PAK INTENATIONAL MEDICAL COLLEGE, PESHAWAR

FOUNDATION -II MODULE

3RD YEAR MBBS

SESSION 2020-21

PREPARED BY
DME

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A. ABBERIVIATIONS

CBL	Case based learning
CBME	Community based medical education
COME	Community oriented medical education
CSW	Clinical skills workshop
DME	Department of Medical Education
EMQ	Extended Matching Question
KMU	Khyber Medical University
LGF	Large group format/ lecture
LO	Learning outcome
MCQ	Multiple Choice Question
OSCE	Objective structured clinical examination
OSPE	Objective structured practical examination
PAL	Peer assisted learning
PBL	Problem based learning
RP	Resource person
SAQ	Short Answer Question
SDL	Self-Directed learning
SGD	Small group discussion
TOS	Table of specifications

B. VISION

Strive for excellence in medical and health education through training, Research, Partnership and quality learning management systems.

C. MISSION

Provision of quality learning environment to enable graduates in becoming efficient learners, compassionate practitioners, community-oriented health promoters and effective researchers at national and international stage.

D. OUTCOMES

By the end of MBBS program, the graduates of Pak International Medical College will be able to,

1. Manage common and local diseases presenting to a general practitioner.
2. Demonstrate a team spirit in managing admitted patients.
3. Organize for referral of critically ill and difficult to diagnose cases.
4. Work towards disease prevention in communities and volunteer for health promotion activities.
5. Display a professional behavior for personal development and meeting patient and societal expectations.
6. Develop better communication skills and strive towards lifelong learning.
7. Engage in evidence-based practice through generation of quality research data, analysis and presentation.
8. Display management skills in academics, patient management and research helping graduates become global leaders in health care.

E. WHAT IS A STUDY GUIDE?

A Study guide helps both the teachers and students, as it contains all the required information of the module. It helps in organising and managing the time for each activity. Moreover, it also clarifies about assessment methods and rules and regulations.

It includes the following among others,

- Contact details of the Module Committee.
- List of abbreviations.
- The learning outcomes expected from the students by the end of module.
- The teaching and learning strategies used to teach different outcomes.
- Table of specifications detailing the learning and teaching activities and assessments.
- Timetable with learning locations.
- Guides for students and facilitators.
- A list of reference learning resources.
- List of student's batches
- List of Facilitators
- List of Mentors.

F. CURRICULAR FRAMEWORK

Students will experience *integrated curriculum* as developed by KMU in line with PMDC regulations.

INTEGRATED CURRICULUM

It comprises of system-based modules that link basic science knowledge to clinical problems both in a horizontal and vertical manner. It encourages better learning environment to students and prepares them for better clinical practice. Integrated curriculum fosters better graduate outcomes for the delivery of enhanced health care delivery.

G. LEARNING STRATEGIES

The following learning and teaching methods are used to promote better understanding:

1. **Interactive Lectures**are used to engage and involve the students as active participants in the learning process.
2. **Small Group discussions** encourage students to express their concepts in a creative way; allowing learning-points to be discussed and schemas corrected and refined.
3. **Case-Based Learning**sessions are employed to prepare students for clinical practice, through the use of authentic clinical cases, using inquiry-based learning methods. Both the students and faculty are allowed to prepare in advance and guidance is provided during the sessions.
4. **Self-Directed Learning** is where student takes responsibility of his/her own learning through individual study, sharing and discussing with peers/tutors and seeking information from learning resource centres.
5. **Community Based Medical Education** is the delivery of health or medical education in a social context, where the students learn the medical problems while in a community.
6. **Practical / Lab work**

H. ASSESSMENT STRATEGIES

- Continuous Assessments in the form of assignments & class tests
- Multiple Choice Questions
- OSCE / OSPE

I. ASSESSMENT POLICY

The approved Khyber Medical University policy in line with PMDC regulations states that 75% attendance is mandatory to appear in exams and the distribution of marks will be as follows,

Weightage of assessments	
Continuous internal assessment	20%
Final examination	80%
Total	**100 %**

J. FOUNDATIONII MODULE

Module name:Foundation-II **Year**: Three **Duration**: 05weeks

Timetable hours: Allotted to Interactive Lectures, Case-Based Learning (CBL), Self-Study, Practical, Skills, Demonstrations, SGDs.

MODULE COMMITTEE

	NAMES
Module In-charge	**Dr.Shiraz**
Module Coordinator	**Dr. Kamran**

DEPARTMENTS & RESOURSE PERSONS FACILITATING LEARNING

DEPARTMENT	RESOURSE PERSON (RP)
Pharmacology	**Dr.Usman Nawaz**
Forensic Medicine	**Dr. Anjum Zia Munawar**
Pathology	**Dr.Mohibullah**
Community Medicine	**Dr.Rab Nawaz**
General Medicine	**Dr.Taj Muhammad Khan**
General Surgery	**Dr. Yasir**
Paediatrics	**Dr. Tariq Ayub**
E. N. T	**Dr. Iftikhar**
Eye	**Dr.Mir zaman**

INTRODUCTION:

Where Foundation I provide integration of core concepts that underlie the foundation of basic sciences and their use in clinical medicine

gives aCell damage (also known as cell injury) is a variety of changes of stress that a cell suffers due to external as well as internal environmental changes. Cell death occurs when the severity of the injury exceeds the cell's ability to repair itself.One of the most obvious ways by which something like a bacterium may cause injury to a person is through the release of exotoxins. ... These toxins are released only when the bacterium dies and therefore the cell wall breaks apart, releasing the endotoxins into the surrounding environment. Ageing is characterized by increased oxidative stress, heightened inflammatory response, accelerated cellular senescence and progressive organ dysfunction. The homeostatic imbalance with aging significantly alters cellular responses to injury.

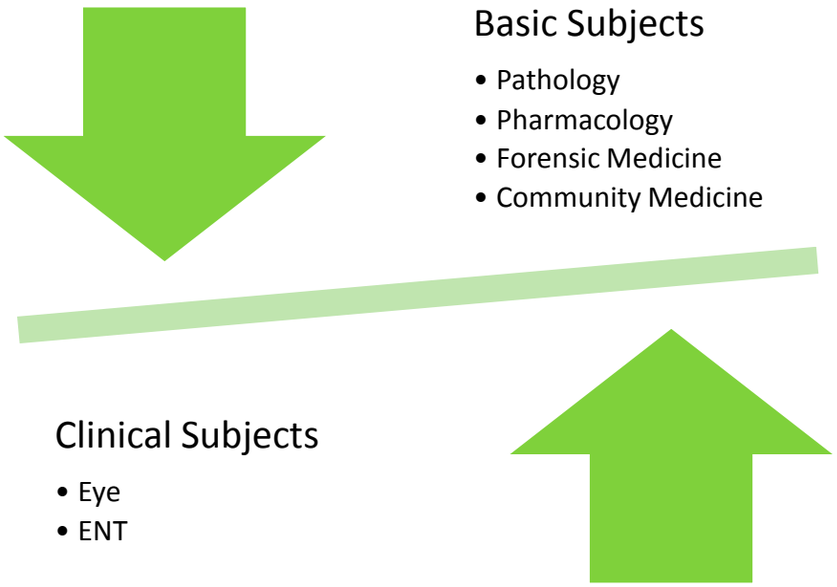

Figure 1: Integration of basic medical sciences and clinical sciences around module

GENERAL LEARNING OUTCOMES

At the end of this module, the 3rd year students would be able to:

1. Define pathology, its different branches and enumerate clinically importantbacteria.
2. Describe the structure of bacterial cell and mechanisms by which they cause thedisease.
3. Describe methods used to identify different microbes in laboratory and explain the interventions employed to prevent infections including vaccines.
4. Describe cell injury, its different mechanisms and sub cellular responses to cellinjury.
5. Describenecrosis,apoptosisandadaptivechangesseeninclinicalsettings and its identification in surgical specimens.
6. Define common terms related toPharmacology.
7. Describe the basic principles of pharmacokinetics and pharmacodynamics and apply these principles to clinical practice as they relate to drug absorption, distribution, metabolism, excretion, mechanism of action, clinical action, andtoxicity.
8. Describe the cellular and biochemical sites where drugs bind toact.
9. Describe the general principles of drug interactions in relation to clinical practice.
10. Describe the process of new drugdevelopment.
11. Identify different dosage forms ofdrugs.
12. Demonstrate searching accurate information quickly in a formulary.
13. Demonstrate administration ofadrugthroughintramuscularand intravenousroutes.
14. Writedownthebasicformatofdrugprescriptionanddescribethegeneral principles of prescribingdrugs.
15. Write correctly medical abbreviations used in clinicalpractice.
16. Identify commonly used equipment inPharmacy.
17. Describe Forensic medicine, its different branches andimportance.
18. Describe law and its variouscomponents.
19. Describe autopsy, its protocols, and relatedhazards.
20. Describe different refractive errors and itsmanagement.
21. Explain causes of watery eyes in both infants and elders and its management.
22. Describe the basic concept of health, disease and primary healthcare.
23. Demonstratedifferentpathologicallaboratoryproceduresandidentifygross and microscopic features in the givenspecimens.
24. Demonstrate professionalism, respect, honesty and compassion bybehaving in a courteous manner with colleagues and teachers during courseactivities like long lectures, SGDs and Practicals.
25. Describe the PMDC code ofEthics
26. Describe the steps of process of developing a researchprotocol

THEMES FOR THE MODULE

S. No	Theme	Number of Weeks
1)	Molecules and Bacteria	3 weeks
2)	Cell injury, Ageing and Death	2 weeks

SPECIFIC LEARNING OUTCOMES

Theme-1: Molecules&Bacteria		
Topic	**S.No**	**Learning Objectives**
PHARMACOLOGY		
Introduction to thesubject	1.	Define basic terms like Pharmacology, Clinical Pharmacology, Therapeutics, drug, medicine, pro-drugs, prototype drugs, Materia medica, pharmacopoeia, poisons, toxins, pharmacokinetics, pharmacodynamics, excipient (vehicle), compounding and dispensing.
	2	Describe the branches of Pharmacology like Pharmacy, Pharmacognosy, pharmacogenetics, pharmacogenomics, toxicology and posology.
	3	Define prescription drugs, OTC drugs, WHO essential drugs and Orphan drugs with examples.
Nomenclature of drugs	4	Describe how drugs are named, i.e. chemical, generic, approved, official and trade names of drugs with examples.
Sources of drugs	5	Enlist various sources of drugs
	6	Give examples of drugs obtained from plants, animals, mineral and synthetic sources
	7	Describe the genetic engineering source of drugs with examples
Active principles of crude drugs	8	Enlist important principles of crude drugs with examples
Routes of drug administration	9	Enlist various routes of drug administration.
	10	Describe the merits and demerits of oral, sublingual, rectal, intramuscular, subcutaneous, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of drug administration.
	11	Give examples of drugs given through oral, sublingual, rectal,

		intramuscular, subcutaneous, intradermal, intravenous, intra- arterial, inhalational, spinal, topical and transdermal routes of drug administration
	12	Describe the difference between topical and transdermal routes of drug administration.
	13	Describe the difference between subcutaneous and intradermal routes of drug administration.
Absorption of drugs	14	Define drug absorption
	15	Describe various mechanisms of drug absorption like simple diffusion, facilitated diffusion, active transport, ion-pair transport, endocytosis and filtration with examples.
	16	Describe the concept of ionization of drug molecules and clinical significance of ion trapping.
	17	Describe factors affecting drug absorption
Bioavailability and Bioequivalence	18	Define bioavailability, bioequivalence and pharmaceutical equivalence.
	19	Explain Time-Concentration curve.
	20	Describe AUC (Area Under the Curve).
	21	Describe the factors affecting bioavailability.
Hepatic first- pass effect (Pre-systemic elimination)	22	Describe hepatic first-pass effect (Pre-systemic elimination) and its clinical significance.
Enterohepatic circulation	23	Define enterohepatic circulation.
	24	Describe enterohepatic circulation with examples and its clinical significance.
Distribution of drugs	25	Define distribution of drugs.
	26	Define redistribution of drugs with example.
	27	Describe plasma protein binding and its clinical significance in diseased conditions.
	28	Describe factors affecting drug distribution.
Volume of distribution	29	Define volume of distribution.
	30	Enlist drugs with small volume of distribution.
	31	Enlist drugs with large volume of distribution.
	32	Apply formula for calculating volume of distribution.
	33	Describe volume of distribution with reference to its clinical

		significance.
Loading dose	34	Define loading dose of a drug.
	35	Enlist some drugs whereby loading dose is administered.
	36	Apply formula for calculating loading dose.
Physiological barriers to transport of drugs	37	Enlist important physiological barriers to transport of drugs.
	38	Describe important physiological barriers to transport of drugs like blood-brain barrier and placental barrier with reference to their clinical significance.
Biotransformation (metabolism) of drugs	39	Define biotransformation.
	40	Define xenobiotics.
	41	Describe the objectives of biotransformation and fate of drugs after biotransformation.
	42	Name major sites of biotransformation.
	43	Describe major drug metabolizing enzymes i.e. microsomal (P450) and non-microsomal enzymes.
	44	Describe the phases and reactions of biotransformation.
	45	Describe the factors affecting drug biotransformation.
Genetic influenceon biotransformation of drugs	46	Define pharmacogenetics and pharmacogenomics.
	47	Define idiosyncrasy with examples.
	48	Describe the genetic factors influencing biotransformation of drugs with examples.
Enzyme induction	49	Define enzyme induction.
	50	Enlist enzyme inducers.
	51	Describe enzyme induction and its clinical significance.
Enzyme inhibition	52	Define enzyme inhibition.
	53	Enlist enzyme inhibitors.
	54	Describe enzyme inhibition and its clinical significance.
	55	Describe suicide inhibition (mechanism-based inhibition) with examples of drugs.
Excretion of drugsand drug clearance	56	Define drug excretion and drug clearance.
	57	Enlist major and minor routes of drug excretion.
	58	Differentiate between excretion, elimination and clearance.
	59	Apply the formula for calculating drug clearance.
Maintenance dose	60	Define maintenance dose of a drug.
	61	Apply the formula for calculating the maintenance dose.

	62	Apply Young's formula, Dilling's formula and Clark's formula for calculating doses of drugs.
Plasma half life	63	Define plasma half-life.
	64	Enlist drugs with short half-life.
	65	Enlist drugs with long half-life.
	66	Apply the formula for calculating plasma half-life.
	67	Explain the clinical significance of half-life.
Steady-state concentration of drugs	68	Define steady-state concentration of drugs.
	69	Describe the time to reach steady-state concentration of drugs.
	70	Describes the importance of steady- state concentration in clinical practice.
First- andzero-order kinetics	71	Define first- and zero-order kinetics.
	72	Differentiate between first- and zero-order kinetics with examples.
	73	Explain the clinical significance of first- and zero-order kinetics
Bioassay and standardization	74	Define bioassay and standardization.
	75	Describe the relative importance of bioassay compared with physical or chemical assays.
	76	Describe the most common type of bioassay, i.e. three-point assay.
PATHOLOGY		
Introduction to the subject	1	Define pathology, microbiology and list its major branches
	2	Describe essential characteristics of five major groups of microorganisms
	3	Differentiate between prokaryotes and eukaryotic cells based on their structure and complexity of their organization
Introduction to cell	4	Define cell
	5	Describe structure of cell membrane
	6	Describe cell organelles
Classification of Bacteria	7	Describe classification of bacteria based on oxygen requirement as aerobes and anaerobes with examples.
	8	Describe classification of bacteria based on staining characteristics, nature of cell wall, ability to grow in the presence of oxygen and ability to form spores.
Structure of bacterialcell	9	Describe structure and function of each of various parts of the bacterial cell including cell wall, cytoplasmic membrane, Mesosome, ribosomes, granules and nucleoid
	10	Describe specialized structures outside the cell wall including

		capsule, flagella, pilli and glycocalyx
	11	List the differences between cell wall characteristics of Gram Positive and Gram Negative Bacteria
	12	Describe classification and important functions of plasmids.
	13	Describe functions and arrangement of transposons.
	14	Describe structure, functions and medical importance of bacterial spores with examples.
Bacterial growthcurve	15	Describe various phases of bacterial growth curve
Normal Flora	16	Describe medically important members of normal flora and their anatomic location
	17	Define mutation
	18	Describe the classification of various types of mutations andtheir common causes.
	19	Describe methods of transfer of DNA within bacterial cells including process of conjugation, transduction, recombination and transformation.
Lab diagnosis of bacterial infections	20	Describe the bacteriologic approach to diagnosis of bacterial infections including blood, throat, stool, sputum, spinal fluid, urine, genital tract and wound cultures.
	21	Describe general principals of various immunologic and nucleic acid based methods for identification of an organism.
Bacterial pathogenesis	22	Define the term pathogen, infection, virulence, communicable, endemic, epidemic and pandemic diseases, carrier, pathogens, opportunists, commensals and colonizers.
	23	Describe stages/determinants of bacterial pathogenesis.
	24	Describe colonization, invasion, toxins, immune-pathogenesis.
	25	Differentiate between exotoxins and endotoxins.
	26	Describe the various modes of action of endotoxins and endotoxinsproduced by gram positive and gram-negative bacteria.
	27	Describe the four stages of a typical infectious disease and Koch's postulates for establishing the causal role of an organism in the disease.
Antibacterial Vaccines	28	Define immunization and vaccination.
	29	Describe role of immunization in inducing active and passive acquired immunity.
	30	Enlist the current bacterial vaccines and their indications.

	31	Describe various types of bacterial vaccines in terms of composition, preparation, indications, route of administration and common side effects.
FORENSIC MEDICINE		
Introduction to the subject of ForensicMedicine	1	Describe forensic medicine and its various branches
	2	Describe pillars of forensic medicine
Introduction to Law	3	Define law
Introduction to medicolegal system	4	Describe code of medical ethics
	5	Describe the terminology in forensic medicine
	6	Discuss different prevailing medicolegal systems in the world
	7	Describe its various types.
	8	Describe the relevant sections of Pakistan penal code and CrPC
	9	Describe court procedures
Chain of evidence	10	Describe evidence, its types and recording of evidence.
Medical jurisprudence	11	Describe laws in relation to medical practice
	12	Describe the components of medical jurisprudence (consent, negligence, secrecy, professional misconduct and privileged communication)
ENT		
Introduction to the subject	1	Describe common ENT symptoms.
	2	Name common diseases of ENT.
	3	Name recommended books that students must read.
OPHTHALMOLOGY		
Introduction to the subject; Career in Ophthalmology	1	Define Ophthalmology and its branches
	2	Highlight the scope of field of Ophthalmology as a future career
Refractory errors	3	Describe refractive error and its effect on vision.
	4	Describe the concept of myopia and its correction.
	5	Describe the concept of hypermetropia and its correction.
	6	Describe the concept of astigmatism & cylindrical lens.
	7	Describe the concept of presbyopia, it's possible causes and correction.
	8	Describe aphakia and possible methods of its correction.
Watery Eyes	9	Explain the structural details, development and functions of lacrimal system.
	10	Correlate the clinical presentation of watery eye with anatomical structures.

	11	Correlate the clinical features with a disease entity.
	12	Describe the causes, clinical features and treatment of congenital nasolacrimal duct obstruction.
	13	Assess the time of probing.
	14	Describe the causes, clinical presentation and treatment modalities.
	15	Differentiate between acute and chronic dacryocystitis.
COMMUNITY MEDICINE		
Introduction to the subject	1	Define Community medicine and Public health
	2	Describe the role of teaching of public health in prevention of diseases
Health and disease	3	Define community medicine, public health and preventive medicine.
	4	Discuss the history and philosophy of public health as well as its concepts and functions regionally & globally.
	5	Describe the stages in the natural history of a disease.
	6	Describe epidemiological triad, web of causation and multifactorial causation
	7	Describe the dimensions and determinants of health
	8	Describe the indicators of health and its characteristics
	9	Discuss the concept of disease control
	10	Discuss the different levels of prevention and their modes of interventions.
	11	Explain the natural history of disease.
	12	Describe the iceberg phenomenon
	13	Describe mode of intervention of diseases with emphasis on health education.
Primary Health Care	14	Define Primary health care (PHC).
	15	Describe the elements of PHC, its principles and strategies for implementation of PHC.
	16	Describe Health for all by the year 2000.
	17	Enumerate the MDGS & SDGS related to health.
PRIME		
Code of ethics	1	Describe PMC`s code of ethics
	2	Compare PMC code of ethics with international code of medical ethics
	3	Describe the composition and functions of PMC
	4	Describe duties of a registered medical practitioner

Personal identity	5	Describe the parametersand methods of personalidentity
Professional identity	6	Describe professional identity
Theme 2- Cell Injury, Ageing & Death		
PHARMACOLOGY		
Pharmacodynamics	1	Define pharmacodynamics.
	2	Define agonist, antagonist, partial agonist and inverse agonist with examples.
	3	Describe receptors.
	4	Define orphan receptors, serpentine receptors and spare receptors.
	5	Describe the biochemicaland cellular sites of drug targets.
	6	Describe intracellular Second- messenger system and enlist someimportant Second-messengers.
	7	Describe up regulation and down regulation of receptors with examples.
	8	Define drug selectivity and specificity.
Dose-response curves (Graded and Quantal)	9	Define dose response curve, graded dose-response curve and quantal dose-response curve.
	10	Describe graded dose-response curve and quantal dose-response curve.
	11	Describe the limitations of graded dose-response curve and its remedy in a quantal dose-response curve.
	12	Describe the significance of constructing dose-response curves.
	13	Explain the advantages of taking log dose values on the dose axis.
Therapeutic index	14	Define therapeutic index.
	15	Describe therapeutic index with reference to its clinical importance.
	16	Apply formula for calculating therapeutic index.
	17	Define median lethal dose, median toxic dose and median effective dose.
	18	Enlist some drugs with narrow therapeutic index.
	19	Enlist some drugs with broad therapeutic index.
Protective index	20	Define protective index.
	21	Differentiate between therapeutic index and protective index.
Therapeutic window	22	Define therapeutic window.
	23	Describe therapeutic window with reference to its clinical importance.
Potency and efficacy	24	Define potency and efficacy.
	25	Describe potency and efficacy with examples.
	16	Describe the clinical importance of efficacy compared to potency.
Drug antagonism	27	Define drug antagonism.
	28	Enlist types of antagonism.

	29	Describe chemical, physiological (functional) and pharmacological (competitive/surmountable and non-competitive) antagonisms with examples.
Drug interactions	30	Define drug interaction.
	31	Define drug incompatibilities with examples.
	32	Describe pharmacokinetic drug interactions with examples and its clinical significance.
	33	Describe pharmacodynamics drug interactions with examples and its clinical significance.
	34	Describe drug-food interactions and drug-disease interactions with examples.
	35	Define summation, synergism and potentiation with examples.
Tolerance and Tachyphylaxis	36	Define Tolerance, cross tolerance, reverse tolerance (sensitization), innate tolerance, tachyphylaxis and drug resistance.
	37	Describe the mechanisms of development of tolerance and tachyphylaxis.
	38	Define drug holidays with example.
Adverse drug reactions	39	Define adverse effects of drugs, secondary effects of drugs and intolerance to drugs.
	40	Classify adverse drug reactions.
	41	Describe dose-related adverse effects (side effects and toxic effects) with examples.
	42	Describe non-dose-related adverse effects (idiosyncrasy and drug allergy) with examples.
	43	Describe causes of adverse drug reactions.
	44	Enlist some drugs causing hepatotoxicity.
	45	Enlist some drugs causing renal toxicity.
	46	Enlist some cardiotoxic drugs.
	47	Enlist some drugs causing adverse effects on reproduction.
New drug development	48	Describe the processes involved in drug discovery and development.
	49	Define lead compound and drug screening.
	50	Describe pre-clinical and clinical studies.
	51	Define placebo, placebo response and nocebo response.
	52	Define no-effect dose and minimum lethal dose.
	53	Describe phases of clinical trials.
	54	Define post-marketing surveillance.
	55	Define single-blind, double-blind, crossover and ADME studies.
	56	Describe the role of Food and Drug Administration (FDA) in the

		drug development process.
	57	Differentiate between IND (Investigational New Drug) and NDA (New Drug Application).
PATHOLOGY		
Cellular injury, celldeath	1	Define the following terms: Pathology, disease, etiology, pathogenesis, morphology, cell injury and homeostasis.
	2	Describe the causes of cell injury from gross physical trauma to single gene defect.
	3	Describe the nature and severity of cell injury with cellular responses.
	4	Enumerate different classes of pathology.
	5	Define the following terms: Pathology, disease, etiology, Pathogenesis, morphology, cell injury and homeostasis.
	6	Describe the following basic mechanisms of cell injury: General Biochemical mechanisms, Ischemic and hypoxic injury, Ischemic/reperfusion injury, Free radical induced cell injury and chemical injury.
	7	Differentiate between reversible and irreversible cell injury.
	8	Describe the mechanism, morphological and biochemical changes and functional alterations in reversible and irreversible cell injury.
	9	Define phagocytosis, endocytosis, pinocytosis, autophagy and heterophagy.
	10	Describe the subcellular responses to injury including lysosomal catabolism, heterophagy and autophagy.
Cellular adaptation	11	Describe types of cellular adaptations.
	12	Differentiate between physiologic and pathologic adaptation.
	13	Define hypertrophy, hyperplasia, atrophy and metaplasia.
	14	Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy and metaplasia.
	15	Describe hypertrophy of the smooth endoplasmic reticulum with examples and mitochondrial alterations
	16	Describe cytoskeletal abnormalities in pathological states with examples.
Necrosis	17	Define necrosis.
	18	Describe types of necrosis with examples.
	19	Describe the mechanism and morphology of necrosis.
Apoptosis	20	Define apoptosis.
	21	Describe physiological and pathological causes of apoptosis with examples.
	22	Describe morphology with alterations in cell structure.
	23	Describe the biochemical features of apoptosis altering the cell structure.

	24	Describe the intrinsic and extrinsic pathways of apoptosis.
	25	Describe role of apoptosis in health and disease.
	26	Describe the mechanism and causes of cellular ageing including genetic & environmental factors, structural & biochemical changes.
	27	Describe adaptive changes in clinical settings.
Steatosis	28	Describe causes and mechanism of steatosis.
	29	Explain the morphology and consequences of steatosis.
Intracellular accumulations	30	Describe three general pathways for abnormal intracellular accumulations.
	31	Define steatosis.
	32	Describe causes, mechanism, morphology and consequencesof lipid accumulation.
	33	Describe causes, mechanism, morphology, consequences of protein and glycogen accumulation
	34	Describe types of pigments
	35	Differentiate betweenendogenous and exogenous pigments.
Pathologic calcification	36	Define Pathologic calcification
	37	Describe types, morphologyand functional alterations ofpathologic calcification with examples.
	38	Differentiate between dystrophic and metastatic calcification.
FORENSIC MEDICINE		
Introduction to Thanatology; Death	1	Define death and describe its phases.
	2	Describecriteriaofdiagnosisofdeath.
	3	Define cause, mode, manner and mechanism of death
Death certificate	4	Describe the WHO format of death certificate
	5	Enlist various methods of disposal of dead body
Post-mortem changes	6	Enlistimmediate,earlyandlatepost-mortem changes.
Death certificate	7	Define cause of death
	8	Listthecontentofinternationalcause of death certificate.
	9	Fill the international cause of death certificatewiththehelpofscenarios.
OPTHALMOLOGY		
Cataracts	1	Define cataract
	2	Describe the types of cataracts
	3	Describe the pathogenesis and complications of cataracts
	4	Describe the management of cataracts
PRIME		
Research Protocol	1	Describe the steps of developing a research protocol
Health system research	2	Define research and health system research.

	3	List types of research.
	4	Describecharacteristicsofhealthsystem research.
	5	Describe building blocks of health system.
	6	Discusskeyareasofconcerninhealth system.
	7	Discussbriefly research methodology.
PRACTICAL WORK		
PHARMACOLOGY		
Lab protocols: Apparatus used in Pharmacy	1	Describe the general protocols for working safely and efficiently in Pharmacology labs.
	2	Identify common apparatus used in Pharmacy.
Metrology &Medical abbreviations	3	Define metrology.
	4	Describe Metric and Imperial systems of measurements.
	5	Calculate the equivalency of Metric system with Imperial system.
	6	Describe common medical abbreviations.
	7	Apply these abbreviations correctly in medical documentations.
Dosage forms of drugs	8	Define dosage form.
	9	Enlist the types of dosage forms.
	10	Describe the characteristic properties of each dosage form.
	11	Identify dosage forms administered through different routes.
Searching information in a formulary	12	Define formulary.
	13	Describe National Formulary.
	14	Demonstrate searching accurate information quickly in a formulary.
Demonstration ofIntramuscular and Intravenousinjections of Drugs on a dummy (manikin)	15	Describe the general protocols for IM and IV injections of drugs.
	16	Demonstrate standard protocols during administration of a drug through Intramuscular route.
	17	Demonstrate standard protocols during administration of a drug through Intravenous route.
Prescription writing	18	Define medical prescription.
	19	Describe the components of a prescription.
	20	Describe how to reduce medication errors.
	21	Define compliance to treatment and describe how to improve it.
	22	Write down the basic format of drug prescription.
PATHOLOGY		
Biosafety procedures/ Precautions in	1	Define sterilization and disinfection.
	2	Demonstrate steps of hand washing.

MicrobiologyLab	3	Enlist various physical and chemical methodsofsterilizationanddisinfection.
	4	Define biosafety and biosecurity.
Tissue processing	5	Describe steps involved in tissue processing.
	6	Identify various tools/instruments involved in tissue processingand their indications.
	7	Demonstrate slide focusing.
Gram staining	8	Describe principal andsignificance of Gram staining.
	9	Enlist steps of Gram staining.
	10	Demonstrate Gram staining procedure.
	11	Identify Gram positive and Gram- negative bacteria morphologically under the microscope.
ZN staining	12	Describe principal andsignificance of ZN staining.
	13	Enlist steps of ZN staining.
	14	Demonstrate ZN staining procedure.
Culture media	15	Define terms like culture, bacterial colony, media, aerobe, anaerobe, agar, selective and differential.
	16	Describe classification of culture media.
	17	Describe basic and enriched media, transport media, selective media and differential media.
	18	Describe preparation/ inoculation of culture media.
	19	Enlist ingredients, indications, importantproperties and organisms grown on various culture media.
Bacterial motility	20	Enumerate motile bacteria
	21	Identify motile bacteria under the microscope
Hyperplasia (BPH)	22	Define hypertrophy and hyperplasia.
	23	Differentiate between hypertrophy and hyperplasia.
	24	Describe gross and microscopic morphology of BPH.
	25	Identify the slide of BPH.
Atrophy (Testicular atrophy)	26	Define atrophy
	27	Describe gross and microscopic featuresofatrophyoveraslideof testicular atrophy as an example
Pathologic calcification	28	Describe causes and various types of calcification.
	29	Identify the slide.
FORENSIC MEDICINE		
Deathcertificate	1	Formulate death certificate based on WHO criteria
Legal procedure	2	Doctor in a witness box- role play
Recordingofevidence	3	Recording of dying declaration
Consent form	4	Take written informed consent for various procedures

E. LIST OF RECOMMENDED BOOKS

PHARMACOLOGY

RECOMMENDED (COVERING "MUST KNOW") READINGS:

1. Lippincott's Illustrated Reviews: Pharmacology, 6th Edition 2014.

SUGGESTED ("NICE TO KNOW") READINGs:

2. Basic & Clinical Pharmacology 10th Edition by Bertram G. Katzung.
3. Trevor's pharmacology examination and board review.
4. Step I USMLE; Kaplan Medical (Pharmacology)
5. Goodman's and Gilman's Manual of Pharmacology and Therapeutics (Portable edition).

PATHOLOGY

6. Robbin and Cotran Pathologic Basis of Disease 9th edition 2013.

COMMUNITY MEDICINE

7. Textbook of Community Medicine, 2013.

MEDICINE

8. Kumar and Clark for Medicine 8th edition 2012.

PEDIATRICS

9. Nelson's Textbook of Peadiatrics 20th edition 2017.

PSYCHIATARY

10. New Oxford Textbook of Psychiatry, 2nd Edition, 2015.

GYNECOLOGY/OBSTETRICS

11. Oxford Handbook of Obstetrics and Gynaecology 3rd Edition.