

FOUNDATION MOD- ULE II 3RDYEAR STUDY GUIDE

This Study guide of the module/course outlines the key components and areas for the facilitation of the students.

Department of Medical Education

Vision and Mission of KGMC

Khyber Medical University: Vision



Khyber Medical University will be the global leader in health sciences academics and research for efficient and compassionate health care.

Khyber Girls Medical College: Vision



Khyber Girls Medical College will promote health care leaders that are critical thinker, ethical, research oriented, culturally and professionally competent

Khyber Girls Medical College: Mission



To develop competent health care leaders by ensuring appropriate policies, procedures which reflect ethical, cultural, community orientated and evidence based practices to achieve best possible health outcomes for society at large.

Curriculum Committee KGMC

Chair:

Professor Dr. Zahid Aman Dean KGMC.

Co-Chair:

Dr. Amin ul Haq, Associate Dean KGMC.

Clinical Sciences:

- Dr. Mohammad Noor Wazir ,Department of Medicine KGMC/HMC
- Dr. Bushra Rauf Department of Gynae KGMC/HMC.
- Dr. Sofia Iqbal, Department of Ophthalmology KGMC/HMC.
- Dr. Said Amin Department of Medicine KGMC/HMC.
- Dr. Ghareeb Nawaz Department of ENT KGMC/HMC.
- Dr. Jamshed Alam Department of Surgery KGMC/HMC.
- Dr. Ambreen Ahmad, Department of Pediatrics KGMC/HMC.
- Dr. Ain-ul-Hadi Department of Surgery KGMC/HMC.
- Dr. Fawad Rahim Department of Medicine KGMC/HMC.

Behavioral Sciences:

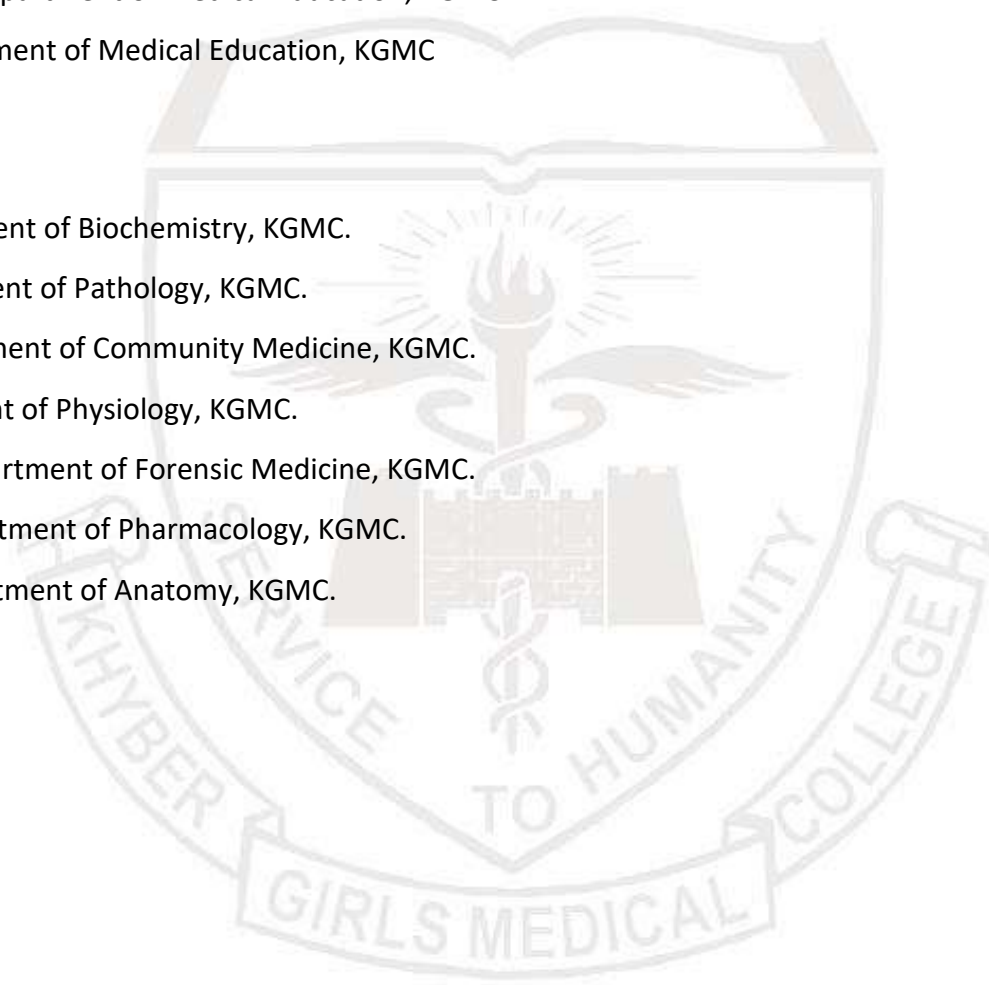
- Dr. Ameer Abbas Department of Psychiatry KGMC/HMC.

Medical Education

- Dr. Naheed Mahsood, Department of Medical Education, KGMC.
- Dr. Naveed Afzal Khan, Department of Medical Education, KGMC.
- Dr Onaiza Nasim , Department of Medical Education, KGMC

Basic Sciences:

- Dr. Amin-ul-Haq Department of Biochemistry, KGMC.
- Dr. Khalid Javed Department of Pathology, KGMC.
- Dr. Raheela Amin Department of Community Medicine, KGMC.
- Dr. Zubia Shah Department of Physiology, KGMC.
- Dr. Naheed Siddique Department of Forensic Medicine, KGMC.
- Dr. Shams Suleman Department of Pharmacology, KGMC.
- Dr. Shahab-ud-Din, Department of Anatomy, KGMC.



Module Committee for Foundation II

Foundation Module:

- Prof. Dr. Abdul Hameed Department of Pharmacology....Member
- Prof. Dr. Sabina Aziz Department of Community Medicine.....Member
- Associate Prof. Dr. Shams Suleman Department of Pharmacology....Member
- Prof. Dr. Bushra Rauf Department of Gynae.....Member
- Prof. Dr. Samia Tabassum Department of Gynae.....Member
- Dr. Saeed-ur-Rehman Professor Department of Pathology.....Member
- Dr. Anwar-ul-Haq Associate Professor Department of Forensic Medicine.....Member
- Dr. Jahanzeb Khan Associate Professor Department of Pediatric A.....Member
- Dr. Muhammad Shah Assistant Professor Department of Surgery C.....Member
- Dr. Fawad Rahim Assistant Professor Department of Medicine.....Member
- Dr. Salma Akbar Senior Lecturer Department of Community Medicine.....Member
- Dr Naheed Mahsoud Director Department of Medical Education.....Member

Integrated curriculum:

An integrated curriculum is all about making connections, whether to real life or across the disciplines, about skills or about knowledge. An integrated curriculum fuses subject areas, experiences, and real-life knowledge together to make a more fulfilling and tangible learning environment for students. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn in relation to clinical examples. Case based discussions, computer-based assignments, early exposure to clinics, wards, and skills acquisition in skills lab are characteristics of integrated teaching program.

Outcomes of the curriculum:

The outcomes of the curriculum of MBBS According to the PMDC are as follows:

- Knowledge
- Skillful
- Community Health Promoter
- Problem-Solver
- Professional
- Researcher
- Leader and Role Model

KNOWLEDGE

By the end of five year MBBS program the KGMC student should be able to;

1. Acquire a high level of clinical proficiency in history taking, physical examination, differential diagnosis, and the effective use of medicine's evolving diagnostic and procedural capabilities including therapeutic and palliative modalities
2. Manage the common prevalent diseases in community
3. Identify the common medical emergencies
4. Develop plan for prevention of common community diseases
5. Formulate a referral plan
6. Compose a prescription plan

PSYCHOMOTOR

By the end of five year MBBS program the KGMC student should be able to;

1. Demonstrate the ability to perform the disease specific relevant examination
2. Respond to common medical emergencies
3. Master the skill of first aid
4. Perform BLS
5. Apply the best evidenced practices for local health problems

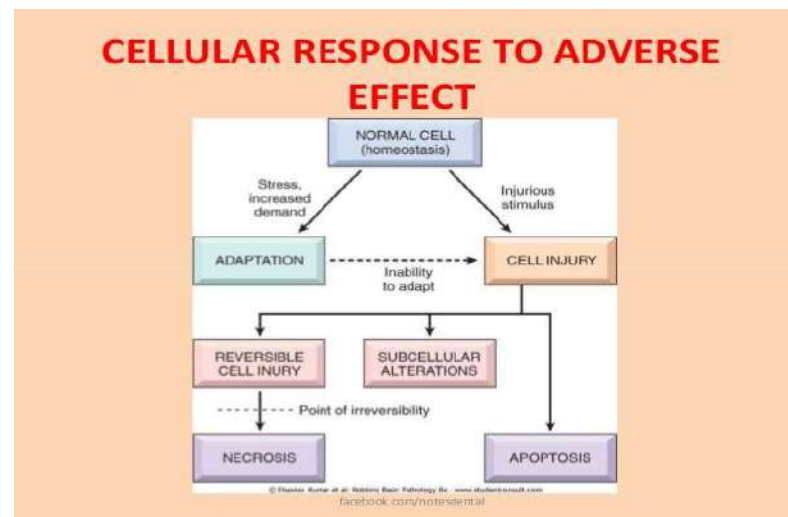
AFFECTIVE

By the end of five year MBBS program the KGMC student should be able to

1. Relate to patient and caregivers vulnerability
2. Demonstrate ethical self-management
3. Counsel and educate patients and their families to empower them to participate in their care and enable shared decision-making.
4. Display compassion with patient and colleagues
5. Demonstrate in clinical care an understanding of the impact of psychological, social, and economic factors on human health and disease

Introduction to Foundation system:

Cell 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**.



General Learning Outcomes of Course, 3rd year MBBS students will be able to:

- 1) Define pathology, its different branches and enumerate clinically important bacteria.
- 2) Describe the structure of bacterial cell and mechanisms by which they cause the disease.
- 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 cell injury.
- 5) Describe necrosis, apoptosis and adaptive changes seen in clinical settings and its identification in surgical specimens.
- 6) Define common terms related to Pharmacology.
- 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 and toxicity.
- 8) Describe the cellular and biochemical sites where drugs bind to act.
- 9) Describe the general principles of drug interactions in relation to clinical practice.
- 10) Describe the process of new drug development.
- 11) Identify different dosage forms of drugs.
- 12) Demonstrate searching accurate information quickly in a formulary
- 13) Demonstrate administration of a drug through intramuscular and intravenous routes.
- 14) Write down the basic format of drug prescription and describe the general principles of prescribing drugs.
- 15) Write correctly medical abbreviations used in clinical practice.

- 16) Identify commonly used equipment's in Pharmacy.
- 17) Describe Forensic medicine, its different branches and importance.
- 18) Describe law and its various components.
- 19) Describe autopsy, its protocols and related hazards.
- 20) Describe different refractive errors and its management.
- 21) Explain causes of watery eyes in both infants and elders and its management.
- 22) Describe the basic concept of health, disease and primary health care.
- 23) Demonstrate different pathological laboratory procedures and identify gross and microscopic features in the given specimens.
- 24) Demonstrate professionalism, respect, honesty and compassion by behaving in a courteous manner with colleagues and teachers during course activities like long lectures, SGDs and Practicals.
- 25) Describe the PMDC code of Ethics.

List of Themes	
Molecules and bacteria	3 weeks
Cell injury, Ageing and Death	2 weeks

Theme 1: Molecule and Bacteria			
Topic	Learning objectives	MIT	Assessment
Pharmacology			
Introduction to the subject	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.	LGF/SGD	MCQ
	Describe the branches of Pharmacology like Pharmacy, Pharmacognosy, pharmacogenetics, pharmacogenomics, toxicology and posology.	LGF/SGD	MCQ
	Define prescription drugs, OTC drugs, WHO essential drugs and Orphan drugs with examples.	LGF/SGD	MCQ
Nomenclature of drugs	Describe how drugs are named, i.e. chemical, generic, approved, official and trade names of drugs with examples.	LGF/SGD	MCQ
Sources of drugs	Enlist various sources of drugs.	LGF/SGD	MCQ

	Give examples of drugs obtained from plants, animals, mineral and synthetic sources.	LGF/SGD	MCQ
	Describe the genetic engineering source of drugs with examples.	LGF/SGD	MCQ
Active principles of crude drugs	Enlist important principles of crude drugs with examples.	LGF/SGD	MCQ
Routes of drug administration	Enlist various routes of drug administration.	LGF/SGD	MCQ
	Describe the merits and demerits of oral, sublingual, rectal, intramuscular, subcutaneous, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of	LGF/SGD	MCQ
	Give examples of drugs given through oral, sublingual, rectal, intramuscular, subcutaneous, intradermal, intravenous, intraarterial, inhalational, spinal, topical and transdermal routes of drug administration.	LGF/SGD	MCQ
	Describe the difference between topical and transdermal routes of drug administration.	LGF/SGD	MCQ
	Describe the difference between subcutaneous and intradermal routes of drug administration.	LGF/SGD	MCQ

Absorption of drugs	Define drug absorption.	LGF/SGD	MCQ
	Describe various mechanisms of drug absorption like simple diffusion, facilitated diffusion, active transport, ion-pair transport, endocytosis and filtration with examples.	LGF/SGD	MCQ
	Describe the concept of ionization of drug molecules and clinical significance of ion trapping.	LGF/SGD	MCQ
	Describe factors affecting drug absorption.	LGF/SGD	MCQ
Bioavailability and Bioequivalence	Define bioavailability, bioequivalence and pharmaceutical equivalence.	LGF/SGD	MCQ
	Explain Time-Concentration curve.	LGF/SGD	MCQ
	Describe AUC (Area Under the Curve).	LGF/SGD	MCQ
	Describe the factors affecting bioavailability.	LGF/SGD	MCQ
Hepatic firstpass effect (Presystemic elimination)	Describe hepatic first-pass effect (Pre-systemic elimination) and its clinical significance.	LGF/SGD	MCQ

Enterohepatic circulation	Define enterohepatic circulation.	LGF/SGD	MCQ
	Describe enterohepatic circulation with examples and its clinical significance.	LGF/SGD	MCQ
Distribution of drugs	Define distribution of drugs.	LGF/SGD	MCQ
	Define redistribution of drugs with example.	LGF/SGD	MCQ
	Describe plasma protein binding and its clinical significance in diseased conditions	LGF/SGD	MCQ
	Describe factors affecting drug distribution.	LGF/SGD	MCQ
Volume of distribution	Define volume of distribution.	LGF/SGD	MCQ
	Enlist drugs with small volume of distribution.	LGF/SGD	MCQ
	Apply formula for calculating volume of distribution.	LGF/SGD	MCQ
	Describe volume of distribution with reference to its clinical significance	LGF/SGD	MCQ
Loading dose	Define loading dose of a drug.	LGF/SGD	MCQ

	Enlist some drugs whereby loading dose is administered.	LGF/SGD	MCQ
	Apply formula for calculating loading dose	LGF/SGD	MCQ
Physiological barriers to transport of drugs	Enlist important physiological barriers to transport of drugs.	LGF/SGD	MCQ
	Describe important physiological barriers to transport of drugs like	LGF/SGD	MCQ
Biotransformation	Define biotransformation.	LGF/SGD	MCQ
	Define xenobiotics.	LGF/SGD	MCQ
	Describe the objectives of biotransformation and fate of drugs after biotransformation.	LGF/SGD	MCQ
	Name major sites of biotransformation.	LGF/SGD	MCQ
	Describe major drug metabolizing enzymes i.e. microsomal (P450) and non-microsomal enzymes.	LGF/SGD	MCQ
	Describe the phases and reactions of biotransformation	LGF/SGD	MCQ
	Describe the factors affecting drug biotransformation.	LGF/SGD	MCQ
Genetic influence on biotransformation of drugs	Define pharmacogenetics and pharmacogenomics.	LGF/SGD	MCQ
	Define idiosyncrasy with examples.	LGF/SGD	MCQ
	Describe the genetic factors influencing	LGF/SGD	MCQ

	biotransformation of drugs with examples.		
Enzyme induction	Define enzyme induction.	LGF/SGD	MCQ
	Enlist enzyme inducers.	LGF/SGD	MCQ
	Describe enzyme induction and its clinical significance.	LGF/SGD	MCQ
enzyme inhibition.	Define enzyme inhibition.	LGF/SGD	MCQ
	Enlist enzyme inhibitors.	LGF/SGD	MCQ
	Describe enzyme inhibition and its clinical significance.	LGF/SGD	MCQ
	Describe suicide inhibition (mechanism-based inhibition) with examples of drugs.	LGF/SGD	MCQ
Excretion of drugs and drug clearance	Define drug excretion and drug clearance.	LGF/SGD	MCQ
	Enlist major and minor routes of drug excretion.	LGF/SGD	MCQ
	Differentiate between excretion, elimination and clearance.	LGF/SGD	MCQ
	Apply the formula for calculating drug clearance.	LGF/SGD	MCQ
Maintenance dose	Define maintenance dose of a drug.	LGF/SGD	MCQ
	Apply the formula for calculating the maintenance dose.	LGF/SGD	MCQ
	Apply Young's formula, Dilling's formula and Clark's formula for calculating doses of drugs.	LGF/SGD	MCQ
Plasma half life	Define plasma half-life.	LGF/SGD	MCQ
	Enlist drugs with short half-life.	LGF/SGD	MCQ

	Enlist drugs with long half-life.	LGF/SGD	MCQ
	Apply the formula for calculating plasma half-life.	LGF/SGD	MCQ
	Explain the clinical significance of half-life.	LGF/SGD	MCQ
Steady-state concentration of drugs	Define steady-state concentration of drugs.	LGF/SGD	MCQ
	Describe the time to reach steady-state concentration of drugs.	LGF/SGD	MCQ
	Describes the importance of steady-state concentration in clinical practice.	LGF/SGD	MCQ
First- and zero-order kinetics	Differentiate between first- and zero-order kinetics with examples.	LGF/SGD	MCQ
	Explain the clinical significance of first- and zero-order kinetics	LGF/SGD	MCQ
Bioassay and standardization	Define bioassay and standardization.	LGF/SGD	MCQ
	Describe the relative importance of bioassay compared with physical or chemical assays.	LGF/SGD	MCQ
	Describe the most common type of bioassay, i.e. three-point assay.	LGF/SGD	MCQ
		LGF/SGD	MCQ

Pathology

Introduction to the subject	Define pathology, microbiology and list its major branches	LGF/SGD	MCQ
	Describe essential characteristics of five major groups of microorganisms	LGF/SGD	MCQ
	Differentiate between prokaryotes and eukaryotic cells based on their structure and complexity of their organization	LGF/SGD	MCQ
Introduction to cell	Define cell	LGF/SGD	MCQ
	Describe structure of cell membrane	LGF/SGD	MCQ
	Describe cell organelles	LGF/SGD	MCQ
Classification of Bacteria	Describe classification of bacteria based on oxygen requirement as aerobes and anaerobes with examples.	LGF/SGD	MCQ
	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.	LGF/SGD	MCQ
Structure of bacterial cell	Describe structure and function of each of various parts of the bacterial cell including cell wall, cytoplasmic membrane, Mesosome, ribosomes, granules and nucleoid	LGF/SGD	MCQ
	Describe structure and function of each of various parts of the bacterial cell including cell wall, cytoplasmic membrane, Mesosome, ribosomes, granules and nucleoid	LGF/SGD	MCQ

	Describe specialized structures outside the cell wall including capsule, flagella, pilli and glycocalyx	LGF/SGD	MCQ
	List the differences between cell wall characteristics of Gram Positive and Gram Negative Bacteria	LGF/SGD	MCQ
	Describe classification and important functions of plasmids.	LGF/SGD	MCQ
	Describe functions and arrangement of transposons.	LGF/SGD	MCQ
	Describe structure, functions and medical importance of bacterial spores with examples.	LGF/SGD	MCQ
Bacterial growth curve	Describe various phases of bacterial growth curve	LGF/SGD	MCQ
Normal Flora	Describe medically important members of normal flora and their anatomic location	LGF/SGD	MCQ
Bacterial genetics	Define mutation	LGF/SGD	MCQ
	Describe the classification of various types of mutations and their common causes.	LGF/SGD	MCQ
	Describe methods of transfer of DNA within bacterial cells including process of conjugation, transduction, recombination and transformation.	LGF/SGD	MCQ
Lab diagnosis of bacterial infections	Describe the bacteriologic approach to diagnosis of bacterial infections including blood, throat, stool, sputum, spinal fluid, urine, genital tract and wound cultures.	LGF/SGD	MCQ

	Describe the bacteriologic approach to diagnosis of bacterial infections including blood, throat, stool, sputum, spinal fluid, urine, genital tract and wound	LGF/SGD	MCQ
--	---	---------	-----

	cultures.		
	Describe general principals of various immunologic and nucleic acid based methods for identification of an organism.	LGF/SGD	MCQ
Bacterial pathogenesis	Define the term pathogen, infection, virulence, communicable, endemic, epidemic and pandemic diseases, carrier, pathogens, opportunists, commensals and colonizers.	LGF/SGD	MCQ
	Describe stages/determinants of bacterial pathogenesis.	LGF/SGD	MCQ
	Describe colonization, invasion, toxins, immune-pathogenesis.		MCQ
	Differentiate between exotoxins and endotoxins produced by gram positive and gram-negative bacteria.	LGF/SGD	MCQ
	Describe the four stages of a typical infectious disease and Koch's postulates for establishing the causal role of an organism in the disease.	LGF/SGD	MCQ
Antibacterial Vaccines	Define immunization and vaccination.	LGF/SGD	MCQ
	Describe role of immunization in inducing active and passive acquired immunity	LGF/SGD	MCQ
	Enlist the current bacterial vaccines and their indications.	LGF/SGD	MCQ
	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 Forensic Medicine 108 Describe forensic medicine and	LGF/SGD	MCQ

Forensic Medicine

Introduction to the subject of Forensic Medicine	Describe forensic medicine and its various branches	LGF/SGD	MCQ
	Describe pillars of forensic medicine	LGF/SGD	MCQ
Introduction to Law	Define law.	LGF/SGD	MCQ
Introduction to medicolegal system	Describe code of medical ethics	LGF/SGD	MCQ
	Describe the terminology in forensic medicine	LGF/SGD	MCQ
	Discuss different prevailing medicolegal systems in the world	LGF/SGD	MCQ
	Describe its various types.	LGF/SGD	MCQ
	Describe the relevant sections of Pakistan penal code and CrPC	LGF/SGD	MCQ
	Describe court procedures	LGF/SGD	MCQ
		LGF/SGD	MCQ

Chain of evidence	Describe evidence, its types and recording of evidence.	LGF/SGD	MCQ
Medical jurisprudence	Describe laws in relation to medical practice	LGF/SGD	MCQ
	Describe the components of medical jurisprudence (consent, negligence, secrecy, professional misconduct and privileged communication)	LGF/SGD	MCQ
ENT			
Introduction to the subject	Describe common ENT symptoms	LGF/SGD	MCQ
	Name common diseases of ENT.	LGF/SGD	MCQ
	Name recommended books that students must read.	LGF/SGD	MCQ
Ophthalmology			
Introduction to the subject; Career in Ophthalmology	Define Ophthalmology and its branches	LGF/SGD	MCQ
	Highlight the scope of field of Ophthalmology as a future career	LGF/SGD	MCQ
Refractory errors	Describe refractive error and its effect on vision.	LGF/SGD	MCQ
	Describe the concept of myopia and its correction.	LGF/SGD	MCQ
	Describe the concept of hypermetropia and its correction.	LGF/SGD	MCQ
	Describe the concept of astigmatism & cylindrical lens	LGF/SGD	MCQ
	Describe the concept of presbyopia, it's possible causes and correction.	LGF/SGD	MCQ
	Describe aphakia and possible methods of its correction.	LGF/SGD	MCQ

Watery Eyes	Explain the structural details, development and functions of lacrimal system.	LGF/SGD	MCQ
	Correlate the clinical presentation of watery eye with anatomical structures.	LGF/SGD	MCQ
	Correlate the clinical features with a disease entity.	LGF/SGD	MCQ
	Describe the causes, clinical features and treatment of congenital nasolacrimal duct obstruction.	LGF/SGD	MCQ
	Assess the time of probing.	LGF/SGD	MCQ
	Describe the causes, clinical presentation and treatment modalities.	LGF/SGD	MCQ
	Differentiate between acute and chronic dacryocystitis.	LGF/SGD	MCQ
Community Medicine			
Introduction to the subject	Define Community medicine and Public health	LGF/SGD	MCQ
	Describe the role of teaching of public health in prevention of diseases	LGF/SGD	MCQ
Health and disease	Define community medicine, public health and preventive medicine.	LGF/SGD	MCQ
	Discuss the history and philosophy of public health as well as its concepts and functions regionally & globally	LGF/SGD	MCQ
	Describe the stages in the natural history of a disease.	LGF/SGD	MCQ
	Describe epidemiological triad, web of causation and multifactorial causation	LGF/SGD	MCQ

	Describe the dimensions and determinants of health	LGF/SGD	MCQ
	Describe the indicators of health and its characteristics	LGF/SGD	MCQ
	Discuss the concept of disease control	LGF/SGD	MCQ
	Discuss the different levels of prevention and their modes of interventions.	LGF/SGD	MCQ
	Explain the natural history of disease.	LGF/SGD	MCQ
	Describe the iceberg phenomenon	LGF/SGD	MCQ
	Describe mode of intervention of diseases with emphasis on health education.	LGF/SGD	MCQ
Primary Health Care	Define Primary health care (PHC).	LGF/SGD	MCQ
	Describe the elements of PHC, its principles and strategies for implementation of PHC.	LGF/SGD	MCQ
	Describe Health for all by the year 2000.	LGF/SGD	MCQ
	Enumerate the MDGS & SDGS related to health.	LGF/SGD	MCQ
PRIME			
Code of ethics	Describe PMC's code of ethics	LGF/SGD	MCQ
	Compare PMC code of ethics with international code of medical ethics	LGF/SGD	MCQ

	Describe the composition and functions of PMC	LGF/SGD	MCQ
	Describe duties of a registered medical practitioner	LGF/SGD	MCQ
Personal identity	Describe the parameters and methods of personal identity	LGF/SGD	MCQ
Professional identity	Describe professional identity	LGF/SGD	MCQ
		LGF/SGD	MCQ

Theme-2
Cell injury, Ageing and Death

Pharmacology			
Topic	Learning objectives	Teaching strategy	Assessment
Pharmacodynamics	Define pharmacodynamics.	LGF/SGD	MCQ
	Define agonist, antagonist, partial agonist and inverse agonist with examples.	LGF/SGD	MCQ
	Describe receptors.	LGF/SGD	MCQ
	Define orphan receptors, serpentine receptors and spare receptors.	LGF/SGD	MCQ
	Describe the biochemical and cellular sites of drug targets.	LGF/SGD	MCQ
	Describe intracellular Secondmessenger system and enlist some important Second-messengers.	LGF/SGD	MCQ
	Describe up regulation and down regulation of receptors with examples.	LGF/SGD	MCQ
	Define drug selectivity and specificity	LGF/SGD	MCQ
Dose-response curves (Graded and Quantal)	Define dose response curve, graded dose-response curve and quantal dose-response curve.	LGF/SGD	MCQ

	Describe graded dose-response curve and quantal dose-response curve.	LGF/SGD	MCQ
	Describe the limitations of graded dose-response curve and its remedy in a quantal dose-response curve.	LGF/SGD	MCQ
	Describe the significance of constructing dose-response curves.	LGF/SGD	MCQ
	Explain the advantages of taking log dose values on the dose axis.	LGF/SGD	MCQ
Therapeutic index	Define therapeutic index.	LGF/SGD	MCQ
	Describe therapeutic index with reference to its clinical importance.	LGF/SGD	MCQ
	Apply formula for calculating therapeutic index.	LGF/SGD	MCQ
	Define median lethal dose, median toxic dose and median effective dose	LGF/SGD	MCQ
	Enlist some drugs with narrow therapeutic index.	LGF/SGD	MCQ
	Enlist some drugs with narrow therapeutic index.	LGF/SGD	MCQ
Protective index	Define protective index.	LGF/SGD	MCQ
	Differentiate between therapeutic index and protective index.	LGF/SGD	MCQ

Therapeutic window	Define therapeutic window	LGF/SGD	MCQ
--------------------	---------------------------	---------	-----

	Describe therapeutic window with reference to its clinical importance.	LGF/SGD	MCQ
Potency and efficacy	Define potency and efficacy.	LGF/SGD	MCQ
	Describe potency and efficacy with examples	LGF/SGD	MCQ
	Describe the clinical importance of efficacy compared to potency.	LGF/SGD	MCQ
Drug antagonism	Define drug antagonism.	LGF/SGD	MCQ
	Enlist types of antagonism.	LGF/SGD	MCQ
	Describe chemical, physiological (functional) and pharmacological (competitive/surmountable and non-competitive) antagonisms with examples.	LGF/SGD	MCQ
Drug interactions	Define drug interaction.	LGF/SGD	MCQ
	Define drug incompatibilities with examples.	LGF/SGD	MCQ
	Describe pharmacokinetic drug interactions with examples and its clinical significance.	LGF/SGD	MCQ
	Describe pharmacodynamics drug interactions with examples and its clinical significance.	LGF/SGD	MCQ
	Describe drug-food interactions and drug-disease interactions with examples.	LGF/SGD	MCQ

	Define summation, synergism and potentiation with examples.	LGF/SGD	MCQ
Tolerance and Tachyphylaxis	Define Tolerance, cross tolerance, reverse tolerance (sensitization), innate tolerance, tachyphylaxis and drug resistance	LGF/SGD	MCQ
	Describe the mechanisms of development of tolerance and tachyphylaxis.	LGF/SGD	MCQ
	Define drug holidays with example	LGF/SGD	MCQ
Adverse drug reactions	Define adverse effects of drugs, secondary effects of drugs and intolerance to drugs	LGF/SGD	MCQ
	Classify adverse drug reactions.	LGF/SGD	MCQ
	Describe dose-related adverse effects (side effects and toxic effects) with examples	LGF/SGD	MCQ
	Describe non-dose-related adverse effects (idiosyncrasy and drug allergy) with examples.	LGF/SGD	MCQ
	Describe causes of adverse drug reactions.	LGF/SGD	MCQ
	Enlist some drugs causing hepatotoxicity.	LGF/SGD	MCQ
	Enlist some drugs causing renal toxicity.	LGF/SGD	MCQ
	Enlist some cardiotoxic drugs.	LGF/SGD	MCQ

	Enlist some drugs causing adverse effects on reproduction.	LGF/SGD	MCQ
New drug development	Describe the processes involved in drug discovery and development..	LGF/SGD	MCQ
	Define lead compound and drug screening.	LGF/SGD	MCQ
	Describe pre-clinical and clinical studies.	LGF/SGD	MCQ
	Define placebo, placebo response and nocebo response.	LGF/SGD	MCQ
	Define no-effect dose and minimum lethal dose.	LGF/SGD	MCQ
	Describe phases of clinical trials.	LGF/SGD	MCQ
	Define post-marketing surveillance.	LGF/SGD	MCQ
	Define single-blind, double-blind, crossover and ADME studies.	LGF/SGD	MCQ
	Describe the role of Food and Drug Administration (FDA) in the drug development process	LGF/SGD	MCQ
	Differentiate between IND (Investigational New Drug) and NDA (New Drug Application).	LGF/SGD	MCQ

Pathology

Pathology			
Cellular injury, cell death	Define the following terms: Pathology, disease, etiology, pathogenesis, morphology, cell injury and homeostasis	LGF/SGD	MCQ
	Describe the causes of cell injury from gross physical trauma to single gene defect.	LGF/SGD	MCQ
	Describe the nature and severity of cell injury with cellular responses.	LGF/SGD	MCQ

	Enumerate different classes of pathology	LGF/SGD	MCQ
	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.	LGF/SGD	MCQ
	Differentiate between reversible and irreversible cell injury.	LGF/SGD	MCQ
	Describe the mechanism, morphological and biochemical changes and functional alterations in reversible and irreversible cell injury	LGF/SGD	MCQ
	Define phagocytosis, endocytosis, pinocytosis, autophagy and heterophagy	LGF/SGD	MCQ
	Describe the subcellular responses to injury including lysosomal catabolism, heterophagy and autophagy.	LGF/SGD	MCQ
Cellular adaptation	Describe types of cellular adaptations.	LGF/SGD	MCQ
	Differentiate between physiologic and pathologic adaptation.	LGF/SGD	MCQ
	Define hypertrophy, hyperplasia, atrophy and metaplasia.	LGF/SGD	MCQ
	Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy and metaplasia.	LGF/SGD	MCQ
	Describe hypertrophy of the smooth endoplasmic reticulum with examples and mitochondrial alterations.	LGF/SGD	MCQ
	Describe cytoskeletal abnormalities in pathological states with examples.	LGF/SGD	MCQ

Necrosis	Define necrosis.	LGF/SGD	MCQ
	Describe types of necrosis with examples.	LGF/SGD	MCQ
	Describe the mechanism and morphology of necrosis.	LGF/SGD	MCQ
Apoptosis	Define apoptosis.	LGF/SGD	MCQ
	Describe physiological and pathological causes of apoptosis with examples.	LGF/SGD	MCQ

	Describe morphology with alterations in cell structure.	LGF/SGD	MCQ
	Describe the biochemical features of apoptosis altering the cell structure.	LGF/SGD	MCQ
	Describe the intrinsic and extrinsic pathways of apoptosis.	LGF/SGD	MCQ
	Differentiate between necrosis and apoptosis	LGF/SGD	MCQ
	Describe role of apoptosis in health and disease.	LGF/SGD	MCQ
	Describe the mechanism and causes of cellular ageing including genetic & environmental factors, structural & biochemical changes.	LGF/SGD	MCQ
	Describe adaptive changes in clinical settings.	LGF/SGD	MCQ
Steatosis	Describe causes and mechanism of steatosis.	LGF/SGD	MCQ
	Explain the morphology and consequences of steatosis.	LGF/SGD	MCQ
Intracellular accumulations	Describe three general pathways for abnormal intracellular accumulations.	LGF/SGD	MCQ

	Define steatosis.	LGF/SGD	MCQ
	Describe causes, mechanism, morphology and consequences of lipid accumulation.	LGF/SGD	MCQ
	Describe causes, mechanism, morphology, consequences of protein and glycogen accumulation	LGF/SGD	MCQ
	Describe types of pigments	LGF/SGD	MCQ
	Differentiate between endogenous and exogenous pigments.	LGF/SGD	MCQ
Pathologic calcification	Define Pathologic calcification	LGF/SGD	MCQ
	Describe types, morphology and functional alterations of pathologic calcification with examples.	LGF/SGD	MCQ
	Differentiate between dystrophic and metastatic calcification.	LGF/SGD	MCQ

Forensic Medicine

Introduction to Thanatology; Death	Define death and describe its phases.	LGF/SGD	MCQ
	Describe criteria of diagnosis of death	LGF/SGD	MCQ
	Define cause, mode, manner and mechanism of death	LGF/SGD	MCQ
Death certificate	Describe the WHO format of death certificate	LGF/SGD	MCQ
	Enlist various methods of disposal of dead body	LGF/SGD	MCQ
Post-mortem changes	Enlist immediate, early and late postmortem changes	LGF/SGD	MCQ
Death certificate	Define cause of death	LGF/SGD	MCQ
	List the content of international cause of death certificate.	LGF/SGD	MCQ
	Fill the international cause of death certificate with the help of scenarios.	LGF/SGD	MCQ

Ophthalmology			
Cataracts	Define cataract	LGF/SGD	MCQ
	Describe the types of cataracts	LGF/SGD	MCQ
	Describe the pathogenesis and complications of cataracts	LGF/SGD	MCQ
	Describe the management of cataracts	LGF/SGD	MCQ
PRIME			
Research Protocol	Describe the steps of developing a research protocol	LGF	MCQ
Health system research	Define research and health system research.	SGD	MCQ
	List types of research.	SGD	MCQ
	Describe building blocks of health system.	LGF	MCQ
	Discuss key areas of concern in health system.	SGD	MCQ
	Discuss briefly research methodology.	LGF/SGD	MCQ
	Describe characteristics of health system research.	LGF/SGD	MCQ

Practical work

Pharmacology

Lab protocols; Apparatus used in Pharmacy	Describe the general protocols for working safely and efficiently in Pharmacology labs	DEMO	MCQ
	Identify common apparatus used in Pharmacy.	DEMO	MCQ
Metrology & Medical abbreviations	Define metrology.	DEMO	MCQ
	Describe Metric and Imperial systems of measurements.	DEMO	MCQ
	Calculate the equivalency of Metric system with Imperial system.	DEMO	MCQ
	Describe common medical abbreviations.	DEMO	MCQ
	Apply these abbreviations correctly in medical documentations	DEMO	MCQ
Dosage forms of drugs	Define dosage form.	DEMO	MCQ

	Enlist the types of dosage forms.	DEMO	MCQ
	Describe the characteristic properties of each dosage form.	DEMO	MCQ
	Identify dosage forms administered through different routes.	DEMO	MCQ
Searching information in a formulary	Define formulary.	DEMO	MCQ
	Describe National Formulary.	DEMO	MCQ
	Demonstrate searching accurate information quickly in a formulary.	DEMO	MCQ
	Demonstration of Intramuscular and Intravenous	DEMO	MCQ
Demonstration of Intramuscular and Intravenous	Describe the general protocols for IM and IV injections of drugs.	DEMO	MCQ
	Demonstrate standard protocols during administration of a drug through Intramuscular route.	DEMO	MCQ
	Demonstrate standard protocols during administration of a drug through Intravenous route.	DEMO	MCQ
Prescription writing	Define medical prescription.	DEMO	MCQ

	Describe the components of a prescription.	DEMO	MCQ
	Describe how to reduce medication errors.	DEMO	MCQ
	Define compliance to treatment and describe how to improve it.	DEMO	MCQ
	Write down the basic format of drug prescription	DEMO	MCQ
Pathology			
Biosafety procedures/Prec autions in Microbiology Lab	Define sterilization and disinfection.	DEMO	MCQ
	Demonstrate steps of hand washing.	DEMO	MCQ
	Enlist various physical and chemical methods of sterilization and disinfection.	DEMO	MCQ
	Define biosafety and biosecurity.	DEMO	MCQ

Describe steps involved in tissue processing.	DEMO	MCQ
Identify various tools/instruments involved in tissue processing and their indications.	DEMO	MCQ
Demonstrate slide focusing	DEMO	MCQ
Describe principal and significance of Gram staining	DEMO	MCQ
Enlist steps of Gram staining.	DEMO	MCQ
Demonstrate Gram staining procedure.	DEMO	MCQ
Identify Gram positive and Gramnegative bacteria morphologically under the microscope.	DEMO	MCQ
Describe principal and significance of ZN staining.	DEMO	MCQ
Enlist steps of ZN staining.	DEMO	MCQ
Demonstrate ZN staining procedure	DEMO	MCQ
Identify AFB and inflammatory cells microscopically.	DEMO	MCQ

Define terms like culture, bacterial colony, media, aerobe, anaerobe, agar, selective and differential.	DEMO	MCQ	
Describe classification of culture media.	DEMO	MCQ	
Describe basic and enriched media, transport media, selective media and differential media.	DEMO	MCQ	
Describe preparation/ inoculation of culture media.	DEMO	MCQ	
Enlist ingredients, indications, important properties and organisms grown on various culture media.	DEMO	MCQ	
Enumerate motile bacteria	DEMO	MCQ	
Identify motile bacteria under the microscope	DEMO	MCQ	
Define hypertrophy and hyperplasia.	DEMO	MCQ	
Differentiate between hypertrophy and hyperplasia.	DEMO	MCQ	
Describe gross and microscopic morphology of BPH.	DEMO	MCQ	
Identify the slide of BPH.	DEMO	MCQ	
Atrophy (Testicular atrophy)	Define atrophy	DEMO	MCQ

	Describe gross and microscopic features of atrophy over a slide of testicular atrophy as an example	DEMO	MCQ
Pathologic calcification	Describe causes and various types of calcification.	DEMO	MCQ
	Identify the slide.	DEMO	MCQ
Forensic Medicine			
Death certificate	Formulate death certificate based on WHO criteria	DEMO	MCQ
Legal procedure	Doctor in a witness box- role play	DEMO	MCQ
Recording of evidence	Recording of dying declaration	DEMO	MCQ
Consent form	Take written informed consent for various procedures	DEMO	MCQ

Teaching and learning strategies:

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

- Interactive Lectures
- Hospital Clinic visits
- Small Group Discussion
- Skills session
- Self-Directed Study

Interactive lectures:

An interactive lecture is an easy way for instructors to intellectually engage and involve students as active participants in a lecture-based class of any size. Interactive lectures are classes in which the instructor breaks the lecture at least once per class to have students participate in an activity that lets them work directly with the material.

- The instructor might begin the interactive segment with an engagement trigger that captures and maintains student attention.
- Then the instructor incorporates an activity that allows students to apply what they have learned or give them a context for upcoming lecture material.

- As the instructor feels more comfortable using interactive techniques he or she might begin to call upon a blend of various interactive techniques all in one class period.

Hospital/Clinic visits:

In small groups, students observe patients with signs and symptoms in hospital or clinical settings. This helps students to relate knowledge of basic and clinical sciences of the relevant module.

Small Group Discussion (SGD):

The shy and less articulate are more able to contribute. Students learn from each other. Everyone gets more practice at expressing their ideas. A two way discussion is almost always more creative than individual thoughts. Social skills are practiced in a 'safe' environment e.g. tolerance, cooperation. This format helps students to clarify concepts acquire skills or attitudes. Students exchange opinions and apply knowledge gained from lectures, tutorials and self-study. The facilitator role is to ask probing questions, summarize, or rephrase to help clarify concepts.

Skills Practical Session:

Skills relevant to respective module are observed and practiced where applicable in skills laboratory or Laboratories of various departments.

Self-Directed learning (SDL):

Self-directed learning, which involves studying without direct supervision in a classroom Library, is a valuable way to learn and is quickly growing in popularity among parents and students. Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Centre, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-study.

Time Table:

The timetables for the module will be shared via Edmodo and the notice boards in advance.

Assessment tools:

Theoretical knowledge is tested by a written examination system constituted by multiple choice questions (MCQs). The assessment of practical knowledge involves oral, spot, or objective structured practical examinations (OSPE).

Multiple Choice Questions (MCQs):

- Multiple choice questions (MCQs) are a form of assessment for which students are asked to select the best choice from a list of answers.
- MCQ consists of a stem and a set of options. The stem is usually the first part of the assessment that presents the question as a problem to be solved; the question can be an incomplete statement which requires to be completed and can include a graph, a picture or any other relevant information. The options are the possible answers that the student can choose from, with the correct answer called the key and the incorrect answers called distractors.
- Correct answer carries one mark, and incorrect 'zero mark'. There is NO negative marking.

- Students mark their responses on specified computer-based sheet designed for the college.
- The block exam will comprise of 120 MCQs and will be compiled according to the shared blueprint.

Objective Structured Practical Examination (OSPE)

- The content may assess application of knowledge, or practical skills.
- Student will complete task in define time at one given station.
- All the students are assessed on the same content by the same examiner in the same allocated time.
- A structured examination will have observed, unobserved, interactive and rest stations.
- Observed and interactive stations will be assessed by internal or external examiners.
- Unobserved will be static stations in which students will have to answer the questions related to the given pictures, models or specimens the provided response sheet.
- Rest station is a station where there is no task given, and in this time student can organize higher thoughts.
- The Block OSPE will be comprise of 20 examined station and 5 rest stations. The stations will be assigned according to the shred blueprint. There will be 8 stations for viva of core subjects like Pathology, Pharmacology, Forensic Medicine and Community Medicine (2 station for viva of each core subject) and 2 clinical station and rest of 10 out of 20 stations will be assigned according to shared blueprints.

•

Internal Evaluation:

Internal evaluation is a process of quality review undertaken within an institution for its own ends. 10% marks of internal evaluation will be added to final marks. This 10% will be based on

Marks obtained	13 out of total 40 marks of internal assessment in block G Paper

Marks obtained	13 out of total 40 marks of internal assessment in block G OSPE

Attendance Requirement:

More than 75% attendance is mandatory to sit for the examinations.

Physiology

- Guyton and Hall physiology
- Ganong physiology
- Human Physiology from cells to system by lauree sherwood
- BRS Physiology
- Neuroscience by Dale Purves

Biochemistry

- Chatterjee text book of Biochemistry
- Harpers Biochemistry
- Lippincotts Biochemistry
- Satya Narayan biochemistry

Pharmacology

- Basic & Clinical Pharmacology, 14edition
- Katzung & Trevor's Pharmacology: Examination & Board Review, 10edition
- Lippincott Illustrated Reviews: Pharmacology, 8th edition
- Pharmacology for Medical Graduates by Tara V. Shanbhag

Forensic Medicine

- Parikh's textbook of Medical Jurisprudence and Toxicology.

- Principles and Practice of Forensic Medicine by Nasir R Awan
- Forensic medicine and toxicology principals and practice by Krishan Vij
- Knights forensic pathology by Bernard knight, Pekka saukko
- Forensic medicine and toxicology Nagesh Kumar G rao

Pathology

- Robbins textbook of pathology
- Harsh mohan text book of pathology
- Levison text book of microbiology
- Paniker parasitology
- Chatterjee book of parasitology

Apart from these resources learning, students can consult books available in library or recommended by the specialty experts.