Faisalabad Medical University

BLOCK G

3rd Year MBBS

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Foundation Module-II

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Introduction of Module

The Foundation-II Module, designed for 3rd year MBBS students at Faisalabad Medical University (FMU), represents a comprehensive educational program structured by the Health Professions Education & Research Department (HPERD). FMU envisions becoming a global leader in health sciences education and research, delivering efficient and compassionate healthcare. The curriculum aims to produce professional competence through innovation and learning, aligned with HPERD's mission of developing leaders in health professions education. The module is organized into key themes, including "Molecules and Bacteria" and "Aging and Death," covering essential aspects of microbiology, pathology, pharmacology, and forensic medicine over specific durations. Learning outcomes target a deep understanding of pathology, bacterial structures, cell injury, pharmacokinetics, pharmacodynamics, and practical skills in drug administration and prescription writing. Students are also introduced to forensic medicine and medico-legal procedures. The curriculum allocates time for each subject to ensure balanced education, with assessments designed to evaluate both theoretical knowledge and practical competencies. The comprehensive approach prepares students for advanced medical studies and professional practice, ensuring they are well-equipped to meet healthcare challenges.

Rationale

The Foundation-II Module aims to merge essential medical sciences with practical skills, preparing students for clinical practice complexities. It offers comprehensive education, covering crucial medical topics to ensure well-rounded professionals. The curriculum integrates theoretical knowledge with practical skills through assessments and exercises, focusing on both technical and softer skills like prescription writing. Critical thinking and problem-solving are emphasized, as students analyze medical conditions to develop appropriate interventions. This module provides a solid foundation for advanced medical studies, aligning with FMU's mission to promote professional competence and innovation, addressing local healthcare issues while integrating global knowledge.

Teaching Hours Allocation

Sr. No	Subject	Hours Needed
1	Pharmacology	35
2	Pathology	33
3	Forensic medicine	12
4	Community medicine	8
5	Family medicine	1
6	PRIME and Research	4+3
7	Eye	3
8	ENT	1
	Total	**100**

List of Themes

Sr. No	Theme	Duration
1	Molecules, bacteria and cell injury	2 weeks
2	Ageing and death	2 weeks

General Learning Objectives

By the end of Foundation-2 Module, 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 equipments in pharmacy.

17. Describe Forensic medicine, its different branches and importance.

18. Describe law and its various components.

19. Explain medico-legal system and legal procedure for a doctor.

20. Describe the contents of medical jurisprudence.

21. Describe the diagnosis of death and WHO death certificate.

22. Describe different refractive errors and its management.

23. Explain causes of watery eyes in both infants and elders and its management.

24. Describe the basic concept of health, disease and primary health care.

25. Demonstrate different pathological laboratory procedures and identify gross and microscopic features in the given specimens.

26. Demonstrate professionalism, respect, honesty and compassion by behaving in a courteous manner with colleagues and teachers during course activities like long lectures, SGDs and Practical work.

27. Describe the PMDC code of ethics

28. Describe the steps of process of developing a research protocol

Specific Learning Objectives

Theme-1 (Molecules and Bacteria)						
Sr.#	**Subject**	**Topic**	**Learning objectives**	**Teaching Strategies**	**Duration (Hour)**	**Assessment**
1	**Pharmacology**	Introduction to the subject	Define basic terms like Pharmacology, Clinical Pharmacology, Therapeutics, drug, medicine, pro-drugs, prototype drugs, Materia medica, pharmacopoeia, formulary, national formulary, poisons, toxins, pharmacokinetics, pharmacodynamics, excipient, compounding and dispensing.	Interactive Lecture	1 hr.	MCQs
			Describe the branches of Pharmacology like Pharmacy, Pharmacognosy, pharmacogenetics, pharmacogenomics, toxicology and posology.			
			Define prescription drugs, OTC drugs, WHO essential drugs and Orphan drugs with examples.			
		Nomenclature of drugs	Describe how drugs are named, i.e. chemical, generic, approved, official and trade names of drugs with examples.			

		Sources of Drugs	Enlist various sources of drugs.	Interactive Lecture	1 hr.	MCQs
			Give examples of drugs obtained from plants, animals, mineral and synthetic sources.			
			Describe the genetic engineering source of drugs with examples.			
		Active Principles of crude drugs	Enlist important principles of crude drugs with examples.			
		Routes of drug administration	Enlist various routes of drug administration.	Interactive Lecture	2 hrs.	MCQs
			Describe the merits and demerits of oral, sublingual, rectal, intramuscular, subcutaneous, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of drug administration.			
			Give examples of drugs given through oral, sublingual, rectal, intramuscular, subcutaneous, intradermal, intravenous, intra-arterial, inhalational, spinal, topical and transdermal routes of drug administration.			

			Describe the difference between topical and transdermal routes of drug administration.			
			Describe the difference between subcutaneous and intradermal routes of drug administration.			
		Absorption of drugs	Define drug absorption.	Interactive Lecture	1 hr.	MCQs
			Describe various mechanisms of drug absorption like simple diffusion, facilitated diffusion, active transport, ion-pair transport, endocytosis and filtration with examples.			
			Describe the concept of ionization of drug molecules and clinical significance of ion trapping. Describe factors affecting drug absorption.			
		Bioavailability and Bioequivalence	Define bioavailability, bioequivalence and pharmaceutical equivalence.	Interactive Lecture	1 hr.	MCQs
			Explain Time-Concentration curve.			
			Describe AUC (Area Under the Curve).			

			Describe the factors affecting bioavailability.			
		Hepatic first-pass effect (pre-systemic elimination)	Describe hepatic first-pass effect (pre-systemic elimination) and its clinical significance.	Interactive Lecture	1 hr.	MCQs
		Enterohepatic Circulation	Define enterohepatic circulation.			
			Describe enterohepatic circulation with examples and its clinical significance.			
		Distribution of drugs	Define distribution of drugs.	Interactive Lecture	1 hr.	MCQs
			Define redistribution of drugs with example.			
			Describe plasma protein binding and its clinical significance in diseased conditions.			
			Describe factors affecting drug distribution.			
		Volume of Distribution	Define volume of distribution.			
			Enlist drugs with small volume of distribution.			
			Enlist drugs with large volume of distribution.			
			Apply formula for calculating volume of distribution.			

			Describe volume of distribution with reference to its clinical significance.			
		Loading dose	Define loading dose of a drug.			
			Enlist some drugs whereby loading dose is administered.			
			Apply formula for calculating loading dose.			
		Physiological barriers to Transport of Drugs	Enlist important physiological barriers to transport of drugs.	Interactive Lecture	1 hr.	MCQs
			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	Define biotransformation.	Interactive Lecture	1 hr.	MCQs
			Define xenobiotics.			
			Describe the objectives of biotransformation and fate of drugs after biotransformation.			
			Name major sites of biotransformation.			
			Describe major drug metabolizing enzymes i.e. microsomal (P450) and non-			

			microsomal enzymes.			
			Describe the phases and reactions of biotransformation.			
			Describe the factors affecting drug biotransformation.			
		Genetic Influence 0n Biotransformation of drugs	Define pharmacogenetics and pharmacogenomics.	Interactive Lecture	1 hr.	MCQs
			Define idiosyncrasy with examples.			
			Describe the genetic factors influencing biotransformation of drugs with examples.			
		Enzyme induction	Define enzyme induction.	SGD	2 hrs.	MCQs
			Enlist enzyme inducers.			
			Describe enzyme induction and its clinical significance.			
		Enzyme inhibition	Define enzyme inhibition.			
			Enlist enzyme inhibitors.			
			Describe enzyme inhibition and its clinical significance.			
			Describe suicide inhibition (mechanism-based			

			inhibition) with examples of drugs.			
		Excretion of drugs and drug clearance	Define drug excretion and drug clearance.	Interactive Lecture	1 hr.	MCQs
			Enlist major and minor routes of drug excretion.			
			Differentiate between excretion, elimination and clearance.			
			Apply the formula for calculating drug clearance.			
		Maintenance dose	Define maintenance dose of a drug.	SGD	2 hrs.	MCQs
			Apply the formula for calculating the maintenance dose.			
			Apply Young's formula, Dilling's formula and Clark's formula for calculating doses of drugs.			
		Plasma half life	Define plasma half-life.			
			Enlist drugs with short half-life.			
			Enlist drugs with long half-life.			
			Apply the formula for calculating plasma half-life.			
			Explain the clinical significance of half-life.			
		Steady-state concentration of drugs	Define steady-state concentration of drugs.	Interactive Lecture	1 hr.	MCQs
			Describe the time to reach steady-			

			state concentration of drugs.			
			Describes the importance of steady-state concentration in clinical practice.			
		First and zero order Kinetics	Define first- and zero-order kinetics.			
			Differentiate between first- and zero-order kinetics with examples.			
			Explain the clinical significance of first- and zero-order kinetics			
		Bioassay and standardization	Define bioassay and standardization.			
			Describe the relative importance of bioassay compared with physical or chemical assays.			
			Describe the most common type of bioassay, i.e. three-point assay.			
		Pharmacodynamics	Define pharmacodynamics.	Interactive Lecture	1 hr.	MCQs
			Define agonist, antagonist, partial agonist and inverse agonist with examples.			
			Describe receptors.			
			Define orphan receptors, serpentine receptors and spare receptors.			
			Describe the biochemical and	SGD	2 hrs.	MCQs

			cellular sites of drug targets.			
			Describe intracellular Second-messenger system and enlist some important Second-messengers.			
			Describe up regulation and down regulation of receptors with examples.			
			Define drug selectivity and specificity.			
		Dose-response curves (Graded and Quantal)	Define dose response curve, graded dose-response curve and quantal dose-response curve.	Interactive Lecture	1 hr.	MCQs
			Describe graded dose-response curve and quantal dose-response curve.			
			Describe the limitations of graded dose-response curve and its remedy in a quantal dose-response curve.			
			Describe the significance of constructing dose-response curves.			
			Explain the advantages of taking log dose values on the dose axis.			
		Therapeutic index	Define therapeutic index.	Interactive Lecture	1 hr.	MCQs
			Describe therapeutic index			

			with reference to its clinical importance.			
			Apply formula for calculating therapeutic index			
			Define median lethal dose, median toxic dose and median effective dose.			
			Enlist some drugs with narrow therapeutic index.			
			Enlist some drugs with broad therapeutic index.			
		Protective Index	Define protective index.			
			Differentiate between therapeutic index and protective index.			
		Therapeutic window	Define therapeutic window.	Interactive Lecture	1 hr.	MCQs
			Describe therapeutic window with reference to its clinical importance.			
		Potency and efficacy	Define potency and efficacy.			
			Describe potency and efficacy with examples.			
			Describe the clinical importance of efficacy compared to potency.			
		Drug antagonism	Define drug antagonism.			
			Enlist types of antagonism.			

			Describe chemical, physiological (functional) and pharmacological (competitive/surmountable and non-competitive) antagonisms with examples.			
		Drug interactions	Define drug interaction.	Interactive Lecture	1 hr.	MCQs
			Define drug incompatibilities with examples.			
			Describe pharmacokinetic drug interactions with examples and its clinical significance.			
			Describe pharmacodynamics drug interactions with examples and its clinical significance.			
			Describe drug-food interactions and drug-disease interactions with examples.			
			Define summation, synergism and potentiation with examples.			
		Tolerance and Tachyphylaxis	Define Tolerance, cross tolerance, reverse tolerance (sensitization), innate tolerance, tachyphylaxis and drug resistance.	Interactive Lecture	1 hr.	MCQs
			Describe the mechanisms of development of tolerance and tachyphylaxis.			

			Define drug holidays with example.			
		Adverse drug Reactions	Define adverse drug effect, secondary effect and intolerance to a drug.	Interactive Lecture	1 hr.	MCQs
			Classify adverse drug reactions.			
			Describe dose-related adverse effects (side effects and toxic effects) with examples.			
			Describe non-dose-related adverse effects (idiosyncrasy and drug allergy) with examples.			
			Describe causes of adverse drug reactions.			
			Enlist some drugs causing hepatotoxicity.			
			Enlist some drugs causing renal toxicity.	SGD	2 hrs.	MCQs
			Enlist some cardio toxic drugs.			
			Enlist some drugs causing adverse effects on reproduction.			
		New Drug Development	Describe the processes involved in drug discovery and development.	Interactive Lecture	1 hr.	MCQs
			Define lead compound and drug screening.			
			Describe pre-clinical and clinical studies.			

			Define placebo, placebo response and nocebo response.			
			Define no-effect dose and minimum lethal dose.			
			Describe 04 phases of clinical trials.			
			Define post-marketing surveillance.			
			Define single-blind, double-blind, crossover and ADME studies.	SGD	2 hrs.	MCQs
			Describe the role of Food and Drug Administration (FDA) in the drug development process.			
			Differentiate between IND (Investigational New Drug) and NDA (New Drug Application).			
2	**Pathology**	Introduction to the subject	Define pathology, microbiology and list its major branches	Interactive Lecture	1 hr.	MCQs
			Describe essential characteristics of five major groups of microorganisms			
			Differentiate between prokaryotes and eukaryotic cells based on their structure and complexity of their organization			
		Introduction to cell	Define cellular housekeeping & cellular metabolism.	Interactive Lecture	1 hr.	MCQs

			Describe cell signaling pathways, transcription factors. Describe cell-cell interactions and cytoskeleton. Discuss maintaining of cell population, stem cells and regenerative medicine.			
		Classification of Bacteria	Describe classification of bacteria based on oxygen requirement as aerobes and anaerobes with examples.	Interactive Lecture	1 hr.	MCQs
			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 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	Interactive Lecture	1 hr.	MCQs
			Describe specialized structures outside the cell wall including capsule, flagella, pilli and glycocalyx			

			List the differences between cell wall characteristics of Gram Positive and Gram-Negative Bacteria			
			Describe classification and important functions of plasmids.	SGD	2 hrs.	MCQs
			Describe functions and arrangement of transposons.			
			Describe structure, functions and medical importance of bacterial spores with examples.			
		Bacterial growth curve	Describe various phases of bacterial growth curve	Interactive Lecture	1 hr.	MCQs
		Normal Flora	Describe medically important members of normal flora and their anatomic Location			
		Bacterial genetics	Define mutation	Interactive Lecture	1 hr.	MCQs
			Describe the classification of various types of mutations and their common causes.			
			Describe methods of transfer of DNA within bacterial cells including process of conjugation, transduction, recombination and transformation.			
		Lab diagnosis of bacterial infections	Describe the bacteriologic approach to diagnosis of	Interactive Lecture	1 hr.	MCQs

			bacterial infections including blood, throat, stool, sputum, spinal fluid, urine, genital tract and wound cultures.			
			Describe general principals of various immunologic and nucleic acid-based methods for identification of an organism.			
		Bacterial pathogenesis	Define the term pathogen, infection, virulence, communicable, endemic,epidemic and pandemic diseases, carrier, pathogens, opportunists, commensals and colonizers.	Interactive Lecture	1 hr.	MCQs
			Describe stages/determinants of bacterial pathogenesis.			
			Describe colonization, invasion, toxins, immune-pathogenesis.			
			Differentiate between exotoxins and endotoxins.	SGD	2 hrs.	MCQs
			Describe the various modes of action of endotoxins and endotoxins produced by gram positive and gram-negative bacteria.			

			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	Define immunization and vaccination.	Interactive Lecture	1 hr.	MCQs
			Describe role of immunization in inducing active and passive acquired immunity.			
			Enlist the current bacterial vaccines and their indications.			
			Describe various types of bacterial vaccines in terms of composition, preparation, indications, route of administration and common side effects.			
3	**Forensic Medicine**	Introduction to the subject of Forensic Medicine	Describe forensic medicine and its various branches	Interactive Lecture	1 hr.	MCQs
			Describe the 3 Tier system.			
			Describe crime and its chemistry Explain general presumptions and exceptions in law Describe plea of insanity			
		Introduction to Medicolegal system	Discuss different prevailing medico-legal systems in the world			

		Introduction to Law Legal proceedings	Define law and its types	Interactive Lecture	1 hr.	MCQs
			Define court, its types and levels			
		Chain of Evidence	Describe evidence and witness and their types			
		PPC andCrPC	Describe the relevant sections of Pakistan penal code and CrPC			
		Medical jurisprudence	Define PMDC and its functions Describe the components of medical jurisprudence (consent, negligence, secrecy, professional misconduct and privileged communication)	Interactive Lecture	2 hrs.	MCQs
			Describe code of medical ethics			
			Describe the duties of a registered medical practitioner			
4	**ENT**	Introduction to the subject	Describe common ENT symptoms.	Interactive Lecture	1 hr.	MCQs
			Name common diseases of ENT.			
			Name recommended books that students must read.			
5	**Ophthalmology**	Introduction to the subject; Career in Ophthalmology	Define Ophthalmology and its branches	Interactive Lecture	1 hr.	MCQs
			Highlight the scope of field of Ophthalmology as a future career			

		Refractory errors	Describe refractive error and its effect on vision.	Interactive Lecture	1 hr.	MCQs
			Describe the concept of myopia and its correction.			
			Describe the concept of hypermetropia and its correction.			
			Describe the concept of astigmatism & cylindrical lens.			
			Describe the concept of presbyopia, its possible causes and correction.			
			Describe aphakia and possible methods of its correction.			
		Watery Eyes	Explain the structural details, development and functions of lacrimal system.			
			Correlate the clinical presentation of watery eye with anatomical structures.			
			Correlate the clinical features with a disease entity.			
			Describe the causes, clinical features and treatment of congenital nasolacrimal duct obstruction.			
			Assess the time of probing.			

			Describe the causes, clinical presentation and treatment modalities.			
			Differentiate between acute and chronic dacryocystitis.			
6	**Community Medicine**	Introduction to the subject	Define Community medicine and public health	Interactive Lecture	1 hr.	MCQs
			Describe the role of teaching of public health in prevention of diseases			
		Health system of Pakistan: Introduction	Define health care system of Pakistan using WHO Health system frame work	Interactive Lecture	1 hr.	MCQs
		Health and Disease	Define community medicine, public health and preventive medicine.	Interactive Lecture	4 hrs.	MCQs
			Discuss the history and philosophy of public health as well as its concepts and functions regionally & globally.			
			Describe the stages in the natural history of a disease.			
			Describe epidemiological triad, web of causation and multifactorial Causation			
			Describe the dimensions and determinants of health			

			Describe the indicators of health and its characteristics			
			Discuss the concept of disease control			
			Discuss the different levels of prevention and their modes of interventions.			
			Explain the natural history of disease.			
			Describe the iceberg phenomenon			
			Describe mode of intervention of diseases with emphasis on health education.			
		Primary Health Care	Define Primary health care (PHC).	Interactive Lecture	2 hrs.	MCQs
			Describe the elements of PHC, its principles and strategies for implementation of PHC.			
			Describe Health for all by the year 2000.			
			Enumerate the MDGS & SDGS related to health.			
			Describe the history of development of PHC			
			Describe comprehensive & selective PHC			
			Describe reasons for failure of PHC			

			Describe Health Systems before & after PHC			
			Describe district health care system			
			Enumerate indicators for assessing PHC			
7	**PRIME**	Personal identity	Describe personal identity in the context of medical education	Interactive Lecture	1 hr.	MCQs
		Professional identity	Define professional identity and describe the basic pre-requisites of professional identity formation			
		Patient safety, clinical governance and quality improvement	Explain the concept of patient safety, clinical governance and quality improvement in primary healthcare	Interactive Lecture	1 hr.	MCQs
		Professionalism Trust	Explain the dynamics of professionalism and trust in health professional-patient relationship			
			Adheres to principles of trust in day-to-day professional interactions			
		Professional identity formation-	Define professional identity formation and explain the students' roles in terms of professional identity	Interactive Lecture	1 hr.	MCQs
		Types and Multiple identities				
		Motivation	Explain motivational skills	Interactive Lecture	1 hr.	MCQs

			for team members			
			for clinical tasks			

~~Theme-2 (Ageing and Death)~~

Sr.#	Subject	Topic	Learning objectives	Teaching Strategies	Duration	Assessment
1	**Pathology**	Cellular injury, cell death	Define the following terms: Pathology, disease, etiology, pathogenesis, morphology, cell injury and homeostasis.	Interactive Lecture	1 hr.	MCQs
			Describe the causes of cell injury from gross physical trauma to single gene defect.			
			Describe the nature and severity of cell injury with cellular responses.			
			Enumerate different classes of pathology.			
			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.			
			Differentiate between reversible and irreversible cell injury.	SGD	2 hrs.	MCQs
			Describe the mechanism, morphological and biochemical changes and functional			

			alterations in reversible and irreversible cell injury.			
			Define phagocytosis, endocytosis, pinocytosis, autophagy and heterophagy.			
			Describe the subcellular responses to injury including lysosomal catabolism, heterophagy and autophagy.			
		Cellular adaptation	Describe types of cellular adaptations. Differentiate between physiologic and pathologic adaptation. Define hypertrophy, hyperplasia, atrophy and metaplasia. Describe the causes and mechanism of hypertrophy, hyperplasia, atrophy and metaplasia. Describe hypertrophy of the smooth endoplasmic reticulum with examples and mitochondrial alterations. Describe cytoskeletal abnormalities in	Interactive Lecture	2 hrs.	MCQs

			pathological states with examples.			
		Human Genome	Discuss Human genome & The Human Genome Project, Encode Project. Describe Histone organization Describe RNA types (coding & non-coding) & DNA & RNA Variations Discuss Gene editing, CRISR Technology, Xist Chromosome	Interactive Lecture	2 hrs.	MCQs
			Discuss Epigenetics, Chromosome remodeling, & reorganization	SGD	2 hrs.	MCQs
		Necrosis	Define necrosis.	Interactive Lecture	2 hrs.	MCQs
			Describe types of necrosis with examples.			
			Describe the mechanism and morphology of necrosis.			
		Apoptosis	Define apoptosis.	SGD	2 hrs.	MCQs
			Describe physiological and pathological causes of apoptosis with examples.			
			Describe morphology with alterations in cell structure.			
			Describe the biochemical features of apoptosis altering the cell structure.			
			Describe the intrinsic and			

			extrinsic pathways of apoptosis.			
			Differentiate between necrosis and apoptosis.			
			Describe role of apoptosis in health and disease.			
			Describe the mechanism and causes of cellular ageing including genetic & environmental factors, structural & biochemical changes.			
			Describe adaptive changes in clinical settings.			
		Steatosis Intracellular accumulations Pathologic calcification	Describe causes, morphology, pathogenesis and complications of Steatosis, Explain different types of intracellular pigmentation Calcification, types and pathogenesis	Interactive Lecture	1 hr.	MCQs
2	**Forensic Medicine**	Death	Describe the medicolegal aspects of brain stem death and suspended Animation	Interactive Lecture	1 hr.	MCQs
			Define cause, mode, manner and mechanism of death			
			Enlist various methods of disposal of dead body			
3	**Ophthalmology**	Cataracts	Define cataract	Interactive Lecture	1 hr.	MCQs
			Describe the types of cataracts			

			Describe the pathogenesis and complications of cataracts			
			Describe the management of cataracts			
4	**PRIME Research**	Research Protocol	Describe the steps of developing a research protocol	Interactive Lecture	1 hr.	MCQs
		Health system research	Define research and health system research.	Interactive Lecture	1 hr.	MCQs
			List types of research.			
			Describe characteristics of health system research.			
			Describe building blocks of health system.			
			Discuss key areas of concern in health system.			
			Discuss briefly research methodology.			
			Define and categorize types of health research			
		Purpose and Process of health research	Explain the purpose of health research	Interactive Lecture	1 hr.	MCQs
5	**Family Medicine**	History & current structure of general	Describe the historical perspectives of general practice	Interactive Lecture	1 hr.	MCQs

		practice	Explain the structure of general practice nationally and internationally. Define the key principles of patient-centered care, continuity of care, and evidence-based practice. Explain effective communication techniques to build rapport, elicit patient concerns, and ensure shared decision-making. Demonstrate strategies to manage challenging consultations while maintaining professionalism and empathy. Utilize evidence-based guidelines to support diagnostic reasoning and therapeutic decision-making. Recognize common safety risks in general practice and implement strategies to mitigate them. Apply best practices in documentation, follow-up, and continuity of care to improve patient outcomes. Analyze ethical dilemmas commonly encountered in general practice			

			and apply appropriate frameworks for resolution. Reflect on the importance of maintaining patient confidentiality, informed consent, and cultural competence.			

Practical Work						
Sr.#	**Subject**	**Topic**	**Learning objectives**	**Teaching Strategies**	**Duration**	**Assessment**
1	**Pharmacology**	Lab protocols; Introduction to Pharmacy; Apparatus used in Pharmacy	Identify and name common apparatus used in pharmacy laboratory.	Skill Lab	1.5 hrs.	OSPE
			Identify and label common apparatus used in the field of Pharmacy.			
		Metrology & Medical abbreviations	Define metrology.	Skill Lab	1.5 hrs.	OSPE
			Describe metric and imperial systems of measurements.			
			Calculate the equivalency of metric system with imperial system.			
			Describe the common medical abbreviations.			
			Apply these abbreviations correctly in medical documentations.			
		Searching information in a formulary	Define formulary.			
			Describe National Formulary.			
			Demonstrate searching accurate information quickly in a formulary.			
		Dosage Forms of Drugs	Define dosage form.	Skill Lab	1.5 hrs.	OSPE
			Enlist the types of dosage forms.			

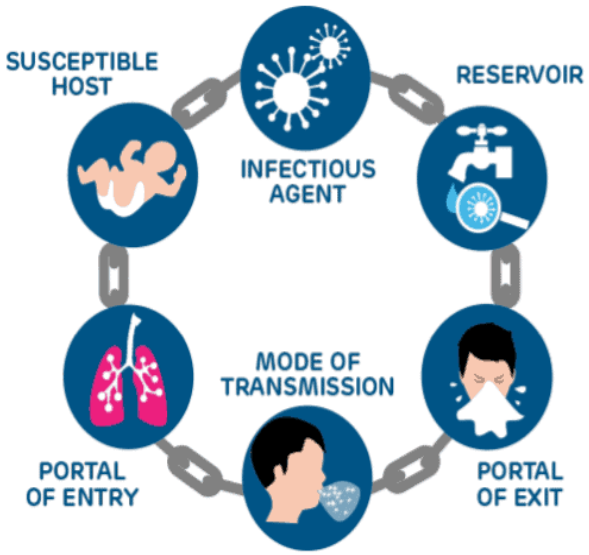
			Describe the characteristic properties of each dosage form.			
			Identify dosage forms administered through different routes.			
		To demonstrate IM, IV, SC, ID SL, IT and IC injection of drugs on a dummy (manikin)	Describe the general protocols for IM, IV, SC, ID SL, IT and IC injection of a drug.	Skill Lab	1.5 hrs.	OSPE
			Demonstrate standard protocols during administration of a drug through Intramuscular route.			
		Prescription writing	Define a medical prescription.			
			Describe the components of a prescription.			
			Describe how to reduce medication errors.			
			Define compliance to the prescribed treatment.			
			Write down the basic format of drug prescription.			
2	**Pathology**	Biosafety procedures/Precautions in Microbiology Lab,	Define sterilization and disinfection.	Skill Lab	1.5 hrs.	OSPE
			Demonstrate steps of hand washing.			

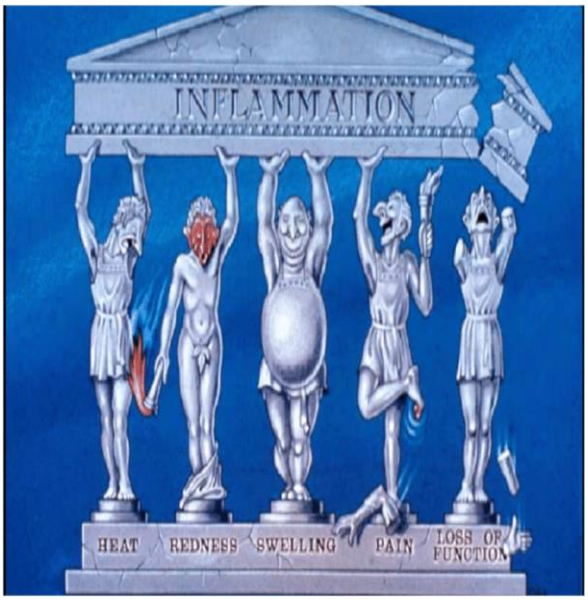
			Enlist various physical and chemical methods of sterilization and disinfection.			
			Define biosafety and biosecurity.			
		Pathologic calcification, intracellular pigmentation and apoptosis	Describe causes and various types of calcifications, intracellular pigmentation and steatosis.			
		Introduction to gross specimen and routine microscopy Necrosis & apoptosis	Identify the slide.	Skill Lab	1.5 hrs.	OSPE
			Recognize and describe the gross specimen in pathology			
			Demonstrate slide focusing			
			Enlist Differences between necrosis and apoptosis			
		Hyperplasia (BPH)	Define hypertrophy and hyperplasia.			
			Differentiate between hypertrophy and hyperplasia.			
			Describe gross and microscopic morphology of BPH.			
			Identify the slide of BPH.			
		Atrophy (Testicular atrophy)	Define atrophy			
			Describe gross and microscopic features of atrophy over a slide of testicular atrophy as an example			

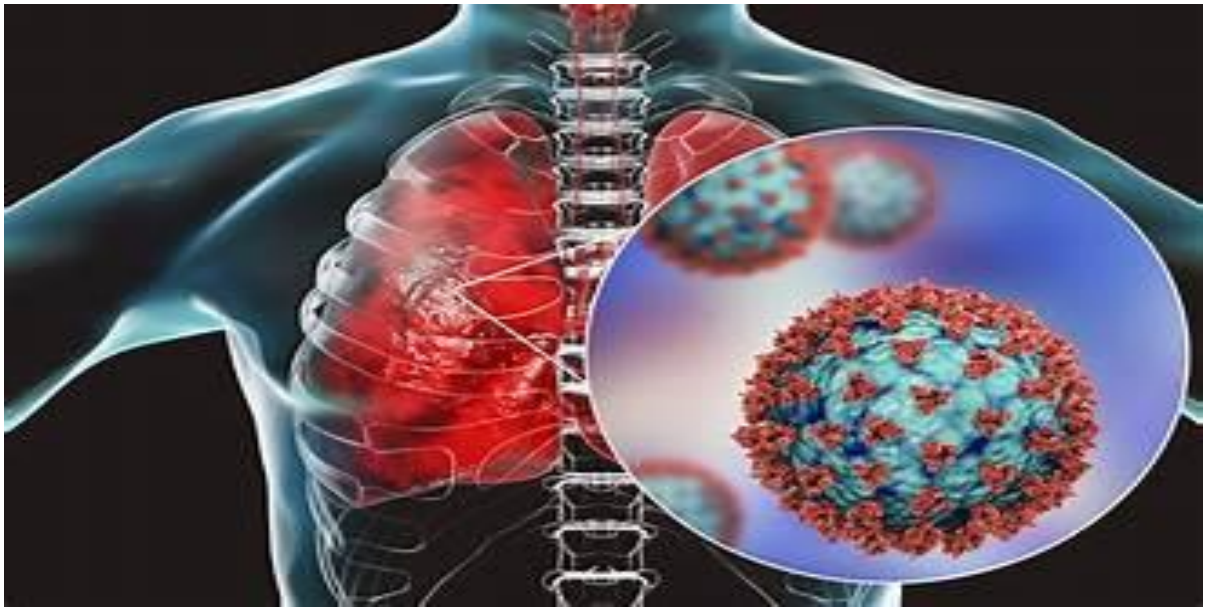
		Gram staining ZN staining	Describe principal and significance of Gram staining.	Skill Lab	1.5 hrs.	OSPE
			Enlist steps of Gram staining.			
			Demonstrate Gram staining procedure.			
			Identify Gram positive and Gram-negative bacteria morphologically under the microscope.			
			Describe principal and significance of ZN staining.			
			Enlist steps of ZN staining.			
			Demonstrate ZN staining procedure.			
			Identify AFB and inflammatory cells microscopically.			
		Bacterial motility	Enumerate motile bacteria			
			Identify motile bacteria under the microscope			
		Culture media	Define terms like culture, bacterial colony, media, aerobe, anaerobe, agar, selective and differential.	Skill Lab	1.5 hrs.	OSPE
			Describe classification of culture media.			

			Describe basic and enriched media, transport media, selective media and differential media.			
			Describe preparation/ inoculation of culture media.			
			Enlist ingredients, indications, important properties and organisms grown on various culture media.			
3	**Forensic Medicine**	Death certificate	Formulate death certificate based on WHO criteria	Skill Lab	1.5 hrs.	OSPE
		Legal procedure	Doctor in a witness box role play	Skill Lab	1.5 hrs.	OSPE
		Recording of evidence	Recording of dying declaration	Skill Lab	1.5 hrs.	OSPE
		Consent form and medical documentation	Take written informed consent for various procedures and Issue various medical documents (Medical report, medical certificates, prescription, notification)	Skill Lab	1.5 hrs.	OSPE

Infection and Inflammation Module







Module Committee

Chairperson Curriculum Committee	Prof. Dr. Humaira Gulnaz	Professor & Head of Anatomy Department
Curriculum Coordinator	Dr. Ayesha Ayub	In-charge Health Professions Education & Research Department
Block Coordinator	Dr. Saima Kanwal	Senior Demonstrator Pharmacology Department
Module Coordinator	Dr. Ghazia Muzammal	Senior Demonstrator Pathology Department
Academic Team Members		
Pharmacology	Dr. Saima Kanwal	Senior Demonstrator Pharmacology Department
Pathology	Dr. Ghazia Muzammal	Senior Demonstrator Pathology Department
Forensic Medicine	Dr. Zuneera Misbah	APWMO Forensic Medicine Department
Community Medicine	Dr. Anam Azam	Senior Demonstrator Community Medicine Department
Biochemistry	Dr. Saira Maqsood	Senior Demonstrator Biochemistry Department
Anatomy	Dr. Uzma Ali	Assistant Professor Anatomy Department
Physiology	Dr. Abdul Basit	Assistant Professor Physiology Department
Ophthalmology	Dr. M. Muneeb	Senior Registrar Ophthalmology Department
ENT	Dr. M. Zahid Rafique Gill	Associate Professor E.N.T Department
Medicine	Dr. Zaheer Ahmad	Senior Registrar Medicine Department

Surgery	Dr. Ghulam Mustafa	Assistant Professor Surgery Department
Pediatric Medicine	Dr. Sumaira Hassan	Senior Registrar Pediatric Medicine Department
Gynaecology & Obstetrics	Dr. Ammara Niaz	Assistant Professor Gynaecology & Obstetrics Department
PRIME	Dr. Sinha	PRIME Coordinator
3rd year MBBS		Students

Introduction of Module

The Infection and Inflammation Module at Faisalabad Medical University is a vital component of the medical curriculum, meticulously designed to equip students with a profound understanding of the pathophysiology, clinical manifestations, diagnostic approaches, and management of infectious and inflammatory diseases. This comprehensive module integrates both theoretical knowledge and practical skills, preparing students to tackle real-world clinical challenges. The curriculum begins with fundamental concepts of infections and inflammation, emphasizing their global health significance. Students explore the mechanisms of disease causation, the body's immune response, and the complex interactions between pathogens and host defenses. Key areas of focus include epidemiology, microbiology, antimicrobial therapy, and antibiotic resistance, along with detailed studies of bacterial, viral, fungal, and parasitic infections. The module also covers public health aspects such as prevention strategies, vaccination, and outbreak management. Additionally, it delves into the biochemical and cellular processes of inflammation, mediators of inflammation, and the pathological consequences of chronic inflammation. Through lectures, laboratory exercises, clinical rotations, and modern teaching tools, the module fosters critical thinking and problem-solving skills, ensuring students are well-prepared to excel in diagnosing and managing infectious and inflammatory diseases.

Rationale

The Infection and Inflammation Module addresses the critical global health impacts of infectious and inflammatory diseases. Infectious diseases, driven by various pathogens and the growing issue of antimicrobial resistance, require comprehensive education to equip healthcare professionals with effective prevention, diagnosis, and treatment strategies. Chronic inflammatory conditions like rheumatoid arthritis and inflammatory bowel disease demand an in-depth understanding of inflammatory processes for better patient outcomes. By integrating these topics, the module offers a holistic view of their interconnected nature, where infections can trigger inflammation and vice versa. Practical skills are emphasized through clinical rotations and laboratory exercises, ensuring the application of theoretical knowledge in real-world settings. The module also fosters lifelong learning and adaptability, promoting research and critical analysis to prepare students for evolving medical challenges. This integrated approach aims to produce competent professionals capable of contributing significantly to patient care and public health.

Teaching Hours Allocation

Sr. No	Subjects	Hours
1	Pharmacology	56
2	Pathology	58
3	Forensic medicine	12
4	Community medicine	18
5	Family medicine	2
6	Medicine	1
7	Surgery	3
8	Pediatrics	2
9	Gynecology	2
10	ENT	5
11	EYE	2
12	PRIME + Research	2 + 5
	Total Hours	**168**

List of Themes

Sr. No	Theme	Duration
1	Pain and fatigue	2 weeks
2	Trauma and repair	1 week
3	Fever and infection	4 weeks

General Learning Objectives

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

1. Describe the process of acute & chronic inflammation with their outcomes

2. Relate different aspects of healing and repair

3. Differentiate common pathogenic bacteria based on morphology, pathogenesis &lab diagnosis.

4. Relate bacterial pathogenic factors to clinical manifestations of common infectious diseases.

5. Describe the pharmacological details of anti-inflammatory drugs

6. Apply/relate the pharmacokinetics & pharmacodynamics of chemotherapeutic agents to their use in infectious diseases

7. Construct / Write prescriptions for various inflammatory and infectious diseases

8. Describe medico legal aspects of HIV patient.

9. Describe mechanism of wound causation.

10. Describe medico legal aspects of parameters used for personal identification in real life situation

11. Apply parameters of a person's identification in a simulated environment

12. Describe the epidemiology of common infectious diseases.

13. Explain the preventive and control measures for infectious diseases.

14. Explain the control & preventive measures for nosocomial infections.

15. Describe the risks associated with hospital waste and its management.

Specific Learning Objectives

Theme-1 (pain and fatigue)						
Sr. #	**Subject**	**Topic**	**Learning objectives**	**Teaching strategy**	**Duration**	**Assessment**
1	**Pharmacology**	Overview to anti-inflammatory drugs	Classify anti-inflammatory drugs. Describe the role of DMARDs and glucocorticoids as anti-inflammatory agents	Interactive lecture	3 hrs.	MCQs
		NSAIDs (Non-selective cox inhibitors: Aspirin & other commonly used NSAIDs)	Classify NSAIDS Differentiate between non-selective COX inhibitors and selective COX-2 inhibitors based on mechanism of action. Name the prototype non-selective COX inhibitor. Describe the pharmacokinetics of Aspirin Describe the mechanism of action of aspirin as anti-platelet, analgesic, antipyretic and anti inflammatory agent. Give the dose of Aspirin as anti-platelet, analgesic/antipyretic and as			

			anti-inflammatory drug. -Describe clinical uses of NSAIDs. Describe the adverse effects of NSAIDs. Describe the drug treatment of Aspirin poisoning. Describe the pharmacokinetics with emphasis on dosage, duration of action and elimination of Diclofenac, Ibuprofen, Indomethacin, Mefenamic acid and Piroxicam in contrast to Aspirin Relate pharmacokinetics and pharmacodynamics of NSAIDs to their clinical applications			
		Selective COX-2 inhibitors	Describe the mechanism of action of selective COX-2 inhibitors Describe the clinical uses of selective COX-2 Inhibitors Describe the adverse effects	Interactive Lecture	1 hr.	MCQs

			of selective COX-2 Inhibitors Describe the merits and demerits of selective COX-2 inhibitors and non-selective COX inhibitors.			
		Paracetamol (Acetaminophen)	Describe the pharmacokinetics of Paracetamol Describe the mechanism of action of Paracetamol. Describe the clinical uses of Paracetamol. Describe the adverse effects of Paracetamol. Give therapeutic and fatal doses of Paracetamol. Describe the drug treatment of Paracetamol poisoning	SGD	2hrs.	MCQs
2	**Pathology**	Cells of Inflammation	Describe different cells of inflammation Describe the functions of various cells of inflammation Enumerate different causes of leukopenia and leukocytosis (each neutrophil,	Interactive lecture	1 hr.	MCQs

			lymphocyte, monocyte, eosinophil, basophil separately)			
		Overview to Acute Inflammation and vascular Phase	Define acute inflammation Describe causes of acute inflammation Describe the vascular events of acute inflammation	Interactive lecture	1 hr.	MCQs
		Recognition of microbes	Describe various molecular patterns and appropriate receptors used by the inflammatory cells to identify microbes Relate the recognition of microbes to the initiation of inflammation	Interactive lecture	1 hr.	MCQs
		Cellular phase of acute inflammation	Describe the sequence of events and cellular changes involved in cellular phase of acute inflammation, pyogenic abscess	Interactive lecture	1 hr.	MCQs
		Plasma Derived Mediator	Enumerate plasma derived mediators Enlist the functions of each mediator Describe the different cascades	Interactive lecture	1 hr.	MCQs

			involved in the generation of mediators			
		Cell Derived Mediators	Enumerate cell derived mediators Enlist the functions of each mediator			
		Gram -ve Cocci		SGD	2hrs.	MCQs
Theme (pain and fatigue)						
Sr. #	**Subjects**	**Topics**	**Learning objectives**	**Teaching strategy**	**Duration**	**Assessment**
1	**Pharmacology**	Anti-histamines	Classify anti-histamines Differentiate between first- and second-generation anti-histamines Describe the pharmacologic effects of H1-receptor antagonists. Describe the clinical uses of H1-receptor antagonists. Enlist the adverse effects of H1-receptorantagonists. Describe the drug interactions of H1-receptor antagonists.	Interactive lecture	1 hr.	MCQs
		Serotonin agonist and Antagonist	Enlist serotonin agonists Classify serotonin antagonists Describe the mechanism of action of serotonin	Interactive lecture	1 hr.	MCQs

			Describe the organ system effects of serotonin. Describe the clinical uses of serotonin agonists and antagonists Describe the pharmacologic al basis of ondansetron in chemotherapy induced vomiting			
2	**Pathology**	Morphologica l patterns, Outcomes, defects of inflammation	-Enumerate the different morphological patterns of inflammation -Describe the histological changes in each pattern - Enlist the outcomes of inflammation -Enumerate the various defects of inflammation -Describe the consequences of the defects of inflammation	Interactive lecture	1 hr.	MCQs
		Overview to chronic Inflammation	-Define chronic inflammation -Differentiate chronic from acute inflammation -Describe the causes and morphological features of chronic Inflammation	Interactive lecture	1 hr.	MCQs

		Granulomatous inflammation	Define granulomatous inflammation Describe the morphological features and mediators involved in granulomatous inflammation	Interactive lecture	1 hr.	MCQs
		Cells and mediators of chronic inflammation	Enlist the cells of chronic inflammation Enumerate the mediators of chronic inflammation Describe the function of the mediators Relate the functions of mediators to the morphological changes seen in chronic inflammation	Interactive lecture	1 hr.	MCQs
		Systemic effects of inflammation	Enumerate the systemic effects of inflammation Describe the pathophysiology of the systemic effects of inflammation	Interactive lecture	1 hr.	MCQs
		Gram -ve Rods (Enteric & E-Coli)		SGD	2 hrs.	MCQ
3	**Forensic Medicine**	Antidotes	Define and classify antidotes Describe the mechanism of action of different antidotes	Interactive lecture	1 hr.	MCQs

4	**Community medicine**	Infectious disease epidemiology	Define incubation period Explain the principles of disease eradication and control Define serial intervals Define infectivity period	Interactive lecture	1 hr.	MCQs
		Infection control	Define the basic definition related to infectious disease epidemiology Review the role of susceptible host for successful parasitism, modes of transmission and the host defense system List and explain the various classifications of communicable diseases with special reference to the scope and purpose of the International classification of Disease (ICD -10). Enlist the common infectious diseases affecting the population of	Interactive lecture	1 hr.	MCQs

			Pakistan as per National institute of Health Pakistan. Explain the effect of climate change and seasonal variation on specific diseases globally and in Pakistan. Explain the role of personal hygiene &PPE in infection control			
		Disease careers Reservoirs of infection Disinfection Communicable disease control measure (Aimed at agent, host, others, administrative measures and vector control measures	Define disease careers Explain the reservoirs of infection Differentiate between sterilization and disinfection Explain the types and procedures of disinfection Discuss Communicable disease control measure (aimed at agent, host, others, administrative measures and vector control measures	Interactive lecture	1 hr.	MCQs
Theme-2 (trauma and repair)						
Sr. #	**Subjects**	**Topics**	**Learning objectives**	**Teaching strategy**	**Duration**	**Assessment**
1	**Pathology**	Prostaglandins	Enlist various prostaglandins-	Interactive lecture	1 hr.	MCQs

			Describe the mechanism of action of Prostaglandins. Describe the organ system effects of Prostaglandins. Describe the clinical uses of Prostaglandins			
		Overview to tissue healing and repair	Differentiate between regeneration and repair Describe various steps involved in the process of tissue healing and Repair	Interactive lecture	1 hr.	MCQs
		Tissue regeneration	Define regeneration Enlist organs capable of regeneration Describe the process and mediators involved in Regeneration	Interactive lecture	1 hr.	MCQs
		Cell cycle	Define cell cycle Describe the initiation, various phases of the cell cycle and its regulation Discuss different types of stem cells Describe regenerative medicine	Interactive lecture	1 hr.	MCQs
		Repair by scarring	Describe the various steps involved in process of	Interactive lecture	1 hr.	MCQs

			repair by scarring Describe the various mediators involved in the steps of scarring			
		Growth factors and receptors	Enumerate various growth factors and their receptors Describe the most common pathways by which growth factors affect tissue repair and regeneration	Interactive lecture	1 hr.	MCQs
		ECM	Classify various components of ECM Describe the role and importance of ECM in tissue repair			
		Factors affecting wound healing/abnormal scarring	Enlist the various factors that influence wound healing Describe the mechanism by which these factors affect wound healing Describe the abnormalities of repair and their Consequences	Interactive lecture	1 hr.	MCQs
		Gram -ve Rods (Salmonella)		SGD	2 hrs.	MCQ
2	**Forensic Medicine**	Toxicity by analgesics	Describe the toxicity by aspirin and paracetamol	Interactive lecture	1 hr.	MCQs

3	**Community Medicine**	Nosocomial infection & its control	Describe the prevalence of the nosocomial infections globally and specifically in Pakistan. Identify the cause of nosocomial infections in Pakistan. Enlist common nosocomial infections. Describe the importance of different modes of transmission for causation of the nosocomial infections. Explain the control & preventive measures for nosocomial Infections	Interactive lecture	1 hr.	MCQs

Theme-3 (fever and infection)						
Sr. #	**Subject**	**Topics**	**Learning objectives**	**Teaching strategy**	**Duration**	**Assessment**
1	**Pharmacology**	Introduction to Chemotherapy	Define basic terms like chemotherapy, antibiotic, antimicrobial, MIC, MBC, chemoprophylaxis, empirical therapy and post-antibiotic effect, bacteriostatic and bactericidal antimicrobials. Explain advantages of drug combinations. Describe various mechanisms of bacterial resistance against antibiotics. Differentiate between concentration and time dependent killing with examples. Classify antimicrobials on the basis of mechanism of action (MOA)	Interactive lecture	2 hr.	MCQs
		Penicillins	Classify beta-lactam antibiotics Enlist narrow and broad-spectrum Penicillins.	Interactive lecture	2hrs.	MCQs

			Enlist anti-pseudomonal, anti-staphylococcal/ beta lactamase Resistant Penicillins. Enlist long- and short-acting Penicillins Describe anti-bacterial spectrum of Penicillins. Describe pharmacokinetics in respect of emphasis on route of administration and excretion of Penicillins. Describe mechanism of action ofPenicillins. Describe clinical uses of Penecillins. Describe adverse effects of Penicillins.			
			Describe contraindications of Penicillins. Describe principal mechanism of bacterialresistance to Penicillins Describe drug interactions of Penicillins Apply formula for interconversion of milligrams and units of Penicillin G.	SGD	2 hrs.	MCQ

			Relate pharmacokinetics and pharmacodynamics of Penicillin with their clinical applications / uses			
		Cephalosporins	Classify Cephalosporins Describe anti-bacterial spectrum of Cephalosporins. Describe pharmacokinetics of Cephalosporins with special emphasis On route of administration and excretion. Describe clinical uses of Cephalosporins Describe the adverse effects of Cephalosporins. Describe drug interactions of Cephalosporins with Ethanol.	Interactive lecture	1 hr.	MCQs
			Describe the principal bacterial mechanism of resistance to Cephalosporins. Relate pharmacokinetics and pharmacodynamics of Cephalosporin	SGD	2 hrs.	MCQs

			With their clinical applications / uses.			
		Beta lactamase inhibitors	1. Enlist beta-lactamase inhibitors 2. Explain the rationale for using beta lactamase inhibitors in combination withβ-lactam antibiotics	SGD	2 hrs.	MCQs
		Monobactam and Carbapenem,	1. Describe the antibacterial spectrum of Monobactams and Carbapenem 2. Describe the clinical uses of Monobactams and Carbapenem	Interactive lecture	1 hr.	MCQs
		Vancomycin	Describe the MOA of Vancomycin. Describe clinical uses of Vancomycin Describe the use of vancomycin in MRSA (Methicillin-resistant Staph aureus). Describe adverse effects of Vancomycin Describe “Red man/Red neck” syndrome.	Interactive lecture	1hr.	MCQs
		Fosfomycin Bacitracin & Cycloserine	Enlist clinical uses of Fosfomycin, Bacitracin & Cycloserine	Interactive lecture	1 hr.	MCQs

		Tetracyclines	Classify Tetracyclines. Describe anti-bacterial spectrum of Tetracyclines. Describe the pharmacokinetics of Tetracycline with special emphasis on absorption of Tetracyclines. Describe mechanism of action of Tetracyclines. Describe the principal mechanism of resistance to Tetracyclines Describe clinical uses of Tetracyclines. Describe adverse effects of Tetracyclines Describe the teratogenic effects of Tetracyclines. Describe drug interactions of Tetracyclines. Describe the adverse effect related to the use of outdated (expired) Tetracycline products. Relate pharmacokinetics and Pharmacodynamics of Tetracycline with their	Interactive lecture	1hr.	MCQs

			clinical applications /uses Describe Black Bone disease			
2	**Pathology**	Bacteria: Pyrogenic Bacteria	Define boil and furuncle Enlist organisms responsible for pyrogenic infections Describe important properties, pathophysiology, lab diagnosis of GPC &GNC	Interactive lecture	1 hr.	MCQs
		Bacteria: Rickettsia	Define Rickettsia Describe the important properties, pathophysiology, lab diagnosis of diseases caused by Rickettsia	Interactive lecture	1hr.	MCQs
		Spore forming GP rods	Enumerate spore forming GP rods Describe the important properties, pathophysiology, clinical features and lab diagnosis of spore forming GP rods	Interactive lecture	1 hr	MCQs
		Non-Spore forming GP rods	Enumerate non spore forming GP rods Describe the important properties, pathophysiology, clinical features and lab	Interactive lecture	1 hr.	MCQs

			diagnosis of non-spore forming GP rods			
		Chlamydia	Describe the important properties, pathophysiology, clinical features and lab diagnosis of chlamydia	Interactive lecture	1 hr.	MCQs
		Miscellaneous: Sepsis and Septic Shock	Define sepsis and septic shock Enlist organisms capable of causing sepsis and inducing septic shock Describe the pathophysiology and clinical features of septic shock	Interactive lecture	1 hr.	MCQs
		Zoonotic Infections	Enlist organisms causing zoonotic infections Describe the important properties, pathophysiology, clinical features and lab diagnosis of different zoonotic diseases	Interactive lecture	1 hr.	MCQs
		Gram -ve Bacilli (Vibrio/ Shigella)		SGD	2hrs.	MCQs
3	**Forensic medicine**	General outlines of identification	Describe methods and parameters of Identification	Interactive lecture	1 hr.	MCQs
		Fetal age determination	Describe important			

			physical developmental stages of fetus for age estimation			
		Age determination by skeletal study	Describe important skeletal points of age Estimation	Interactive lecture	1 hr.	MCQs
		Ages of medico legal significance	Enlist important ages of legal significance	Interactive lecture	1 hr.	MCQs

Theme (fever and infection)						
Sr. #	**Subjects**	**Topics**	**Learning objectives**	**Teaching strategy**	**Duration**	**Assessment**
1	**Pharmacology**	Aminoglycosides	Enlist Aminoglycosides. Describe anti-bacterial spectrum of Aminoglycosides. Describe the pharmacokinetics of Aminoglycosides with special emphasis on route of administration, concentration-dependent killing and post-antibiotic effect. Describe mechanism of action of Aminoglycosides. Describe the principal mechanism of resistance to Aminoglycosides. Describe clinical uses of Aminoglycosides. Describe adverse effects of Aminoglycosides.	Interactive lecture	1 hr.	MCQs
			Describe the drug interactions of Aminoglycosides. Relate pharmacokinetics and pharmacodynamics of Aminoglycosides with their clinical applications / uses	SGD	2 hrs.	MCQs
		Macrolides & other related drug	Enlist Macrolides. Describe anti-microbial	Interactive lecture	1 hr.	MCQs

			spectrum of Macrolides Describe pharmacokinetics of Macrolides Describe the mechanism of action of Macrolides Describe the principal mechanism of resistance to Macrolides Describe clinical uses of Macrolides			
			Describe adverse effects of Macrolides. Describe drug interactions of Macrolides Differentiate the salient features of Erythromycin, Clarithromycin and Azithromycin in respect of dosing and clinical use. Relate pharmacokinetics and pharmacodynamics of Macrolides with their clinical applications / uses	SGD	2 hrs.	MCQs
		Linezolid	Describe mechanism of action of Linezolid Describe clinical uses of Linezolid with special emphasis on methicillin resistant staphylococci and vancomycin	Interactive lecture	1 hr.	MCQs

			resistant enterococci			
		Clindamycin	Describe mechanism of action of Clindamycin. Enumerate clinical uses of Clindamycin. Describe antibiotic-associated(pseudo membranous) colitis.	Interactive lecture	1 hr.	MCQs
		Streptogramins	• Enumerate Streptogramins. • Describe clinical use of Quinupristin- • Dalfopristin in VRE (Vancomycin-resistant enterococci).	Interactive lecture	1 hr.	MCQs
		Chloramphenicol	Describe anti-microbial spectrum of Chloramphenicol Describe mechanism of action of Chloramphenicol Enlist clinical uses of Chloramphenicol Describe the reason for obsoleting the systemic use of Chloramphenicol Enlist adverse effects of Chloramphenicol	Interactive lecture	1 hr.	MCQs
		Quinolones	Describe Gray baby syndrome. Classify Quinolones. Describe the pharmacokinetics of Fluroquinolones	Interactive lecture	1 hr.	MCQs

			with special emphasis on half life of Moxifloxacin Enlist respiratory Quinolones. Describe anti-microbial spectrum of Fluoroquinolones. Describe mechanism of action of Fluoroquinolones. Describe the principal mechanism of resistance to Fluroquinolones, Describe clinical uses of Fluroquinolones			
			Describe adverse effects of Fluroquinolones Describe drug interactions of Fluroquinolones Relate pharmacokinetics and pharmacodynamics of Fluoroquinolones with their clinical applications / use	SGD	2 hrs.	MCQs
		Sulfonamides and Trimethoprim	Classify Sulfonamides Describe anti-microbial spectrum of Sulfonamides Describe mechanism of action of Sulfonamides and Trimethoprim Describe mechanism of	Interactive lecture	2 hrs.	MCQs

			resistance to Sulfonamides Describe clinical uses of Sulfonamides and Trimethoprim Describe adverse effects of Sulfonamides and Trimethoprim Describe the advantages of combining sulfamethoxazole with trimethoprim (Co Trimoxazole) Describe the drug interaction of Sulphonamides with Phenytoin.			
2	**Pathology**	Parasites: Hydatid Cyst	Describe the life cycle and important properties of Echinococcus Relate the pathogenesis to the clinical features and lab work up of Echinococcus Identify cysts of Echinococcus in the lab	Interactive lecture	1 hr.	MCQs
		Leishmania	Describe the life cycle, and important properties of Leishmania Relate the pathogenesis to the clinical features and lab work up of Leishmania	Interactive lecture	1 hr.	MCQs
		Toxoplasma	Describe the life cycle and important properties of Toxoplasma Relate the pathogenesis to the	Interactive lecture	1 hr.	MCQs

			clinical features and lab work up.			

		Malaria	• Describe the life cycle and important properties of Malarial parasite • Relate the pathogenesis to the clinical features and lab work up of Malaria	Interactive lecture	1 hr.	MCQs
		Tenia	• Describe the life cycle, important properties of Tenia saginata and solium • Relate pathogenesis to the clinical features and lab work up of Tenia saginata and solium	Interactive lecture	1 hr.	MCQs
		Respiratory Gram -ve Rods		SGD	2 hrs.	MCQs
3	**Forensic Medicine**	Dactylography Sex and stature determination	Describe medicolegal aspects of Dactylography Describe parameters of stature and sex determination	Interactive lecture	1 hr.	MCQs
		Race determination	Describe parameters ofrace determination	Interactive lecture	1 hr.	MCQs
		Forensic odontology	Discuss the application of odontology in forensic medicine.	Interactive lecture	1 hr.	MCQs
4	**Community Medicine**	Epidemiology and control of vector borne diseases • Malaria • Dengue and other Viral hemorrhagic fevers and Arboviral infections • Plague • Filariasis	Describe the epidemiological determinants, frequency and distribution of Malaria Compare the prevalence/incidence of malaria in different provinces of Pakistan. Explain the preventive and control measures of Malaria Describe the scope/function of	Interactive lecture	2 hrs.	MCQs

			Malaria control program. Explain the types, risk factors, complications and control measures of viral hemorrhagic fevers including Dengue fever			
		Epidemiology & control of Leishmaniasis	Describe the epidemiological determinants, frequency and distribution of Leishmaniasis Explain the preventive and control measures of Leishmaniasis	Interactive lecture	1 hr.	MCQs
		Zoonotic and direct contagious diseases • Rabies • Anthrax • Plague • Brucellosis • Tetanus • Scabies	Explain the pre and post exposure prophylaxis of Rabies Explain the epidemiology, types of Anthrax and its preventive measures Discuss the history, types and prevention of Plague Explain the etiology, risk factors, clinical features and prevention of Brucellosis Explain the preventive measures of Scabies Discuss the etiology, risk factors, clinical features and prophylaxis of pre and post exposure of Tetanus	Interactive lecture	3 hrs.	MCQs
		• Leprosy • Trachoma	Explain the etiology, risk factors, stages and preventive measures of Leprosy			

			Explain the etiology, risk factors, complications and preventive measures of Trachoma			
5	**Family medicine**	Malaria & Hepatitis control program teams	Explain the etiology, clinical features, types, investigations and management of Malaria in family practice Describe the red-flags in a patient with Malaria for referral to speciality care Identify at risk patients of hepatitis and Malaria and offer them Screening. Advice prophylaxis for travelers to regions. Manage a patient with complications of malaria.	Interactive lecture	1 hr.	MCQs

Theme (fever and infection)						
Sr. #	**Subjects**	**Topics**	**Learning objectives**	**Teaching strategy**	**Duration**	**Assessment**
1	**Pharmacology**	Antimalarials	Describe terms like chemoprophylaxis, causal prophylaxis, terminal Prophylaxis and radical cure with examples of drugs. Classify antimalarial drugs.	Interactive lecture	2 hrs.	MCQs
			Enlist drugs used for chemoprophylaxis of malaria. Enlist drugs used for radical cure of malaria. Describe the pharmacokinetics of Chloroquine with special emphasis On volume of distribution and dosing Describe mechanism of action of Chloroquine, Quinine, Mefloquine, Halofantrine, Primaquine, Pyrimethamine and			

			Artemisinins. Describe adverse effects of antimalarial drugs.			
			Describe Cinchonism and Black water fever. Enlist the antimalarial drugs relatively safe in pregnancy. Describe the antimalarial drugs contraindicated in G6PD deficiency. Relate pharmacokinetics and pharmacodynamics of antimalarial drugs with their clinical applications / use.	SGD	2 hrs.	MCQs

		Antifungal drugs	Classify Antifungal drugs. Describe the pharmacokinetics of Amphotericin B and Ketoconazole Describe the advantages of liposomal preparation of Amphotericin B Describe mechanism of action of Azoles, Amphotericin B, Griseofulvin, Terbinafine, and Nystatin. Describe clinical uses of Azoles, Amphotericin B, Griseofulvin, Terbinafine, and Nystatin.	Interactive lecture	1 hr.	MCQs
			Describe adverse effects of Azoles, Amphotericin B, Griseofulvin, Terbinafine, and Nystatin.	SGD	2 hrs.	MCQs

			Describe drug interactions of Ketoconazole and Amphotericin B			
		Antivirals	Classify antiviral drugs. Drugs for Influenza and CMV Drugs for HBV, HCV	Interactive lecture	2 hrs.	MCQs
		Anti-herpes	Enlist anti-Herpes drugs Describe the pharmacokinetics of Acyclovir Describe mechanism of action of Acyclovir Describe clinical uses of Acyclovir. Describe adverse effects of Acyclovir. Describe the role of Ganciclovir in CMV retinitis.	Interactive lecture	1 hr.	MCQs
		Anti-HIV drugs	Classify anti-HIV drugs. Describe the role of entry inhibitors, integrase inhibitors,	Interactive lecture	3 hrs.	MCQs

			protease inhibitors,NRTIs and NNRTIs in HIV treatment			
			Describe adverse effects of Zidovudine and Indinavir Describe the rationale of HAART therapy.	SGD	2 hrs.	MCQs
2	**Pathology**	Viruses: Corona	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Corona Virus	Interactive lecture	1 hr.	MCQs
		Viruses: HIV	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of HIV	Interactive lecture	1 hr.	MCQs
		Viruses: Herpes viruses	Describe the structure, important properties, pathogenesis and clinical features along with lab work up	Interactive lecture	1 hr.	MCQs

			of Herpes viruses			
		Viruses: Tumor Viruses	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Tumor viruses	Interactive lecture	1 hr.	MCQs
		Viruses: MMR	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of MMR viruses	Interactive lecture	1 hr.	MCQs
		Fungi: Aspergillus	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Aspergillus	Interactive lecture	1 hr.	MCQs
		Fungi: Candida	Describe the structure, important properties, pathogenesis and clinical features along with lab work up of Candida			

		Gram -ve Bacteria (Campylobacter/Helicobacter)		SGD	2hrs.	MCQs
3	**Forensic Medicine**	DNA finger Printing	Define DNA finger printing, its methods and applications in forensic medicine	Interactive lecture	1 hr.	MCQs
		Tattoos, Scar marks, Bite marks Superimposition on and facial reconstruction	Describe medico legalaspects of tattoos, scars and bite marks Describe medico legal aspects of superimposition and facial reconstruction			
		Polygraph	Describe medico legal aspects of polygraph			
		Narcoanalysis	Describe medico legal aspects of Narcoanalysis			
4	**Family Medicine**	TORCH infections	Define TORCH infection Describe the steps of investigations for TORCH infections Describe the preventive strategies	Interactive lecture	1 hr.	MCQs

			for TORCH infections and their Complications. Describe screening for patients at risk of Torch infections.			
5	**Community Medicine**	Epidemiology & control of airborne diseases	Describe the epidemiological determinants, frequency and distribution of measles, mumps, chickenpox, rubella, Diphtheria, Pertissus and meningitis	Interactive lecture	1 hr.	MCQs
			Explain the preventive and control measures of measles, mumps & rubella with reference to Pakistani context			
		Epidemiology & control of Corona virus infection	Describe the epidemiological determinants, frequency and Distribution of corona Compare the prevalence/incidence of corona in different	Interactive lecture	1 hr.	MCQs

			parts of the world. Describe the preventive and control measures of corona Describe the role of Pakistani government in corona control program			
		Epidemiology and prevention of water borne diseases: • Cholera • Typhoid • Acute Diarrhea and Dysentery • Polio • Hepatitis A and E • Food poisoning • Amebiasis and Giardiasis • Brucellosis • Leptospirosis • Worm infestations	Enumerate common water borne diseases Explain the epidemiology and prevention measures of these diseases Describe the current situation of these diseases on Pakistan and Worldwide	Interactive lecture	3 hrs.	MCQs

Practical Work

Week 1 Practical						
Sr.#	**Subjects**	**Topics**	**Learning Objectives**	**Teaching Strategy**	**Duration (Hours)**	**Assessment**
1	**Pharmacology**	Prescription writing for Acute Tonsillitis	Construct a prescription for a patient with acute tonsillitis	Skill lab	1.5 hrs.	OSPE
2	**Pathology**	Cells of inflammation	Identify Cells of inflammation in the microscope, reaction of blood vessels in acute inflammation	Skill lab	1.5 hrs.	OSPE
3	**Forensic Medicine**	Gastric Lavage	Demonstrate steps of gastric lavage	Skill lab	1.5 hrs.	OSPE
Week 2 Practical						
1	**Pharmacology**	Prescription writing for Malaria	Construct a prescription for a patient With Malaria	Skill lab	1.5 hrs.	OSPE
2	**Pathology**	Acute appendicitis and chronic cholecystitis	Identify the histopathological changes in acute appendicitis and chronic cholecystitis	Skill lab	1.5 hrs.	OSPE
3	**Forensic Medicine**	Sex, age and Race determinationthrough bones	Identify human sex, age and Race through bones	Skill lab	1.5 hrs.	OSPE
Week 3 Practical						
1	**Pathology**	Granulation tissue	Identify the histological features of granulation tissue, regenerative changes and fibrosis	Skill lab	1.5 hrs.	OSPE
2	**Forensic Medicine**	Hair, Fiber, Tattoos, scars, Bite marks.	Identify human and animal hair, fiber, scars, tattoos,	Skill lab	1.5 hrs.	OSPE

			bite marks.			
Week 4 Practical						
1	**Pathology**	Granuloma	Identify the granulomas with different cells involved in granulomatous inflammation along with associated changes. Identify slides of foreign body granuloma, and tuberculous granulomas	Skill lab	1.5 hrs.	OSPE
Week 5 Practical						
1	**Pathology**	Culture Media	Identify blood agar, Mannitol salt agar, Chocolate media, Cary Blair transport media in the lab-Identify different types of hemolysis on blood agar	Skill lab	1.5 hrs.	OSPE
Week 6 Practical						
1	**Pathology**	Catalase test Coagulase test Oxidase test Urease Test	Perform and interpret the result of catalase test by tube and slide method Perform and interpret the result of coagulase test by tube method Perform and interpret the	Skill lab	1.5 hrs.	OSPE

			result of coagulase test			
2	**Community Medicine**	Communicable diseases models	Identify the models related to the communicable diseases Explain the complication, preventive measures and the identification signs of concerned disease	Skill lab	3 hrs.	OSPE
Week 7 Practical						
1	**Pathology**	Hydatid Cyst Leishmania Malaria Taenia	Identify cysts and ova of Echinococcus, Leishmania and Taenia in stool examination. Identify Malarial parasite trophozoites and gametocytes in peripheral blood smear. Identify the physical and chemical parameters of urine examination.	Skill lab	1.5 hrs.	OSPE

Clinical Subjects							
Sr. No	**Medicine**	**Surgery**	**Paeds**	**Gynae**	**ENT**	**EYE**	**PRIME**
1	PUO **1 hr.**	Surgical infections **1 hr.**	PUO (Better to teach either by Medicine or Paeds if majority content is same/ joint session can be taken) **1 hr.**	Puerperal pyrexia **1 hr.**	Acute & chronic Phyrangitis **1 hr.**	Acute and chronic dacryocystitis **1 hr.**	Reaction to illness **1 hr.**
2		Anesthesia and pain relief **1 hr.**	Child with Rash **1 hr.**	Postoperative wound sepsis **1 hr.**	Acute & chronic Rhinitis **1 hr.**	Episcleritis and infective conjunctivitis **1 hr.**	Attributes of professionalism empathy **1 hr.**
3		Acute abdomen **1 hr.**			Acute & chronic Sinusitis **2 hrs.**		Steps of research process **1 hr.**
4							Identifying study question **2 hrs.**
5					Acute and chronic tonsillitis **1 hr.**		Literature review **2 hrs.**

Learning Resources

Sr. No	Subjects	Textbooks
1.	**Community Medicine**	1. Community Medicine by Parikh 2. Community Medicine by M Illyas 3. Basic Statistics for the Health Sciences by Jan W Kuzma
2.	**Forensic Medicine**	1. Nasib R. Awan. Principles and practice of Forensic Medicine 1st ed. 2002. 2. Parikh, C.K. Parikh's Textbook of Medical Jurisprudence, Forensic Medicine and Toxicology.7th ed.2005. 3. Knight B. Simpson's Forensic Medicine. 11th ed.1993. 4. Knight and Pekka. Principles of forensic medicine. 3rd ed. 2004 5. Krishan VIJ. Text book of forensic medicine and toxicology (principles and practice). 4th ed.2007 6. Dikshit P.C. Text book of forensic medicine and toxicology. 1st ed. 2010 7. Polson. Polson's Essential of Forensic Medicine. 4th edition. 2010. 8. Rao. Atlas of Forensic Medicine (latest edition). 9. Rao.Practical Forensic Medicine 3rd ed ,2007. 10. Knight: Jimpson's Forensic Medicine 10th 1991,11th ed.1993 11. Taylor's Principles and Practice of Medical Jurisprudence. 15th ed.1999
3.	**Pathology**	1. Robbins & Cotran, Pathologic Basis of Disease, 9th edition. 2. Rapid Review Pathology, 4th edition by Edward F. Goljan MD
4.	**Pharmacology**	1. Lippincott Illustrated Pharmacology 2. Basic and Clinical Pharmacology by Katzung
5.	**ENT**	Diseases of Ear, Nose and Throat, 7th Edition by P. L. Dhingra

Assessment Plan – 3rd Year MBBS

The 3rd Year will be assessed in 3 blocks.

1. **Block-G** (Foundation-II and Infection and Inflammation modules) will be assessed in paper-G
2. **Block-H** (Multisystem-I, Blood-II and MSK-II modules) will be assessed in paper-H
3. **Block-I** (CVS-II and Respiratory-II module) will be assessed in paper-I
4. Each **written paper** consists of 120 MCQs and
5. **Internal assessment** will be added to final marks in FMU as shown in below table.
6. In **OSPE**, each station will be allotted 6 marks, and a total of 120 (+10% marks of internalassessment) marks are allocated for each OSPE/OSCE examination.

Paper-G (Foundation 2 and Infection and Inflammation)

Table – 1: MCQs

Subject	Foundation-II Module	Infection and Inflammation Module	Total MCQs
Pharmacology	19	20	39
Pathology	12	23	35
Forensic Medicine	6	08	14
Community Medicine	5	10	15
ENT	1	03	04
Eye	3	02	05
PRIME including Research	1+2 (3)	0	03
Medicine	0	01	01
Surgery	0	02	02
Gynaecology	0	01	01
Pediatrics	0	01	01
Total	**49**	**71**	**120**

Table – 2: OSPE

Subject	OSPE/OSCE	Viva stations	Total *
Pharmacology	2	2	4
Pathology	5	2	7
Forensic Medicine	2	2	4
Community Medicine	1	2	3
Medicine (history and physical examination)	1	0	1
PRIME (Behavioral Sciences)	1	0	1
Total	**12**	**8**	**20**

* A minimum of 20 stations will be used in final exams. Total marks will be 120 (6 marks for each station).

Internal Assessment Pattern for Integrated Modular Curriculum

Theory		
Sr. No	**Criteria**	**Numbers**
1	Attendance (>90%=3,80-89%=2,70-79%=1, <70%=0)	3
2	Creative work/assignments/Task	2
3	Continuous Assessment throughout block (Formative assessments, Viva Voce, departmental activities)	2
4	Block examination theory	4
5	Pre prof Examination of Block	3
Total		**14**

OSPE		
Sr. No	**Criteria**	**Numbers**
1	Attendance (>90%=3,80-89%=2,70-79%=1, <70%=0)	3
2	Log Book/practical copy	4
3	Discipline, Responsibility and Team work	3
4	Block examination OSPE	4
Total		**14**

3rd Professional Exam in System-based Curriculum

Theory paper	Modules	Theory Marks	Internal assessment theory (10%)	OSPE/ OSCE	Internal assessment OSPE/OSCE (10%)	Total Marks
Paper G	Foundation-II Infection & Inflammation-I	120	14	120	14	268
Paper H	Multisystem-I Blood-II MSK-II	120	13	120	14	267
Paper I	CVS-II Respiratory-II	120	13	120	12	265
Total Marks		360	40	360	40	800

*Research viva of 20 marks will be conducted in paper-L. However, the rest of 15 marks will be decided by the concerneddepartment internally for the contribution of the students in research project/thesis.