Joseph Prahlow
- **Manual/Practical Copies**
- Practical note book by Prof Dr. Shahid Hanif and Prof Dr. Tajammul Hussain

FORENSIC MEDICINE**First Module (2 x Lecture / Week)****Subject: Forensic Medicine**

Lectures	Week	Topics	Learning Objectives
1.	I.	Introduction to forensic medicine	<ul style="list-style-type: none"> Describe the role of Forensic Medicine / Sciences in Crime detection, especially in crimes involving human life & body in national as well as international context. Law, its types, evidence prevailing medico-legal systems, judiciary.
2.		Thanatology	<ul style="list-style-type: none"> Discuss the Diagnosis of death Review the Cause mode manner of death. Identify and describe the earlier signs of death.
3.	II.	Thanatology	<ul style="list-style-type: none"> Identify and discuss late Indicators of death. Interpret the Medico legal aspects of sudden death.
4.		Thanatology	<ul style="list-style-type: none"> Correlate between physiochemical changes occurring in body after death with different environment conditions. Demonstrate the certification of death.
5.	III.	Personal identity	<ul style="list-style-type: none"> Distinguish between living and dead, identification of mutilated bodies, Fragmentary remains by using appropriate parameters of identity.
6.		Personal identity	<ul style="list-style-type: none"> Apply different techniques e.g radiology, NAA, DNA techniques, super imposition photography to identify an individual.
7.	IV.	Personal identity	<ul style="list-style-type: none"> Discuss Medicolegal aspects of age sex race and their determination by various methods. Define Lockard's principle of exchange and its medicolegal

			significance.
8.		Biological specimen	<ul style="list-style-type: none"> Summarize forensic importance of biological specimen blood, semen, saliva
9.	v.	Biological specimen	<ul style="list-style-type: none"> Summarize vomitus, breath, urine, hair and their medicolegal importance and collection preservation and dispatch of various human body trace specimens
10.		General traumatology	<ul style="list-style-type: none"> Distinguish between ante-mortem and post-mortem wounds Discuss the diagnoses of the cause, mode, manner of death (suicidal, homicidal and accidental)
11.	VI.	General traumatology	<ul style="list-style-type: none"> Classify wounds and time since injury of different types of wounds.
12.		General traumatology	<ul style="list-style-type: none"> List and debate on the laws in relation to causing Bodily harm, Wounding and Homicide. Distinguish between ante-mortem and post-mortem wounds.
13.	VII.	Firearm	<ul style="list-style-type: none"> Classify firearms Correlate the mechanisms of wound production to their medico-legal aspects. Identify different ammunitions. Differentiate between entry and exit wounds. Distinguish between suicidal and homicidal firearm deaths.
14.		General traumatology	<ul style="list-style-type: none"> Discuss time since injury pertaining to different types of wound /fractures. Discuss the enzymes involved in traumatology and also explain the pathophysiology in relation to injury.
15.	VIII.		<ul style="list-style-type: none"> Revision
16.		Revision week	<ul style="list-style-type: none"> Revision

FORENSIC MEDICINE**First Module (1 x Practical / Week)****Subject: Forensic Medicine Practical**

Demonstration	Week	Practical	Learning Objectives
1.	I.	Semen examination	<p>Knowledge:</p> <ul style="list-style-type: none"> Summarize the Morphological structure of sperms and seminal fluid Describe the medicolegal aspects of semen. <p>Skill:</p> <ul style="list-style-type: none"> Identification of semen slide under microscope, acid phosphatase test, Florence test.
2.	II.	Examination of hair	<p>Knowledge:</p> <ul style="list-style-type: none"> Differentiate between animal and human hair and describe the medicolegal importance of hair in different matters of forensic medicine. <p>Skill:</p> <ul style="list-style-type: none"> Identification of human, animal hair and different fibers (cotton wool jute)
3.	III.	Examination of blood	<p>Knowledge:</p> <ul style="list-style-type: none"> Describe blood grouping on ABO and RH antigen basis also identification of species origin and medicolegal aspects of blood grouping in different matters of forensic medicine. <p>Skill:</p>

			<ul style="list-style-type: none"> ▪ Blood grouping test
4.	IV.	Examination of blood	<p>Knowledge:</p> <ul style="list-style-type: none"> ▪ Describe the serological test of blood and their medicolegal importance. <p>Skill:</p> <ul style="list-style-type: none"> ▪ TakaYama's test, benzidine test, teichmann's, test.
5.	V.	Examination of urine, saliva, and milk	<p>Knowledge:</p> <ul style="list-style-type: none"> • Describe the Serological test of urine, saliva and milk and their medicolegal importance <p>Skill</p> <ul style="list-style-type: none"> ▪ Identify saliva, milk and urine with naked eye and under the micro scope.
6.	VI.	Forensic Radiology age certification by x-rays	<p>Knowledge:</p> <ul style="list-style-type: none"> ▪ Describe the parameters of age certification. How x-rays from different age groups can be used to give out age certificate. <p>Skill:</p> <ul style="list-style-type: none"> ▪ Identify x-rays of different individual according to their age

7.	VII.	Forensic Radiology Sex and race identification	Knowledge: <ul style="list-style-type: none">• Describe different parameters of sex and race by the help of x-rays. Explain the Identification by the help of super imposition photography. Skill: <ul style="list-style-type: none">• Identify different sexes and races by the help of x-rays.
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