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LIAQUAT UNIVERSITY
OF MEDICAL & HEALTH SCIENCES,
JAMSHORO, SINDH

STUDY GUIDE

FIRST PROFESSIONAL MBBS

BATCH 2025-26

ACADEMIC SESSION 2025-26

ACADEMIC CALENDAR
ACADEMIC SESSION 2025-2026

Activity	Class Year	Dates
Classes starts	All Batches of MBBS	January 26, 2026
Summer Vacation/ Internship/Elective	1st to Final Year MBBS	June 01 to 27, 2026
Classes Resumes	All Batches of MBBS	June 29, 2026
Classes Ends	1st to 4th Year MBBS	October 30, 2026
	Final Year MBBS	November 27, 2026
Exam Preparation	1st to 4th Year MBBS	November 01 to November 27, 2026
	Final Year MBBS	November 30 to December 25, 2026
Annual Examination	1st to 4th Year MBBS	November 30 to December 27, 2026
	Final Year MBBS	December 28, 2026 to January 30, 2027
New session will start	1st to Final Year MBBS	January 11, 2027

PREFACE

The MBBS curriculum is designed to prepare the medical student to assume the role of the principal carer for patients. The majority of instruction in the various basic and clinical science disciplines is focused on attaining this objective. The amount of material and specificity that the student must acquire in order to complete the MBBS programme as a whole is substantial. Subject-based instruction affords students the chance to develop comprehensive and profound understanding of each respective subject. However, this instructional framework might result in the student failing to recognize the interconnectedness of knowledge across different disciplines, their interrelation, and most significantly, their significance in the context of patient care.

Over the years, numerous inventive approaches have been devised to tackle these obstacles. One such approach is the integration of instruction at multiple levels, which eliminates and reduces boundaries within subjects, both vertically and horizontally, across phases. LUMHS, while acknowledging the merits of these methodologies, has endeavoured to seize the opportunity to comprehend the interdependencies and minimise duplication in the subjects being instructed through the implementation of an integrated modular approach.

The cardiovascular system, musculoskeletal system, and respiratory system are few examples of system-based modules in an integrated modular curriculum that connects basic scientific knowledge to clinical problems. By means of integrated instruction, subjects are presented as a unified whole. Students can enhance their comprehension of basic scientific principles through consistent application of clinical examples in their learning. A skills lab provides early exposure to the acquisition of skills, case-based discussions, and self-directed learning are all elements of an integrated teaching programme.

LEARNING STRATEGIES

The following instructional and learning strategies are implemented to foster greater comprehension:

- Interactive Lectures
- Small group sessions
- Case-Based Learning (CBL),
- Self-Study,
- Practical,
- Skills lab sessions,
- Demonstrations
- Field visits

INTERACTIVE LECTURES

In large group, the lecturer actively involves the students by introducing the topic or common clinical conditions and explains the underlying phenomena by questions, pictures, videos of patients' interviews, exercises, etc. in order to enhance their learning process.

SMALL GROUP TEACHING (SGT):

This strategy is helpful for the students to make their concepts clear, and s acquiring skills or attitudes. These sessions are organized with the help of specific tasks such as patient case, interviews or discussion topics. Students are than encouraged to exchange their ideas and apply knowledge gained from lectures, tutorials and self-study. The facilitator employs probing questioning, summarization, or rephrasing techniques to enhance the understanding of concepts.

CASE- BASED LEARNING:
A format of small group discussion that centers on a sequence of questions derived from a clinical scenario, with the aim of facilitating learning. Students engage in discussions and provide answers by applying pertinent knowledge acquired in clinical and basic health sciences throughout the curriculum.

PRACTICAL:
Basic science practical related to anatomy, biochemistry, pathology, pharmacology and physiology are scheduled to promote student learning by application.

SKILLS LAB SESSION:
Skills relevant to respective module are observed and practiced where applicable in skills laboratory.

SELF DIRECTED LEARNING:
Students take on the responsibility of their own learning by engaging in independent study, collaborating and talking with classmates, accessing knowledge from the Learning Resources available, teachers, and other experts. Students can make use of the designated self-study hours provided by the college.

DEMONSTRATIONS:
During Anatomy teaching hour students in small groups are encouraged to utilize their knowledge in demonstrating different morphological features of various organs of the body with the help of their facilitator and discuss with their peers. This would help in enhancing their learning as well as motivate them in team based learning environment.

FIELD VISITS:
Students visit community health areas to understand the common diseases and their preventive measures.

Prof. Dr. Manzoor Ali Lakhair
Director Academics
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STUDY GUIDE

A study guide is a strategic and effective approach to

- ❖ Provide students a detailed framework of the modules organization
- ❖ Support students in organizing and managing their studies throughout academic year.
- ❖ Provide students information on assessment methods and the rules and regulations that apply.

- It outlines the outcomes which are expected to be achieved at the end of each module.
- Ascertains the education strategies such as lectures, small group teachings, demonstration, tutorial and case based learning that will be implemented to achieve the module objectives.
- Provides a list of learning resources for students in order to increase their learning.
- Emphasizes information on the contribution of attendance, end module tests, block examinations and annual examinations on the student's overall performance.
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives.

ABBREVIATIONS

FOUNDATION	Fnd
HAEMATOLOGY	Hem
RESPIRATORY	RESP
CARDIOVASCULAR	CVS
MUSCULOSKELETAL	MSK
PATHOLOGY	Path
PHARMACOLOGY	Pharm
MEDICINE	Med
SURGERY	Surg
PAEDIATRICS	Paeds
COMMUNITY MEDICINE	CM
GYNAECOLOGY & OBSTETRICS	Gynae & Obs
CARDIOLOGY	Cardio
SPIRAL	S

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FOUNDATION MODULE-1

Introduction Welcome to the foundation module. This exciting module will serve as building block and is very essential to your future work as doctors. This module is designed to make your learning both interesting and productive by including several interactive activities.

During this module, students will be encouraged to learn basic organization of human body in terms of structure, function and Biochemical properties in an integrated manner i.e. Basic subjects including Anatomy, Physiology, Biochemistry, Pharmacology and Pathology will be learned and assessed together. You will also learn to integrate basic knowledge with clinical relevance. By adopting this approach, you will be prepared for your future work as doctor, where patients will come to you with problems that are not categorized by discipline name.

In order to help you learn in an integrated manner, we have updated the learning of basic sciences around a few key health-related situations (real life situations), which you are likely to encounter as house officers. You will be expected to think about the scenarios and participate in case-based learning sessions for clearing your concepts and better learning. It will also help you focus your attention on what you need to achieve from the Interactive Lectures, practical and tutorials that have been scheduled during this module.

Rational Orientation of medical sciences in respect to health and disease is the fundamental requirement of every medical student. Therefore, this module is designed to provide the integration of core concepts that underlie the foundation of basic sciences and their correlation and application in clinical sciences. Students also learn clinical skills such as how to communicate effectively with patients and their relatives with compassion and understanding their issues/problems and how to resolve in coming years. Working in groups will enhance students' team working skills and capacity and management skills. Along with LGT/Interactive Lectures, practical and demonstrations; through supplemented case-based learning they develop problem solving skills to apply their basic medical knowledge and skills to practical situations under supervision and subsequently in real life practice.

Duration 8 weeks

Learning Outcomes

by the end of this foundation module, the students should be able to:

Knowledge

- Describe the cell division, its types and genetic material along with its clinical correlation.
- Describe the basic organization of the human body.
- Describe the basic tissues of the human body
- Explain the maintenance of homeostatic mechanism.
- Describe the various malformations.
- Describe the Biochemistry of carbohydrates, nucleic acids and enzymes
- Describe various cellular adaptations during cell growth, differentiation and cell injury

- Describe the basic concepts of medical ethics, professionalism, clinical research, behavioral sciences, communication skills, information technology skills

Skills

- Describe the basic laboratory techniques and demonstrate the use of microscope
- Identify basic tissues under the microscope
- Learn and follow the basic laboratory protocols
- Perform Biochemical analysis of carbohydrates
- Prepare different solutions used in laboratory for tests

Attitude

- Follow the basic laboratory protocols
- Participate in class and practical work professionally
- Communicate effectively in a team with pears, staff and teachers
- Demonstrate professionalism and ethical values in dealing with patients, cadavers, pears, staff and teachers.
- Communicate effectively in a team with pears and teachers.
- Demonstrate the ability to reflect on the performance.

Themes

Theme 1: Cell structure, Chemistry and Function
Theme 2: Cellular interactions, Cell injuries, Cellular responses and Adaptations
Theme 3: Body fluids: Composition, Function & Homeostasis
Theme 4: Macromolecules: Fundamental tissues/systems of the human body
Theme 5: Fundamental tissues/systems of the human body
Theme 6: Development, Differentiation and Growth
Theme 7: Genetics and Developmental anomalies

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

INTRODUCTORY WEEK

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
1	• State the history of the subject Anatomy including its various branches and practical applications of Anatomy as a foundation in different fields of Medicine Comprehend the exact location of dissected / prosecuted part / organ of human body with respect to various terms of positions, direction, and body planes	**Fnd-S1-Ana-G1** Introduction to the subject of Anatomy and its subdivisions Anatomical position, Anatomical planes & terms of position	Interactive Lecture	SBQs & OSVE
2	• Interpret the movements of different parts of human body the knowledge of various terms of movement.	**Fnd-S1-Ana-G2** Terms of movements		
Physiology				

3	• Define Physiology and Enumerate the branches of Physiology	**Fnd-S1-Phy-1** Introduction to Physiology	Interactive Lecture	SBQs & OSVE
Biochemistry				
4	• Define Biochemistry & • Discuss the role of Biochemistry in medicine	**Fnd-S1-Bio-1** Introduction to Biochemistry and its implication in medicine	Interactive Lecture	SBQs &OSVE
5	• Describe the significance of Protection protocols to keep yourself safe during Biochemistry laboratory work.	**Fnd-S1-Bio-2** Laboratory Hazards & Protection Protocols	Practical	OSPE & OSVE
6	• Demonstrate importance of chemicals and reagents in the different reactions of Biomolecules	**Fnd-S1-Bio-3** Chemicals and reagents		
7	• Illustrate techniques of using glassware and handling of Biochemical instruments during laboratory work.	**Fnd-S1-Bio-4** Use of glassware & Instruments for laboratory work		
Pathology				
8	• Define the pathology • Enumerate the different branches of pathology • Describe the terminologies used in Pathology	**Fnd-S1-Path-1** Introduction to Pathology	Interactive Lecture	SBQs & OSVE
Pharmacology				
9	• Define the Pharmacology and role of Pharmacology in medicine • Discuss Pharmaco-dynamics and Pharmacokinetics	**Fnd-S1-Pharm-1** Introduction to Pharmacology	Interactive Lecture	SBQs & OSVE
Community Medicine				
10	• Define different definition of public health/Community Medicine • Discuss basic functions of Public health/community Medicine • Define the difference between clinical and community medicine • Discuss Non-Governmental organizations, International agencies and National Programs of Pakistan	**Fnd-S1-CM-1** Introduction to Community Medicine & Public Health	Interactive Lecture	SBQs & OSVE
Forensic Medicine				
11	• Define Forensic Medicine, Forensic Pathology and state	**Fnd-S1-FM-1** Introduction to forensic	Interactive Lecture	SBQs & OSVE

	Medicine • Know the branches and the history of Forensic Medicine briefly • Discuss the scope of Forensic Medicine in practice • Identify the essential facilities for medico legal investigation. • Define medical jurisprudence and differentiate it from Forensic medicine	Medicine and Toxicology		
Medical Education				
12	• Describe the curriculum and modules under implementation • Describe the use of study guides (not to be assessed) • Differentiate between various teaching & learning strategies • Enlist various assessment tools, and assessment policy	**Fnd-S1-ME-1** Curriculum structure teaching learning strategies	Interactive Lecture	SBQs & OSVE
13	• Describe various study skills strategies	**Fnd-S1-ME-2** Study skills strategies		
Information Technology				
14	• Define IT and its importance in Medicine	**Fnd-S1-IT-1** Importance of IT skills	Interactive Lecture	SBQs & OSVE
Library Sciences				
15	• Learn literature search skills	**Fnd-S1-LIB-1** Literature search and library resources	Interactive Lecture	SBQs & OSVE
Behavioral Sciences				
16	• Learn the significance of communication skills in Medical Sciences	**Fnd-S1-BS-1** Introduction to behavioral Sciences	Interactive Lecture	SBQs & OSVE
Communication Skills				
17	• Learn the significance of communication skills in Medical Sciences	**Fnd-S1-CS-1** Introduction to communication skills	Interactive Lecture	SBQs & OSVE
Biomedical Ethics				
18	• Learn the significance of ethics in Medical Sciences	**Fnd-S1-BE-1** Introduction to Bio Medical Ethics	Interactive Lecture	SBQs & OSVE
Research Methodology				
19	• Learn the significance of ethics in Medical Sciences	**Fnd-S1-RM-1** Introduction to research methodology	Interactive Lecture	SBQs & OSVE

Theme 1: Cell Structure, Chemistry & Functions

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
20	• Describe the basic structure and functions of cell membrane. Describe the basic structure and functions of the Nucleus.	**Fnd-S1-Ana-H1** Cell structure ;Membrane, Nucleus and organelles	Interactive Lecture	SBQs & OSVE
21	• Operate the different parts of the light microscope. • Explain how to use the light • microscope to visualize a slide.	**Fnd-S1-Ana-H2** Parts of Light microscope	Practical	OSPE & OSVE
Physiology				
22	• Describe the Functional arrangement of different level of organization and General structure, Physiology and composition of cell, tissues, organs, organ systems, cell nutrition, capillary and venules.	**Fnd-S1-Phy-2** Functional arrangement of different levels of organization and General structure and composition of Cell.	Interactive Lecture	SBQs& OSVE
23	• Define the Functional organization of different components of a cell and its organelles, Describe the functions of lysosomes & peroxisomes, Endoplasmic Reticulum.	**Fnd-S1-Phy-3** Functional organization of cellular components; functions of ER, Golgi Apparatus, Lysosomes, Peroxisomes,		
24	• Describe the functions of mitochondria, its special features & its role in generation of ATP • Describe the functions of ER, Golgi apparatus, Ribosomes, and cytoskeleton.	**Fnd-S1-Phy-4** Cell organelles-II Ribosome Mitochondria, Microtubules & Microfilaments, Ribosomes Vaults Centromere.		
25	• Recognize the structure & functions of Nucleus	**Fnd-S1-Phy-5** Nucleus & its functions		
26	• Show the Parts And Functions of the Microscope	**Fnd-S1-Phy-6** Introduction to Microscope	Practical	OSPE & OSVE
Biochemistry				
27	• Cell membrane composition, types of lipids and cholesterol. • Describe the chemical structure and significance of	**Fnd-S1-Bio-5** Cell membrane Permeability Mitochondria: Structure & location of enzymes for metabolic pathways	Interactive Lecture	SBQs & OSVE

	mitochondria and location of enzymes for metabolic pathways & chemical reactions that occur in mitochondria, ATP generation (oxidative phosphorylation)			
28	• Prepare all types of solutions and their quantities in different chemicals reaction.	**Fnd-S1-Bio-6** Solutions, concentration expression (Percent solutions, Molarity, Molality, Normality)	Practical	OSPE & OSVE
Pathology				
29	• Enumerate causes of Cell Injury. • Discuss types of cell injury. Describe sequential morphologic changes in Cell Injury.	**Fnd-S1-Path-2** Cell injury	Interactive Lecture	SBQs & OSVE
30	• Define Hypertrophy, Hyperplasia, Atrophy and Metaplasia. • Enlist Physiological and pathological mechanisms of cellular adaptation	**Fnd-S1-Path-2** Cellular adaptations		

Theme 2: Cellular Interactions, Cell Injuries, Cellular Responses and Adaptations

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
31	• Differentiate between normal and abnormal cell division and their Consequences • Discus chromosomal anomalies	**Fnd-S1-Ana-E-1** Cell cycle: Mitosis and Meiosis cell divisions , chromosomal anomalies		
32	• Enlist steps of tissue processing. Define the artifacts. Know the basic histological stains. • Define H&E Staining.	**Fnd-S1-Ana-H-3** Basic staining in histology	Practical	OSPE & OSVE
Physiology				
33	• Explain composition and basic structure of cell membrane, its functional importance.	**Fnd-S1-Phy-6** Plasma membrane & its structure and function	Interactive Lecture	SBQs & OSVE
34	• Enumerate the Types & describe processes of membrane transport via simple diffusion, facilitated diffusion, carrier	**Fnd-S1-Phy-7** Types of transport, Simple Diffusion		

	mediated transport ,osmosis			
35	• Describe the Primary & secondary active transport and vesicular transport	**Fnd-S1-Phy-8** Active Transport		
36	• Describe the membrane potential its development & maintenance ionic basis of resting membrane • potential. • Explain factors affecting RMP and • graded potentials.	**Fnd-S1-Phy-9** Resting membrane potential		
37	• Discuss action potential • Give mechanism of propagation of • action potential & its ionic changes	**Fnd-S1-Phy-10** Action potential		
Pathology				
38	• Define Necrosis and its types. Describe the nuclear and cytoplasmic features of necrosis	**Fnd-S1-Path-4** Necrosis	Interactive Lecture	SBQs & OSVE
Pharmacology				
39	• Describe enteral route of administration and its types.	**Fnd-S1-Pharm-2** Routes of administration-Enteral	Interactive Lecture	SBQs & OSVE
40	• Describe Parenteral route of administration and its different types.	**Fnd-S1-Pharm-3** Routes of administration-Parenteral		
41	• Define drug absorption and the factors influencing it. • Describe bioavailability and Half-life.	**Fnd-S1-Pharm-4** Drug absorption, Bioavailability & Half Life		
42	• Describe Drug Distribution and discuss drug reservoirs.	**Fnd-S1-Pharm-5** Drug Distribution, Drug Reservoirs.		
43	• Drug Biotransformation and phases of biotransformation.	**Fnd-S1-Pharm-6** Drug Biotransformation		
44	• Describe the concept of Pharmacodynamics.	**Fnd-S1-Pharm-7** Pharmacodynamics-I		
45	• Discuss different receptor families.	**Fnd-S1-Pharm-8** Pharmacodynamics-II		
46	• Describe important terminologies of Pharmacology.	**Fnd-S1-Pharm-9** Terminology		
47	• Describe the different types of pharmaceutical dosage forms	**Fnd-S1-Pharm-10** Pharmaceutical preparations	Practical	OSPE & OSVE
48	• Describe the components of a dose–response curve.	**Fnd-S1-Pharm-11** Dose response curve-I		

	• Differentiate between graded and quantal dose–response curves.			
49	• Explain the concepts of potency and efficacy using dose–response curves.	**Fnd-S1-Pharm-12** Dose response curve-II		

Theme 3: Body Fluids: Composition, Function & Homeostasis

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
		Physiology		
50	• Describe the divisions of body fluids into intracellular, extracellular and intravascular compartments.	**Fnd-S1-Phy-11** Body fluids	Interactive Lecture	SBQs& OSVE
51	• Recognize the Physiological aspects for the maintenance of homeostasis, ECF, Internal environment and role of various body systems in homeostasis.	**Fnd-S1-Phy-12** Homeostasis		
52	• Explain the concepts of homeostasis and its regulation through feedback mechanism. • Negative feedback, Positive Feedback, Feed-forward Stress & disease	**Fnd-S1-Phy-13** Mechanisms of Homeostasis		
		Pharmacology		
53	• Enlist different routes of drug administration • Describe the merits & demerits of the different routes of drug administration	**Fnd-S1-Pharm-13** Routes of drug administration	Interactive Lecture	SBQs & OSVE
		Pathology		
54	• Define Apoptosis. Enumerate pathological and physiological causes of Apoptosis. Describe Biochemical Features and Mechanism of Apoptosis	**Fnd-S1-Path-5** Apoptosis	Interactive Lecture	SBQs & OSVE
55	• Define and describe pathological calcification. Discuss Dystrophic and Metastatic calcification	**Fnd-S1- Path-6** Calcification and Pigmentation		
56	• List and define causes of intracellular accumulations. Discuss the role of intracellular accumulations in metabolic	**Fnd-S1- Path-7** Intracellular accumulations & Amyloidosis		

	derangements of cell. Define and enlist causes of amyloidosis			

Theme 4: Macromolecules/ Fundamental tissues/systems of the Human Body

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
57	• Define the divisions & functions • of skeletal system. • Enlist bones of axial and appendicular skeleton • Classify bones on the basis of shape ,development, microscopic features and parts of long bone.	**Fnd-S1-Ana-G3** The skeletal system (axial and appendicular skeleton, classification of bones.)	Demonstrat ion	SBQs, OSPE & OSVE
58	• Define the joints. Classify joints on the basis of structure, regions and functions • Discuss the characteristics of synovial joints and classify on basis of structure & movement	**Fnd-S1-Ana-G4** The joints and its types. The synovial joints.	Interactive Lecture	SBQs & OSVE
59	• Define dislocation, sprain and inflammation of joints	**Fnd-S1-Orth-1** Fractures	Clinical Interactive Lecture	SBQs & OSVE
60	• Describe the microscopic features of epithelial tissues • Explain their functional • Importance, surface modifications and junctions	**Fnd-S1-Ana-H-04** The Epithelium and cell surface modification and junctions	Interactive Lecture	SBQs & OSVE
61	• Define the composition of the connective tissue. • Describe and differentiate the microscopic features of the different types of the connective tissues	**Fnd-S1-Ana-H-05** Histology of Connective tissue (General arrangement of connective tissue)		
62	• Identify different types of the epithelia on the light microscope • Discuss gross and microscopic features of exocrine glands	**Fnd-S1-Ana-H-06** Epithelium and Exocrine glands	Practical	OSPE & OSVE
Biochemistry				
63	• Apply the basic knowledge of carbohydrates in chemistry for health	**Fnd-S1-Bio-07** carbohydrates: introduction, classification and its Biochemical significance	Interactive Lecture	SBQs& OSVE
64	• Describe the Biochemical structure of polysaccharides with its clinical importance	**Fnd-S1-Bio-08** Monosaccharides: Classification, Structure,		

		Functions		
65	• Discuss functions of carbohydrates in cell membrane, energy provision and nutrition supply to different parts of body	**Fnd-S1-Bio-09** Chemical Properties & Derivatives of Monosaccharides & their Biochemical significance in Biological systems.		
66	• Describe different isomers of monosaccharides e.g. Glactose, Mannose, Fructose, Dextrose.	**Fnd-S1-Bio-10** Isomerism: Structural & Optical Isomerism in carbohydrates & their Biochemical significance.		
67	• Explain Structure of disaccharides and oligosaccharides	**Fnd-S1-Bio-11** Glycosidic Linkage, Biologically important disaccharides and oligosaccharides		
68	• Describe classification of polysaccharides and their functions.	**Fnd-S1-Bio-12** Polysaccharides: Classification , Structure & Functions of Homopolysaccharides		
69	• Perform Molisch's Test, Iodine Test, Benedict's Test to identify an unknown carbohydrate in a given fluid	**Fnd-S1-Bio-13** Molisch's Test, Iodine Test, Benedict's Test	Practical	OSPE & OSVE
70	• Detect carbohydrates by different tests	**Fnd-S1-Bio-14** Selivanoff's Test, Barfoed's Test, Osazone Test		
71	• Classify amino acids on the basis of their polarity, charge & nutritional significance.	**Fnd-S1-Bio-15** Classification of Amino Acids on the basis of structure, Properties, Nutrition & their role in human metabolism	Interactive Lecture	SBQs & OSVE
72	• Describe Physio-chemical classification of proteins. • Enumerate functional classification of proteins. • Classify proteins on the basis of their axial ratio.	**Fnd-S1-Bio-16** Classification of Proteins on the basis of their structures, functions & chemical reactions.		
73	• Describe the structural levels of proteins and their important Biochemical features.	**Fnd-S1-Bio-17** Structural Organization of Proteins		
74	• Able to detect unknown amino acid/protein in a given fluid	**Fnd-S1-Bio-18** General Tests for Proteins & Amino acids	Practical	OSPE & OSVE
75	• Discuss the significance of Lipids for a balanced diet and Health	**Fnd-S1-Bio-19** Lipids: Classification &	Interactive Lecture	SBQs & OSVE

		Biochemical significance.		
76	• Basic structure of nucleotide, polymerization in DNA and RNA, difference between DNA and chromatin, arrangement of DNA into chromosomes	**Fnd-S1-Bio-20** Nucleic Acids: Structure of DNA & RNA, organization of DNA into chromatin		
77	• Basic mechanism of PCR, types of PCR and their diagnostic applications, how PCR helps in diagnosis, prognosis and management of diseases.	**Fnd-S1-Bio-21** Polymerase chain reaction (PCR): Basic mechanism, Types, Biomedical importance in diagnosis and management.		
78	• Recombinant DNA Technology: definition, components, basic mechanism, insulin synthesis as example of rDNA technology, applications and examples from today's world	**Fnd-S1-Bio-22** Recombinant DNA Technology: Biomedical importance and applications.		
79	• Able to detect proteins by colour reaction tests	**Fnd-S1-Bio-23** Colour Reaction Tests of Proteins	Practical	OSPE & OSVE
80	• Able to detect proteins by Separation tests	**Fnd-S1-Bio-24** Separation Tests		
81	• Able to detect proteins by precipitation tests	**Fnd-S1-Bio-25** Precipitation Tests		
82	• Able to detect solubility, oily nature, emulsification, saponification tests	**Fnd-S1-Bio-26** Tests for Lipids		
Pathology				
83	• Define edema. Describe patho-physiology of edema	**Fnd-S1-Path-8** Edema	Interactive Lecture	SBQs & OSVE
84	• Define Hemorrhage, Hyperemia, Congestion. • Describe their causes and patho physiology	**Fnd-S1-Path-9** Hyperemia, Congestion		

Theme 5: Fundamental Tissues/Systems of the Human Body

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
85	• Define the parts of the skin • Define the appendages of the skin. • Recognize the role of Component • tissues of Skin and fascia in Support • and Protection	**Fnd-S1-Ana-G-05** Integumentary system (Skin and fascia)	Interactive Lecture	SBQs & OSVE
86	• Explain the types and functions of blood vessels. (Arteries, veins, capillaries and Anastomosis)	**Fnd-S1-Ana-G-06** Blood vascular system		
87	• Integrate the function of Defense	**Fnd-S1-Ana-G-07**		

	with the structure of lymph nodes and lymphatic's	lymphatic system		
88	• Define the types of muscles • Describe the internal structure of muscle action, nerve supply and naming of skeletal muscles • Define smooth and cardiac muscles.	**Fnd-S1-Ana-G-08** Muscular system		
89	• Describe the Nervous system and classification of NS • Define the central and peripheral nervous system	**Fnd-S1-Ana-G-09** Nervous System		
90	Define the autonomic nervous • system. • Describe the types and functions of Autonomic Nervous System.	**Fnd-S1-Ana-G-10** Autonomic nervous system		
88	• Describe the process of Gametogenesis in male & female • Discus the steps of fertilization	**Fnd-S1-Ana-E-2** Gametogenesis,		
89	Enumerate the events of first week of development (cleavage and blastocyst formation and implantation)	**Fnd-S1-Ana-E-3** The First week of development, ovulation and fertilization		
90	Enumerate the events of Second week of development (Formation of amniotic cavity, amnion, bilaminar embryonic disc, yolk sac, chorionic sac and primary chorionic villi)	**Fnd-S1-Ana-E-4** The second week of development		
93	• Recognize male & female genitalia. Describe the process of fertilization (conception).	**Fnd-S1-Cli-G&O-1** Fertilization (The conception)		
Physiology				
94	• Describe the Physiological Concepts and organization of nervous system. • State general physiological concepts and organization of Autonomic Nervous System	**Fnd-S1-Phy-14** Introduction Organization of the Nervous system	Interactive Lecture	SBQs & OSVE
95	• Structure and functions of Neurons & Neuroglial cells, Myelination and Salutatory Conduction	**Fnd-S1-Phy-25** Neuron and neuroglia		
96	• Definition, structure, functions , types and mechanism of impulse transmission of synapse .	**Fnd-S1-Phy-26** Synapses and its types		

Theme 6: Development, Differentiation and Growth

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Anatomy				
97	• Explain the main events of third week of development	**Fnd-S1-Ana-E-5** Third week to	Interactive Lecture	SBQs & OSVE

	• State formation of the primitive streak, Gastrulation and notochord • Explain formation of neural tube and somites • Recognize external appearance of embryo during second month • Define teratogen and its main principle	eighth week of development And teratogenesis		
98	• Enlist the derivatives of Ectoderm and neural crest cells • Enlist the derivatives of mesodermal and endodermal germ layers	**Fnd-S1-Ana-E-6** Derivatives of all germ layers and neural crest cells		
99	• Explain the interchange of substances between maternal and fetal blood by applying the knowledge of structure and functions of placenta and fetal • Membranes & clinicals	**Fnd-S1-Ana-E-7** Placenta and fetal membranes		
100	• Describe the Ectopic pregnancy & its consequences.	**Fnd-S1-CL-O&G-2** Ectopic pregnancy		

Theme 7: Genetics and Developmental Anomalies

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Clinical				
101	• Calculate the expected date of delivery (EDD) • Describe various methods used to assess fetal wellbeing	**Fnd-S1-Gyn & Obs-3** The Fetal wellbeing & EDD	Interactive Lecture	SBQs & OSVE
Physiology				
102	• Describe Physiological basis of gene and functions of DNA and RNA	**Fnd-S1-Phy-17** DNA, Gene, Genetic code RNA Types, codan , anti codan	Interactive Lecture	SBQs & OSVE
	• Describe regulation of gene expression and protein synthesis	**Fnd-S1-Phy-18** Control of gene functions		
Pathology				
103	• Define Mutation and its type. Describe the effects of different types of mutations.	**Fnd-S1-Path-10** Mutations	Interactive Lecture	SBQs & OSVE
104	• Define Mendelian Disorder. Explain the pattern of inheritance in Mendelian Disorders. List the examples of autosomal, Recessive and sex linked disorders	**Fnd-S1-Path-11** Mendelian Disorders		
105	• Describe normal Karyotype. Discuss various numerical and structural abnormalities of	**Fnd-S1-Path-12** Chromosomal aberration.		

	chromosomes.			
106	• Discuss various technique in diagnosis of genetic diseases	**Fnd-S1-Path-13** Diagnosis of Genetic Diseases		

HAEMATOLOGY MODULE-1

Introduction welcome to the hematology module. this module aims to provide the basic understanding of hematopoiesis and hemostasis at the molecular level. this module is designed to learn and integrate basic knowledge of blood cells, with clinical relevance. this module is designed to make your learning both interesting and productive by including more practical activities. it will deal with the basic patho-physiological and pharmacological aspects of infections and chemo therapeutic agents and integrate it with clinical sciences.

The module will give the 1st year medical students, an opportunity to know the presentations and principles of management of common hematological, immunological, inflammatory and neoplastic disorders. You will be expected to think about the scenarios and participate in case-based learning sessions for clearing your concepts and better learning. It will also help you focus your attention on what you need to achieve from the Interactive Lectures, practical and tutorials that have been scheduled in this module.

DURATION: 8 weeks

Learning outcomes

- Knowledgeable
- Skillful
- Community Heath Promoter
- Problem-solver
- Professional
- Researcher
- Leader and Role Model

COGNITIVE DOMAIN: By the end of this module, first year MBBS students shall be able to:

- Identify & describe the various cellular and non-cellular components of blood in relation to its Anatomy, Physiology &Biochemistry
- Describe structure, synthesis and degradation of Hemoglobin
- Describe the regulatory mechanisms of normal hemostasis and coagulation
- Describe the conditions associated with dysfunction of cellular and non-cellular components of blood
- Describe the basic characteristics of immune system.
- Discuss the structure, functions and Biochemical aspects of the Lympho-reticular system.
- Explain the principles and clinical significance of ABO/RH blood grouping system
- Explain the Patho-Physiology of various bleeding disorders
- Identify the role of Pharmacology in inflammation, anemia and bleeding disorders.

PSYCHOMOTOR DOMAIN

Description of the psychomotor skills to be developed and the level of performance required:

By the end of this Module, the student should be able to:

- Carry out practical work as instructed in an organized and safe manner
- Make and record observations accurately.

- Determine percentage of formed blood elements (Hematocrit).
- Identify RBC and should be able to do its counting-on-counting chamber and to know normal values. And also classify Anemia morphologically.
- Determine the Hemoglobin with the apparatus and have knowledge of normal and abnormal value.
- Identify WBC morphology and its different types, should be able to count them on counting chamber and to know the normal values. Diagnostic importance of each WBC.
- Identify Platelets and should be able to know normal values. Its diagnostic importance in relation to bleeding disorders
- Perform bleeding time and clotting time and to know normal values and its diagnostic importance in relation to bleeding disorders.
- Perform Blood groups typing and Rh factor.
- Perform ESR and to know its normal value and prognostic importance.

ATTITUDE AND BEHAVIOUR:

By the end of Module, the student shall gain the ability and carry responsibility to:

- Demonstrate ability to give and receive feedback, respect for self and peers.
- Demonstrate sympathy and care to patients.
- Having respect for patients, colleagues and other health professionals
- Organize & distribute tasks
- Exchange opinion & knowledge
- Develop communication skills with sense of responsibility.
- Regularly attend the classes
- Demonstrate good laboratory practices

Laboratory Skills (Physiology & Pathology):

By the end of Module, the students should be able to:

- Describe types & methods of sterilization
- Collect blood sample by various methods i.e. pricking method &venipuncture on dummies
- Prepare blood film & Identify and quantify different types of white blood cells on blood film
- Identify different blood groups
- Antigen-Antibody reactions in the Laboratory
- Determine hemoglobin concentration (Sahli's method)
- Laboratory diagnosis of Anemias
- Estimate bleeding time, clotting time (BT & CT)
- Laboratory diagnosis of Bleeding Disorders
- Estimate erythrocyte sedimentation rate (ESR by wester green method)
- Non. Neoplastic WBC Disorders
- Acute Inflammation/ Chronic inflammation
- Repair: Wound Healing
- Isolation of micro-organism/Lab diagnosis of infectious disease
- Culture Media-I & Culture Media-II

Clinical Skills: By the end of Module, the students should be able to:

1. Practice history taking: patients with anemia and bleeding disorders
2. Define and classify polycythemia

3. Define and describe the different types of anemia
4. Describe various types of blood indices

Themes

Theme 1: Red cell disorders (Anemia, Polycythemia)
Theme 2: Infections & Inflammation
Theme 3: Bleeding & thromboembolic disorders
Theme 4: ABO & Rh-Incompatibility
Theme 5: Immunological disorders

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

Theme 1: Red cell disorders (Anemia, Polycythemia)

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Anatomy				
1	• Illustrate the organization of hematopoietic tissue • Enlist the sites and source of hematopoiesis before and after the birth.	**Hem-S1-E1-Ana-** Development of blood	Interactive Lecture	SBQs & OSVE
2	• Examine structure of RBC, WBC & platelets. • Illustrate methods use to study blood and bone marrow cells.	**Hem-S1-H1-Ana-** Morphology of blood cells	Practical	SBQs &OSPE & OSV
Physiology				
3	• Discuss the cellular components of blood • Define hematocrit, normal values & factors affecting hematocrit	**Hem-S1-Phy-1** Composition of blood & its cellular components	Interactive Lecture	SBQs & OSVE
4	• Describe RBC ,its structure and membrane .Discuss functions of RBC .	**Hem-S1-Phy-2** Structure and functions of RBC		
5	• Discuss the various stages of RBC'S formation. • Discuss various sites of erythropoiesis • Enlist the factors necessary for erythropoiesis. • Discuss the significance of Reticulocyte count	**Hem-S1-Phy-3** Erythropoiesis		
6	• Enlist types of hemoglobin; describe normal and abnormal hemoglobin; explain functions of hemoglobin; role in O_2 & CO_2 transport	**Hem-S1-Phy-4** Structure and Functions of Hemoglobin		
7	• How to take blood sample	**Hem-S1-Phy-P 1** Take blood sample by IV method	Practical	OSPE & OSVE
8	• To estimate red blood cell count	**Hem-S1-Phy- P2**		

		RBC count practical		
9	• Examine hemoglobin concentration by Sahli's method	**Hem-S1-Phy- P3** Hemoglobin concentration (Sahli's method)		
10	• Estimate erythrocyte sedimentation rate (ESR by wester green method)	**Hem-S1-Phy-P4** Estimation of erythrocyte sedimentation rate (ESR by wester green method)		
Biochemistry				
11	• Explain Biochemical basis for the difference in plasma & serum. • Describe composition of blood & plasma protein.	**Hem-S1-Bio-1** Composition of blood & plasma proteins (Specialized body fluid)	Interactive Lecture	SBQs & OSVE
12	• Describe Chemistry& synthesis of Heme • Explain structure, types & forms of Hb.	**Hem-S1-Bio-2** Normal Hemoglobin		
13	• Identify abnormalities of Heme synthesis (PorPhyrias & its types).	**Hem-S1-Bio-3** Abnormal Heme		
14	• Explain the Biochemical aspects of Hemoglobinpathies. (Thalassemia, sickle cell anemia)	**Hem-S1-Bio-4** Abnormal Hemoglobin (Hemoglobinopathies)		
15	• Describe degradation of heme. • Explain bile pigments, formation, types, transport & Excretion of bile.	**Hem-S1-Bio-5** Degradation of Heme		
16	• Discuss Iron Metabolism & identify its abnormalities.	**HemM-S1-Bio-6** Iron Metabolism		
17	• Explain the Biochemical importance of Vitamin B12 & Folic acid & their associated diseases.	**Hem-S1-Bio-7** Vitamin B12 & Folic acid		
18	• Describe importance of Vitamin K, C & E B_6 & their associated diseases.	**Hem-S1-Bio-8** Vitamin K, C & Vitamin B_6		
Pathology				
19	• Describe classification ofAnemia • Differentiate the different types of anemias on the basis of Morphology & Patho-Physiology.	**Hem-S1-Path-1** Introduction of Anaemia		
20	• Identify the types of nutritional Anemias • Enlist causes of iron deficiency, Anemia & clinical features and Laboratory diagnosis	**Hem-S1-Path-2** Iron deficiency Anemia	Interactive Lecture	SBQs & OSVE
21	• Enlist causes of vitamin D-12 and folate deficiency • Explain the Patho-Physiology, clinical features and laboratory diagnosis.	**Hem-S1-Path-3** Megaloblastic Anemia		

Pharmacology				
22	• Describe role of oral & injectable iron in iron deficiency anemia	**Hem1-S1-Pharm-1** Drugs for iron deficiency anemia	Interactive Lecture	SBQs & OSVE
23	• Describe role of Vitamin B_{12} & Folic acid in Macrocytic anemia	**Hem1-S1-Pharm-2** Drugs for Megaloblastic anemia		
24		**Hem1-S1-Pharm-3 CBL Anemia**		

Theme 2: Infections & Inflammation

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
25	• Discuss the embryological source of lymphoid organs	**Hem-S1-E2-Ana-** Development of lymphoid organs	Interactive Lecture	SBQs & OSVE
26	• Discuss the histological classification & microscopic features of lymphoid organs. • Define histological features of spleen & lymph node.	**Hem-S1-H2-Ana** Microscopic anatomy of lymphoid organs: Spleen & Lymph node	Practical	OSPE & OSVE
27	• Define histological features of Thymus gland & Tonsil.	**Hem-S1-H3-Ana-** Microscopic anatomy of Thymus & Tonsil		
Physiology				
28	• Describe leukocyte genesis; types of granulocytes & agranulocytes normal values and functions;	**Hem-S1-Phy-05 Types,** properties and Functions of WBC	Interactive Lectures/ Small Group Discussion	SBQs, OSPE & OSVE
29	• Describe properties and role of neutrophils , monocyte and macrophages in inflammation	**Hem-S1-Phy-06** Role of Neutrophils & Monocytes in inflammation		
30	• Explain significance and functions of reticuloendothelial (monocyte–macrophage) system	**Hem-S1-Phy-07** Monocyte–Macrophage System / Reticuloendothelial System		
31	How to estimate WBC count	**Hem-S1-Phy- practical -5** WBC count	Practical	OSPE & OSVE
Pathology				
32	• Define acute inflammation. • Describe the changes systemic effects & occurring in acute inflammation.	**Hem-S1-Path-4** Overview of acute and chronic inflammation	Interactive Lecture	SBQs & OSVE
33	• Describe causes of Neutrophilia and Neutropenia, Eosinophilia, Lymphocytosis, Monocytosis	**Hem-S1-Path-5** Non Neoplastic WBC Disorders		

Theme 3: Bleeding & thromboembolic disorders

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
		Physiology		
34	• Describe the structure and properties of platelets	Hem-S1-Phy-08 Properties of platelets	Interactive Lectures/Small Group Discussion	SBQs, OSPE & OSVE
35	• Describe the four mechanisms • Explain the mechanism of formation of platelet	**Hem-S1-Phy-09** Hemostasis & role of thrombocyte		
36	• Explain steps involved in intrinsic and extrinsic pathway for coagulation, • Enlist the clotting factors, to • describe the role of clotting factors in coagulation	**Hem-S1-Phy-10** Clotting factors coagulation cascade		
37	• Determination of bleeding time	**Hem-S1-Phy- practical - 06** Bleeding time practical	Practical	OSPE & OSVE
38	• Determination of clotting time	**Hem-S1-Phy- practical -07** Clotting time practical		
		Biochemistry		
39	• Define Immunoglobulin • Describe chemistry, Structure and their classification	**Hem-S1-Bio-09** Immunoglobulin	Interactive Lecture	SBQs & OSVE
		Pathology		
40	• Discuss the different types of bleeding disorders. • Discuss Quantitative & Qualitative platelets disorders • Describe classification& Lab. diagnosis of haemophilia and Von Willebrand disease.	**Hem-S1-Path-6** Platelet and Bleeding disorder	Interactive Lecture	SBQs & OSVE
41	• Discuss thrombosis, pathogenesis, types and fate of thrombosis.	**Hem-S1-Path-7** Thrombosis		
42	• Define embolism, its types and morphological features of embolism.	**Hem-S1-Path-8** Embolism		

Theme 4: ABO & Rh-Incompatibility

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
		Physiology		
43	• Describe the antigens & antibodies for A,B,AB & O blood groups • Define Agglutinogen, agglutinin, and agglutination & what takes	**Hem-S1-Phy-11** Blood groups ABO	Interactive Lectures/Small Group Discussion/ Practical	SBQs, OSPE & OSVE

	place when incompatible blood types are mixed. • Identify universal donor & recipient & explain why?			
44	• Enlist various Rh antigens & Rh immune response. • What is erythroblastosis fetalis & how it can be prevented	**Hem-S1-Phy-12** RH system		
45	• Determination of blood groups	**Hem-S1-Phy- practical - 08** Blood group practical	Practical	
Pathology				
46	Discuss different types of blood transfusion products. Brief overview of different types of blood transfusion reactions.	**Hem-S1-Path-9** Overview of Blood Transfusion	Interactive Lecture	SBQs & OSVE

Theme 5: Immunological Disorders

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Physiology				
47	• Introduction to immunity, classification, natural and acquire/Active and Passive. Components of Innate immunity .	**Hem-S1-Phy-13** Immunity. , innate immunity	Interactive Lectures/ Small Group Discussion	SBQs, OSPE & OSVE
48	• Discuss humoral immunity; describe formation & mechanism of action of antibodies	**Hem-S1-Phy-14** Humoral Immunity		
49	• Understand cell-mediated immunity; differentiate active & passive immunity	**Hem-S1-Phy-15** Cell-Mediated Immunity		
50	• Describe the basic concept of the complement system • List the major functions of the complement system • Explain the three complement activation pathways • Describe the triggers for each pathway • Outline the common final pathway • Explain the role of key complement components • Describe how complement enhances immunity • Discuss regulation of the complement system • Describe the physiological importance of complement	**Hem-S1-Phy-16** Complement system		

	system			
51	• Differentiate between T and B lymphocytes • Describe the maturation process of T and B cells • Explain the types of T lymphocytes and their functions • Explain the types of B lymphocytes and their functions • Describe how T and B cells recognize antigens	**Hem-S1-Phy-17** T and B lymphocytes		
Biochemistry				
52	• Definition, Classification and Mechanism of action	**Hem-S1-Bio-10** Enzymes (Overview)	Interactive Lecture	SBQs & OSVE
53	• Describe properties, factors affecting and inhibitors of enzyme activity	**Hem-S1-Bio-11** Enzymes (Properties)		
Pathology				
54	• Define hypersensitivity • Describe Pathogenesis of Type-I & II hypersensitivity reactions with examples	**Hem-S1-Path-10** Hypersensitivity reaction Type I & II	Interactive Lecture	SBQs & OSVE
55	• Describe type III & IV hypersensitivity reactions with examples.	**Hem-S1-Path-11** Hypersensitivity reaction Type III & IV		
56	• Discuss primary immunodeficiency and its causes • Discuss secondary immunodeficiency and its causes	**Hem-S1-Path-12** Immunodeficiency		
PHARMACOLOGY				
57	• Associate role immune modulating drugs in autoimmune disorders	**Hem-S1-Pharm-4** Immuno-modulating drugs	Interactive Lecture	SBQs & OSVE

MUSCULOSKELETAL MODULE - 1

Introduction This exciting module will serve as building block and is very essential to your future work as doctors. This module is designed to make your learning both interesting and productive by including several interactive activities.

Motility is the most important feature of life. Every living being shows locomotion in one or other form. Human locomotor system is very beautiful and well organized. Man is the only mammal that walks on two feet. So, our musculoskeletal system is well oriented to counter the effect of gravity. God Himself has said in Holly Quran that He has made man in the best of its form. Cerebral cortex, the highest center of brain causes controls various body movements by coordination of the muscles, bones, & joints.

Rationale This module is designed to build a solid foundation regarding knowledge of the structure and function of various muscles, bones and joints. This also provides information regarding its clinical applications. It has been estimated that one in four consultations in primary care is caused by problems of the musculoskeletal system.

It is likely that individuals at some time suffer from a problem related to the musculoskeletal system, ranging from a very common problem such as osteoarthritis or back pain to severely disabling limb trauma or rheumatoid arthritis. Many musculoskeletal problems are chronic conditions as well. The most common symptoms are pain and disability, with an impact not only on individuals' quality of life but also, importantly, on people's ability to earn a living and be independent.

Throughout this module, students will have the opportunity to link basic science knowledge to clinical problems. Teaching relevant basic sciences with clinical examples will help you make connections among concepts and retain the information for later clinical education.

Duration 10 weeks

Learning Outcomes

By the end of this module, the students should be able to describe, demonstrate & explain

Knowledge

- Muscles, bones, joints, fascia, fossa, compartments, nerves and blood vessels of upper limb
- Muscles, bones, joints, fascia, fossa, compartments, nerves and blood vessels of Lower limb
- Microscopic features of muscles, bones, cartilages, and skin.
- Collagen metabolism and collagen disorders.
- Development of muscles and bones & their congenital anomalies
- Fractures& their healing, bone remodeling, osteoporosis & its management.
- Nerve palsies and disability
- Pain Physiology and pain management including analgesics.
- Scheme & control of motor activity, motor cortical areas, motor pathways, and role of cerebellum and basal ganglia in motor activity.
- Mechanism of contraction of skeletal muscle & its molecular basis
- Muscle glycogen metabolism and glycogen storage diseases

- Neuromuscular junction, abnormalities of transmission across it, and drugs affecting this transmission
- Calcium homeostasis, role of hormones and their abnormalities
- Nutrition & adaptation of muscles in exercise
- Epidemiology of road accidents, their prevention, disability and rehabilitation
- Functions of skin, its common disorders and their treatment

Skills

- Histology of Cartilage
- Introduction to power lab
- Histology of Muscles
- Simple muscle twitch & summation
- The muscular twitch response and recruitment
- Physiological properties of skeletal muscle
- EMG
- Estimation of calcium
- Estimation of Phosphorus
- Fractures

Attitude Follow the basic laboratory protocols

- Participate in class and practical work professionally
- Communicate effectively in a team with pears, staff and teachers
- Demonstrate professionalism and ethical values in dealing with patients, cadavers, pears, staff and teachers.
- Communicate effectively in a team with pears and teachers.
- Demonstrate the ability to reflect on the performance.

Themes

Theme 1: Theme 1: Pectoral region and Breast
Theme 2: Back, Axilla and Shoulder joint
Theme 3: Brachial Plexus and Arm
Theme 4: Forearm, hand and carpal tunnel syndrome
Theme 5: Anterior thigh and femoral hernia
Theme 6: Gluteal region, hip joint and Sciatic nerve
Theme 7: Anterior compartment of leg and compartment syndrome
Theme 8: Posterior compartment of leg and foot

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

Theme 1: Pectoral region and Breast

S #	LEANING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Anatomy				
1	• Define different regions of the upper limb • Identify various compartments of arm, forearm & hand. • Define the axial and appendicular skeleton and define the girdle bones.	**MSK-S1-Ana-G-1** Organization of upper limb Pectoral region & the clavicle	Demonstration	SBQs, OSPE & OSVE

	• Identify joints of the upper limb. • Define the pectoral region. • Describe its muscles. • Identify the general features and different land marks for side determination and the attachments of various muscles on clavicle.			
2	• Discuss development of Bone • Describe Intramembranous ossification • Describe endochondral ossification • Describe ossification of the limb bones • Describe development of the joints and cartilage • Discus differentiation of paraxial mesoderm	**MSK-S1-Ana-E-1** Development of skeletal system, somites and paraxial mesoderm	Interactive Lecture	SBQs & OSVE
3	• Describe the attachments, nerve supply and the actions of the muscles of the back. • Define the effects of paralysis of these muscles	**MSK-S1-Ana-G-2** Muscles of back	Demonstration	SBQs, OSPE & OSVE
4	• Identify general features and different land marks for side determination and the attachments of various muscles on the Scapula.	**MSK-S1-Ana-G-3** Scapular region (scapula bone, Muscles)		
5	• Discuss the arterial anastomosis around the scapula. • Explain the neurovascular bundle of scapula.	**MSK-S1-Ana-G-4** Anastomosis around scapula & Neurovascular bundle of scapula	Interactive Lecture	SBQs & OSVE
Physiology				
6	• Types of muscles, and properties of skeletal, smooth and cardiac muscles, structure and functions of myofilaments	**MSK-S1-Phy-P1** Introduction to Musculoskeletal System	Interactive Lecture	SBQs & OSVE
7	• Identify and name various parts of power lab • Illustrate functions of various parts of the power lab	**MSK-S1-Phy-P1** Introduction to Power Lab	Practical	
Biochemistry				
8	• Enlist classification, functions and Biochemical significance of Hetero polysaccharides in formation of Extracellular Matrix.	**MSK-S1-Bio-01** Role of Hetero polysaccharides (Glycosaminoglycans)	Interactive Lecture	SBQs & OSVE
9	• Explain Muco-polysacharridoses:	**MSK-S1-Bio-02**		

	• Classification, Deficient Enzymes Clinical Manifestation	Muco-polysaccharidoses		
10	• Discuss general introduction and classification of Minerals.	**MSK-S1-Bio-03** Classification of Minerals		
Clinical Lecture				
11	• Define bone density and factors which are responsible to maintain bone density • Define Pathogenesis and clinical course of change in bone density and conditions associated with lactation. • Discuss its complications and management.	**MSK-S1-Gyn & Obs-1** Changes in bone density with lactation	Interactive Lecture	SBQs & OSVE
12	• Describe the Patho-Physiology of mammary gland disorders • Describe the lactation reflex • Describe weaning • Describe the hormonal effect • Student guide for complete protocol of lactation and weaning	**MSK-S1-Paeds-1** Breast feeding guide for medical profession		

Theme 2: Back, Axilla and Shoulder joint

S. #	LEANING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
13	• Enumerate bony components type & variety, attachment of capsule and ligaments of this joint. • Demonstrate various muscles & movements at the joint. • Identify the factors stabilizing or weakening the shoulder joint.	**MSK-S1-Ana-G-5** The Shoulder Joint Sternoclavicular acromioclavicular Joints	Demonstrati on	SBQs, OSPE & OSVE
14	• Discuss the developmental • stages of skull, ribs, vertebrae and sternum and its clinicals	**MSK-S1-Ana-E-2** Development of skull, ribs and vertebrae and sternum.	Interactive Lecture	SBQs & OSVE
15	• Define the shape, location, boundaries and contents of Axilla. • Discuss the formation, course and relations of axillary vessels • Describe arrangement of axillary lymph nodes and their area of drainage.	**MSK-S1-Ana-G-6** Axilla: Boundaries & Contents	Demonstrati on	SBQs, OSPE & OSVE
16	• Describe and draw formation of the brachial plexus. • Mention different parts of brachial plexus and their location. • Identify different nerves with their root values.	**MSK-S1-Ana-G-07** Brachial Plexus	Interactive Lecture	SBQs & OSVE

	• Discuss the effects of injury to different sites of brachial plexus.			
17	• Identify the skeletal muscle under light microscope • Describe the structural basis of muscle striations. • Recognize the structural elements that produces muscle contraction and brings the movement of a body part.	**MSK-S1-Ana-H-1** Histology of skeletal muscle	Practical	OSPE & OSVE
Physiology				
18	• Describe Structure of sarcomere; arrangements of actin and myosin ,troponin and tropomyosin and their role in muscle contraction and relaxation	**MSK-S1-PHY-02** Properties of skeletal muscles contraction	Interactive Lecture	SBQs & OSVE
Biochemistry				
19	• Describe sources, RDA, Absorption, transport, Functions, Clinical Aspects	**MSK-S1-Bio-4** Calcium metabolism.	Interactive Lecture	SBQs & OSVE
20	• Describe sources, RDA, Absorption, transport, Functions, Clinical Aspects	**MSK-S1-Bio-5** Vitamin D metabolism.		
21	• Describe sources, RDA, Absorption, transport, Functions, Clinical Aspects • Discuss role of Parathyroid, Calcitonin & Vitamin D	**MSK-S1-Bio-6** Magnesium & Regulation of Magnesium Phosphorus and calcium		
22	• Discuss chemical composition of bone, remodeling and normal composition of synovial fluid.	**MSK-S1-Bio-7** Chemical composition of bone		
23	• Describe the Collagen structure and synthesis, • Types, Role of Vitamin C in synthesis of Collagen	**MSK-S1-Bio-08** Collagen Structure and synthesis		
24	• Brief overview of inherited Collagen Disorders and their clinical manifestation	**MSK-S1-Bio-09** Overview of Inherited Collagen disorders		
25	• Demonstrate importance of calcium & phosphorus as macro-mineral. RDA, Absorption, factors influencing absorption. • Clinical manifestation of excess and deficiency states.	**MSK-S1-Bio-10** Estimation of serum calcium & phosphorus	Practical	OSPE & OSVE
Pathology				
26	• Discuss significance of Vitamin-D in the body. • Describe the different deficiency states associated with Vitamin-D in children and adults	**MSK-S1-Path-1** Vitamin D deficiency	Interactive Lecture	SBQs & OSVE

	• Discuss the prevention of Vitamin D deficiency.			
Pharmacology				
27	• Describe the receptors distribution of cholinergic receptors.	**MSK-S1-Pharm-1** Introduction to Cholinergics	Interactive Lecture	SBQs & OSVE
28	• Describe the classification , mechanism of action and side effects of Cholinergics Agonists	**MSK-S1-Pharm-2** Cholinergic Agonists		
29	• Describe the classification , mechanism of action and side effects of Cholinergic Antagonists	**MSK-S1-Pharm-3** Cholinergic Antagonists		
30	• Classify different muscle relaxants. • Discuss mechanism of their action. • Explain clinical uses and their adverse effects	**MSK-S1-Pharm-4** Drugs used as skeletal muscle relaxant		
31		**MSK-S1-Pharm-5** To observe the normal reflexes on rabbit eye	Practical	OSPE & OSVE
32		**MSK-S1-Pharm-6** To observe the effects of Pilocarpine & Atropine on rabbit eye		
33		**MSK-S1-Pharm-7** To observe the effects of Pilocarpine & Atropine on intestinal movements of rabbit.		

Theme 3: Brachial Plexus and Arm

S. #	LEANING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSES MENT
Anatomy				
34	• Explain the arrangement of different functional groups of muscles in the ant compartment of arm & their attachment • Demonstrate the actions of above muscles • Describe the neurovascular structures and their important relations	**MSK-S1-Ana-G-08** Humerus bone Anterior compartment of arm	Demonstrati on	SBQs OSPE & OSVE
35	• Define cubital fossa. • Discuss its boundaries • Clinical correlates	**MSK-S1-Ana-G-9** Cubital fossa	Interactive Lecture	SBQs & OSVE
36	• Explain arrangement of different functional groups of muscles in the post compartment arm & their		Demonstrati on	SBQs OSPE & OSVE

	attachment • Demonstrate actions of muscles • Describe neurovascular structures and their important relations	**MSK-S1-Ana-G-10** Posterior compartment of arm & Elbow joint		
37	• Identify general features of the radius & ulna. • Discuss attachments of various muscles on the radius & ulna. • Discuss the radioulnar joints.	**MSK-S1-Ana-G-11** Radius & Ulna (radioulnar joints)	Demonstrati on	SBQs, OSPE & OSVE
38	• Explain arrangement of different functional groups of muscles in anterior compartment of fore-arm & their attachment. • Describe neurovascular structures and their important relations	**MSK-S1-Ana-G-12** Anterior compartment of forearm		
39	• Explain arrangement of different functional groups of muscles in the posterior compartment of forearm & their attachment. • Describe neurovascular structures and their important relations	**MSK-S1-ANA-G- 13** Posterior compartment of forearm		
40	• Identify smooth and cardiac muscles under light microscope • Describe structural basis of muscle striations & differentiate the two muscles. • Recognize function and organization of the connective tissue in muscle.	**MSK-S1-Ana-H-2** Histology of smooth and cardiac muscles	Practical	OSPE & OSVE
Physiology				
41	• Describe general mechanism of skeletal muscle contraction. • Describe molecular mechanism (sliding filament theory) of skeletal muscle contraction. • Describe walk along theory–power stroke.	**MSK-S1-Phy-3** Mechanism & different theories of muscle contraction	Interactive Lecture	SBQs & OSVE
42	• Define neuromuscular junction (NMJ) & list the components of NMJ • Explain sequence of events of neuromuscular transmission	**MSK-S1-Phy-4** Neuromuscular Junction & transmission and its disorders		
43	• Describe Types of smooth muscle; contractile mechanism; comparison between smooth and skeletal muscle contraction	**MSK-S1-Phy-05** Smooth muscle contraction		
44	• Describe different types of muscle contraction ,Isometric and isotonic contraction and muscle fatigue .	**MSK-S1-Phy-06** Types of muscle contraction		

45	• EMG	**MSK-S1-Phy-P2** EMG	Practical	OSPE & OSVE
Clinical Lecture				
46	• Enlist disorders of skeletal muscle disorders and factors which are responsible to it • Define Pathogenesis and clinical course of conditions associated with skeletal muscle disorders • Discuss it's complications and management	**MSK-S1-Ortho-1** Disorders of voluntary muscles	Interactive Lecture	SBQs & OSVE

Theme 4: Forearm, Hand and Carpal Tunnel Syndrome

S #	LEANING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSES MENT
Anatomy				
47	• Describe the location, destination, course & relations of arteries & their branches in upper limb. • Identify and discuss the deep veins of upper limb. • Describe the location, destination, course & relations of nerves & their branches in • upper limb.	**MSK-S1-Ana-G-14** Neuromuscular bundle of the upper limb	Demonstrati on	SBQs OSPE & OSVE
48	• Describe the type, variety, attachment of capsule and ligaments of this joint. • demonstrate various movements at this joint. • Describe the structural organization of the Flexor & Extensor Retinaculum. • Discuss carpal tunnel syndrome.	**MSK-S1-Ana-G-15** Wrist joint	Interactive Lecture	SBQs & OSVE
49	• Describe the bony arrangement of the hand. • Describe the joints of the hand.	**MSK-S1-Ana-G-16** Osteology of the hand and the joints of the hand.	Demonstrati on	SBQs OSPE & OSVE
50	• Discuss the cutaneous supply, arteries & veins of palm of hand. • define fibrous flexor sheath. • Define the palmer aponeurosis, facial spaces. • Describe small muscles of hand. • Discuss the dorsal venous arch. • Describe insertion of the long extensors tendons.	**MSK-S1-Ana-G-17** Palm and Dorsum of the hand		
51	• Describe different regions of lower limb. • Identify the various bones forming skeleton of lower limb. • Describe general arrangement of	**MSK-S1-Ana-G-18** Introduction to lower limb / Superficial veins, arteries , lymph		

	superficial & deep fasciae of lower limb	nodes & cutaneous supply of the lower limbs		
52	• Identify the superficial arteries of lower limb • Name and discuss superficial veins of lower limb • Highlight the course of great and small saphenous vein • Describe the superficial lymphatic vessels & lymph nodes of lower limb • Discuss clinical correlates	**MSK-S1-Ana-G-19** Blood supply of the lower limb	Interactive Lecture	SBQs & OSVE
53	• Describe the development of muscles. • Discuss the development of Myotomes • List derivatives of Ebaxial and Primaxial divisions of myotomes	**MSK-S1-ANA-E-3** Development of muscles	Interactive Lecture	SBQs & OSVE
54	• Classify bone on developmental and structural basis. • Differentiate between compact bone and spongy bone under microscope. • Differentiate between different types of cartilage with examples	**MSK-S1-Ana-H-3** Histology of bones and cartilage	Practical	OSPE & OSVE
Physiology				
55	• Demonstrate SMT on power lab • What are the different periods of SMT & their duration? • Demonstrate the phenomenon of fatigue & Tetanus	**MSK-S1-Phy-P3** Simple Muscle twitch response	Practical	OSPE & OSVE
56	• Describe Strength, power and endurance; classification of exercise; aerobic vs anaerobic metabolism; energy use; oxygen debt and recovery; training effects	**MSK-S1-Phy-07** Skeletal muscles in exercise, fatigue and endurance	Interactive Lecture	SBQs & OSVE
57	• To see the effect of fatigue on power lab	**MSK-S1-Phy-P4** Fatigue and recovery in skeletal muscle	Practical	OSPE & OSVE
Pharmacology				
58	• Classify different muscle relaxants. • Discuss mechanism of their action • Explain clinical uses and their adverse effects	**MSK-S1-Pharm-8** Drugs used as Skeletal muscle relaxant	Interactive Lecture	SBQs & OSVE
Clinical Lecture				
59	• Define of osteoporosis • Describe generalized and localized osteoporosis • Enlist primary &secondary causes of	**MSK-S1-Ortho-2** Clinical manifestation of Osteoporosis	Interactive Lecture	SBQs & OSVE

	generalized osteoporosis • Define Pathogenesis and clinical course • Discuss it's complications and management			

Theme 5: Anterior thigh and femoral hernia

Theme 6: Gluteal region, hip joint and Sciatic nerve

S. #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESS MENT
Anatomy				
60	• Identify parts of the hip bone. • Determine side of the bone. • Describe general features of each part of hip bone. • Identify the bone. • Determine the side of the bone. • Describe the anatomical position of the bone.	**MSK-S1-Ana-G-20** Hip bone + Femur	Demonstration	SBQs, OSPE & OSVE
61	• Discuss division of the thigh into compartments • Enumerate muscles of the anterior compartment of thigh and their respective actions. • Describe the innervation and blood supply of muscles of anterior compartment. • Describe the Femoral triangle, its boundaries and contents. • Discuss femoral sheathand its contents and the clinical conditions associated	**MSK-S1-Ana-G-21** Anterior compartment of thigh and Femoral triangle		
62	• Discuss muscles of medial compartment of the thigh. • Discuss blood & nerve supply of these muscles. • Describe actions of the muscles of medial compartment of thigh.	**MSK-S1-Ana-G-22** Medial compartment of thigh	Interactive Lecture	SBQs & OSVE
63	• Describe location of gluteal region. • Discuss about bones and ligaments of gluteal region. • Discuss muscles of the gluteal region & their respective actions. • Discuss nerves and blood vessels of the gluteal region.	**MSK-S1-Ana-G-23** The Gluteal region		
64	• Describe articular surfaces of the hip joint along with capsular attachment • Enumerate ligaments of the hip joint & describe their attachments. • Discuss clinical correlates	**MSK-S1-Ana-G-24** Hip joint	Demonstration	SBQs, OSPE & OSV
65	• Identify different types of cartilage under light Microscope. • Define distinctive microscopic	**MSK-S1-Ana-H-4** Histology of Cartilage	Practical	OSPE & OSVE

	features of each type.			
Physiology				
66	• Daily requirement, absorption and excretion of calcium; distribution in bones; bone cells and calcium homeostasis role of hormones in calcium homeostasis	**MSK-S1-Phy-08** Calcium Homeostasis	Interactive Lecture	SBQs & OSVE
67	• Describe role of skin in homeostasis • Describe the function of skin • Describe medico-legal importance of the skin	**MSK-S1-Phy-09** Physiology of Skin		
Biochemistry				
68	• Describe metabolic pathway for synthesis of purines and pyrimidines	**MSK-S1-Bio-11** Metabolic pathway for synthesis of purines and pyrimidines	Interactive Lecture	SBQs & OSVE
69	• Discuss in detail metabolic pathways for nucleic acids degradation. Inherited associated disorders. Uric acid metabolic disorders.	**MSK-S1-Bio-12** Metabolic pathways for nucleic acids degradation and related disorders.		
70	• Demonstrate the methods to estimate the serum uric acid.	**MSK-S1-Bio-13** Estimation of serum uric acid	Practical	OSPE & OSVE
Pathology				
71	• Define and classify different types of osteomyelitis. • Discuss etiology, pathogenesis, organisms, routes of spread, and complications of osteomyelitis.	**MSK-S1-Path-2** Osteomyelitis	Interactive Lecture	SBQs & OSVE
Clinical Lecture				
72	Explain clinical manifestations of arthritis	**MSK-S1-Ortho-3** Clinical manifestation of Arthritis	Interactive Lecture	SBQs & OSVE

Theme 7: Anterior Compartment of Leg and Compartment Syndrome

S #	LEANING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSES MEN
Anatomy				
73	• Describe muscles of posterior compartment of thigh. • Describe arterial supplyof posterior compartment of thigh. • Discuss trochanteric and cruciate anastomosis at back of thigh. • Describe venous drainage of this region.	**MSK-S1-Ana-G-25** Post: compartment of thigh + popliteal fossa	Demonstration	SBQs OSPE OSV

74	• Describe anatomical position of the bone. • Identify the bone and its side determination. • Mark attachment of muscles and ligaments. • Describe the nerve injuries related to it.	**MSK-S1-Ana-G-26** Tibia & fibula		
75	• Discuss site and time of appearance of upper and lower limb buds. • Define source of mesoderm forming the limb muscles	**MSK-S1-Ana-E-4** Development of Limbs & its clinical 1	Interactive Lecture	SBQs OSVI
76	• Discuss formation of different compartments of leg. • Explain arrangement of the muscles in anterior compartments of leg and their actions. • Describe neurovasculature of these compartments of leg. • Identify bones forming the architecture of foot. • Discuss joints formed by these bones.	**MSK-S1-Ana-G-27** Anterior compartment of leg & dorsum of foot	Demonstration	SBQs OSPE OSV
77	• Explain arrangement of the • muscles in lateral compartments of leg and their actions. • Describe the neurovasculature of these compartments of leg • Discuss clinical correlates like compartment syndrome of leg.	**MSK-S1-Ana-G-28** Lateral compartment of leg & tibiofibular joint		
78	• Describe articular surfaces of the knee joint along with capsular attachment. • Describe ligaments & bursa of the knee joint and discuss their attachments. • Describe movements of the knee joint. (locking & unlocking mechanism)	**MSK-S1-Ana-G-29** Knee joint		

Theme 8: Posterior compartment of leg and foot

S #	LEANING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
	Anatomy			
79	• Explain arrangement of the muscles in posterior compartment of leg. • Describe nerve supply of these muscles. • Explain actions of the muscles of posterior compartment. • Discuss clinical correlates.	**MSK-S1-Ana-G-30** Posterior compartment of leg	Demonstration	SBQs, OSPE & OSVI

80	• Describe the architecture of arches of foot and the factors responsible for their maintenance. • Identify the bones forming these arches. • Describe the function of the arches of foot.	**MSK-S1-Ana-G-31** Skeleton of foot & arches of foot		
81	• Discuss the hand plate and formation of digital rays resulting into digits • Describe the muscles involved in and process of rotation of limb • Explain the congenital anomalies of the limbs	**MSK-S1-Ana-E-4** Development of Limbs & its clinical 2	Interactive Lecture	SBQs & OSVE
82	• Describe the Ankle Joint. • Describe Superior and Inferior Tibiofibular Joints.	**MSK-S1-Ana-G-32** Ankle ,subtalar & small joints of foot	Demonstration	SBQs, OSPE & OSVE
83	• Identify the bones forming architecture of sole of foot. • Discuss the joints formed by these bones. • Describe clinical correlates • like flat foot and club foot. • Describe vascular and nervous supply of dorsum of foot	**MSK-S1-Ana-G-33** Sole of foot and neurovascular bundle		
84	• Explain different nerve of lower limb and their root value. • Discuss causes of injuries. • Enumerate common sites of these nerve injuries • Discuss symptoms caused by these nerve injuries.	**MSK-S1-Ana-G-34** Neurovascular bundle of lower limb		
85	• Describe development of musculoskeletal system. • Discuss development of Myotomes • List derivatives of epaxial and hypaxial divisions of myotomes • Describe the development of bones, joints & cartilage	**MSK-S1-Ana-E-5** Overview of Embryological development of musculoskeletal system		
86	• Identify three layers of skin under light microscope • Describe structural basis & elements of skin. • Recognize function and organization of connective tissue in skin	**MSK-S1-Ana-H-4** Histology of skin and appendages	Practical	OSPE & OSVE

Clinical Interactive Lecture				
87	• Define terms related to fracture: Stress Fracture, Incomplete fracture, • Closed (simple fracture), Open (complicated) fracture, multi-fragmented fractures, complex fracture, Pathologic fractures • Describe mechanism of bone healing • Enlist complications of fracture • Describe etiology & Pathogenesis of Pathologic fractures.	**MSK-S1-Ortho-4** Fractures/Dislocations	Interactive Lecture	SBQs & OSVE
Pathology				
88	• Define arthritis, osteoarthritis, and rheumatoid arthritis. • Explain patho-physiology and clinical features of osteoarthritis and rheumatoid arthritis. • Discuss patho-physiology and clinical features of Gout.	**MSK-S1-Path-3** Arthritis & Gout	Interactive Lecture	SBQs & OSVE
89	• Discuss osteoporosis, patho physiology and clinical features. • Brief overview of muscular dystrophies and inflammatory myopathies	**MSK-S1-Path-4** Osteoporosis		

CARDIOVASCULAR MODULE-1

Introduction Welcome to the cardiovascular abnormalities' module. This exciting module will be very necessary to your future work as doctors. This module is designed to make your learning both interesting and productive by including interactive activities.

During this module, students will be encouraged to learn the structure and function of the cardiovascular system in an integrated manner i.e. subjects such as Anatomy, Physiology and Biochemistry, will be learned and assessed together (Horizontal Integration). We will also help you learn the basic sciences in a way that is relevant to their clinical applications (Vertical Integration). By adopting this approach, we are preparing you better for your future work as doctor, where patients will come to you with problems that are not categorized by discipline name.

In order to help you learn in an integrated manner, we have updated the learning of basic sciences around a few key health-related situations (real life situations), which you are likely to encounter as first year medical students. You will be expected to think about the scenarios and participate in case based learning sessions for clearing your concepts and better learning. It will also help you focus your attention on what you need to achieve from the Interactive Lectures, practical and tutorials that have been scheduled during this module.

Rationale An overall aim of this module is to help you form a cognitive base for understanding pathogenesis of cardiovascular diseases as they are major cause of morbidity and mortality. (Cardiovascular diseases module – Third-year) & practice of cardiovascular medicine (final-year clinical rotation). The module will prepare you for your future work in the medical course that will include learning in relation to the assessment and promotion of cardiovascular health and management of range of cardiovascular disease.

Duration 5 weeks

Learning Outcomes By the end of this foundation module, the students should be able to:

Knowledge: At the end of this module, the students will be able to:

- Describe the components of the cardiovascular system by learning and applying the relevant basic sciences.
- Apply the above knowledge to a few common real-life situations (Hypertension, Myocardial Infarction and Shock) to explain how the anatomy, Physiology and Biochemistry are altered in the given situation.
- Describe the anatomy of the different parts of the cardiovascular system in detail.
- Describe the development and anomalies of the cardiovascular system.
- Define and identify the microscopic features of the cardiovascular system.
- Describe the functions of the cardiovascular system.
- Interpret the Biochemical changes in the body related to the cardiovascular system.
- Enlist pathologies involving cardiovascular system.
- Describe the management of the cardiovascular diseases.
- Perform the cardiovascular system examination.

- Take the history of the patients and co-relate the cardiovascular sign & symptoms to reach the differential diagnosis
- To counsel the people in community regarding the risk factors of the cardiac diseases.

Clinical/ Practical skills

Measuring blood pressure using Sphygmomanometer with correct technique and interpretation of its values and calculation of mean arterial pressure.
Identification of areas on the chest for auscultation of the heart sounds.
Placing electrodes and obtaining an electrocardiogram and interpretation of the basic ECG findings.
Identification of cardiac tissues and blood vessels under the microscope with points of Identification. (Students are required to draw and label microscopic sections of cardiovascular components in histology journal. The journal will be assessed during end-module examination).
Perform clinical examination of the cardiovascular system.

Attitude:

Follow the basic laboratory protocols.
Participate in class and practical work professionally.
Communicate effectively in a team with pears, staff and teachers.
Demonstrate professionalism and ethical values in dealing with patients, peers, staff and teachers.
Demonstrate the ability to reflect on the performance.

Themes

Theme 1: Arrhythmias and Myocardial Infarction
Theme 2: Congenital anomalies of Cardiovascular System
Theme 3: Hypertension
Theme 4: Heart Failure

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

Theme 1: Arrhythmias, Myocardial Infarction

S. #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
	Anatomy			
1	• Define the middle mediastinum. • Explain location and contents of the middle mediastinum. • Discuss fibrous and serous parts of the pericardium. • Define pericardial sinuses and nerve supply of the pericardium. • Discuss related clinical conditions.	**CVS-S1-Ana-G-1** Middle Mediastinum and The Pericardium	Interactive Lecture	SBQs & OSVE
2	• Define Anatomical position of the heart. • Identify and name structures constituting the borders and surfaces of the heart. • Define the external features of the Chambers of the heart.	**CVS-S1-Ana-G-2** Anatomy of the Heart-1	Demonstration	SBQs, O & OSV
3	• Describe Internal features of each chamber of heart. • Discuss the related clinical conditions.	**CVS-S1-Ana-G-3** Anatomy of the Heart-2		

	• Describe composition of the walls and the skeleton of the heart. • Describe conducting system of the heart. • Discuss related clinical conditions	Structure of the heart and The Conducting system of the Heart, surface Anatomy		
4	• Identify the histological features of heart; endocardium, myocardium, epicardium on light microscope.	**CVS-S1-Ana-H-1** Histology of the Heart (cardiac muscle)	Practical	OSPE OSV
Physiology				
5	• Describe components/parts of CVS and their functions • Define systemic and pulmonary circulation • Mention distribution of blood (in percentage of total blood) in different parts of the circulatory system • Mention pressures in various portions of the circulatory system	**CVS-S1-Phy-1** Overview of CVS	Interactive Lecture	SBQs OSV
6	• Mention three major types of muscle • Describe properties of cardiac muscle (Functional syncytium, Automaticity, Rhythmicity, Conductivity, Long refractory period) • Describe cardiac muscle action potential • Discuss mechanism of excitation contraction coupling in cardiac muscle	**CVS-S1-Phy-2** Properties of cardiac muscle	Interactive Lecture	SBQs OSV
7	• Describe various parts/components of conducting system of the heart and their functions • Explain action potential and rhythmicity of sinus nodal fibers • Describe origin and spread of cardiac impulse • Mention AV nodal delay and its significance • Describe the effect of ANS on the functioning of conducting system of the heart	**CVS-S1-Phy-3** Excitatory and Conducting system of the heart	Interactive Lecture	SBQs OSV
8	• To determine pulse rate on power lab	**CVS-S1-Phy-Practical-01** Determination of pulse rate	Practical	
9	• Define electrocardiogram and electrocardiography • Describe the waves, intervals and segments of a normal electrocardiogram (ECG)	**CVS-S1-Phy-4** Electrocardiogram (ECG)	Interactive Lecture	SBQs OSV

	• Mention the uses/indications of ECG			
10	• To record ECG and calculate heart rate	**CVS-S1-Phy- Practical-02** To record ECG	Practical	
Biochemistry				
11	• Mention introduction of isoenzymes • Discuss diagnostic significance of isoenzymes	**CVS-S1-Bio-1** Diagnostic significance of Isoenzymes in cardiovascular disorders	Interactive Lecture	SBQs OSV
Pathology				
12	• Describe pathogenesis of atherosclerosis. • Discuss morphological features and pathogenesis of atherosclerosis. • Discuss complications of atherosclerosis.	**CVS-S1-Path-1** Atherosclerosis	Interactive Lecture	SBQs OSVE
Medicine (Cardiology)				
13	• Define Arrhythmias • Recognize the common abnormalities in rate and rhythm of the heart (tachycardia, bradycardia, flutter, fibrillations, heart blocks and extra systole) failure. • Describe the hemodynamic, neuroendocrine and cellular changes that occur in heart failure. • Describe the Physiological basis of the treatment principles in heart failure.	**CVS-S1-Cardio-1** Arrhythmias	Interactive Lecture	SBQs OSVE

Theme 2: Congenital Anomalies of Cardiovascular System

S. #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Anatomy				
14	• Describe development of cardiogenic field and heart tube. • Enumerate the derivatives of heart tube. • Define formation of cardiac looping and dextrocardia and how sinus venous and cardiac septa formed.	**CVS-S1-Ana-E-1** Development of the heart tube	Interactive Lecture	SBQs OSV
15	• Explain atrial and interatrial septum development. • Explain ventricles and Inter-ventricular septum development. • Enlist common congenital anomalies of heart chambers.	**CVS-S1-Ana-E-2** Development of the heart chambers and their septa -1		

16	• Explain How atria and interatrial septum develops? • How ventricles and Inter-ventricular septum develops? • What are the common congenital anomalies of heart chambers? Describe septa formation in bulbus cordis and truncus arteriousis. Enlist congenital heart defects; transposition of great vessels, PDA, PTA	**CVS-S1-Ana-E-3** Development of the heart chambers and their septa -2 Development of septa in truncus arteriosus, valves and conducting system		
17	• Describe the microscopic features of the arteries • Identify the different types of arteries and veins	**CVS-S1-Ana-H-2** Histology of the Blood vessels	Practical	OSPE OSV
Physiology				
18	• Define cardiac cycle • Mention duration of cardiac cycle and its relation with heart rate • Describe sequence of events of cardiac cycle • Mention pressure changes that occur during each cardiac cycle	**CVS-S1-Phy-5** Cardiac cycle and its mechanical Events-I	Interactive Lecture	SBQs OSV
19	• Describe the relationship of the electrocardiogram to mechanical events of cardiac cycle • Mention pressure changes in atria • Define JVP and mention its clinical importance • Define EDV, ESV and Stroke volume • Define ejection fraction and mention its clinical importance • Define preload and afterload	**CVS-S1-Phy-6** Cardiac cycle and its mechanical events-II		
20	• Describe functions of heart valves • Mention normal heart sounds and explain their production • Define heart murmur • Mention the timing of the murmur produced by valvular defects and congenital heart diseases • Explain the hemodynamic changes in various valvular heart diseases	**CVS-S1-Phy-7** Heart valves, heart sounds and murmurs		
21	• To auscultate heart sounds.	**CVS-S1-Phy-P3** Auscultation of heart sounds	**Practical**	
22	• Define Ohm's law of circulation • Describe main factors that determine vascular resistance • Define total peripheral vascular resistance and total pulmonary vascular resistance	**CVS-S1-Phy-8** Interrelationship among blood flow, pressure and resistance	Interactive Lecture	SBQs OSV

	• Mention Poiseuille's law			
Biochemistry				
23	• Important properties of fatty acids • Trans and cis-Fatty acids • Essential fatty acids Omega fatty acids	**CVS-S1-Bio-2** Fatty acids	Interactive Lecture	SBQs OSV
Pathology				
24	• Define hypertension and classify its causes • Discuss pathogenesis of hypertension. • Discuss complications of hypertension.	**CVS-S1-Path-2** Hypertension	Interactive Lecture	SBQs OSV
25	• Define infarction. • Discuss etiology of infarction. • Discuss morphological classification of infarcts. • Describe morphological features of infarction	**CVS-S1-Path-3** Infarction.		
Paediatrics				
26	• Describe the Hemodynamic changes in various congenital heart diseases including; Mitral Stenosis Mitral regurgitation Stenosis Aortic regurgitation	**CVS-S1-Paeds-I** Congenital heart diseases	Interactive Lecture	SBQs OSV

Theme 3: Hypertension

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Anatomy				
27	• Describe the arterial supply and venous drainage of heart. • Describe the branches of major arteries and their distribution. Define the nerve supply of the heart. Describe the cardiac plexus.	**CVS-S1-Ana-G-4** Blood and nerve supply of the Heart	Interactive Lecture	SBQs OSV
28	• Discuss development of arterial system; aortic arches, umbilical, vitelline and coronary arteries • Name the common congenital anomalies of arteries?	**CVS-S1-Ana-E-4** Development of arterial system of heart		
29	• Discuss development of venous system; cardinal veins, umbilical and vitelline. • Name the common congenital anomalies of venous system?	**CVS-S1-Ana-E-5** Development of venous system of heart		
Physiology				
30	• Mention the specific needs of the tissues for blood flow • Define local blood flow • Describe acute/short-term control of local blood flow • Describe long-term control of local blood	**CVS-S1-Phy-9** Control of local blood flow	Interactive Lecture	SBQs OSV

	flow • Explain the auto-regulation of blood flow			
31	• Describe structure of microcirculation and capillary wall • Explain flow of blood in capillaries • Define vasomotion • Define Starling forces and give their approximate values • Describe role of Starling forces in fluid exchange across the capillary wall • List the functions of lymphatics • Define edema and explain the patho Physiological basis for edema (i.e. increased capillary hydrostatic pressure, hypoalbuminemia, increased capillary permeability and lymphatic obstruction)	**CVS-S1-Phy-10** Capillary fluid exchange		
32	• Define cardiac output and mention its relationship to stroke volume and heart rate; describe factors that regulate cardiac output; describe Frank–Starling mechanism of the heart.	**CVS-S1-Phy-11** Cardiac Output & Venous Return - I		
33	• Mention pathological conditions that cause high cardiac output; mention pathological conditions that cause low cardiac output; mention methods of measurement of cardiac output; define venous return and mention • factors that regulate venous return; describe central venous pressure.	**CVS-S1-Phy-12** Cardiac Output & Venous Return- II		
34	• Describe vasomotor center, its important areas and functions • Define vasomotor tone • Describe role of sympathetic nervous system in regulation of circulation • Describe role of parasympathetic nervous system in regulation of circulation	**CVS-S1-Phy-13** Nervous regulation of circulation		
35	• Define systolic blood pressure, diastolic blood pressure, pulse pressure and mean arterial pressure • Mention important factors on which blood pressure depends • List various mechanisms that regulate/control blood pressure • Describe role of baroreceptor reflex in regulation of blood pressure	**CVS-S1-Phy-14** Blood pressure and its Regulation-I (Baroreceptor reflex mechanism)		
36	• Chemoreceptor reflex mechanism of blood pressure regulation, CNS ischemic response	**CVS-S1-Phy-15** Blood pressure and		

	bain bridge reflex mechanism of blood pressure regulation .	its Regulation-I (chemoreceptor reflex mechanism		
Biochemistry				
37	• Describe different aspects related to fatty acids and their clinical significance in the CVS diseases	**CVS-S1-Bio-03** Fatty acids	Interactive Lecture	SBQs OSV
38	• Explain the metabolism and function of cholesterol and its clinical significance in CVS diseases • Atherosclerosis and LDL	**CVS-S1-Bio-4** Cholesterol		
39	• Describe the prostaglandins & leukotriens, their synthesis and general functions.	**CVS-S1-Bio-5** Prostaglandins and Leukotriens		
Pharmacology				
40	To describe the drugs used in CVS	**CVS-S1-Pharm-1** Introduction to drugs used in CVS	Interactive Lecture	SBQs OSV
Medicine (Cardiology)				
41	• Define hypertension. List the causes of hypertension. • Describe the pathogenesis of hypertension. • Explain the compensatory measures that maintain the blood pressure on rising from supine positions. • Explain the Physiological basis of the treatment principles in hypertension	**CVS-S1-Cardio-2** Hypertension	Interactive Lecture	SBQs OSV

Theme 4: Heart Attack

S. #	LEARNINGOBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSME
Anatomy				
42	• Identify different chambers /structures of the heart.	**CVS-S1-Ana-G-5** Model study of heart		
43	• Describe circulatory changes before and after birth. • Name the adult derivatives of embryonic • structures?	**CVS-S1-Ana-E-6** Circulation before and after birth	Interactive Lecture	SBQs & OS
44	• Identify the capillaries with the help of light microscope.	**CVS-S1-Ana-H-3** Histology of capillaries	Practical	OSPE & OS
Physiology				
45	• Explain renal-body fluid system and its role in arterial pressure control • Describe Renin-Angiotensin system and its role in arterial pressure control	**CVS-S1-Phy-16** Blood pressure and its regulation-II (Role of kidneys in long-term control of blood pressure)	Interactive Lecture	SBQs & OS

46	• To determine systolic and diastolic blood pressure and calculate pulse pressure	**CVS-S1-Phy-Practical- 04** Measurement of blood pressure,		
47	• Define circulatory shock • Describe causes and major types of shock • Mention stages of shock • Describe Physiology of non-progressive and progressive hemorrhagic shock	**CVS-S1-Phy-17** Circulatory shock		
48	• Explain the phases of coronary blood flow • Describe myocardial oxygen consumption • Explain venous drainage of the heart • Describe local metabolic regulation • Explain autoregulation • Describe neural regulation • Explain endothelial factors in coronary regulation	**CVS-S1-Phy-18** Coronary circulation its regulation and its related clinical conditions		
49	• To record the effects of exercise on pulse and blood pressure	**CVS-S1-Phy-Practical-05** Effects of exercise on cardiovascular parameters	Practical	OSPE & OS
Biochemistry				
50	Discuss lipoproteins' metabolism and their clinical significance in CVS diseases	**CVS-S1-Bio-6** Lipoproteins	Interactive Lecture	SBQs & OS
51	Demonstrate the estimation of the serum cholestrol Interpret lipid profile and its significance	**CVS-S1-Bio-7** Serum cholesterol estimation and Lipid Profile	Practical	OSPE & OS
Pathology				
52	• Define shock • Enlist types of shock • Describe causes, patho-physiology, signs and symptoms of shock	**CVS-S1-Path-4** Shock	Interactive Lecture	SBQs & OS
Medicine (Cardiology)				
53	• Define heart failure. • Explain the Physiological basis of common clinical manifestations of heart failure. • Describe different types of the heart failure. • Describe hemodynamic, neuroendocrine and cellular changes that occur in heart failure.	**CVS-S1-Cardio-3** Heart failure	Interactive Lecture	SBQs & OS

	• Describe Physiological basis of treatment principles in heart failure.			

5 RESPIRATORY MODULE 1

Introduction This exciting module will serve as building block and is very essential to your future work as doctors. This module is designed to make your learning both interesting and productive by including several interactive activities. An understanding of the structure of the chest wall and the diaphragm is essential if one has to understand the normal movements of the chest wall. Contained within the protective thoracic cage are the important life sustaining organs, such as lungs, Heart and the major blood vessels. Although the chest wall is strong; blunt or penetrating wounds can injure the soft organs. Flail chest (stove-in chest) is an extremely painful injury and impairs ventilation, thereby affecting oxygenation of the blood. This module will explain the Patho-Physiology of all the related conditions.

Rationale There is a high prevalence of respiratory diseases in our community which may leads to increased morbidity and mortality. A practitioner can only be able to deal with the patients suffering from the respiratory diseases when he/she has the basic concepts regarding the structural and functional knowledge of respiratory system. Acute respiratory infections, like pneumonia are critical for children, older adults and people with immune system disorders. For the management certain respiratory diseases, oxygen administration and artificial ventilation are required, hence it is better to explain the students on these topics in earlier years. Smoking is high risk factor for the development of COPD and lung cancer; therefore, its Patho-Physiology is important to learn. Respiratory module is designed in such a way that a student can understand structure, functions, pathogenesis, prescriptions including drug prescription and can educate the community regarding prevention of diseases and promotion of health.

Duration 5 weeks

Learning Outcomes

Knowledge: At the end of this module, the students will be able to:

- Describe the development and anomalies of the respiratory system.
- Define and identify the microscopic features of the respiratory system
- Describe the anatomy of the different parts of the respiratory system in detail
- Describe the functions of the respiratory system
- Interpret the Biochemical changes in the body related to the respiratory system
- Explain obstructive and restrictive pathologies involving respiratory system
- Describe the management of the respiratory diseases
- Perform the respiratory system examination
- Take the history of the patients and co-relate the respiratory sign & symptoms to reach the differential diagnosis
- To counsel the people in community regarding the risk factors of the respiratory diseases.

Skills

- Microscopic identification of the different parts of the respiratory system.
- Perform the spirometry & plot a graph of lung volume
- Perform the cardiopulmonary resuscitation(CPR)
- Analysis of general properties of lipids

- Application of pH meter
- Interpretation of ABGs, PFT
- Perform clinical examination of the respiratory system

Attitude

- Follow the basic laboratory protocols
- Participate in class and practical work professionally
- Communicate effectively in a team with pears, staff and teachers
- Demonstrate professionalism and ethical values in dealing with patients, cadavers, pears, staff and teachers.
- Communicate effectively in a team with pears and teachers.
- Demonstrate the ability to reflect on the performance.

Themes

Theme 1: The Chest / Thoracic wall and trauma
Theme 2: Airways and their conditions or diseases
Theme 3: Lung parenchyma & interstitium and the related diseases

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

Theme 1: The Chest/ Thoracic Wall and Trauma

S #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSES MEN
Anatomy				
1	• Define structure of the thoracic cage & wall. • Define thoracic inlet & thoracic outlet. • Discuss thoracic outlet syndrome. • Define general features of the sternum. • Define general features of the ribs. • Differentiate typical and atypical ribs. • Define costal cartilages.	**RESP-S1-Ana-G-1** Thoracic Cage I	Interactive Lecture	SBQs OSVE
2	• Define general features of the thoracic vertebra. • Differentiate typical and atypical thoracic vertebrae. • Discuss joints of the thoracic walls.	**RESP-S1-Ana-G-2** Thoracic Cage II	Demonstrati on	SBQs OSPE OSVE
3	• Define three morphological layers of the muscles of the thoracic wall. • Define intercostal spaces. • Define endothoracic fascia. • Discuss supra pleural membrane.	**RESP-S1-Ana-G-3** Muscles of the thoracic wall and intercostal spaces		
4	• Define intraembryonic mesoderm and its parts. • Discuss divisions of lateral plate mesoderm into visceral and parietal layers. • Define extent of intraembryonic coelom and its divisions.	**RESP-S1-Ana-E-1** Formation of the intraembryonic cavity ,Serous membranes and thoracic cavity		

	• Discuss formation of the pleuro-pericardial and pleuro-peritoneal membranes.			
5	• Discuss steps of development of diaphragm from its composite embryonic derivatives. • Discuss anomalies related with its development.	**RESP-S1-Ana-E-2** Development of the diaphragm	Interactive Lecture	SBQs OSVE
6	• Describe histological features of different layers of Trachea. • Identify tracheal epithelium and other microscopic features of the trachea with help of light microscope.	**RESP-S1-Ana-H-1** Histology of the Trachea	Practical	OSPE OSVE
Physiology				
7	• Describe overview of respiration • Describe parts and functions of respiratory tract • Define pulmonary ventilation	**RESP-S1-Phy-1** Overview of respiratory tract, functions	Interactive Lecture	SBQs & OSVE
8	• Describe mechanics of pulmonary ventilation and muscles of respiration	**RESP-S1-Phy-2** The mechanics of breathing I		
9	• Describe changes in the lung volume, alveolar pressure, pleural pressure & Trans-pulmonary pressure & its changes during respiration. • Discuss alveolar ventilation & dead space also describe cough & sneezing reflexes	**RESP-S1-Phy-3** The mechanics of breathing II		
10	• Define pulmonary surfactant • Describe the cells that produce surfactant • Explain the physiological functions of surfactant • Describe factors that increase or decrease surfactant production • Define IRDS (Hyaline Membrane Disease) • Explain the pathophysiology of IRDS • Describe clinical features of IRDS	**RESP-S1-Phy-04** Surfactant and IRDS		
11	• Define lung compliance & list factors affecting lung compliance • Describe composition & role of surfactant in maintaining the alveolar stability & infant respiratory distress syndrome • Differentiate compliance work, tissue resistance work & airway resistance work	**RESP-S1-Phy-5** Lung compliance & work of breathing		
12	• Define pulmonary volumes & capacities with their normal values & significance in pulmonary function test. • Discuss alveolar ventilation & dead space	**RESP-S1-Phy-6** Lung volumes & capacities		

13	• Record effect of respiration during sitting & standing of young adult on power lab & plot a graph. • Record the effect of swallowing & deglutition on respiration in healthy adult on power lab & plot a graph	**RESP-S1-Phy-P1** Effect of sitting , standing, during exercise and swallowing on respiration	Practical	OSPE OSVE
14	• Record effect of exercise on respiration in healthy adult on power lab & plot a graph • Interpret Pulmonary Function Tests	**RESP-S1-Phy-Practical-02** Record the lung volumes and capacities on power lab and plot a graph		
Biochemistry				
15	• Concept of pH, Buffers & their mechanism of action, Types of Buffers in humans	**RESP-S1-Bio-1** Concept of pH, Buffers & their mechanism of action, Types of Buffers in humans	Interactive Lecture	SBQs & OSVE
16	• Describe the acid base balance. • Explain the respiratory and metabolic acidosis & alkalosis with causes and compensatory mechanisms.	**RESP-S1-Bio-2** Acid Base Balance/ Metabolic & Respiratory Acidosis & Alkalosis		
17	• Description & Biomedical significance of Compound Lipids	**RESP-S1-Bio-3** Biomedical significance of Compound Lipids		
18	• Describe the Synthesis & Functions of Phospholipids. • Discuss role of lecithin in respiration	**RESP-S1-Bio-4** Synthesis of Phospholipids & Role of Lecithin in Respiration		
19	Demonstrate the pH Meter, Significance, interpretation	**RESP-S1-Bio-5** Introduction to pH Meter, Significance, interpretation	Practical	OSPE OSVE
Pathology				
20	• Describe pleural diseases and their pathogenesis and clinical features	**RESP-S1-Patho-1** Overview of pleural diseases	Practical	OSPE & OSVE
CLINICAL CLASSES				
21	• Define Chyne-stokes breathing and effects on body. • Define COPD and RLD. • Differentiate between RLD & COLD & effects on body (obstructive & restrictive lung disease). Is COVID-19 RLD or COLD	**RESP-S1-MED-1** Obstructive and Restrictive Lung Diseases	Interactive Lecture	SBQs & OSVE

	type of disease • Define emphysema, chronic bronchitis. • Define Bronchiectasis. • Define interstitial lung diseases			

Theme 2: Airways and Their Conditions or Diseases

S #	LEARNING OBJECTIVES	TOPICS	TEACHING STRATEGY	ASSESSMENT
Anatomy				
22	• Discuss attachments of the diaphragm. • Define blood and nerve supply of the diaphragm. • Identify openings in the diaphragm with levels. • Define structures passing through these openings. • Define functions of the diaphragm.	**RESP-S1-Ana-G-4** The Diaphragm and its Openings	Demonstration	SBQs, OSPE & OSVE
23	• Describe mediastinum • Describe boundaries and divisions of mediastinum • Enumerate structures present in it	**RESP-S1-Ana-G-5** Mediastinum	Interactive Lecture	SBQs & OSVE
24	• Define anatomy of the trachea. • Discuss clinical conditions related with trachea. • Define anatomy of the principal bronchi. • Discuss clinical conditions related with bronchi	**RESP-S1-Ana-G-6** Anatomy of the tracheobronchial tree		
25	• Describe development of the larynx, trachea and bronchi. • Discuss anomalies related with development of these structures.	**RESP-S1-Ana-E-3** Formation of the Larynx, Trachea and Bronchi	Interactive Lecture	SBQs & OSVE
26	• Describe microscopic features of the bronchi. • Differentiate primary bronchioles from the tertiary bronchioles. • Identify general histological features of bronchi and bronchioles with help of light microscope. • Identify structure of the alveoli under microscope and correlate functions of different types of cells, forming the alveolar wall. • Identify structure and function of the blood air barrier	**RESP-S1-Ana-H-2** The Histology of the Bronchi: Primary and Tertiary Bronchioles and alveoli	Practical	OSPE & OSVE
Physiology				
27	• Describe pulmonary circulation and lung zones (1, 2, 3); describe ventilation-perfusion ratio and mismatching. explain capillary dynamics; explain pulmonary edema & pleural effusion;	**RESP-S1-Phy-07** Pulmonary Circulation & V/Q Relationship	Interactive Lecture	SBQs & OSVE
28	• Describe structure & functions of			

	Respiratory membrane • Gasses exchange across the respiratory membrane • Factors affecting exchange through membrane	**RESP-S1-Phy-08** Exchange of gases and Diffusion of Gasses		
29	• Explain diffusion of gases; mechanism of CO_2 transport; gas exchange between blood & tissues; discuss Bohr effect & Haldane effect.it	**RESP-S1-Phy-09** Transport of oxygen Transport of CO2		
30	• Explain sigmoid curve shape; flat and steep portions; right and left shift; Hb–O_2 curve changes at lung and tissue levels.	**RESP-S1-Phy-10** Oxygen Hemoglobin Dissociation Curve		
31	• Enlist respiratory centers • Describe mechanisms of nervous regulation of respiration • Describe reflexes involve in nervous • regulation	**RESP-S1-Phy-11** Nervous regulation of respiration		
Biochemistry				
32	Describe the Glycosis in detail.	**RESP-S1-Bio-6** Glycosis	Interactive Lecture	SBQs & OSVE
33	Describe role of TCA Cycle in cellular respiration	**RESP-S1-Bio-7** Role of TCA Cycle in cellular respiration		
34	• Demonstrate the Arterial blood gases significance • Describe the ABG's interpretation with various respiratory disorders	**RESP-S1-Bio-8** Arterial blood gases (ABGs) interpretation	Practical	OSPE & OSVE
Pathology				
35	• Describe types and clinical features of pulmonary edema. • Define acute lung injury. • Describe causes of ARDS • Discuss characteristic features, morphology, and pathogenesis of ARDS. • Discuss types and causes of Atelectasis	**RESP-S1-Path-2** Pulmonary edema, ARDS, and Atelectasis	Interactive Lecture	SBQs & OSVE
Pharmacology				
36	• Classify drugs used to treat dry and productive cough according to their mechanism of action. • Describe adverse effects, contraindications and drug interactions of the drugs used to treat various types of cough.	**RESP-S1-Pharm-1** The Anti-Tussives, Expectorants and Mucolytes. Drugs	Interactive Lecture	SBQs & OSVE

	•			
Clinical Classes				
37	• Define hypoxia and its types. • Explain effects of the hypoxia. • Explain psychogenic dyspnea & causes of psychogenic dyspnea • Define cyanosis. • Explain prevention strategies of cyanosis. • Enlist three principal reasons of cyanosis. • Define CO2 poisoning. • Explain the effects of CO2 poisoning and preventing measures of CO2.	**RESP-S1-MED-2** Hypoxia Cyanosis CO2 poisoning	Interactive Lecture	SBQs & OSVE

Theme 3: **Lung Parenchyma and Interstitium and their Conditions or Diseases**

S. #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY	ASSESSMENT
Anatomy				
38	• Define structure and neve supply of pleura	**RESP-S1-Ana-G-7** Anatomy of the pleurae	Demonstration	SBQs, OSI & OSVE
39	• Describe gross and surface anatomy of the lungs. • Discuss the phases of the respiration • Define bronchopulmonary segments. • Define types of the respiration. • Discuss clinical conditions related with lungs.	**RESP-S1-Ana-G-8** Gross and Surface Anatomy of the lungs Mechanism of the respiration		
40	• Define blood and nerve supply of the lungs. • Discuss clinical conditions related with lungs.	**RESP-S1-Ana-G-9** Anatomy of the lungs-3 (Blood supply)	Interactive Lecture	SBQs & OS
41	• Define clinical significance of chest X- ray in respiratory diseases.	**RESP-S1-Ana-G-10** Radiology: Basics of chest X-ray		
42	• Discuss formation of laryngo-tracheal groove & respiratory diverticulum or lung buds. • Define anomalies related with development of the lung buds. • Discuss stages of development / maturation of the lungs. • Discuss anomalies related with the lung maturation	**RESP-S1-Ana-E-4** Formation of the lung buds The maturation of the Lungs		
Physiology				
43	• Describe chemical control of	**RESP-S1-Phy-12**	Interactive	SBQs & OS

	respiration • Explain chemoreceptor involved in • Describe regulation of respiration during exercise. • Explain Periodic breathing	Chemical regulation of respiration Regulation during exercise	Lecture	
44	• Define respiratory changes associated with High altitude • Discuss hypoxia and its types.	**RESP-S1-Phy-13** High altitude & Hypoxia		
45	• Explain deep sea diving Physiology • Describe caisson's disease	**RESP-S1-Phy-14** Deep sea Diving Physiology		
46	• Describe hypoxia aind its types	**RESP-S1-Phy-15** Hypoxia		
Biochemistry				
47	• Describe organization of the Electron Transport Chain	**RESP-S1-Bio-9** Organization of Electron Transport Chain	Interactive Lecture	SBQs & OS
48	• Describe Oxidative phosphorylation & ATP Synthesis	**RESP-S1-Bio-10** Oxidative phosphorylation & ATP Synthesis		
49	• Demonstrate role of emulsification in respiration and digestion.	**RESP-S1-Bio-11** Role of Emulsification in respiration and digestion	Practical	OSPE & OS
Pathology				
50	• Define Chronic Obstructive Pulmonary Diseases (COPD). • Classify the types of COPD. • Describe pathogenesis and clinical features of COPD**.**	**RESP-S1-Path-3** Overview of Chronic Obstructive Pulmonary Diseases (COPD)	Interactive Lecture	SBQs & OS
51	• Define Pneumonia. • Discuss etiological classification of Pneumonia. • Discuss types and clinical features of Pneumonia. • Discuss diagnostic tools for Pneumonia	**RESP-S1-Path-4** Overview of Pneumonia		
Clinical				
52	• Define RDS. • Describe sign and symptoms of the respiratory distress syndrome. • Enlist the causes of the respiratory distress syndrome • Discuss the management	**RESP-S1-Med-3** Respiratory distress syndrome	Interactive Lecture	SBQs & OS

BEHAVIOURAL SCIENCES

Introduction

Behavioral sciences (BS) is the scientific study of human behavior, and it includes psychology, sociology, and anthropology. These three disciplines are taught together in undergraduate curricula around the world because they are all concerned with understanding human behavior from different perspectives. BS is similar to other basic medical sciences, such as anatomy, biochemistry, physiology, and pathology, in that it explains existing behavior and can be used to predict the behavior of patients and healthcare providers in both clinical and non-clinical situations.

Behavioral sciences are essential for physicians to understand the psychosocial aspects of medical disorders. A physician who has been trained in BS is aware of the impact of history, culture, environment, and psychology on the manifestation of various symptoms. This knowledge allows physicians to communicate more effectively and ethically with their patients, and to develop treatment plans that include not only the patient but also the family.

Behavioral sciences can also be beneficial to medical students on a personal level. By understanding the modern theories of learning, memory, and cognition, students can improve their own learning abilities. Additionally, the knowledge of behavioral sciences can help students to better understand themselves and their relationships with others.

In 2022, the Pakistan Medical & Dental Council (PM&DC) assigned 50 teaching hours to the subject of behavioral sciences in the curriculum of MBBS. This is a significant step in the right direction, as it acknowledges the importance of BS in medical education. It will help to produce physicians who are better equipped to understand and treat the psychosocial aspects of medical disorders. This will ultimately lead to improved patient care.

Rationale

- To provide medical and dental graduates with a broader bio-psycho-social perspective on health and illness.
- To teach students how to use principles of learning and behavior change to enhance their own learning capabilities and to help their patients make positive behavioral changes.
- To help medical graduates develop the ethical and personal qualities necessary to provide compassionate and effective care.

Learning Outcomes of Behavioral Sciences Among MBBS Students:

Upon completion of a BS course in undergraduate MBBS, students should be able to:

KNOWLEDGE:

- Comprehend BS in clinical practice.
- Conceptualize the holistic aspect of medical learning.

- Understand communication skills in clinical and non-clinical settings.
- Understand human cognitive faculties like learning, memory, perception, thinking, intelligence, and meta-cognition that regulate behavior.
- Demonstrate the psychological components of health and disease like defense mechanisms and personality in various behavioral states.
- Apprehend psychosocial issues in special hospital settings.
- Learn psychosocial aspects of aging, death, pain, and terrorism.
- Be aware of sex and gender issues in pre-clinical, clinical, and professional settings.
- Understand and recognize common psychiatric ailments like anxiety, depression, and stress.

SKILLS

- Keep an eye on behavioral issues while working in pre-clinical, clinical, and professional settings.
- Understand patients' stance while taking a comprehensive history or in any other scenario like breaking bad news, conflict resolution, disaster management, information care, etc.
- Communicate well his/her own understanding and strategy in interpersonal relationships.
- Use cognitive and behavioral theories while communicating with others and in any clinical or non-clinical activity.
- Believe in the implication of socio-cultural factors such as gender, race, social class, family, and occupations in health and disease.
- Be able to correlate the psychosocial aspects with the common clinical conditions (DM, Coronary Artery Disease, AIDS, etc.)
- Identify the social and anthropological factors that influence detection, management, compliance, and clinical outcome (stigma, myths, cultural taboo, somatization, etc.)
- Demonstrate stress management skills towards self, patients, and colleagues.
- Be highly concerned about the psychosocial factors in important clinical settings like hospitalization, emergency, ICU, cancer wards, etc.

ATTITUDE

- Exhibit the highest level of ethical and professional standards in his/her character with the patients, colleagues, teachers, relatives, attendants, pharmaceutical industry, and public as a whole.
- Be highly concerned about the rights of patients and doctors envisaged in law, constitution, and religion.
- Acknowledge the social, cultural, and anthropological aspects of health and disease.
- Demonstrate confidentiality and privacy of their patient's information in their clinical practice, interaction with colleagues, and medical/dental and other authorities.
- Undertake an informed consent from the patient.
- Demonstrate principles of these Medical/Dental Ethics in their interactions with patients, their relatives, colleagues, pharmaceutical industry, and medical/dental as well as other authorities.

In conclusion, BS is an essential component of medical education. It provides students with the knowledge, skills, and attitudes necessary to provide comprehensive and patient-centered care.

LEARNING METHODOLOGIES

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

- Lectures
- Interactive Lectures
- Demonstrations
- Hospital / Clinic visits
- Problem- Based Learning (PBL)
- Case- Based Learning (CBL)
- Practical's
- Skills session
- E-Learning
- Self-learning

THEME 1: Introduction to Behavioral Sciences and Its Importance in Health

S#	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY
1.	Comprehend the significance of behavioral sciences in medical practice. Understand the bio psycho-social model in clinical practice, along with the impact of culture on medical practice. gain a comprehensive understanding of psychology, sociology, anthropology, and the biological determinants of health and disease in clinical practice, and be able to identify normal and abnormal behaviors	**PAR-S-1-BS-1** **Introduction to Behavioral Sciences and its importance in health.** • The importance of behavioral sciences in healthcare • The Bio-psycho-social model of health and illness • The connection between health and behavioral sciences (psychology, sociology, anthropology). • The correlation between body, brain, mind and behavioral sciences • Normality vs. abnormality	**LECTURE**

THEME 2: Understanding Behavior

S#	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY
1.	Analyze human behavior by examining factors such as sensation, sensory organs, perception, attention, concentration, memory, thinking, and communication. Evaluate how these elements influence the development of psychological and behavioral disorders, applying clinical reasoning and fostering personal growth in learning and practice.	**PAR-S-1-BS-2** **Understanding Behavior: Sensation, Perception,** **Attention, Memory, Thinking, and Communication.** • Explore sensation and the functions of sensory organs. • Define perception, its influencing factors, and abnormalities, including extrasensory perception (ESP). • Examine attention and concentration, focusing on factors that affect their efficacy. • Discuss memory, including its stages, types, and strategies for enhancement. • Analyze thinking, its types, and related theories, along with levels of cognition, problem-solving techniques, and decision-making strategies. • Define communication, highlighting its types, modes, influencing factors, non-verbal cues, and the characteristics of effective communication.	**LECTURE**

THEME 3: THEME 3: Individual Differences

S#	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY
1.	Analyze the types of human personality and the stages of personality development, emphasizing their influence on behavior and	**PAR-S-1-BS-3** **Understanding Individual Differences: Personality, Intelligence.** • Explore the stages and key characteristics of psychological human growth and development. • Define personality and examine cognitive and psychodynamic theories, factors influencing personality development, and methods of	**LECTURE**

	growth. Assess the role of intelligence in shaping personal and professional success.	assessment. Analyze how personality impacts responses to health, disease, hospitalization, and stress. • Define intelligence and its various types, including IQ and EQ, and their relevance in a doctor's life. Discuss strategies to enhance EQ and effectively utilize IQ. Examine factors influencing intelligence and methods of assessment.	
2.	Explain the complex relationship between brain function and behavior, focusing on emotions, motivation, and learning, as well as strategies to manage and enhance these processes effectively.	**PAR-S-1-BS-4** **Interplay of Brain and Behavior: Emotions, Motivation/need/drive and Learning** • Define emotions, their types, and the concept of Emotional Quotient (EQ), emphasizing emotional literacy and its practical utility. • Define motivation, its types, and the application of motivational theories to improve learning and treatment adherence. • Define learning and explore its principles, modern methods, learning styles, and types of learners. Discuss cognitive theories of learning and strategies to enhance learning skills effectively	**LECTURE**

THEME 4: Doctor-Patient Relationship and Medical Ethics

S#	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY
1.	Critically evaluate complex clinical scenarios to identify and resolve ethical and practical challenges while upholding ethical boundaries within the doctor patient relationship. Demonstrate professionalism and strive for excellence in fostering trust and maintaining a healthy, effective doctor-patient dynamic.	**PAR-S-1-BS-5** **Doctor-Patient Relationship and Medical Ethics.** • Professional boundaries and psychological aspects (e.g., transference, counter-transference). • Ethical principles: Hippocratic Oath, medical/dental ethics, and patient-doctor rights (international law, Pakistan's Constitution, PM&DC, Islam). • Ethical dilemmas in interactions with families, colleagues, and the pharmaceutical industry. • Emerging issues: e-consultation, telemedicine, euthanasia, and physician-assisted	**LECTURE**

		suicide	

THEME 5: Communication skills and Non-Pharmacological Interventions

S#	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY
1.	Demonstrate effective communication skills in clinical practice, including the use of non-pharmacological interventions such as counseling, providing informational care, and sensitively breaking bad news, in conjunction with appropriate medication management. Effectively handle patient information across diverse clinical scenarios while maintaining confidentiality and professionalism. Develop the ability to navigate and manage uncertain situations with confidence and empathy in clinical practice	**PAR-S-1-BS-6 Communication skills and Non-Pharmacological Interventions (NPIs) in Clinical Practice.** • Principles of effective communication: active listening, the art of questioning, and the art of listening. Characteristics of good and bad listeners. • Counseling: Scope, indications, contraindications, steps, do's and don'ts. Managing real-life crisis and conflict situations in health settings. • Informational Care: Communicating with patients about disease, medications, prognosis, etc. • Breaking bad news: Introduction, model, and approach to patient and caregivers	**LECTURE**

COMMUNITY MEDICINE

FOUNDATION MODULE

Learning Outcomes

By the end of this foundation module, students will be able to:

- Define community medicine and explain its scope, principles, and relevance to public health.
- Describe the concepts of health and disease and their determinants in a community setting.
- Recognize the role of community medicine in disease prevention, health promotion, and primary care.
- Describe the natural history of disease and prevention strategies.
- Outline the structure of the health care delivery system in Pakistan, including primary, secondary, and tertiary levels of care.
- Identify key public and private sector health service providers in Pakistan, including Basic Health Units (BHUs), Rural Health Centers (RHCs), Tehsil and District Headquarter Hospitals.
- Explain the concept and importance of Sustainable Development Goals (SDGs) with special emphasis on SDG-3 (Good Health and Well-being).

Rationale

The Community Medicine Foundation Module provides students with a conceptual framework for understanding health beyond the individual patient, emphasizing the community as a unit of care. Early exposure to public health principles helps future doctors develop a preventive, promotive, and population-based approach to health care. This module builds the foundation for later clinical and field-based learning by linking social, environmental, and behavioral factors with disease occurrence, thereby preparing students to address the major public health challenges of Pakistan effectively.

S.No	Topic	Sub Topic/ Lecture	Learning Objectives
1	**Introduction to Community Medicine & Public Health:**	Introduction to Community Medicine & Public Health	• To define different definition of public health/Community Medicine • To learn evolution of public health, its importance in today's world • To discuss the basic functions of Public health/community Medicine • To differentiate between the clinical and community medicine • To discuss seven-star doctor
2	**Concept of**	Concept of Health and Disease	• To understand the various concepts of health and disease. • To understand the concept of wellbeing

	Health & Disease		• To understand the Health Dimensions • To discuss the Spectrum of health
3		Determinants of health and Health Indicator	• To define the concept and importance of determinants of health • To define and classify health indicator • To describe the characteristics of health indicators • To define the concept of DALY and QALY
4		Natural history of disease & Ice berg phenomenon Levels of prevention	• To define the concept of Epidemiological Triangle • To know the natural history of disease • To discuss the ice berg phenomenon • To define the level of prevention • To discuss the Primordial, Primary, Secondary, Tertiary level of prevention and mode of interventions.
5	**Health system in Pakistan**	Concept of Primary Health Care	• To discuss the "health for All", background, concepts and progress. • To discuss the Alma Ata Declaration • To discuss the Universal health coverage • To define Primary health care • Component of primary health care
6		Tiers of Health care delivery system of Pakistan	• To learn about health care delivery system of Pakistan • To define the concept of Vertical and horizontal program
7		Health policy and plans of Pakistan & Sustainable Development Goals	• To describe the national health policy and plans of Pakistan • To define Sustainable Development Goals (SDGs). • To describe the 17 SDGs and their purpose. • To explain the importance of SDGs for global and national development. • To discuss the Pakistan's progress and challenges related to SDGs

Undergraduate Research Module
Certificate Course for Undergraduate MBBS Students
Basics of Epidemiology, Biostatistics, and Research (BEBR)

Learning Outcomes:
By the end of this course, the student will be able to:

1. Define the role of research in health sciences and describe the core ethical principles governing medical research.
2. Differentiate between major epidemiological study designs and identify the appropriate design for a given clinical question.
3. Explain key epidemiological measures (incidence, prevalence) and basic measures of association (odds ratio, relative risk).
4. Classify data variables and select appropriate statistical summaries.
5. Interpret foundational statistical concepts (mean, standard deviation, p-value, confidence interval) as presented in medical literature.
6. Formulate a focused research question using the PICO(T) framework and conduct an effective search of online medical databases.
7. Demonstrate foundational research skills, including designing a basic data collection tool, entering and cleaning data in a spreadsheet, and calculating descriptive statistics.
8. Determine the steps of data entry using statistical software (SPSS)
9. Outline the key components and sequential steps involved in writing a structured research proposal and draft a mini research proposal.
10. Conduct an effective, systematic search of online medical databases (e.g., PubMed) using MeSH terms.
11. Apply a standard medical citation style (e.g., Vancouver, APA) and utilize reference management tools (EndNote / Mendeley)
12. Demonstrate professional responsibility by valuing academic integrity, collaborative teamwork, and patient-centred ethics.

Rationale

In the modern era, a physician must be more than a passive consumer of textbooks; they must be a critical evaluator of evidence and a custodian of community health. This module addresses this dual mandate by integrating research methodology, epidemiology, and biostatistics from the beginning, while also establishing the community as a foundational unit of care. This early exposure bridges a critical disconnect, fostering evidence-based thinking that illuminates the dynamic science behind subjects like Physiology and Biochemistry, and cultivates a preventive, population-based mindset. Furthermore, by introducing principles of research proposal designing, it equips students to link social, environmental, and behavioral determinants with disease, transforming them into ethical inquirers. Ultimately, this integrated approach prepares future physicians to be both critical physician-scientists and effective community practitioners, ready to address Pakistan's public health

challenges through systematic investigation and meeting regulatory mandates for research-oriented education.

1. **Instructional Methodology:** The course utilizes an interactive pedagogical approach, consisting primarily of Lectures and exercises.
2. **Certification Criteria:** Award of the certificate is conditional to 85% attendance and the successful completion of a mini-research proposal.
3. **Assessment:** The course will follow a Formative and Summative assessment model, with evaluations conducted at the end of Research Module (Practice exercises, mini-research proposal submission, and end of course exam)

Basics of Epidemiology, Biostatistics, and Research (BEBR)	
Undergraduate Research Certificate Course **Research Module - I**	
First year MBBS	**No of lectures**
Unit 1: Foundation and Fundamentals of Epidemiology (Measuring Health & Disease)	06
Unit 2: Study Designs & Epidemiology (How do we design a study to answer the question?)	05
Total Lectures	**11**
Second year MBBS	**No of lectures**
Unit 3: Basic Biostatistics (Interpreting the Data) (Making sense of the numbers (Data Literacy).	06
Unit 4: The Research Process (Finding the Evidence)	08
Total Lectures	**14**

Undergraduate Research Module
Certificate Course for Undergraduate MBBS Students
Basics of Epidemiology, Biostatistics, and Research (BEBR)
Research Module – I

Learning Outcomes:

By the end of this module, the Year 1 student will be able to:

- Define Evidence-Based Medicine and explain the components of the Epidemiological Triad (Agent, Host, Environment).
- Differentiate between key measures of disease frequency (Incidence and Prevalence) and explain the appropriate context for using each.
- Distinguish between the major observational study designs (Descriptive, Case-Control, Cohort) and experimental studies (RCTs).
- Interpret basic measures of association (Odds Ratio, Relative Risk) to determine if an exposure is a risk factor.
- Formulate a specific, focused clinical research question using the PICOT (Population, Intervention, Comparison, Outcome, Time) format.
- Draft the preliminary section (Phase 1) of a research proposal, including a Title, Rationale, and specific Objectives.

Rationale

In the first year of MBBS, students are introduced to the basic sciences (Anatomy, Physiology) to understand the normal functioning of the human body. It is equally critical to introduce the "Basic Science of Public Health" Epidemiology. This module provides the logical framework for understanding how diseases interact with populations. By learning study designs and the concept of risk early, students develop critical thinking skills necessary to understand why we treat patients the way we do, moving beyond rote memorization to an evidence-based mindset.

Lecture	Learning Objectives
Unit 1: **Foundation and Fundamentals of Epidemiology (Measuring Health & Disease)** Focus: What is research and what are we looking for? How do we track diseases in a population?	
Lecture 1. **Introduction to Research & Evidence-Based Medicine**	○ The "Physician-Scientist" concept ○ Research and Evidence based medicine importance ○ Triad of Evidence Based Medicine ○ Role of the Physician-Scientist as a bridge between th lab and the bedside ○ Why research is essential for patient care ○ Students poll on why research matters for their futur patients
Lecture 2. Introduction of epidemiology and concept of The Epidemiological Triad	○ Define Epidemiology ○ Describe the basic terminologies, objectives and use of epidemiology ○ The Epidemiological Triad: Agent, Host, an Environment interaction. ○ Burden of Disease: How to use global data (WHO/CDC to justify why a research topic is important.

Lecture 3. Measures of Disease Frequency	○ Incidence vs. Prevalence: The "Bathtub Analogy" (Nev cases vs. Existing cases). ○ Rate, Ratio and Odds ○ Morbidity vs. Mortality rates
Lecture 4. The Concept of Risk	○ Association vs. Causation (Bradford Hill Criteria). ○ Risk Factors: Modifiable vs. non-modifiable.
Lecture 5: Framing the Research Question (PICOT)	○ Review of Population, Intervention, Comparison Outcome. ○ Convert a vague statement ("I want to study smoking" into a PICOT question ("In adult males [P], does vapin [I] compared to cigarettes [C] reduce the risk of lun cancer [O] over 5 years [T]
Lecture 6: Proposal Writing Phase 1 (The "What" & "Why")	○ The Anatomy of a Proposal (Skeleton: Title→ Introduction → Methods→Analysis) ○ Drafting the Title ○ Writing the Rationale ○ Writing SMART Objectives
Unit 2: Study Designs & Epidemiology Focus: How do we design a study to answer the question?	
Lecture 7: Descriptive Studies	○ Study Designs and their purpose ○ Descriptive: Case Reports, Case Series. ○ Cross-sectional study (Prevalence studies) ○ Purpose and Uses ○ Advantages vs Disadvantages Measure of occurrence in cross-sectional study
Lecture 8: Analytical Studies (Case-Control)	○ Concept of the Medical Detective: purpose of Case Control study ○ Case-Control Studies (Looking Backward) ○ Advantages vs Disadvantages ○ Measure of occurrence and association in Case-contro studies.
Lecture 9: Analytical Studies (Cohort Study)	○ Concept of the Medical Detective: purpose of Cohor study ○ Cohort Studies (Looking forward) ○ Advantages vs Disadvantages ○ Measure of occurrence and association in Cohor Study.
Lecture 10: Experimental Studies	○ Introduction to Experimental Research ○ Core Components of a Randomized Control Trial Blinding (Masking)
Lecture 11: Measures of associations	○ Different types of measures of associations ○ Measures used in different study designs ○ Rate ratio vs Risk ratio ○ Odds Ratio

INFORMATION TECHNOLOGY

Introduction/ Rationale

The integration of information technology into the MBBS (Bachelor of Medicine and Bachelor of Surgery) curriculum is essential in today's rapidly evolving healthcare landscape. IT proficiency is vital, as it will equip MBBS students with the skills needed to navigate electronic health records, telemedicine platforms, and advanced diagnostic tools. It enables efficient data management and evidence-based decision-making. Moreover, IT skills are crucial for facilitating interdisciplinary collaboration, ensuring that MBBS graduates can research, access academic literature, and adapt to emerging healthcare technologies. By incorporating an IT module, the MBBS curriculum aligns with the evolving healthcare environment. It is time that healthcare professionals stay updated with the latest medical research, clinical guidelines, and best practices. IT modules will help students leverage digital resources for continuous learning, including online courses, webinars, and virtual conferences, ultimately leading to ongoing professional development. Understanding healthcare management systems, hospital information systems (HIS), and administrative software is crucial for effective healthcare administration. IT modules will provide relatable knowledge to students.

Learning Outcomes

After completing this IT module, students will be able:

- To effectively use office software (e.g., Microsoft office, google workspace) for tasks such as word processing, spreadsheet analysis, and presentation creation.
- To organize, store, and manage medical documents and reports using office automation tools.
- To proficiently use medical databases (e.g., PubMed, The Cochrane Library) to access scholarly articles, research, and evidence-based resources.
- To edit medical images and videos for presentations, reports, and patient education, ensuring accuracy and clarity.
- To use visuals effectively to convey medical information, diagnoses, and treatment plans.
- To comprehend the fundamental principles of electronic health records (EHR), including their structure, purpose, and functionalities. They will learn to enter, update, and manage patient information and medical records in EHR systems.

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

S. #	LEARNING OBJECTIVES	TOPIC	TEACHING STRATEGY
01	To learn the basics of IT, importance, benefits, and major areas of Information Technology	**PAR-S-1-IT-1** Introduction to IT & its Importance in healthcare	Lecture
		PAR-S-1-IT-2 Advance applications of IT in healthcare (AI, EHR, mHealth, IoT)	
02	Learn efficient content delivery and resource management in a digital environment	**PAR-S-1-IT-3** Google Classroom	Practical
03	Comprehensive understanding of computer system components, their functions, and the skills necessary for hardware maintenance, troubleshooting, and optimization	**PAR-S-1-IT-4** Components of a Computer System	Lecture
		PAR-S-1-IT-5 Hardware & Software	
		PAR-S-1-IT-6 Types of Software	
		PAR-S-1-IT-7 Software Installation and Troubleshooting	Practical
		PAR-S-1-IT-8 Operating System	Lecture
		PAR-S-1-IT-9 Microprocessors, mobile computing	
04	Developing skills in document design, enhancing aesthetics for professional presentations and reports. Learn to Explore advanced techniques for data visualization	**PAR-S-1-IT-10** Word Processing Software	Practical
		PAR-S-1-IT-11 Presentation Software	
		PAR-S-1-IT-12 Data Analysis using MS Excel software	

Recommendation:

Relevant reading material and supplementary handouts will be provided during classes/ lectures

BIOMEDICAL ETHICS

Introduction/ Rationale

The rationale for teaching Biomedical Ethics to MBBS students at LUMHS is rooted in several important considerations related to the fields of medicine, healthcare, and related professions. This will provide ethical guidance and education, promote ethical behavior, protect patient rights and resolve ethical dilemmas. This will help students as future professionals to navigate complex ethical challenges and ensures that ethical principles and values are integrated into the practice of medicine, research, and other professional fields. Ultimately, this course will play a vital role in promoting ethical conduct and maintaining the trust and integrity of these professions.

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

S #	LEARNING OUTCOMES	TOPIC	TEACHING STRATEGY
01	• Students should be able to understand the principles of bioethics and what is ethical practice and what is an ethical dilemma • Students should be able to understand harms and benefits in health care settings • Students should be able to understand the concepts of autonomy and individual responsibility and to understand their significance for the health care provider patient relationship • Students should be able to understand concept of non-maleficence and Hippocratic oath • Students should be able to understand concept of justice in health care setting and equity in resource allocation	**PAR-S-1-ETH-1** Introduction to Biomedical Ethics	**Lecture SGD**

RESEARCH

Introduction

The foundation of any institution is research. Advanced nations assert that their advancements in research and development have modernized them and enabled them to generate revenue. Globally, medical universities are essential to the advancement of healthcare. Beginning with health issue prediction surveys and continuing with the creation of innovative medications and diagnostic methods.

Any institution's greatest asset is its student population. Here, we offer the guidelines and framework for research curriculum, which will assist you in reaching degree program standards.

The scientific research element of the medical curriculum aims to develop a research-oriented mindset in students that promotes evidence-based practice, critical thinking, and a more comprehensive understanding of medical science. This module focuses on bridging the knowledge gap between theory and clinical application by giving students the tools they need to carry out significant medical research.

Rationale

Research is essential to expanding our understanding of medicine and enhancing patient care. Students who engage in research projects improve their analytical and critical thinking skills, strengthen their capacity to understand scientific literature, and make a positive impact on the continuous advancement of medical science. Students' academic journeys are further enhanced by research experiences, which equip them to make evidence-based decisions in their future healthcare endeavors.

Learning Objectives:

- **Develop Research Competence:** Get the know-how required to plan, carry out, and evaluate medical research on your own.
- **Critical Thinking:** Gain the capacity to evaluate scientific literature critically, understanding research techniques and coming to conclusions supported by data.
- **Communication Skills:** Improve your written and verbal communication abilities to effectively communicate research findings to a variety of audiences.
- **Ethical Considerations:** Show your dedication to responsible and open scientific inquiry by understanding and putting ethical principles into practice in your research.

TOPICS WITH SPECIFIC LEARNING OBJECTIVES AND TEACHING STRATEGIES

S #	LEARNING OBJECTIVE	TOPICS	TEACHING STRATEGY
1	Define Research Fundamentals	**PAR-S-1-RES-1** Introductory class	Lecture
2	Describe Fundamentals of Biostatistics	**PAR-S-1-RES-2** Introduction to Biostatistics	
3	Enlist the types of research variables	**PAR-S-1-RES-3** Types of Research Variables	
4	Identify methods of measuring Central Tendencies & Measures of Dispersion	**PAR-S-1-RES-4** Central Tendencies & Measures Of Dispersion	
5	Summarize Concepts of basic research	**PAR-S-1-RES-5** Basic Research	
6	Demonstrate an understanding of different research designs	**PAR-S-1-RES-6** Study Designs	
7	Summarize and synthesize relevant literature to establish the research context	**PAR-S-1-RES-7** Literature search	
8	Identify and apply appropriate research methods and techniques.	**PAR-S-1-RES-8** Basic Laboratory techniques	
9	Define research proposal and its contents	**PAR-S-1-RES-9** What is research proposal and how to write it?	
10	Define research proposal and its contents	**PAR-S-1-RES-10** What are the components of proposal writing?	
11	Define research proposal and its contents	**PAR-S-1-RES-11** Presentation of Research Proposal	Discussion

Model Course Outline
for the Course Understanding of Quran – I

Course Title: Understanding of Quran – I
Course Book: Muallim ul Quran (Volume 1, 2 & 3) by Dr Ubaid ur Rahman
Credit Hours: 1 (0-1)
Contact Hours: 3 per week
Weeks: 15-16 (45-48 hours)

Course Learning Outcomes:

By the end of this course, students will be able to:

1. Develop the ability to understand basic words of the Quran, phrases and sentences that do not contain verbs (unit 1 to 5 of Muallim ul Quran Book) and then sentences having present tense (first half of unit 6 of Muallim ul Quran Book).
2. Acquire a strong foundation for understanding long verses of the Quran with clarity.
3. Comprehend Quranic vocabulary, particles (operative & non operative particles) , compounds (Adjective & Possessive compound), pronouns (singular & plural) and types of plural through hundreds of Quranic sentences.
4. Recognize and understand different styles of Quranic sentences, including nominal sentence, emphatic sentence, double emphatic sentence, negative sentence, interrogative sentence, oath –based sentences.
5. Strengthen understanding of fundamental Quranic linguistic styles, expressions and idioms.
6. Understand at least 30 to 40 % of each page of the holy Quran.

Provision of material, content and books:

- **Paper book**: All volumes are available in printed book form.
- **Tutorial videos:** Teaching video of each lesson available on YouTube.
- **Confirmation Videos:** A complete series of confirmation videos of all lessons is available in which the student can confirm his answers.
- **A flipbook:** A flipbook edition is also accessible.
- **Helping material:** Helping material for the teachers like quizzes, question papers and images is available on website.

Course Outline:

Weeks	Lectures (1.5 hrs)	Units	Lessons	Assignments/Home Task	Linguistic Rules
1.	1.	1	1-6	Writing the meaning of Quranic words Lesson 1-8	Proper Noun Masculine & Feminine
	2.	1	9-14	Writing the meaning of Quranic words 9-14	Two kinds of plural Concept of (و) "And" Common Noun
2.	1.	1	15-17	Writing the meaning of Quranic words, phrases & translation of Sentences 15-17	Demonstrative Noun (This & That for Masculine (هذا- هذه) Demonstrative Noun (This & That for Feminine) (ذلك- تلك)
	2.	1	18-19 & Revision (Unit 1)	Writing the meaning of Quranic words , phrases & translation of Sentences 17-19 Quiz	Laam for emphasis (لام التأكيد) Superlative Degree like أكبر Revision of all Quranic Sentences
3.	1.	Unit 2	1-3	Writing the meaning of Quranic words, phrases & translation of Sentences 1-3	Emphatic Particle إن Preposition "For" (اللام) Preposition (في)
	2.	2	4-6	Writing the meaning of Quranic words, phrases & translation of Sentences 4-6	Preposition (على- من- إلى)
4.	1.	2	7- 9	Writing the meaning of Quranic words & translation of Sentences 7-9	Preposition (الباء) Absolute Negation Particle Exceptive Particle (لا النافية للجنس)(ما النافية) (إلا)
	2.	2	10-13 & Revision (Unit 2)	Writing the meaning of Quranic words, phrases & translation of Sentences 10-13 Quiz	Subordinating Conjunction(أن), Was (كان), Vocative Particle(حرف النداء)

5.	1.	Unit 3	1-2	Writing the meaning of Quranic phrases 1-2	Quranic Adjective Compounds (صفة وموصوف)
	2.	3	3-5	Writing the meaning of Quranic phrases & translation of sentences 3-5	Quranic Possessive Construction (مضاف ومضاف إليه)
6.	1.	3	6 -7	Writing the meaning of Quranic phrase translation of sentences 6-7	Quranic Possessive Construction (مضاف ومضاف إليه)
	2.	3	8-10 & Revision (Unit 3)	Writing the meaning of Quranic phrase & translation of sentences 8-10 Quiz	Active Participle (اسم الفاعل), Passive Participle (اسم المفعول), Dual (مثنى)
7.	1.	Unit 4	1-2	Writing the meaning of Quranic phrase & translation of sentences 1-2	Personal Pronoun He(هو المنفصل) Possessive Pronoun His ـه المتصل)
	2.	4	3-4	Writing the meaning of Quranic phrase & translation of sentences 3 -4	Possessive Pronoun with prepositions like في بيته Pronoun "His" with prepositions like له، منه، فيه
8.	1.	4	5-8	Writing the meaning of Quranic sentences 5-8	Personal Pronoun You(أنت المنفصل) Possessive Pronoun Your ك المتصل) Possessive Pronoun with prepositions like في بيتك Pronoun "your" with prepositions like لك، منك، فيك
	2.	Mid Term			

9.	1.	4	9-12	Writing the meaning of Quranic phrases & sentences 9-12	Personal Pronoun She(هي المنفصل) Possessive Pronoun Her ها المتصل) Possessive Pronoun with prepositions like في بيتها Pronoun "Her" with prepositions like لها،
	2.	4	13-16	Writing the meaning of Quranic phrases & sentences 13-16	Personal Pronoun I (أنا المنفصل) Possessive Pronoun Her ي المتصل) Possessive Pronoun with prepositions like في بيتيPronoun "My" with prepositions like لي
10.	1	4	17 & Revision Unit 4	Revision of all Quranic sentences of Unit 4 Quiz	Adverb (حال)
	2.	Unit 5	1-2	Writing the meaning of Quranic phrases & sentences 1-2	Masculine Plural جمع المذكر السالم و جمع المذكر السالم المسبوق بحرف الجر
11.	1.	5	3-4	Writing the meaning of Quranic phrases & sentences 3-4	Possessive Construction with Plurals جمع المذكر السالم المسبوق بالإضافة
	2.	5	5-6	Writing the meaning of Quranic phrases, sentences & verses 5-6	Personal Pronoun They (هم المنفصل) Possessive Pronoun Their هم المتصل)
12.	1.	5	7-8	Writing the meaning of Quranic phrases, sentences & verses 7-8	Possessive Pronoun with prepositions like في بيتهمPronoun "Their" with prepositions like لهم
	2.	5	9-11	Writing the meaning of Quranic phrases, sentences & verses 9-11	Personal Pronoun You (أنتم المنفصل) Possessive Pronoun Your كم المتصل) Possessive Pronoun with prepositions

					في بيتكم like
13.	1.	5	12-14	Writing the meaning of Quranic phrases & sentences & verses 12-14	Pronoun "Your" with prepositions like لكم Personal Pronoun We (نحن المنفصل) Possessive Pronoun Our نا المتصل)
	2.	5	15-16	Writing the meaning of Quranic sentences & verses 15-16	Possessive Pronoun with prepositions في بيتنا like Pronoun "Our" with prepositions like لنا
14.	1.	5	17-18	Writing the meaning of Quranic sentences & Verses 17-18	Demonstrative Pronoun These, Those (هؤلاء- أولئك)
	2.	5	19-23	Writing the meaning of Quranic sentences & Verses 19-23	ما / إلا، إن / إلا، إنما، ليس، ما ، (أ/أم، أن، بل، كأن) (ألا، أليس، اليوم، يومئذ، سبحان، مابينهما، قل، إذن، بئس، نعم، كلا، ما أدراك، حسب، أعلم ب، مصير، مرجع، دينا(تمييز)
15.	1.	5	Revision Unit 5	Quiz	
	2.	5	1-3 (till Page 16)	Writing the meaning of Quranic Verbs &Translation of Quranic Sentences & Verses (1-3)	Introduction of Present Tense(فعل مضارع) & Verbal Sentence (جملة فعلية) Present Tense الفعل المضارع صيغة المفرد يعلم
16.	1.	6	3 (From Page 17) & 4 -5	Translation of Quranic Sentences & Verses 3-5	Present Tense الفعل المضارع صيغة المفرد يعلم
	2.	6	6	Translation of Quranic Sentences & Verses	Present Tense الفعل المضارع صيغة الجمع يعلمون

PAKISTAN STUDIES

Introduction / Objectives

• Develop vision of historical perspective, government, politics, contemporary Pakistan, and ideological background of Pakistan.

• Study the process of governance, national development, issues arising in the modern age, and posing challenges to Pakistan.

Course Outline

1. Historical Perspective:

• Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal, and
Quaid-e-Azam Muhammad Ali Jinnah.

• Factors leading to Muslim separatism.

2. People and Land:

• Indus Civilization

• Muslim advent

• Location and geo-physical features.

3. Government and Politics in Pakistan:

• Political and constitutional phases:

- 1947–58
- 1958–71
- 1971–77
- 1977–88
- 1988–99
- 1999 onward

4. Contemporary Pakistan:

• Economic institutions and issues

• Society and social structure

• Ethnicity

• Foreign policy of Pakistan and challenges

• Futuristic outlook of Pakistan

Recommended Books

1. Burki, Shahid Javed. State & Society in Pakistan. The Macmillan Press Ltd, 1980.

2. Akbar, S. Zaidi. Issues in Pakistan's Economy. Karachi: Oxford University Press, 2000.

3. S. M. Burke and Lawrence Ziring. Pakistan's Foreign Policy: An Historical Analysis. Karachi: Oxford University Press, 1993.

4. Mehmood, Safdar. Pakistan Political Roots & Development. Lahore, 1994.

5. Wilcox, Wayne. The Emergence of Bangladesh. Washington: American Enterprise Institute for Public Policy Research, 1972.

6. Mehmood, Safdar. Pakistan Kayyun Toota. Lahore: Idara-e-Saqafat-e-Islamia, Club Road, n.d.

7. Amin, Tahir. Ethno-National Movement in Pakistan. Islamabad: Institute of Policy Studies, 1988.

8. Ziring, Lawrence. Enigma of Political Development. Kent, England: Wm Dawson & Sons Ltd, 1980.

9. Zahid, Ansar. History & Culture of Sindh. Karachi: Royal Book Company, 1980.

10. Afzal, M. Rafique. Political Parties in Pakistan, Vol. I, II & III. Islamabad: National Institute of Historical and Cultural Research, 1998.

11. Sayeed, Khalid Bin. The Political System of Pakistan. Boston: Houghton Mifflin, 1967.

12. Aziz, K. K. Party Politics in Pakistan : National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem. Pakistan Under Martial Law. Lahore: Vanguard, 1987.
14. Haq, Noor ul. Making of Pakistan: The Military Perspective. Islamabad: National Commission on
Historical and Cultural Research, 1993

ENGLISH I

Course Objectives

Enable medical students to meet their academic and professional real-life communication needs, build language fluency, and enhance listening, reading, writing, and speaking competencies.

Course Learning Outcomes (CLOs)

1. Apply enhanced English communication skills through effective use of word choices, grammar, and sentence structure in medical contexts.
2. Comprehend a variety of literary/non-literary written and spoken texts in English.
3. Effectively express information, ideas, and opinions in written and spoken English.
4. Recognize inter-cultural variations in the use of English language and effectively adapt communication style and content based on diverse cultural and social contexts.

Course Contents

1. Foundations of Functional English

• **Vocabulary Building:** Contextual usage, synonyms, antonyms, and idiomatic expressions.
• **Communicative Grammar:** Subject-verb agreement, verb tenses, fragments, run-ons, modifiers, articles, word classes, etc.
• **Word Formation:** Affixation, compounding, clipping, back formation, etc.
• **Sentence Structure:** Simple, compound, complex, and compound-complex sentences.
• **Sound Production & Pronunciation:** Phonetics basics, clarity, accent neutrality, and stress patterns.

2. Comprehension and Reading / Listening Skills

• **Understanding Purpose, Audience, and Context:** Analyzing author intent and contextual adaptation.
• **Contextual Interpretation:** Tones, biases, stereotypes, assumptions, and inferences.
• **Reading Strategies:** Skimming, scanning, SQ4R, intensive and extensive reading, speed reading, and critical reading.
• **Summary & Précis Writing:** Extracting key ideas and compressing texts accurately.
• **Active Listening:** Overcoming listening barriers, focused listening, and taking accurate notes.

3. Effective Writing, Academic & Professional Communication

• **Paragraph Writing:** Practice in writing good, unified, and coherent paragraphs.
• **Essay Writing:** Introduction to essay structures, thesis statements, and coherence.
• **CV & Job Application:** Drafting professional resumes, cover letters, and formal job applications.
• **Translation Skills:** Urdu to English translation techniques for clinical and academic contexts.
• **Academic Skills:** Letter writing, memo writing, minutes of meetings, and effective use of library/internet resources.
• **Principles of Communication:** Clarity, coherence, conciseness, courteousness, and

correctness (7 Cs).
• **Inclusivity in Communication:** Gender-neutral language, avoiding stereotypes, and cross-cultural communication.

4. Personality Development & Presentation Skills

• **Public Speaking:** Overcoming stage fright, voice modulation, body language, and non-verbal cues.
• **Presentation Skills:** Organization of content, visual aids (PowerPoint/slides), and engaging the audience.
• **Informal & Professional Communication:** Small talk, networking, conversational skills, business emails, and formal letters.
• **Personality Development:** Emphasis on content, style, pronunciation, and discussion/review of select documentaries.

Recommended Books & Reading Material

• **Grammar:** A Practical English Grammar by A. J. Thomson and A. V. Martinet (Exercises 2, 3rd Edition, Oxford University Press).
• **Writing Skills (Intermediate):** Writing (Intermediate) by Marie-Christine Boutin, Suzanne Brinand, and Francoise Grellet (Oxford Supplementary Skills).
• **Writing Skills (Upper-Intermediate):** Writing (Upper-Intermediate) by Rob Nolasco (Oxford Supplementary Skills - for memos, presentations, descriptive and argumentative writing).
• **Reading & Study Skills:** Reading (Advanced) by Brian Tomlinson and Rod Ellis (Oxford Supplementary Skills); Reading and Study Skills by John Langan; Study Skills by Richard Yorky.

ISLAMIC STUDIES-I

Objectives: This course is aimed at:

1. To provide basic information about Islamic Studies
2. To enhance understanding of the students regarding Islamic Civilization
3. To improve students' skill to perform prayers and other worships
4. To enhance the skill of the students for understanding of issues related to faith and religious life

Detail of courses

Introduction to Quranic studies

1) Basic concepts of quran
2) History of quran
3) Uloom-ul-quran

Study of selected text of Holy Quran

1) Verses of surah al-baqra related to faith (verse no. 284-286)
2) Verses of surah al-hujrat related to adab al-nabi (verse no. 1-18)
3) Verses of surah al-mumanoon related to characteristics of faithful (verse no. 1-11)
4) Verses of surah al-furqan related to social ethics (verse no. 63-77)
5) Verses of surah al-inam related to ihkam (verse no. 152-154)

Study of selected text of Holy Quran

1) Verses of surah al-ihzab related to adab al-nabi (verse no. 6, 21, 40, 56, 57, 58)
2) Verses of surah al-hashar (18, 19, 20) related to thinking, day of judgement
3) Verses of surah al-saf related to tafakar, tadabar (verse no. 1, 14)

Seerat of Holy Prophet (S.A.W) I

1) Life of Muhammad bin Abdullah (before prophet hood)
2) Life of holy prophet (S.A.W) in Makkah
3) Important lessons derived from the life of holy prophet in Makkah

Seerat of Holy Prophet (S.A.W) II

1) Life of holy prophet (S.A.W) in madina
2) Important events of life holy prophet in madina
3) Important lessons derived from the life of holy prophet in madina

Introduction to Sunnah

1) Basic concepts of hadith
2) History of hadith
3) Kinds of hadith
4) Uloom – ul – hadith
5) Sunnah & hadith
6) Legal position of sunnah

Reference books:

1) Hameed ullah Muhammad, "**Emergence of Islam",** IRI, Islamabad
2) Hameed ullah Muhammad, "**Muslim conduct of state"**
3) Hameed ullah Muhammad, "**Introduction to Islam"**
4) Mulana Muhammad Yousaf Islahi
5) Hussain hamid hassan, "**An introduction to the study of Islamic law"** leaf publication Islamabad, Pakistan.

6) Ahmad hasan, principles of Islamic jurisprudence, Islamic research Institute, international Islamic university, Islamabad, 1993
7) Mir Waliullah, muslim jurisprudence and the quranic law of crimes Islamic book service 1982
8) H.S. Bhatia, Studies in Islamic law, religion and society, deep and deep Publications new delhi 1989
9) Dr. Muhammad Zia – ul – haq, Introduction to Al Sharia Al islamia, Allama Iqbal Open University, Islamabad 2001

ANNUAL EXAMINATION ASSESMENT

MBBS ASSESMENT STRUCTURE (THEORY) LUMHS

No.	Scoring Parameter	Marks in %
01	Main Examination Portion / BCQ's	80 %
02	**Internal Evaluation** Attendance as following **05 Marks** Above 90% = 5, 89-80%= 4, 79-70%=3, 65-70%=2 Below 65%=00 Module Tests (BCQ's) **15 Marks**	20 %
03	**TOTAL**	**100 %**

MBBS ASSESMENT STRUCTURE
(PRACTICAL-FIRST TO FOURTH PROFESSIONAL) LUMHS

No.	Scoring Parameter	Marks in %
01	Main Examination Portion / OSPE and VIVA Static Stations and interactive/ viva stations	80 %
02	**Internal Evaluation** Research **05 Marks** Practical Books **02 Marks** Module Tests (OSPE/VIVA)**13 Marks**	20 %
03	**TOTAL**	**100**

MBBS ASSESMENT STRUCTURE
(PRACTICAL-FINAL PROFESSIONAL) LUMHS

No.	Scoring Parameter	Marks in %
01	Main Examination Portion / OSCE and VIVA Static Stations and clinical Viva at wards	80 %
02	**Internal Evaluation** Research **05 Marks** log Books **02 Marks** Module Tests (OSCE/VIVA)**13 Marks**	20 %
03	**TOTAL**	**100**

7 LEARNING RESOURCES

Anatomy:

- **GROSS ANATOMY**
  - Clinical Anatomy by Richard S. Snell
  - K.L. Moore, Clinically Oriented Anatomy
  - Neuro Anatomy by Richard Snell
- **HISTOLOGY**
  - B. Young J. W. Health Wheather's Functional Histology
- **EMBRYOLOGY**
  - Keith L. Moore. The Developing Human
  - Langman's Medical Embryology

Biochemistry:

- **TEXTBOOKS**
  - Harper's Illustrated Biochemistry
  - Lehninger Principle of Biochemistry
  - Biochemistry by Devlin

Community Medicine:

- **TEXT BOOKS**
  - Community Medicine by Parikh
  - Community Medicine by M Illyas
  - Basic Statistics for the Health Sciences by Jan W Kuzma

Pathology / MicroBiology:

- **TEXT BOOKS**
  - Robbins & Cotran, Pathologic Basis of Disease, 9th edition.
  - Rapid Review Pathology, 4th edition by Edward F. Goljan MD

Pharmacology:

- **TEXT BOOKS**
  - Lippincot Illustrated Pharmacology
  - 2. Basic and Clinical Pharmacology by Katzung

Physiology:

- **TEXTBOOKS**
  - Textbook of Medical Physiology by Guyton And Hall
  - Ganong' S Review of Medical Physiology
  - Human Physiology by Lauralee Sherwood
  - Berne & Levy Physiology
  - Best & Taylor Physiological Basis of Medical Practice
- **REFERENCE BOOKS**
  - Guyton & Hall Physiological Review
  - Essentials of Medical Physiology by Jaypee
  - Textbook of Medical Physiology by InduKhurana
  - Short Textbook of Physiology by Mrthur

- NMS Physiology
- Monoo's Physiology

- **Behavioral Sciences:**
  - Hand book of Behavioral Sciences by Brig (Rtd) Mowadat H Rana (3rd Edition)
  - Introduction To Psychology By Atkinson & Hilgard (15th Edition)
  - Shorter Oxford Textbook of Psychiatry (7th Edition)
- **Biomedical Ethics:**
  - Beauchamp TL, Childress JF. Principles of biomedical ethics. Oxford University Press, USA; 2001
- **Research:**

➢ Basic Biostatistics for Clinical Researchers" by Prof. Dr. Binafsha Manzoor Syed, PhD et al.

Weblink: https://www.lumhs.edu.pk/publishers/documents/basicbio.pdf

➢ Research Methodology in Medicine" by John K. Last

Weblink: https://kth.diva-portal.org/smash/get/diva2:1547062/FULLTEXT01.pdf

Journals:

- New England Journal of Medicine
- Nature Medicine
- Journal of clinical investigation (JCI)
- Circulation

Online Databases:

- PubMed

Annexure

Policy for Electives

I. Introduction:

The undergraduate medical program (MBBS) aims to develop healthcare providers who provides care to community at large. It also envisages the student as a future scholar, specialist, researcher and scientist.

An elective permits the students to think of a career beyond examinations and offers students a stimulus to think laterally and creatively besides laying down the foundation for future professional pathways. It also lets the students to match their aspirations with the ground reality in a field of their dreams being a health care professional.

Pakistan Medical & Dental Council recommends to develop medical college's policy on electives for undergraduate medical students, implement it, monitor it and maintain the record of the students selected the electives and evaluate the elective program.

Liaquat University of Health Sciences (LUMHS) Jamshoro, Sindh follows the guiding principles of Higher Education Commission (HEC) of Pakistan and Pakistan Medical & Dental Council (PMDC) and has developed the policy on electives for undergraduate medical students and incorporated in undergraduate medical curriculum.

II. Policy on Electives

a. Definition of elective:

An elective is a learning experience created in the undergraduate medical curriculum to provide an opportunity for the learner (student) to explore, discover and experience areas or streams of his/her interest.

b. Objectives of elective

The objectives of electives are to provide the learner (student) opportunities: 1) for diverse learning experiences and to conduct research or community or institutional project that stimulates inquiry-based learning, self-directed learning, lateral thinking and thinking out of the box.

c. Duration of elective:

Duration for 2 electives is Six-eight weeks (3-4 weeks for each); the duration must be put in the time schedule for elective rotations.

d. Time of electives in Phase of MBBS Curriculum:

After completion of summative (University) examination of third year MBBS, each students have to complete 2 electives.

e. Elective a Compulsory part of course:

It is mandatory for the students to do electives.

f. Departments for electives:

Electives will be done in Pre-clinical, Para clinical and Clinical department

g. Structure of Electives:

1. There are two slabs of electives
2. The learner has to rotate through two elective slabs; each slab is of 3-4 weeks.
3. Focus of slab one is on pre-clinical and para-clinical subjects and two on clinical subjects.
4. Institutions selected for electives, nature of elective, number of students in each elective, name of supervisors and available resources will be determined 6-8 weeks ahead of schedule.
5. The list for the choice of electives will be made available six months ahead of schedule of electives.
6. The students fill the log book meant for electives and get it signed from the supervisor (internal, external if any) after completion of elective in one slab.
7. Ninety percent attendance must be ensured in each elective.
8. Learning must be focused on all three domains of learning, cognitive, psychomotor and affective.

h. Electives Slabs

Slab one	**Slab two**
Pre-Clinical and Para-clinical	***Clinical***
Experiential learning in any laboratory Pathology, Microbiology, Biochemistry, Molecular Biology, Genetics, Immunology.	**Community Experiential Learning** Care at Rural Health Centre level Care at Basic Health Units Care at Specialized clinics in community such as Diabetic Clinic
Other experiential learnings Pharmacovigilance and clinical pharmacology Infection Control Program Activities in Hospital	**Hospital Experiential Learning** Emergency care in emergency Intensive care in ICU or HDU Outpatient care any of the clinical sciences departments for 3-4 weeks
Research Activities Students initiated research Participation in faculty research Surveys: Community or epidemiological	**Others** Rehabilitation and palliative Care Sports Medicine Clinical Ethics CPR
Community Experiential Learning School Health Program Immunization Program Maternal and Child Health Program Other National Health Programs such TB Control, Tobacco Control	
Others Bio informatics Artificial Intelligence in Healthcare	

i. Template to be used for planning electives

Item	Response
Name of Slab	
Name of elective	
Place where elective will be done	
Name of Internal Supervisor	
Name of External Supervisor	
Learning Objective/s of the elective	
Number of students to be accommodated at the designated place	
Pre-requisite for the elective	
Learning resource to be utilized by the students	
Logbook/Portfolio entry	
Assessment	
Any other	

j. Obligation of Faculty Members/mentors

- The faculty members/mentors shall counsel the students to help students select desired electives.
- The faculty members/mentors must ascertain a student's expectation must be met from the selected electives.
- The faculty members/mentors must make aware students of the rules regarding attendance, work schedule, documentation and assessment requirements for each elective.

k. Obligation of In-charge of electives program

The allocation of electives shall be done based on the student's choice and availability of rotation by the faculty who have been identified to be in-charge of the electives program, for each slab in consultation with overall in-charge of elective program.

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l. Reflective Report on Elective:

Each student has to prepare 3-4 pages reflective report on elective. The font size will be 12 in Times New Roman. Student can include 1-2 photos of activities done during elective.

m. Evaluation of Electives Program

It is to be done every year by the independent team.

III. Conclusion:

Experiential learning through electives is essential for adult learner. This program helps in grooming of the students and permit students to reflect, plan and grow their career.

THE END