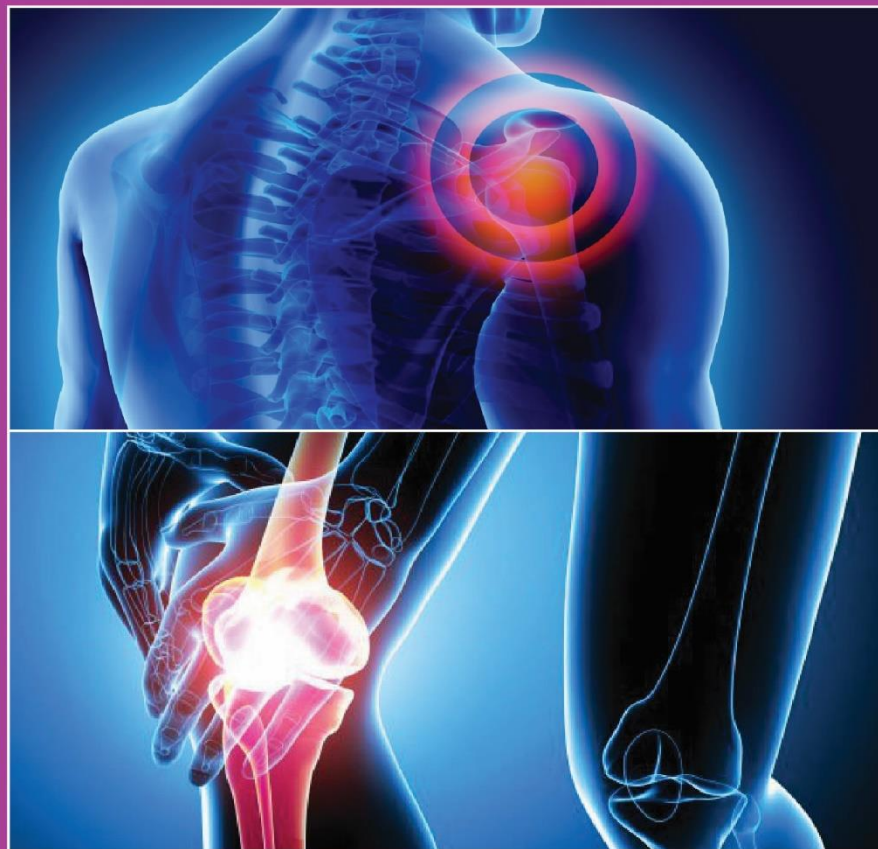


# STUDY GUIDE

## Block - II

### Musculoskeletal & Locomotion - I Module

1<sup>st</sup> Year MBBS



Department of Medical Education  
Aziz Fatimah Medical & Dental College  
Faisalabad

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## 1. List of Abbreviations

Abbreviations	Subjects
<b>A</b>	Anatomy
<b>ABCDE</b>	Airway, Breathing, Circulation, Disability, Exposure
<b>ABG</b>	Arterial Blood Gas
<b>ACS</b>	Acute Coronary Syndromes
<b>Ag</b>	Aging
<b>AKI</b>	Acute Kidney Injury
<b>ALT</b>	Alanine Transaminase
<b>AMI</b>	Acute Myocardial Infarction
<b>AMP</b>	Adenosine Monophosphate
<b>ANA</b>	Antinuclear Antibody
<b>ANCA</b>	Antineutrophil Cytoplasmic Antibodies
<b>ANS</b>	Autonomic Nervous System
<b>AO</b>	Association of Osteosynthesis
<b>APTT</b>	Activated Partial Thromboplastin Clotting Time
<b>ARDS</b>	Acute Respiratory Distress Syndrome
<b>ARVC</b>	Arrhythmogenic Right Ventricular Cardiomyopathy
<b>ASD</b>	Atrial Septal Defect
<b>AST</b>	Aspartate Aminotransferase
<b>ATLS</b>	Advanced Trauma Life Support
<b>Au</b>	Autopsy
<b>AUC</b>	Area Under The Curve
<b>AV</b>	Atrioventricular
<b>B</b>	Biochemistry
<b>BhS</b>	Behavioral Sciences
<b>BHU</b>	Basic Health Unit
<b>BSL</b>	Biological Safety Level
<b>C</b>	Civics
<b>C-FRC</b>	Clinical-Foundation Rotation Clerkship
<b><i>C. burnetii</i></b>	<i>Coxiella burnetii</i>
<b><i>C. neoformans</i></b>	<i>Cryptococcus neoformans</i>
<b><i>C. pneumoniae</i></b>	<i>Chlamydia pneumoniae</i>
<b><i>C. psittaci</i></b>	<i>Chlamydia psittaci</i>

<b><i>C. trachomatis</i></b>	<i>Chlamydia trachomatis</i>
<b>CA</b>	Cancer
<b>CABG</b>	Coronary Artery Bypass Grafting
<b>CAD</b>	Coronary Artery Disease
<b>CBC</b>	Complete Blood Count
<b>CCR5</b>	Cysteine-Cysteine Chemokine Receptor 5
<b>CD31</b>	Cluster of Differentiation 31
<b>CD34</b>	Cluster of Differentiation 34
<b>CD4</b>	Clusters of Differentiation 4
<b>CF</b>	Cystic Fibrosis
<b>CK</b>	Creatine Kinase
<b>CK</b>	Creatine Kinase
<b>CLED</b>	Cystine Lactose Electrolyte Deficient
<b>CLL</b>	Chronic Lymphocytic Leukemia
<b>CM</b>	Community Medicine
<b>CML</b>	Chronic Myelogenous Leukemia
<b>CMV</b>	Cytomegalovirus
<b>CNS</b>	Central Nervous System
<b>CO</b>	Carbon Monoxide
<b>CO<sub>2</sub></b>	Carbon Dioxide
<b>CODIS</b>	Combined Dna Index System
<b>COPD</b>	Chronic Obstructive Pulmonary Disease
<b>COVID-19</b>	Corona Virus Disease 2019
<b>COX</b>	Cyclooxygenase
<b>CPR</b>	Cardio Pulmonary Resuscitation
<b>CR</b>	Clinical Rotation
<b>CRP</b>	C- Reactive Protein
<b>CSF</b>	Cerebrospinal Fluid
<b>CT</b>	Computed Tomography
<b>CT</b>	Computerized Tomography
<b>CV</b>	Cardiovascular
<b>CVA</b>	Cerebral Vascular Accident
<b>CVDs</b>	Cardiovascular Diseases
<b>CVS</b>	Cardiovascular System
<b><i>D. medinensis</i></b>	<i>Dracunculus Medinensis</i>
<b>DALY</b>	Disability-Adjusted Life Year

<b>DCIS</b>	Ductal Carcinoma <i>in situ</i>
<b>DCM</b>	Dilated Cardiomyopathy
<b>DCMLS</b>	Dorsal Column Medial Lemniscus System
<b>DLC</b>	Differential Leukocyte Count
<b>DMARDs</b>	Disease-modifying antirheumatic drugs
<b>DNA</b>	Deoxy Ribonucleic Acid
<b>DOTS</b>	Directly Observed Treatment Short-course
<b>DTP</b>	Diphtheria, Tetanus, Pertussis
<b>DVI</b>	Disaster Victim Identification
<b>DVT</b>	Deep Vein Thrombosis
<b><i>E. coli</i></b>	<i>Escherichia coli</i>
<b>ECF</b>	Extra Cellular Fluid
<b>ECG</b>	Electrocardiography
<b>ECG</b>	Electocardiogram
<b>ECP</b>	Emergency contraceptive pills
<b>ED50</b>	Median Effective Dose
<b>EEG</b>	Electroencephalogram
<b>EIA</b>	Enzyme Immunoassay
<b>ELISA</b>	Enzyme Linked Immunosorbent Assay
<b>EnR</b>	Endocrinology & Reproduction
<b>ENT</b>	Ear Nose Throat
<b>EPI</b>	Expanded Programme on Immunization
<b>ER</b>	Emergency Room
<b>F</b>	Foundation
<b>FAST</b>	Focused Assessment with Sonography in Trauma
<b>FEV1</b>	Forced Expiratory Volume 1
<b>FM</b>	Family Medicine
<b>For</b>	Forensics Medicine
<b>FPIA</b>	Fluorescent Polarization Immunoassay
<b>FS</b>	Forensic Serology
<b>FSc</b>	Forensic Science
<b>FVC</b>	Forced Vital Capacity
<b>GCS</b>	Glasgow Coma Scale
<b>GFR</b>	Glomerular Filtration Rate
<b>GIT</b>	Gastrointestinal tract
<b>GL-MS</b>	Gas Liquid Mass Spectrometry

<b>GLC</b>	Gas Liquid Chromatography
<b>GLP</b>	Good Laboratory Practice
<b>GMP</b>	Guanosine Monophosphate
<b>GO</b>	Gynecology and Obstetrics
<b>GP</b>	General Practitioner
<b>GPE</b>	General Physical Examination
<b>GTO</b>	Golgi Tendon Organ
<b>Gynae &amp; Obs</b>	Gynecology and Obstetrics
<b>H &amp; E</b>	Hematoxylin and Eosin
<b><i>H. influenzae</i></b>	<i>Haemophilus influenzae</i>
<b><i>H. pylori</i></b>	<i>Helicobacter pylori</i>
<b>HAI</b>	Healthcare Associated Infections
<b>HbC</b>	Hemoglobin C
<b>HbS</b>	Sickle Hemoglobin
<b>HbSC</b>	Hemoglobin Sickle C Disease
<b>HCL</b>	Hydrochloric Acid
<b>HCM</b>	Hypertrophic Cardiomyopathy
<b>HHV</b>	Human Herpesvirus
<b>HIT</b>	Hematopoietic, Immunity and Transplant
<b>HIV</b>	Human Immunodeficiency Virus
<b>HL</b>	Hematopoietic & Lymphatic
<b>HLA</b>	Human Leukocyte Antigen
<b>HMP</b>	Hexose Monophosphate
<b>HNSS</b>	Head & Neck and Special Senses
<b>HPLC</b>	High Pressure Liquid Chromatography
<b>ICF</b>	Intra Cellular Fluid
<b>ID</b>	Infectious Diseases
<b>IE</b>	Infective Endocarditis
<b>IL</b>	Interleukin
<b>ILD</b>	Interstitial Lung Disease
<b>IN</b>	Inflammation
<b>INR</b>	International Normalized Ratio
<b>INSTIs</b>	Integrase Strand Transfer Inhibitors
<b>IPV</b>	Inactivated Poliovirus Vaccine
<b>IUD</b>	Intrauterine Device
<b>IUGR</b>	Intra Uterine Growth Restriction

## 2. Curriculum 2k23 Framework

YEAR	MODULES
YEAR 1	<ul style="list-style-type: none"> <li>• Foundation-1</li> <li>• Hematopoietic &amp; Lymphatic</li> </ul> <p><b>Block 1</b></p>
	<ul style="list-style-type: none"> <li>• Musculoskeletal &amp; Locomotion-1</li> </ul> <p><b>Block 2</b></p>
	<ul style="list-style-type: none"> <li>• Cardiovascular-1</li> <li>• Respiratory-1</li> </ul> <p><b>Block 3</b></p>
	<ul style="list-style-type: none"> <li>• PERLs 1</li> <li>• Quran-1</li> <li>• Islamiyat &amp; Pak Studies</li> </ul> <p><b>Will be taught throughout the year</b></p>
	<ul style="list-style-type: none"> <li>• Clinical Skills Foundation</li> </ul> <p><b>C-FRC 1 (Clinical – Foundation, Rotation, Clerkships)</b></p>
YEAR 2	<ul style="list-style-type: none"> <li>• GIT &amp; Nutrition</li> <li>• Renal</li> <li>• Endocrinology &amp; Reproduction</li> <li>• Neurosciences</li> <li>• Head &amp; Neck, Special Senses</li> <li>• Inflammation</li> <li>• PERLs - 2</li> <li>• Quran-2</li> <li>• Islamiyat &amp; Pak Studies</li> </ul>
	<ul style="list-style-type: none"> <li>• Clinical Skills Foundation</li> </ul> <p><b>C-FRC 2 (Clinical – Foundation, Rotation, Clerkships)</b></p>
YEAR 3	<ul style="list-style-type: none"> <li>• Foundation-2</li> <li>• Infectious Diseases</li> <li>• Neoplasia</li> <li>• Musculoskeletal &amp; Locomotion-2</li> <li>• Hematopoietic, Immunity &amp; Transplant-2</li> </ul>

	<ul style="list-style-type: none"> <li>• Cardiovascular-2</li> <li>• Respiratory-2</li> <li>• Forensic medicine</li> <li>• Community Medicine &amp; family Health-1</li> <li>• PERLs - 3</li> <li>• Quran-3</li> </ul>
	<ul style="list-style-type: none"> <li>• Clinical Rotations</li> </ul> <p>C-FRC 3 (Clinical – Foundation, Rotation, Clerkships)</p>
<b>YEAR 4</b>	<ul style="list-style-type: none"> <li>• Renal-2</li> <li>• Endocrine &amp; Reproduction-2</li> <li>• GIT &amp; Nutrition-2</li> <li>• Neurosciences-2</li> <li>• Maternal &amp; Child Health</li> <li>• Ophthalmology</li> <li>• Otorhinolaryngology</li> <li>• Community Medicine &amp; family Health-2</li> <li>• Psychiatry &amp; Behavioral Sciences</li> <li>• PERLs - 4</li> <li>• Quran-4</li> <li>• <b>Electives</b></li> <li>• <b>BLS workshop</b></li> </ul>
	<ul style="list-style-type: none"> <li>• Clinical Rotations</li> </ul> <p>C-FRC 4 (Clinical – Foundation, Rotation, Clerkships)</p>
<b>YEAR 5 (Clerkships)</b>	<ul style="list-style-type: none"> <li>• Gynecology &amp; Obstetrics</li> <li>• Pediatrics</li> <li>• Medicine</li> <li>• Surgery</li> </ul> <p><b>Clinical Clerkships</b> C-FRC 5 (Clinical – Foundation, Rotation, Clerkships)</p>

### **3. Introduction to Study Guide**

The study guide serves several crucial purposes:

**1. Communicating information on the organization and management of the module:**

This aids students in identifying the appropriate point of contact in case they encounter any difficulties during the semester.

**2. Defining the objectives expected to be achieved by the end of the module:**

It outlines clear learning goals, ensuring that students understand what is expected of them academically.

**3. Identifying the learning strategies employed to achieve module objectives:**

These strategies may encompass various methods such as lectures, small group sessions, clinical skills practice, demonstrations, tutorials, and case-based learning.

**4. Providing a list of learning resources:**

Students are offered a comprehensive list of resources, including books, computer-assisted learning programs, web links, and journals. These resources empower students to maximize their learning potential.

**5. Highlighting information on the contribution of continuous assessment and semester examinations:**

This section emphasizes the significance of ongoing assessments and final exams in determining a student's overall performance in the module.

**6. Including information on assessment methods:**

Details about the various assessment methods employed to evaluate students' progress in achieving the objectives are outlined.

**7. Focusing on examination policies, rules, and regulations:**

This section clarifies the policies and regulations governing examinations, ensuring that students are well-informed about the rules they must adhere to during their assessments.

By providing students with this comprehensive guide, educational institutions aim to enhance their learning experience, facilitate effective academic management, and foster compliance with academic standards and regulations.



#### **4. Block-2 Module Committee**

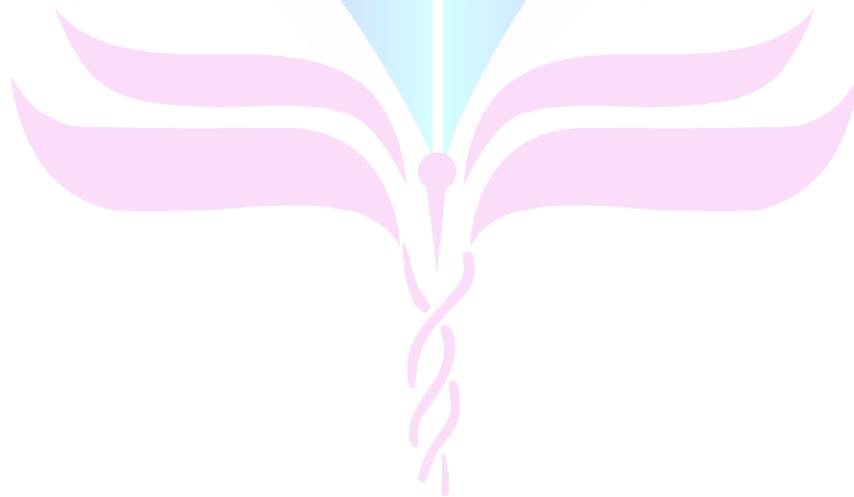
<b>BASIC HEALTH SCIENCES</b>	<b>CLINICAL SCIENCES</b>
<b>Anatomy:</b> Prof. Dr. Quddus Ur Rehman	<b>Medicine:</b> Prof. Dr. Ghulam Abbas Sheikh
<b>Physiology:</b> Assoc. Prof. Dr. Benash Altaf	<b>Surgery:</b> Prof. Dr. Asrar
<b>Biochemistry:</b> Prof. Dr. Shakeel Ahmad	<b>Radiology:</b> Asst. Prof. Dr. Shemona
<b>Community Medicine:</b> Prof. Dr. Humayun Suqrat	<b>Gynecology:</b> Prof. Dr. Nazia Musarrat
<b>Pathology:</b> Prof. Dr. Kashif Baig	
<b>Pharmacology:</b> Dr. Sarwat Jahan	
<b>Behavioral Sciences:</b> Dr. Yawar	
<b>Medical Education:</b> Dr. Ayesha Sadiq	

<b>Block Coordinator</b>	<b>Dr. Mahrukh</b>
<b>Principal AFMDC</b>	<b>Prof. Dr. Ghulam Abbas Sheikh</b>

timah Medical & Dental



# MUSCULOSKELETAL & LOCOMOTION-1 MODULE



## **5. Introduction of Musculoskeletal & Locomotion-1 Module**

Welcome to the Musculoskeletal and Locomotion Module Study Guide for 1st Year MBBS students. This guide is meticulously crafted to assist you in navigating the fascinating world of the musculoskeletal system, which is essential for movement and support in the human body. The musculoskeletal system, comprising bones, muscles, tendons, ligaments, and joints, not only facilitates locomotion but also plays a critical role in protecting vital organs, storing minerals, and producing blood cells.

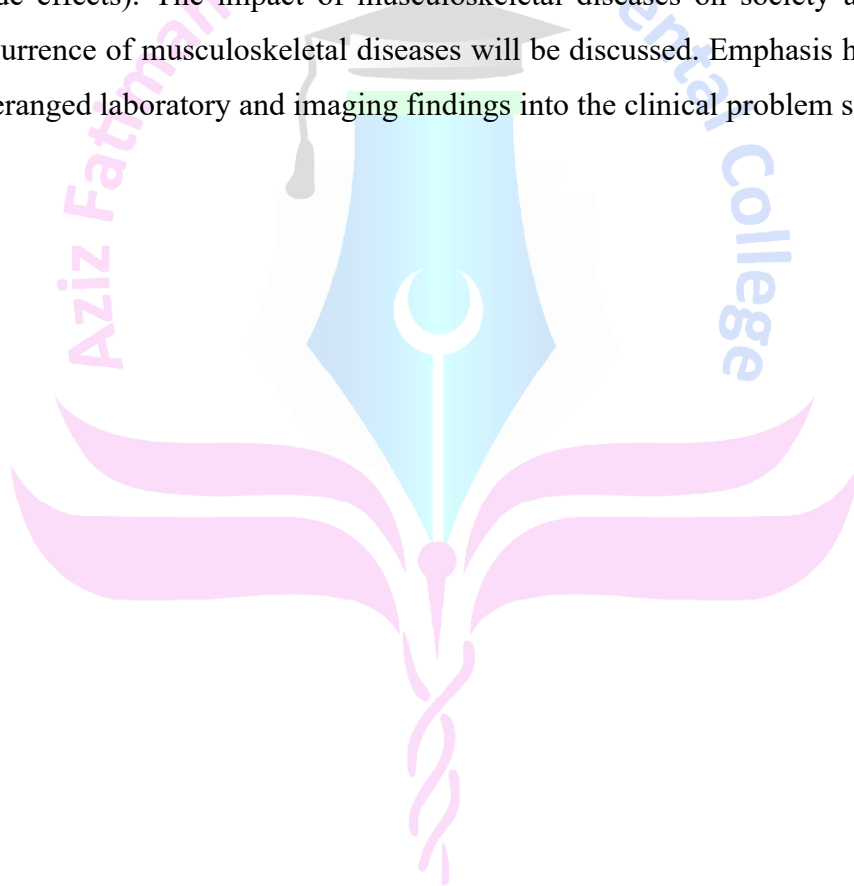
In this module, you'll delve into the intricate details of the musculoskeletal and locomotion system through various topics, such as the structure of bones, muscles, and joints. You'll come to understand their relationships and functions, exploring the mechanisms of muscle contraction, bone growth, and how these systems integrate to produce coordinated movement. You'll study the molecular processes underlying muscle metabolism, bone mineralization, and the biochemical pathways supporting musculoskeletal health.

You'll also examine diseases and disorders affecting the musculoskeletal system, their causes, manifestations, and effects on the body. The module will also cover public health aspects related to musculoskeletal health, including prevention strategies, epidemiology, and the impact of lifestyle and environmental factors on the system.

This study guide will take you through all the topics involved in the module, subject-wise, ensuring a comprehensive understanding of each aspect. With anatomy as the main focus, you will build a robust framework upon which the other subjects will expand your knowledge and clinical skills. Embark on this educational journey to master the musculoskeletal and locomotion system, preparing you for a successful career in medicine.

## 5.1. Module Rationale

The musculoskeletal system comprises the bones, muscles, cartilage, tendons, ligaments, and other connective tissues that provide the framework, support, and movement of the body. The initial learning activities will help in understanding the normal structure, development, and normal physiological mechanisms of the organs of the system. This will help in better understanding the possible pathological conditions of the system, including common injuries, diseases, and disorders that affect it, followed by discussion on some important group of drugs used for treatment and/or prevention of these conditions (administration route, mechanism of action and side effects). The impact of musculoskeletal diseases on society and the effect of ageing on occurrence of musculoskeletal diseases will be discussed. Emphasis has been given to incorporate deranged laboratory and imaging findings into the clinical problem solving.



## 5.2. Module Outcomes

- Develop an understanding of the fundamental components of the musculoskeletal system.
- Explain the development of the structure & function of the musculoskeletal components of limbs, back & correlate it with organization and gross congenital anomalies of the limbs.
- Identify the anatomical features of bones, muscles & neurovascular components of the limbs with clinical correlation.
- Describe how injury and disease alter the musculoskeletal structure & function.
- Integrate concepts relating to various metabolic processes, their disorders and relevant lab investigations in the study of human musculoskeletal system.
- Describe the role of the limbs (upper/lower) in musculoskeletal support, stability, and movements.
- Describe the types, formation, stability, function & clinical significance of joints of the upper and lower limb.
- Describe the basic histology of muscle fibers including their molecular structure (Sarcomere).
- Explain the mechanism of excitation and contraction of skeletal and smooth muscles.
- Discuss the psychosocial impact of musculoskeletal diseases in society.

## 5.3. Learning Objectives

### 5.3.1. Knowledge

#### ➤ Gross Anatomy

Topic	Sub Topic	Learning objectives
Upper Limb	Pectoral Region	<ul style="list-style-type: none"> <li>Describe the topographical anatomy of Pectoral Region</li> <li>Perform dissection of the Pectoral Region or use models to identify the key structures</li> <li>Describe muscles of the Pectoral Region with their origin, insertion, nerve supply and actions.</li> </ul>
	Dermatomes and cutaneous innervation of Upper Limb	<ul style="list-style-type: none"> <li>Describe the cutaneous nerves &amp; superficial veins of the Upper Limb.</li> <li>Describe the extent, attachments, and structures passing through Clavipectoral Fascia</li> </ul>
	Pectoral region & Back + Mammary Glands	<ul style="list-style-type: none"> <li>Describe the extent, structure, vascular supply, lymphatic drainage of Breast (Mammary Glands)</li> <li>Define the boundaries of auscultation and state its clinical significance</li> <li>Demonstrate palpation of breast and define its relation to the Fibrous septa in Carcinoma of Breast</li> <li>Explain the anatomical basis of position adopted for breast examination and mammography.</li> <li>Describe the osteology of the bones in pectoral region.</li> <li>Enumerate the superficial muscles of back, connecting shoulder girdle with vertebral column.</li> <li>Describe the               <ol style="list-style-type: none"> <li>Attachments</li> <li>Nerve supply</li> </ol> </li> <li>Actions of Trapezius, Latissimus Dorsi, Rhomboid major and minor. Mention the neurovascular supply of pectoral region and Correlate with important clinical conditions.</li> <li>Describe superficial muscles of the back with their origin, insertion, nerve supply and</li> </ul>

		actions.
	Bones of Upper Limb: Clavicle & Scapula	<ul style="list-style-type: none"> <li>• Describe the Osteology of Clavicle (Morphological features, side determination, attachments, ossification)</li> <li>• Describe the correlates functions of Clavicle (clavicle fracture, its role in terms of weight transmission of upper limb, compression of neurovascular structures)</li> <li>• Describe the Osteology of Scapula (morphological features, attachments, ossification)</li> <li>• Determine the side and identify the landmarks of scapula</li> <li>• Describe the movements of Scapula associated with movements of Shoulder Girdle</li> <li>• Tabulate the muscles of scapular region and give their attachments, nerve supply and action</li> <li>• Tabulate the attachments, origin, insertion, innervation, and actions of Anterior Axioappendicular Muscles</li> </ul>
	Bones of thorax, Joints of Upper Limb: Sternoclavicular Joint	<ul style="list-style-type: none"> <li>• Describe the Sternoclavicular Joint in terms of articulating surfaces, ligaments, articular disc, and nerve supply.</li> </ul>
	Axila	<ul style="list-style-type: none"> <li>• Develop clear concepts of the topographical anatomy of Axilla and its contents</li> <li>• Describe the boundaries of Axilla. (Identification of muscles forming the boundaries of axilla)</li> <li>• List the contents of Axilla</li> <li>• Perform dissection/ Identify the Axilla and its Contents</li> <li>• Describe Axillary Artery with reference to its 3 parts their relations, branches, and anastomoses</li> <li>• Describe the formation, tributaries, and drainage of Axillary Vein</li> <li>• Identify and demonstrate the course/ relation and branches/tributaries of axillary vessels</li> <li>• Describe the Axillary Lymph Nodes in terms of location, grouping, areas of drainage and clinical significance</li> <li>• Describe the course, relations, root value and</li> </ul>

		<p>distribution of Axillary nerve.</p> <ul style="list-style-type: none"> <li>Describe the boundaries and contents of quadrangular space.</li> </ul>
	Bones of upper limb: Humerus	<ul style="list-style-type: none"> <li>Describe the Osteology of Humerus (Side)</li> <li>Determination, morphological features, attachments, ossification)</li> </ul>
	Joints of Upper Limb: Shoulder Joint	<ul style="list-style-type: none"> <li>Describe the Shoulder Joint under the following headings: Articulation, Type/ Variety, Capsule, Ligaments, Innervation, Blood supply, Movements.</li> <li>Describe the 3 parts of Deltoid Muscle and correlate them with its unique functions.</li> <li>Explain its role in abduction of shoulder joint.</li> <li>Explain mechanism of Abduction of arm</li> <li>Identify and demonstrate the movements of scapula and shoulder joint.</li> <li>Draw and label the arterial anastomosis around shoulder joint</li> <li>Describe, in detail, the Scapula-Humeral Mechanism in relation to movement of abduction. Discuss important clinical conditions</li> </ul>
	Rotator Cuff	<ul style="list-style-type: none"> <li>Describe Rotator Cuff Muscles, state their</li> <li>Anatomical significance and explain Rotator Cuff Tendinitis</li> <li>Clinical correlates of shoulder joint. (shoulder joint stability, dislocation and shoulder pain)</li> </ul>
	Nerves of Upper Limb	<ul style="list-style-type: none"> <li>Describe the formation of Brachial Plexus; Infra and Supraclavicular parts.</li> <li>Discuss Brachial plexus injuries</li> <li>Demonstrate and identify the formation of brachial plexus and its branches</li> <li>List the branches of brachial plexus and give their areas of distribution and muscles they innervate</li> <li>Enlist and tabulate the muscles of anterior compartment of arm with their attachments, nerve supply and action.</li> <li>Identify &amp; Describe Musculocutaneous Nerve in terms of its Origin, Course, Termination, Relations, Branches, and distribution.</li> <li>Describe and illustrate the cutaneous innervation of the arm.</li> </ul>
	Blood supply of arm	<ul style="list-style-type: none"> <li>Describe the Brachial Artery in terms of its course, relations, branches, and distribution</li> </ul>

		<ul style="list-style-type: none"> <li>• Tabulate the attachments, innervation, and actions of Triceps brachii as a muscle of Posterior Fascial Compartment of Arm</li> <li>• Identify &amp; Describe the Profunda Brachii Artery giving its course, relations, branches, and distribution</li> </ul>
	Muscles of Arm	<ul style="list-style-type: none"> <li>• Describe Cubital Fossa with emphasis on its boundaries, contents, and clinical significance</li> <li>• Demonstrate surface marking of superficial veins of arm and forearm for IV (Intra venous) injections</li> <li>• Demonstrate biceps brachi reflex, triceps reflex and brachioradialis reflex</li> </ul>
	Bones of Forearm	<ul style="list-style-type: none"> <li>• Determine the side and identify the landmarks of radius and ulna.</li> <li>• Describe the Osteology of Radius (Side Determination, morphological features, attachments).</li> <li>• Describe the Osteology of Ulna (Side Determination, morphological features, attachments).</li> </ul>
	Muscle of Anterior/Flexor Compartment of Forearm	<ul style="list-style-type: none"> <li>• Describe osseofascial compartment of forearm.</li> <li>• Tabulate flexor and pronators muscles of forearm, their attachments, actions and nerve supply.</li> <li>• Describe the action of paradox with examples</li> </ul>
	Muscle of Lateral and Posterior/Extensor Compartment of Forearm	<ul style="list-style-type: none"> <li>• Tabulate the attachments, innervation, and actions of Extensor Muscles of the Forearm</li> <li>• Tabulate the attachments, innervation, and actions of Lateral Muscles of the Forearm</li> </ul>
	Nerves of Forearm	<ul style="list-style-type: none"> <li>• Identify the muscles and nerves of flexor and extensor compartments of forearm</li> <li>• Describe and illustrate the cutaneous innervation of the Forearm</li> <li>• Describe ulnar, median and radial nerves in forearm.</li> </ul>
	Blood supply of forearm	<ul style="list-style-type: none"> <li>• Describe the Origin, Course, Relations, and branches of Ulnar and radial Artery in Forearm</li> <li>• Describe the Origin, Course, Relations and list the tributaries of veins of Forearm.</li> <li>• Surface marking of Brachial artery, Cephalic,</li> <li>• Median cubital, Basilic Vein, Radial &amp; Ulnar</li> </ul>

		arteries, anterior & posterior interosseous artery
	Retinacula of Forearm	<ul style="list-style-type: none"> <li>Identify the Extensor &amp; Flexor Retinacula and describe their attachments and relations</li> </ul>
	Carpal tunnel syndrome	<ul style="list-style-type: none"> <li>Demonstrate the formation of carpal tunnel and identify the contents</li> <li>Describe Carpel Tunnel Syndrome</li> <li>Describe the features, attachments, relations and structures passing under Flexor Retinaculum</li> </ul>
	Forearm: Blood supply and Venous drainage	<ul style="list-style-type: none"> <li>Describe the Origin, Course, Relations, and branches of Ulnar Artery in Forearm</li> <li>Describe the Origin, Course, Relations and list the tributaries of veins of Forearm</li> <li>Surface marking of Brachial artery, Cephalic,</li> <li>Median cubital, Basilic Vein, Radial &amp; Ulnar arteries, anterior &amp; posterior interosseous artery</li> </ul>
	Joints of Upper Limbs: Elbow Joint	<ul style="list-style-type: none"> <li>Describe the Elbow Joint in terms of articular surfaces, type, variety, ligaments, muscles Producing movements, blood supply {Anastomosis around elbow joint}, nerve supply and radiological imaging.</li> <li>Describe Carrying Angle and justify its importance in limb movement</li> </ul>
	Joints of Upper Limbs: Radioulnar Joint	<ul style="list-style-type: none"> <li>Describe the Radioulnar Joints in terms of articular surfaces, type, variety, ligaments, and muscles producing movements, nerve supply and radiological imaging.</li> <li>Describe the wrist joint in terms of articular surfaces, type, variety, ligaments, and muscles producing movements, nerve supply and radiological imaging.</li> <li>Demonstrate mechanisms of movements of Pronation &amp; Supination</li> </ul>
	Interosseous membrane	<ul style="list-style-type: none"> <li>Describe the features of Interosseous</li> <li>Membrane with structures that pierce through it</li> </ul>
	Fascia & Muscles of Hand	<ul style="list-style-type: none"> <li>Describe the features and explain the importance of Fibrous Flexor Sheaths, synovial flexor sheaths and extensor expansion</li> </ul>
	Hand & Actions of Muscles of	<ul style="list-style-type: none"> <li>Demonstrate the attachments and actions of the muscles of hand</li> <li>Identify the muscles and neurovasculature of</li> </ul>

	Upper Limb as a Functional Unit	<p>palm.</p> <ul style="list-style-type: none"> <li>• Explain the morphology and tabulate the attachments, innervation and actions of intrinsic muscles of hand.</li> <li>• Explain the fascial spaces of palm and pulp space of fingers</li> <li>• Describe Dupuytren contracture, mallet finger and buttonaire deformity.</li> <li>• Describe hand as a functional unit. (position of hand, movement of thumb and fingers while performing different functions)</li> <li>• Discuss cupping of hand and fist formation.</li> </ul>
	Blood vessels of forearm and hand	<ul style="list-style-type: none"> <li>• Draw the Radial Artery course, relation and termination in hand with its clinical significance in the region</li> <li>• Describe the Ulnar Artery's Course, relation and termination in hand with its clinical significance in the region</li> <li>• Describe the formation, branches, and areas of distribution of Superficial and Deep Palmar Arch</li> </ul>
	Nerves of forearm and hand	<ul style="list-style-type: none"> <li>• Describe the course, relations and branches of Ulnar, Median and Radial Nerves in the Hand</li> </ul>
	Joints of Hands	<ul style="list-style-type: none"> <li>• Describe the First Carpometacarpal Joint in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation, movements.</li> <li>• Demonstrate the movements of the 1st carpometacarpal joint</li> <li>• Describe the Metacarpophalangeal &amp; interpharyngeal Joints in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation &amp; Movements</li> </ul>
	Skills	<ul style="list-style-type: none"> <li>• Palpate the arteries of the upper limb on a subject</li> <li>• Identify the topographical features of upper limb in a cross-sectional model/ specimen.</li> <li>• Demonstrate and identify the anatomical landmarks of upper limb on radiographs/ CT (Computed tomography)/ MRI (Magnetic resonance imaging)</li> <li>• Mark the anatomical landmarks and surface marking on a subject/ simulated model</li> </ul>
<b>Lower Limb</b>	Hip Bone	<ul style="list-style-type: none"> <li>• Draw and label the Parts of the hip bone, with</li> </ul>

		<p>its attachments.</p> <ul style="list-style-type: none"> <li>• Describe the parts, attachments of hip bone</li> <li>• Identify the parts and bony features of the hip bone, with its attachments, important relations</li> <li>• Demonstrate the side determination of hip bone, its bony features, attachments</li> </ul>
	Femur	<ul style="list-style-type: none"> <li>• Describe the parts, attachments, side determination of femur</li> <li>• Identify the parts and bony features of the femur, with its attachments.</li> <li>• Demonstrate the side determination of femur, its bony features, attachments, and important relations (correlate these with fractures)</li> <li>• Describe coxa Vara and coxa valga and their clinical significance</li> </ul>
	Fascia Lata	<ul style="list-style-type: none"> <li>• Describe the extent, attachments, and modifications of Fascia Lata</li> <li>• Demonstrate the attachment of fascia Lata, iliotibial tract</li> </ul>
	Neurovascular Supply of thigh	<ul style="list-style-type: none"> <li>• Describe the cutaneous nerves and vessels of thigh</li> <li>• Draw and label the cutaneous nerve supply of thigh</li> <li>• Describe the formation, course, relations, tributaries, and termination of the superficial veins</li> <li>• Explain the anatomical justification of venesection, varicose veins, and saphenous venous grafts</li> <li>• Describe the lymphatic drainage of the region with special emphasis on afferent and efferent of inguinal lymph nodes</li> <li>• Identify the superficial and deep lymph nodes</li> <li>• Explain the anatomical justification for enlargement of inguinal lymph nodes</li> </ul>
	Femoral Triangle & Canal	<ul style="list-style-type: none"> <li>• Describe and identify the Boundaries and contents of femoral triangle</li> <li>• Draw and label the Boundaries and contents of femoral triangle</li> <li>• Identify the femoral sheath with its compartments</li> <li>• Describe the formation of femoral sheath and its significance</li> <li>• Describe the formation of femoral canal and its contents and significance</li> </ul>

		<ul style="list-style-type: none"> <li>• Describe the formation and significance of femoral ring</li> <li>• Compare and contrast the anatomical features of femoral and inguinal hernias</li> </ul>
	Muscles of Anterior Compartment of Thigh	<ul style="list-style-type: none"> <li>• Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions</li> <li>• Demonstrate and identify the muscles of anterior compartment of thigh with their proximal and distal attachments</li> <li>• Demonstrate the actions of muscles of anterior compartment of thigh</li> <li>• Explain the anatomical basis of psoas abscess</li> </ul>
	Neurovascular supply of Anterior Compartment of Thigh	<ul style="list-style-type: none"> <li>• Identify and demonstrate the nerves and vessels of anterior compartment of thigh along with their branches</li> <li>• Describe the origin, course, relations, branches, distribution, and termination of femoral artery</li> <li>• Describe the origin, course, relations, tributaries, area of drainage and termination of femoral vein</li> <li>• Describe the origin, course, relations, branches, distribution, and termination of femoral nerve</li> <li>• Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions.</li> </ul>
	Adductor Canal	<ul style="list-style-type: none"> <li>• Describe the formation, boundaries, contents of adductor canal</li> <li>• Identify and demonstrate the boundaries and contents of adductor canal</li> </ul>
	Muscles of Medial Compartment of Thigh	<ul style="list-style-type: none"> <li>• Describe Muscles of medial compartment of thigh with their proximal and distal attachments, innervation and actions</li> <li>• Identify the muscles of medial compartment of thigh with their proximal and distal attachments</li> <li>• Demonstrate the actions of the muscles of the compartment on self/ subject</li> </ul>
	Neurovascular supply of Medial Compartment of Thigh	<ul style="list-style-type: none"> <li>• Describe the origin, course, relations, branches/tributaries, distribution, and termination of neurovascular structures of medial compartment of thigh</li> <li>• Identify the nerves and vessels of medial</li> </ul>

		<p>compartment of thigh along with their branches</p> <ul style="list-style-type: none"> <li>• Describe and identify the lumbar and sacral plexus and its branches supplying the lower limb</li> <li>• Describe the cutaneous nerve supply and lymphatics of the region</li> </ul>
	Gluteal Region	<ul style="list-style-type: none"> <li>• List the structures passing through the greater and lesser sciatic foramen.</li> <li>• Describe the muscles of gluteal region with their proximal and distal attachments, innervation, and actions</li> <li>• Identify the muscles of gluteal region with their proximal and distal attachments</li> <li>• Describe the origin, course, relations, branches/tributaries, distribution, and termination of neurovascular structures of gluteal region</li> <li>• Demonstrate the actions of the muscles of gluteal region</li> <li>• Explain the anatomical basis of the consequences of wrongly placed gluteal intramuscular injections</li> <li>• Damage to Gluteus medius &amp; minimus due to poliomyelitis</li> <li>• Demonstrate and identify the origin, course, relations, branches/tributaries and termination of nerves and vessels of gluteal region</li> </ul>
	Muscles of Posterior Compartment of Thigh	<ul style="list-style-type: none"> <li>• Describe the Attachments of muscles of posterior compartment of thigh with the innervation and action</li> <li>• Identify the muscles of posterior compartment of thigh with their proximal and distal attachments</li> <li>• Demonstrate the actions of muscles of posterior compartment of thigh</li> <li>• Describe the anatomical basis of signs and Symptoms of sciatica.</li> </ul>
	Blood supply of Posterior compartment thigh	<ul style="list-style-type: none"> <li>• Describe the origin, course, relations, branches, distribution, and termination of Profunda femoris artery</li> <li>• Describe blood supply on back of thigh</li> </ul>
	Sciatic Nerve	<ul style="list-style-type: none"> <li>• Describe the origin, course, relations, branches, distribution, and termination of sciatic nerve</li> </ul>

		<ul style="list-style-type: none"> <li>Describe the anatomical basis, signs and symptoms of compression of or injury to sciatic nerve</li> </ul>
	Hip Joint	<ul style="list-style-type: none"> <li>Describe the hip joint with its type, articulations, ligaments, stabilizing factors</li> <li>Movements, and neuro-vascular supply with clinical significance.</li> <li>Perform the movements of hip joint at various angles and be able to describe the muscles producing the movement.</li> <li>Discuss important associated clinical conditions (Hip dislocation, Arthritis, Hip joint stability and Trendelenburg sign) movements, and neurovascular supply with clinical significance.</li> </ul>
	Popliteal Fossa	<ul style="list-style-type: none"> <li>Describe the Boundaries and contents of popliteal fossa. Discuss clinical correlates (Popliteal aneurysm, Palpation of Popliteal artery, semi membranous bursa swelling and Baker's cyst</li> <li>Draw and label boundaries and contents of popliteal fossa</li> <li>Identify the boundaries and contents of popliteal fossa</li> <li>Describe the origin, course, relations, branches/tributaries, distribution and termination of popliteal artery and vein</li> </ul>
	Knee Joint	<ul style="list-style-type: none"> <li>Describe parts of tibia and fibula, with their attachments, important relations and side determination</li> <li>Identify the parts and bony features of the tibia &amp; fibula, their bony features, attachments, important relations.</li> <li>Draw and label Parts of patella with its attachments</li> <li>Describe features of patella, and name the factor responsible for stabilizing Patella</li> <li>Describe the knee joint with its type, articulations, ligaments, movements, and neuro-vascular supply</li> <li>Explain the mechanism of locking and unlocking of knee joint with the foot on ground and off the ground</li> <li>Describe the attachments and role of popliteus in locking and unlocking of the</li> </ul>

		<p>knee joint</p> <ul style="list-style-type: none"> <li>Describe the factors responsible for stability of knee joint. Discuss important associated clinical conditions.</li> </ul>
	Muscles of leg	<ul style="list-style-type: none"> <li>Describe the Muscles of anterior, lateral, and posterior compartments of leg with their proximal &amp; distal attachments, innervation, and actions</li> </ul>
	Neurovascular supply of Leg	<ul style="list-style-type: none"> <li>Identify the muscles of anterior, lateral, and posterior compartments of leg with their proximal and distal attachments</li> </ul>
	Neurovascular supply of Leg	<ul style="list-style-type: none"> <li>Describe the origin, course, relations, branches/tributaries and termination of nerves and vessels of anterior, lateral, and posterior compartments of leg- Compartment Syndrome, Foot Drop</li> <li>Describe the cutaneous nerves and veins of leg.</li> <li>Draw and label the cutaneous nerve supply and dermatomes of leg</li> </ul>
	Flexor, Extensor, and Peroneal Reticula	<ul style="list-style-type: none"> <li>Identify the extensor, flexor, and peroneal retinacula and demonstrate the structures related to them</li> <li>Describe the attachments, relations, and structures passing under cover of, extensor, peroneal, and flexor retinacula</li> <li>Identify and demonstrate the nerves and vessels of anterior, lateral, and posterior compartments of leg along with their branches</li> <li>Describe the formation of noncalcaneous (Achilles tendon)</li> </ul>
	Tibio-fibular Joint	<ul style="list-style-type: none"> <li>Describe the articulations, muscles and nerve supply and movements at Tibiofibular joints</li> </ul>
	Ankle Joint	<ul style="list-style-type: none"> <li>Describe the ankle joint with its type, articulations, ligaments, movements, and nerve supply</li> <li>Describe the factors stabilizing the ankle joint.</li> <li>Discuss important associated clinical conditions.</li> <li>Identify and demonstrate the articulating surfaces and ligaments of ankle joint</li> </ul>
	Plantar Fascia	<ul style="list-style-type: none"> <li>Describe the formation, attachments, and clinical significance of plantar aponeurosis</li> </ul>

		<ul style="list-style-type: none"> <li>• Explain the anatomical basis of the signs and symptoms of plantar fasciitis.</li> </ul>
	Muscles of foot	<ul style="list-style-type: none"> <li>• Identify the parts and bony features, attachments, and important relations of the articulated foot</li> <li>• Describe the muscles of the dorsum and sole of foot with their proximal &amp; distal attachments, innervation and actions emphasizing the role of interossei and lumbricals.</li> <li>• Draw and label the muscles of the layers of sole of foot</li> <li>• Demonstrate and identify the muscles and tendons with their proximal and distal attachments in the sole of foot</li> </ul>
	Small joints of foot	<ul style="list-style-type: none"> <li>• Describe the interphalangeal, subtalar and midtarsal joints with their types, articulation, movements, and ligaments.</li> </ul>
	Arches of foot	<ul style="list-style-type: none"> <li>• Describe the formation, components, stabilizing and maintaining factors of the arches of foot</li> <li>• Describe the clinical significance of arches of foot with respect to flat foot, claw foot.</li> </ul>
	Retinacula of foot	<ul style="list-style-type: none"> <li>• Describe the fibrous flexor sheaths, extensor expansions and synovial flexor sheaths</li> </ul>
	Neurovascular supply of foot	<ul style="list-style-type: none"> <li>• Describe the origin, course, relations, branches/tributaries, distribution, and termination of plantar vessels</li> <li>• Identify the nerves and vessels on the foot along with their branches</li> <li>• Describe the cutaneous nerves of foot</li> <li>• Draw and label the cutaneous nerve supply and dermatomes of foot</li> <li>• Identify the nerves and vessels in the sole of foot along with their branches</li> <li>• Describe the palpation of dorsalis pedis artery &amp; explain the clinical significance of dorsalis pedis artery</li> </ul>
	Arterial and Venous drainage of lower limb	<ul style="list-style-type: none"> <li>• Describe the surface anatomy, course, relations, tributaries, and communications of the superficial veins of the lower limb</li> <li>• Draw a concept map of the superficial veins of lower limb</li> <li>• List the factors favoring venous return of the lower limb</li> </ul>

		<ul style="list-style-type: none"> <li>• Explain the anatomical basis of the formation,</li> </ul>
	Human Gait	<ul style="list-style-type: none"> <li>• Explain the anatomical basis of the formation, and signs and symptoms of deep venous thrombosis</li> <li>• Discuss Clinical correlations of Lower Limb Arteries (palpation of femoral, popliteal, posterior tibial &amp; dorsalis pedis arteries, collateral circulation, intermittent claudication, occlusive arterial disease)</li> </ul>
	Lymphatic drainage of lower limb	<ul style="list-style-type: none"> <li>• Draw a concept map of the lymphatic drainage of lower limb</li> </ul>
	Cutaneous dermatomes & nerve supply of lower limb	<ul style="list-style-type: none"> <li>• Draw and label the cutaneous nerves &amp; dermatomes of the lower limb</li> <li>• Discuss clinical correlates of Lower limb nerves (Femoral nerve injury, Sciatic Nerve injury, Common fibular, tibial &amp; obturator nerve injury)</li> <li>• Describe the anatomical basis of knee jerk, ankle jerk, and plantar reflex</li> </ul>
	Topographical and radiological anatomy of lower limb	<ul style="list-style-type: none"> <li>• Demonstrate the surface marking of nerves and vessels of lower limb</li> <li>• Demonstrate the surface marking of bony landmarks of lower limb</li> <li>• Identify the topographical features of lower limb in a cross-sectional model</li> <li>• Demonstrate and identify the features of bones and joints of lower limb on radiograph/ CT scan/ MRI</li> </ul>
	Bone Fracture	<ul style="list-style-type: none"> <li>• Describe the common fractures of the following bone with the risk factors, clinical presentations, and management:             <ol style="list-style-type: none"> <li>1. Clavicle</li> <li>2. Humerus</li> <li>3. Radius</li> <li>4. Ulna</li> <li>5. Small bones of hand</li> <li>6. Hip bone</li> <li>7. Femur</li> <li>8. Tibia</li> <li>9. Fibula</li> <li>10. Small bones of foot</li> </ol> </li> </ul>
	Joint Dislocation	<ul style="list-style-type: none"> <li>• Describe the dislocations of the following joints with the risk factors and clinical presentations, and brief management:             <ul style="list-style-type: none"> <li>• Shoulder joint</li> </ul> </li> </ul>

		<ol style="list-style-type: none"> <li>1. Elbow joint</li> <li>2. Interphalangeal joint of hand</li> <li>3. Hip joint</li> <li>4. Knee joint</li> <li>5. Ankle joint</li> </ol>
<b>Embryology &amp; Post-Natal Development</b>	Development of Muscles	<ul style="list-style-type: none"> <li>• Name the molecular and genetic factors involved in the development of musculoskeletal system</li> <li>• Describe the development of skeletal muscle and innervation of axial skeletal Muscles- developmental basis of myotome</li> <li>• Briefly discuss the development of cardiac and smooth muscle (Detail to be covered in respective modules later).</li> </ul>
	Development of Limb	<ul style="list-style-type: none"> <li>• Describe the process of limb development and limb growth</li> </ul>
	Development of Nerve supply of limbs	<ul style="list-style-type: none"> <li>• Describe the embryological basis of cutaneous innervation of limb</li> <li>• Describe the embryological basis of blood supply of limbs and concept of axial artery</li> <li>• Describe the embryological basis of congenital anomalies related to muscular system.</li> </ul>
	Congenital anomalies of limbs	<ul style="list-style-type: none"> <li>• Describe the clinical presentations and embryological basis of;               <ol style="list-style-type: none"> <li>i. Amelia</li> <li>ii. Meromelia</li> <li>iii. Phocomelia</li> <li>iv. Cleft Hand and Foot</li> <li>v. Polydactyly, Brachydactyly, Syndactyly</li> <li>vi. Congenital club foot</li> </ol> </li> </ul>
	Development of Cartilage	<ul style="list-style-type: none"> <li>• Describe the developmental process of cartilage and bone</li> <li>• Describe the process of histogenesis of cartilage of Cartilage and bone</li> </ul>
	Development of Axial skeleton	<ul style="list-style-type: none"> <li>• List the factors contributing to the development of Axial skeletal system</li> <li>• Describe the clinical picture and explain the embryological basis of Axial skeletal anomalies</li> <li>• Describe the developmental process of Vertebral Column</li> </ul>
	<b>Microscopic Anatomy</b>	Histology of Muscles

		<ul style="list-style-type: none"> <li>• Describe the microscopic and ultramicroscopic structure of cardiac muscle</li> <li>• Describe the microscopic and Histology ultramicroscopic structure of smooth muscle</li> <li>• Compare and contrast the histological features of three types of muscle tissue</li> </ul>
	Functional Histology	<ul style="list-style-type: none"> <li>• Describe Myosatellite Cells &amp; their role in regeneration of muscle, hyperplasia, and hypertrophy of muscle fiber</li> <li>• Explain the histopathological basis of leiomyoma</li> </ul>
	Histology of Osseous tissue	<ul style="list-style-type: none"> <li>• Describe the light and electron microscopic structure of bone cells</li> <li>• Describe the light and electron microscopic structure of compact and spongy bone</li> <li>• Describe the histological justification for Osseous tissue osteoporosis, Osteopetrosis</li> <li>• Describe the histological basis for bone repair after Pathology fractures.</li> </ul>
	Histology of Bone	<ul style="list-style-type: none"> <li>• Compare and contrast the microscopic features of compact and spongy bone</li> <li>• Explain the characteristic features of ossification (Intramembranous &amp; Endochondral ossification)</li> <li>• Describe the zones seen in an epiphyseal growth plate</li> </ul>
	Functional Histology of Bone	<ul style="list-style-type: none"> <li>• Describe the metabolic role of bone</li> <li>• Describe the clinical presentation of osteoporosis, osteopenia</li> </ul>
	Histology of Cartilage	<ul style="list-style-type: none"> <li>• Describe the microscopic and ultramicroscopic structure of all types of cartilage</li> <li>• Compare and contrast the structure of cartilage and bone matrix</li> <li>• Tabulate the differences between three types of cartilage</li> </ul>
	Mechanism of Bone growth	<ul style="list-style-type: none"> <li>• Describe the histological basis for bone &amp; Cartilage growth and repair</li> </ul>

➤ **Physiology**

Topic	Sub Topic	Learning objectives
<b>Medical Physiology</b>	Diffusion / Equilibrium Potentials	<ul style="list-style-type: none"> <li>• Explain the Physiological basis of membrane Potential</li> <li>• Explain diffusion potentials of Na &amp; K</li> </ul>
	Nernst potential	<ul style="list-style-type: none"> <li>• Define Nernst potential</li> <li>• Explain Physiological Basis of Nernst potential</li> <li>• Write the Nernst equation.</li> <li>• Calculate Nernst potential for Na &amp; K</li> <li>• Explain the effects of altering the concentration of Na<sup>+</sup>, K<sup>+</sup>, Ca on the equilibrium potential for that ion</li> </ul>
	Goldman Equation	<ul style="list-style-type: none"> <li>• Describe the normal distribution of Na<sup>+</sup>, K<sup>+</sup>, Ca and Cl<sup>-</sup> across the cell membrane</li> <li>• Explain physiological basis of Goldman equation</li> <li>• Clarify the role of Goldman equation in generation of Resting Membrane Potential (RMP).</li> </ul>
	Resting Membrane Potential in Neurons	<ul style="list-style-type: none"> <li>• Describe the Physiological basis of generation of RMP.</li> <li>• Explain the effects of hyperkalemia and Hypokalemia on the Resting Membrane Potential (RMP)</li> <li>• Name the membrane stabilizers</li> <li>• Explain the physiological basis of action of Local Anesthetics.</li> </ul>
	Neurons	<ul style="list-style-type: none"> <li>• Describe the Physiological anatomy of Neurons</li> <li>• Discuss the axonal transport</li> <li>• Enlist &amp; give functions of Neuroglial cells</li> <li>• Explain process of myelination in Central Nervous System (CNS) &amp; Peripheral Nervous System (PNS)</li> </ul>
	Classification of Neurons & Fibers	<ul style="list-style-type: none"> <li>• Classify neurons functionally.</li> <li>• Classify nerve fibers according to Erlanger &amp; Gasser Classification</li> </ul>
	Action Potential of Neurons	<ul style="list-style-type: none"> <li>• Define Action Potential</li> <li>• Enlist the Properties of action potential</li> <li>• Describe the ionic basis of an action potential.</li> <li>• Explain the phases of action potential.</li> <li>• Explain the effects of hyperkalemia and</li> </ul>

	<ul style="list-style-type: none"> <li>• Hypokalemia on the action potential.</li> <li>• Draw monophasic action potential.</li> <li>• Explain absolute and relative refractory period</li> </ul>
Role of other ions in action potential	<ul style="list-style-type: none"> <li>• Explain the role of other ions in action potential.</li> <li>• Elaborate the effect of hypocalcemia on neuron excitability.</li> </ul>
Local / Graded potentials	<ul style="list-style-type: none"> <li>• Explain Physiological basis &amp; properties of Graded potential</li> <li>• Draw &amp; explain Physiological basis &amp; properties of compound action potential.</li> <li>• Contrast between action potential and graded potential</li> <li>• Describe the ionic basis of excitatory Post Synaptic Potential (EPSP), Inhibitory Post Synaptic Potential (IPSP), End Plate Potential (EPP).</li> </ul>
Synapse	<ul style="list-style-type: none"> <li>• Classify and explain Physiological basis of different types of synapses</li> <li>• Elaborate how signal transmission takes place across chemical synapse</li> </ul>
Conduction of Nerve Impulse	<ul style="list-style-type: none"> <li>• Explain the mechanism of conduction of Nerve impulse in myelinated and unmyelinated nerve fibers.</li> <li>• Elaborate significance of saltatory conduction</li> </ul>
Nerve Degeneration	<ul style="list-style-type: none"> <li>• Enlist the types of nerve injury</li> <li>• Explain Wallerian degeneration.</li> <li>• Describe the process of regeneration of nerve fiber.</li> <li>• Describe the causes, features &amp; pathophysiology of Multiple sclerosis, GB syndrome.</li> </ul>
Skeletal muscle	<ul style="list-style-type: none"> <li>• Discuss the physiological anatomy of skeletal muscles.</li> <li>• Differentiate b/w skeletal, smooth, and cardiac muscle</li> <li>• Describe the structure of Sarcomere</li> </ul>
Characteristics of whole muscle contraction	<ul style="list-style-type: none"> <li>• Differentiate between isometric and isotonic contraction by giving examples</li> <li>• Compare the fast and slow muscle fibers.</li> </ul>
Mechanics of muscle contraction	<ul style="list-style-type: none"> <li>• Explain the mechanism of summation and Tetanization.</li> <li>• Describe staircase effect/Treppe phenomena</li> </ul>

		<ul style="list-style-type: none"> <li>• Discuss the mechanism of skeletal muscle fatigue.</li> <li>• Explain the remodeling of skeletal muscle to match the function. Describe the development of macro motor units in poliomyelitis.</li> <li>• Explain the physiological basis of rigor mortis</li> </ul>
	Neuromuscular junction	<ul style="list-style-type: none"> <li>• Describe the physiological anatomy of Neuro Muscular Junction (NMJ)</li> <li>• Mechanism of Neuromuscular transmission &amp; generation of End Plate Potential</li> <li>• Explain features, pathophysiology &amp; treatment of myasthenia Gravis</li> <li>• Describe the enhancers or blockers of neuromuscular transmission at the neuromuscular junction.</li> <li>• Discuss the steps/ events of excitation contraction coupling in skeletal muscle</li> </ul>
	Smooth Muscle	<ul style="list-style-type: none"> <li>• Differentiate between types of smooth muscles.</li> <li>• Describe mechanism of smooth muscle contraction in comparison to skeletal muscle.</li> <li>• Explain the physiological anatomy of neuromuscular junction of smooth muscle</li> <li>• Explain the excitatory and inhibitory transmitters secreted at Neuro Muscular Junction (NMJ) of smooth muscles.</li> <li>• Explain the depolarization of multiunit smooth muscles without action potentials.</li> <li>• Explain the local tissue factors and hormones that can cause smooth muscle contraction without action potential.</li> <li>• Explain the regulation of smooth muscle contraction by calcium ions.</li> <li>• Explain membrane potential and action potentials in smooth muscles.</li> <li>• Explain the phenomena of stress relaxation and reverse stress relaxation in smooth muscles.</li> <li>• Explain the LATCH mechanism</li> <li>• Describe the significance of LATCH mechanism.</li> <li>• Explain the nervous and hormonal control of Smooth Muscle Contraction.</li> </ul>

➤ **Medical Biochemistry**

Topic	Sub Topic	Learning objectives
<b>Medical Biochemistry</b>	Classification carbohydrates	<ul style="list-style-type: none"> <li>Classify carbohydrates along with the structure and biomedical importance of each class</li> </ul>
	Carbohydrates	<ul style="list-style-type: none"> <li>Explain the isomerization of carbohydrates</li> <li>Describe the physical and chemical properties of carbohydrates</li> <li>Differentiate between proteoglycan and glycoproteins</li> </ul>
	Extracellular matrix	<ul style="list-style-type: none"> <li>Describe the components of extracellular matrix:               <ol style="list-style-type: none"> <li>Describe structure, functions and clinical significance of glycosaminoglycans</li> <li>Discuss structure and functions of Fibrous proteins (collagen and Elastin)</li> <li>Interpret diseases associated with them on basis of sign/symptoms and data</li> <li>Interpret the importance of vitamin C in collagen synthesis</li> <li>Describe sources, active form, functions and deficiency diseases of vitamin C</li> <li>Identify the defects in collagen synthesis based on given data (Osteogenesis Imperfecta)</li> </ol> </li> <li>Interpret genetic basis of Duchene muscular Dystrophy</li> <li>Explain the transport and uptake of glucose in cells, steps of glycolysis and citric acid cycle along with enzymes, co enzymes and cofactors involved</li> </ul>
	Glycolysis and Tricarboxylic acid cycle (TCA)	<ul style="list-style-type: none"> <li>Discuss the provision of energy to the muscles and cells through glycolytic pathway and TCA cycle</li> <li>Explain the hormonal and allosteric regulation of glycolysis and TCA</li> </ul>
	Protein Digestion & Transport across cell	<ul style="list-style-type: none"> <li>Describe the digestion and absorption of proteins in mouth, stomach and small intestine.</li> <li>Discuss the uptake of amino acids by cells</li> </ul>
	Reactions involve in catabolism	<ul style="list-style-type: none"> <li>Explain following reactions with enzymes involved in it:               <ol style="list-style-type: none"> <li>Transamination</li> <li>Deamination decarboxylation</li> </ol> </li> </ul>

		3. Deamidation 4. Trans deamination. 5. Oxidative deamination.
	Transportation of ammonia to the liver	<ul style="list-style-type: none"> <li>• Role of pyridoxal phosphate, glutamate, glutamine, alanine</li> </ul>
	Urea cycle	<ul style="list-style-type: none"> <li>• Illustrate steps of urea cycle with enzymes and its importance</li> <li>• Discuss ammonia intoxication</li> <li>• Interpret different types of hyper ammonia on basis of sign symptoms and data</li> </ul>
	Protein metabolism	<ul style="list-style-type: none"> <li>• Discuss the catabolic pathways of aliphatic, aromatic, branched chain, sulfur containing, hydroxyl group containing amino acids with the products formed and enzymes and vitamins involved in them</li> <li>• Interpret the following on basis of given data:             <ol style="list-style-type: none"> <li>1. Phenylketonuria</li> <li>2. Tyrosinemia</li> <li>3. Albinism</li> <li>4. Homocystinuria</li> <li>5. Maple syrup urine disease</li> <li>6. Alkaptonuria</li> </ol> </li> </ul>

➤ **Pathology**

Topic	Sub Topic	Learning objectives
<b>General Pathology</b>	Muscle remodeling	<ul style="list-style-type: none"> <li>• Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber</li> <li>• Explain the histopathological basis of leiomyoma</li> </ul>
	Diseases of Muscle	<ul style="list-style-type: none"> <li>• Describe the histological basis of Duchenne Muscular Dystrophy and myopathy.</li> </ul>
	Diseases of Bone	<ul style="list-style-type: none"> <li>• Describe the clinical presentation and histological justification for osteoporosis, osteopetrosis</li> <li>• Describe the histological basis for bone repair after fractures</li> </ul>
	Disease of Cartilage	<ul style="list-style-type: none"> <li>• Describe the histological basis for cartilage growth and repair</li> </ul>

➤ **Aging**

Topic	Sub Topic	Learning objectives
Aging	Bone	<ul style="list-style-type: none"> <li>Discuss the effect of age on bone fragility and its implications with management.</li> </ul>
	Cartilage	<ul style="list-style-type: none"> <li>Discuss the effect of age on loss of cartilage resilience and its implications and management</li> </ul>
	Muscle	<ul style="list-style-type: none"> <li>Discuss the effect of age on Muscular strength and its implications and management</li> </ul>
	Effect of estrogen on BMD	<ul style="list-style-type: none"> <li>Explain the protective effect of estrogen (female sex hormone) on bone mineral density and relate it to increased prevalence of postmenopausal fractures in women.</li> </ul>

➤ **Pharmacology and Therapeutics**

Topic	Sub Topic	Learning objectives
General Pharmacology	Drugs acting on Neuromuscular Junction (NMJ)	<ul style="list-style-type: none"> <li>Explain the mechanism by which drugs can stimulate NMJ.</li> <li>Explain the mechanism by which drugs can block NMJ.</li> </ul>
	Drugs in Myasthenia Gravis	<ul style="list-style-type: none"> <li>Discuss briefly the therapeutic effect of drugs used in myasthenia gravis.</li> </ul>
	Local Anesthetics	<ul style="list-style-type: none"> <li>Discuss briefly the therapeutic effect of drugs used as local anesthetics.</li> </ul>

➤ **Disease Prevention & Impact**

Topic	Sub Topic	Learning objectives
Community medicine and public Health	Back Pain	<ul style="list-style-type: none"> <li>Explain causes of low back pain</li> <li>Describe prevention of low back pain</li> </ul>
	Work related Musculoskeletal disorders	<ul style="list-style-type: none"> <li>Describe work related musculoskeletal disorders addition with its burden/epidemiology</li> <li>Identify risk factors of Musculoskeletal disorders MSD at workplace</li> <li>Describe prevention of exposure to risk factors related to workplace</li> </ul>

	MSD related to mobile usage	<ul style="list-style-type: none"> <li>• Describe MSD related to mobile addition with its burden/epidemiology</li> <li>• Describe MSD related to mobile usage (Text neck,</li> <li>• Trigger thumb, DeQuervain Syndrome, Carpel Tunnel Syndrome)</li> <li>• Identify risk factors related to MSD due to excessive mobile usage.</li> <li>• Describe the preventive strategies for mobile addiction-related MSD.</li> </ul>
	Ergonomics	<ul style="list-style-type: none"> <li>• Describe the application of ergonomics in MSD related to the above disorders.</li> </ul>
	Noncommunicable disease	<ul style="list-style-type: none"> <li>• Describe the concept of non-communicable Musculoskeletal diseases</li> </ul>
	Risk factor assessment of Musculoskeletal diseases	<ul style="list-style-type: none"> <li>• Identify the risk factors in the community for Osteoporosis</li> <li>• Learn and apply interventions to prevent the risk factors for various musculoskeletal diseases in the community.</li> </ul>
<b>Behavioral Sciences</b>	Psychosocial factors influencing chronic illnesses	<ul style="list-style-type: none"> <li>• Identify and deal with the various psychosocial aspects of Musculoskeletal conditions (such as Osteoarthritis, Osteomyelitis, Rheumatoid arthritis, Gout, chronic back pain, psychosomatic complaints) and Neuromuscular conditions (Muscular dystrophy, Myasthenia Gravis, Sclerosis) on Individual, Family and Society</li> </ul>
	Psychosocial Impact of Disease and its management	<ul style="list-style-type: none"> <li>• Identify the psychosocial risk factors as mediating factors between illness and its effect.</li> <li>• Discuss the role of psychological variables like coping, social support, and other health cognitions in mediating between illness and its effect.</li> </ul>

### 5.3.2. Skills

#### ➤ Practical

Topic	Sub Topic	Learning objectives
Histology	Histology of Muscles	<ul style="list-style-type: none"> <li>• Draw and label the histology of skeletal muscle</li> <li>• Draw and label the histology of smooth muscle</li> <li>• Draw and label the histology of cardiac muscle</li> </ul>
	Histology of Bones	<ul style="list-style-type: none"> <li>• Draw and label the histological picture of compact bone</li> <li>• Draw and label the histological picture of spongy bone</li> </ul>
	Histology of Cartilage	<ul style="list-style-type: none"> <li>• Draw and label the microscopic structure of hyaline cartilage</li> <li>• Draw and label the microscopic structure of elastic cartilage</li> <li>• Draw and label the microscopic structure of fibrocartilage</li> </ul>
Physiology	Locomotion	<ul style="list-style-type: none"> <li>• Demonstrate and categorize the following movements: Pushing against the wall, Biceps curls, squats, yoga chair pose, standing on toes, running on an inclined treadmill, yoga tree pose, deadlift as isotonic and isometric skeletal muscle contraction</li> </ul>
Biochemistry	Total proteins	<ul style="list-style-type: none"> <li>• Estimation of total proteins by kit method/dipstick methods.</li> </ul>
	Albumin/globulin	<ul style="list-style-type: none"> <li>• Estimation of albumin and globulin</li> </ul>

### 5.3.3. C-FRC for Musculoskeletal & Locomotion-1 Module

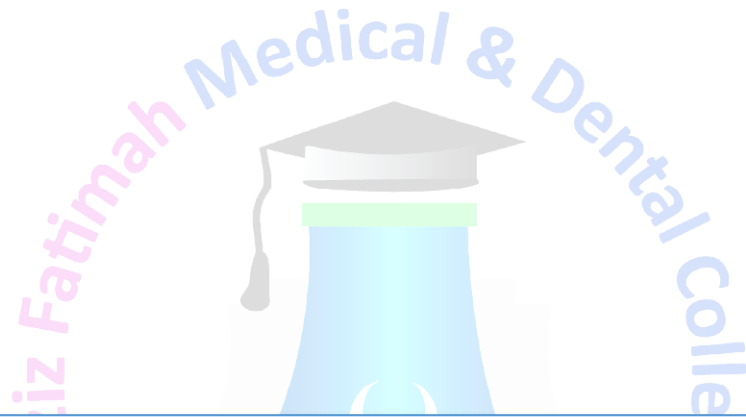
<b>MUSCULOSKELETAL AND LOCOMOTION MODULE</b>		
<b>Objectives</b>	<b>Skill</b>	<b>Miller's Pyramid Level Reflected</b>
Measure body temperature using a mercury/digital thermometer	Body temperature	Shows
Examine the wrist joint for functionality	Wrist joint examination	Shows
Examine strength of the upper limb	Upper limb strength and power examination	Shows
Examine strength of the lower limb	Lower limb strength and power examination	Shows
Examine the knee joint for functionality	Knee joint examination	Shows
Examine the shoulder joint for functionality	Shoulder joint examination	Shows
Examine the hip joint for functionality	Hip joint examination	Shows
*Identify common fractures showing in x rays of upper limb	X ray common fractures Upper limb	Knows how

## 6. Attitude

### ➤ PERL's for Block-2

Domain	Topic	Specific Learning Objectives	Proposed Portfolio Entry
Professionalism	Respect for the Human Body/Remain	<ul style="list-style-type: none"> <li>Understand the ethical and professional significance of respecting the human body, especially in medical education settings such as anatomy labs, and appreciate the contributions of body donors to medical science.</li> </ul>	Write a Code of Conduct of professional behaviors in Anatomy Hall, Laboratories /museums with human tissue/remains.
Ethics	Virtues of a Medical Professional	Analyze the key virtues expected from healthcare providers, including compassion, courage, integrity, humility, patience, altruism, professional responsibility, trustworthiness, and honesty, and their role in ethical medical practice. • Reflect on a case or scenario where healthcare professionals demonstrated one or more of these virtues, discussing how these traits influenced patient care and outcomes.	Write a reflective entry on a case or scenario where healthcare professionals demonstrated one or more of these virtues, discussing how these traits influenced patient care and outcomes.
Leadership	Written and Electronic Communication Skills	Appreciate effective written and electronic communication skills, focusing on clarity, professionalism, and accuracy in both academic and clinical contexts, including emails and electronic health records. • Students will practice composing a clear and professional email to a faculty member or peer, ensuring correct format, tone, and content.	Submit a sample professional email or electronic communication (e.g., a message to a faculty member) that demonstrates clarity, appropriate tone, and adherence to communication protocols.
Leadership	Giving Feedback	Appreciate the importance of giving constructive feedback • Discuss the principles using techniques like the Sandwich Technique and “2 Stars and a Wish” to promote improvement while maintaining positive communication. • Practice giving feedback to a peer using the Sandwich Technique (positive-constructive-positive) or ‘2 Stars and a	Submit the feedback given to you by your peer during class activity with the identification of areas for improvement and an

Domain	Topic	Specific Learning Objectives	Proposed Portfolio Entry
		Wish' (two positive aspects and one area for improvement) during a group activity or simulated scenario.	action plan.
Research	Critiquing Scientific articles– Introduction	Describe the steps to critique a research article. • Use any checklist, e.g. <a href="https://web2.qatar.cmu.edu/~mhhammo/15440-f16/assignments/HowtocritiqueaJournalarticle.pdf">https://web2.qatar.cmu.edu/~mhhammo/15440-f16/assignments/HowtocritiqueaJournalarticle.pdf</a> for journal article critique.	Submit an Article Critique report highlighting areas for improvement.
Ethics	Patient Autonomy in decision making	Define patient autonomy and understand its foundational role in medical practice, recognizing that every patient has the right to make informed decisions regarding their own healthcare. • Describe necessary components of informed decision-making, including the provision of accurate information, understanding of risks and benefits, patient comprehension, and the patient's ability to voluntarily make choices free from coercion. • Appreciate the responsibilities of healthcare providers in ensuring that patients receive all necessary information and support to make autonomous decisions, including effective communication and respecting cultural, religious, or personal values.	Submit a reflective case study analyzing how patient autonomy was handled in a clinical situation. Discuss whether the patient was fully informed, how their preferences were respected, and the role of healthcare providers in ensuring the patient's right to make decisions about their own care.



**ASSESSMENT POLICY AND TOS OF UHS**

## **7. Teaching & Learning Methodologies**

### ➤ **Interactive Lectures**

Interactive lecturing involves an increased interchange between teachers, students and the lecture content. The use of interactive lectures can promote active learning, heighten attention and motivation, give feedback to the teacher and the student, and increase satisfaction for both.

### ➤ **Small group discussions**

Small-group discussion is a student-centered methodology that allows students to actively involve and be partners in the teaching-learning process. Students interact with peers and instructors, discussing, and sharing ideas. They develop the ability to build consensus in a group.

### ➤ **Practical's**

Hands-on performance of skills in laboratory

### ➤ **Clinical Skills Session**

Clinical skills are abilities health care professionals use when assessing, diagnosing and caring for patients. Clinical skills also describe applied medical knowledge, such as assessing bloodwork.

### ➤ **Case based Learning**

Case-based learning is a student-centered learning approach where students read and discuss complex situations and apply their knowledge to each situation. Students typically examine the case together as a team and address the problems within the realistic scenario to develop a reasonable conclusion.

### ➤ **Problem Based Learning**

Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem. This problem is what drives the motivation and the learning.

### ➤ **Self-directed learning**

Self-directed learning is an instructional strategy where the students with guidance from the teacher decide what and how they will learn. It can be done individually or with group, learning, but the overall concept is that students take honor ship of their learning

## 8. Assessment Methodologies

### 1. Theory

- MCQ's

A multiple-choice question (MCQ) is composed of two parts: a stem that identifies the question or problem, and a set of alternatives or possible answers that contain a key that is the best answer to the question, and a number of distractors that are plausible but incorrect answers to the question.

- SEQ's

It is a type of assessment tool in which a question on a topic is given in test or examination requiring a written analysis and explanation usually of a specified length.

### 2. Practical

- OSPE

“Objectively Structured Practical Examination.”, as a tool for the assessment of practical skills of undergraduate Medical Students.

- OSCE

OSCE stands for “Objectively Structured Clinical Examination.” OSCEs are very helpful in medical education because they allow a student to practice and demonstrate clinical skills in a standardized medical scenario.

### 3. OSVE

OSVE stands for “Objectively Structured Viva Examination”. In the viva you have to answer questions and engage with your examiners.

## **9. Assessment Policy (UHS)**

### **Statutes**

1. The first professional MBBS shall be held at the end of first year MBBS whereas, the second Professional MBBS Examination shall be held at the end of the second year.
2. Every candidate shall be required to study contents of Anatomy (including Histology), Physiology, Biochemistry, Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Islamic Studies/Ethics and Pakistan Studies, Clinical skills and Professionalism, Ethics, Research and Leadership. The teaching and assessment shall be done in three modular blocks.
3. There will be three papers in the first professional examination, and four papers in the second professional examination

#### **First Professional Exam:**

- a) Paper 1 will be based on contents of Block 1;
- b) Paper 2 will be based on contents of Block 2;
- c) Paper 3 will be based on contents of Block 3;

#### **Second Professional Exam:**

- a) Paper 1 will be based on contents of Block 4;
  - b) Paper 2 will be based on contents of Block 5;
  - c) Paper 3 will be based on contents of Block 6;
  - d) Paper 4 will be based on contents of Islamic Studies/Civics and Pakistan Studies;
4. Each paper will comprise of two components 'Written' and 'Oral/Practical/Clinical' examinations.
  5. The 'Written' and 'Oral/Practical/Clinical' examinations in each paper will carry 175 marks each, making the total marks of 350 for each paper of papers 1, 2 and 3 (inclusive of internal Assessment).
  6. Total marks for the First and Second Professional Examinations shall be 1050, each. Marks of Islamic Studies/Civics and Pakistan Studies shall not be counted towards total marks of any professional examination, and determination of position or merit of a candidate. However, the candidates failing in the subject of Islamic Studies/Civics & Pakistan Studies, while passing other subjects of 2nd professional examination, may not

be subjected to detention, as the subject has no contribution towards total marks of any professional examination, and determination of position or merit. The students may rather be allowed to pass the examination in the subject, before appearing in their final professional MBBS examination, and in case of their failure to clear the subject they may not be allowed to take their final professional MBBS examination

7. Major content areas of the first two professional years shall be from:
  - a. Anatomy including applied/clinical/Anatomy
  - b. Physiology including applied/clinical/Physiology
  - c. Biochemistry including applied/clinical/ Biochemistry
8. The Applied/Clinical content for the Anatomy, Physiology and Biochemistry shall be based on clinical correlations.
9. Integrated clinical content areas for the both years include Behavioral Sciences, Community Medicine & Public Health, Pathology, Pharmacology & Therapeutics, Clinical Foundation- 1& II and PERLs- 1 & II.

#### **10. Written Examination**

- d. The written component of Papers 1, 2, and 3 will consist of 'One-best-type' Multiple Choice Questions (MCQ) and Structured Essay Questions (SEQ) in a ratio of 65:35 %.
- e. Each MCQ will have five options (one best response and four distractors) and will carry one (01) mark.
- f. There will be no negative marking.
- g. There will be no sections within an SEQ, and it will be a structures question with five (05) marks each.
- h. SEQ's will only be based on the major content areas of the year.
- i. There will be total of 85 MCQs and 07 SEQs in every written paper in Papers 1, 2 and 3.
- j. The duration of each written paper will be 195 minutes (03 hours & 15 minutes).
- k. The MCQ section will be 95 minutes duration and the SEQ section 100 minutes.

#### **11. Oral/Practical/Clinical Examination**

- a. The Oral/Practical/Clinical examination of each Papers 1, 2, and 3 will consist of a total of twelve (18) OSPE/OSCE/OSVE stations in each Oral/Practical/Clinical examination.
  - b. There will be seven (11) Observed OSPE (Objective Structured Practical Examination) stations from major subject areas. Each OSPE station will have the Practical component and an evaluation of the underlying principle relevant to that practical with a component of applied knowledge.
  - c. There will be two (02) Observed OSCE (Objective Structured Clinical Examination) stations, 01 from C-FRC1 and PERLs-1 in each Oral/Practical/Clinical examination.
  - d. There will be three (03) Observed Interactive OSVE (Objective structured Viva Examination) from major subject areas. Each OSVE station will have a structured Viva to assess a practical component along evaluation of the underlying principle relevant to that practical with a component of applied/practical knowledge and related clinical application.
  - e. Each OSPE station will carry eight (08) marks.
  - f. Each OSCE from C-FRC-1 and PERLs-1 will carry eight (05) marks.
  - g. Each OSVE station will carry 14 marks
  - h. The duration of each Oral/Practical/Clinical examination will be 100 minutes.
  - i. Time for each OSPE, OSCE and OSVE station will be eight (06) minutes.
12. Every candidate shall take the examination in the following Blocks (Modules) in First & Second Professional MBBS Examination:

**Year 1**

- |   |     |
|---|-----|
| i. Block 1 (Foundation-I + Hematopoietic & Lymphatic) Marks | 350 |
| ii. Block 2 (Musculoskeletal & Locomotion-1) Marks          | 350 |
| iii. Block 3 (Cardiovascular-1 Respiratory-1) Marks         | 350 |

**Year 2**

- |   |     |
|---|-----|
| a. Block 4 (Gastrointestinal Tract & Nutrition- Renal-1) Marks              | 350 |
| b. Block 5 (Endocrinology & Reproduction Head & Neck, Special Senses) Marks | 350 |
| c. Block 6 (Neurosciences-1+ Inflammation) Marks                            | 350 |

d. Islamic Studies Civics Pakistan Studies Marks

100

**A. Block 1 (Foundation- Hematopoietic and Lymphatic)**

The examination in Block 1 shall be as follows:

- I. One written paper of 140 marks having two parts
  - a. Part I shall have ninety (90) Multiple Choice Questions (MCQs) of total 90 marks (01 mark for each MCQ) and the time allotted shall be 95 minutes. There will be no negative marking.
  - b. Part II shall have ten Structured Essay Questions (SEQs) of total 50 marks (05 marks for each SEQ) and the time allotted shall be 100 minutes.
- II. Oral Practical/Clinical examination shall have 140 marks in total.
- III. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 70 marks, e 20% of the total allocated marks (350) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

**B. Block 2 (Musculoskeletal & Locomotion-1)**

- IV. One written paper of 140 marks having two parts
  - c. Part I shall have ninety (90) Multiple Choice Questions (MCQs) of total 90 marks (01 mark for each MCQ) and the time allotted shall be 95 minutes. There will be no negative marking.
  - d. Part II shall have ten Structured Essay Questions (SEQs) of total 50 marks (05 marks for each SEQ) and the time allotted shall be 100 minutes.
- V. Oral Practical/Clinical examination shall have 140 marks in total.
- VI. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 70 marks, e 20% of the total allocated marks (350) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

**C. Block 3 (Cardiovascular-1 + Respiratory-1)**

- VII. One written paper of 140 marks having two parts
  - e. Part I shall have ninety (90) Multiple Choice Questions (MCQs) of total 90 marks (01 mark for each MCQ) and the time allotted shall be 95 minutes. There will be no negative marking.

- f. Part II shall have ten Structured Essay Questions (SEQs) of total 50 marks (05 marks for each SEQ) and the time allotted shall be 100 minutes.
- VIII. Oral Practical/Clinical examination shall have 140 marks in total.
- IX. The continuous internal assessment through Block Examination conducted by the college of enrollment shall carry 70 marks, e 20% of the total allocated marks (350) for the block The score will be equality distributed to the Written and Oral/Practical Clinical Examinations

YEAR-1						
Subject	Theory		Practical			Total
<b>Block 1</b> Modules (Foundation-I + Hematopoietic and Lymphatic)	Part I MCQs (90)	90 Marks	Practical /Clinical Examination	01 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	350
	Part II SEQs (10)	50 Marks				
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	175	Total	175		
<b>Block 2</b> Modules (Musculoskeletal & Locomotion-I)	Part I MCQs (90)	90 Marks	Practical /Clinical Examination	11 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	350
	Part II SEQs (10)	50 Marks				
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	175	Total	175		
<b>Block 3</b> Modules (Cardiovascular-I & Respiratory-I)	Part I MCQs (90)	90 Marks	Practical /Clinical Examination	11 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	350
	Part II SEQs (10)	50 Marks				
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	175	Total	175		
<b>Total Marks:</b>						<b>1050</b>

13. No grace marks shall be allowed in any examination or practical under any guise or name.

14. At least 25% MCQ & 25% SEQ shall be based on applied/case/clinical scenarios to assess high order thinking in the papers set for the students of First and Second Professional MBBS Examination.

## 10. Exam Regulations by UHS

1. Professional examination shall be open to any student who:
  - a. Has been enrolled/registered and completed one academic year preceding the concerned professional examination in a constituent/affiliated College of the University.
  - b. Has his/her name submitted to the Controller of Examinations, for the purpose of examination, by the Principal of the college in which he/she is enrolled & is eligible as per all pre-requisites of the examination.
  - c. Has his/her marks of internal assessment in all the Blocks sent to the Controller Examinations by the Principal of the college along with the admission forms.
  - d. Produces the following certificates duly verified by the principal of his/ her college:
    - I. of good character;
    - II. of having attended not less than cumulative 85% of the full course of lectures delivered and practical conducted in the academic session, while maintaining 75 % attendance in each block,
    - III. Certificate of having appeared at the Block Examinations conducted by the college of enrolment with at least 55 % cumulative percentage in aggregate of blocks 1,2 and 3 for the 1st Year and 4,5, and 6 for the Second year;
    - IV. Candidates falling short of block/s attendance shall not be admitted to the annual examination unless they take remedial classes to complete the requirement
2. The minimum number of marks required to pass this examination for each paper shall be fifty percent (55%) in Written and fifty percent (55%) in the Oral/Practical/Clinical examinations and fifty percent (50%) in aggregate, independently and concomitantly at one and the same time.
3. Candidates who secure eighty five percent (85%) or above marks in any of the papers shall be declared to have passed “**with distinction**” in that Block subject to having at least 80 % marks in the Written component of that paper, concomitantly. However, no candidate shall be declared to have passed “with distinction” in any paper, who does not pass in all the papers of the First Professional Examination as whole at one and the same time.
4. A candidate failing in one or more paper of the annual examination shall be provisionally allowed to join second professional class till the commencement of supplementary examinations. Under no circumstances, a candidate shall be promoted to the second professional class till he/she has previously passed all the papers in the First Professional MBBS Examination.

5. If a student appears in the supplementary examination for the first time as he/she did not appear in the annual examination because of any reason and fails in any paper in the Supplementary Examination, he/she will be detained in the same class and will not be promoted to the next class.
6. The colleges may arrange remedial classes and one re-sit for block examination after approval from the competent authority.
7. The remedial classes and re-sit examination can be conducted during summer vacation/weekends, before or during preparatory leave, for the concerned professional examination, subject to the following conditions:

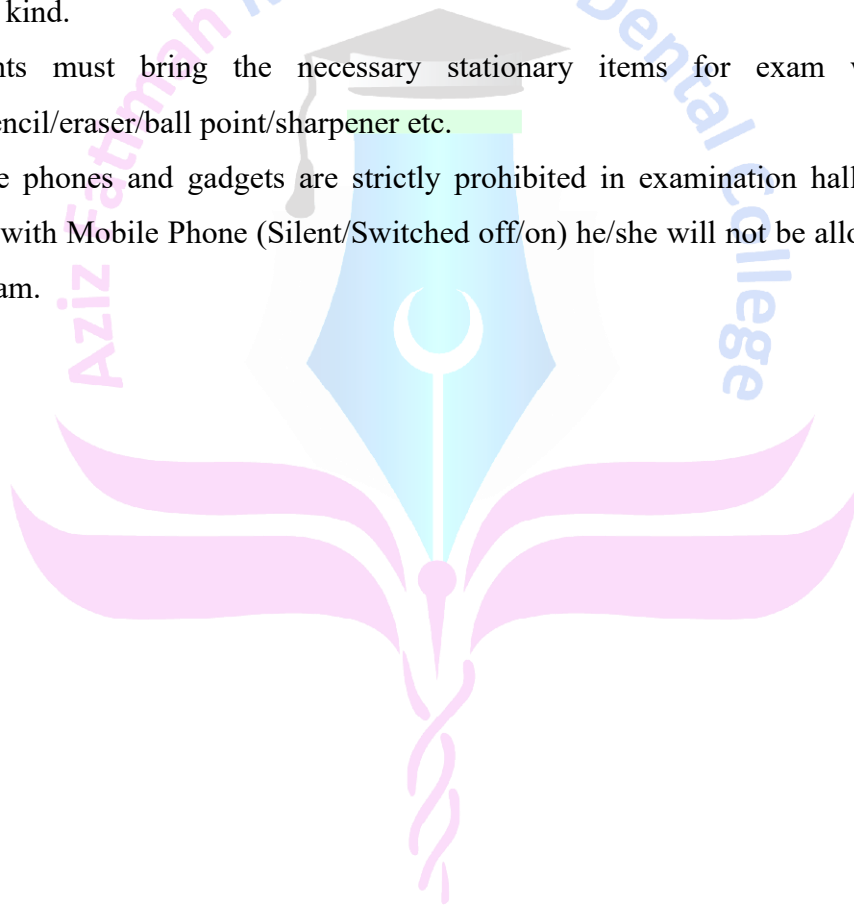
At the completion of each block, the principals of the colleges shall submit a detailed report to the university, including cases of students with short attendance poor performance/absence in the block examination along with the reasons and evidence for the same, proposed schedule to remedial classes and re-sit examination.

- I. Competent Authority UHS will have the cause and the submitted evidence evaluated and documented, before permitting the colleges to arrange remedial classes and re-sit examination at the concerned block. No college is allowed to conduct remedial classes or re-sit examination without prior approval of the competent authority
- II. The students can appear in re-sit of a block examination, along with the subsequent block, and before or during preparatory leave for the terminal block of the professional year, once the requirement of attendance is met with However conduct of remedial classes shall be permitted only in the cases of students, who shall have attended at least 50% of total attendance of the concerned block in the first instance
- III. The valid reasons for short attendance in a block or absence from a block examination may include major illness/accident/surgery of the student or death of an immediate relative/being afflicted by a natural calamity or disaster  
However, in special circumstances a student can be allowed to attend the 'remedial classes' for a certain block, with the permission of the Competent Authority, to complete his/her requirement of attendance, even if the block attendance is less than 50%. In such cases, the evidence of reason will be provided by the college after the Principal has endorsed the case.
  - b. The students who have attained a cumulative attendance of 85% directly or with remedial classes, can appear in the 'annual' professional examination.
  - c. The valid reasons for short attendance in a block or absence from a block examination may include major illness/accident/surgery of the student or sickness / death of an immediate relative/being afflicted by a natural/manmade calamity or disaster or detained students (missed the first block of the year) or UHS permitted late admission students

8. The application for admission of each candidate for examination shall be submitted to the Controller of Examination, through the Principal of the College, in a prescribed format, as per notified schedule, accompanied by the prescribed fee.
9. The marks of internal assessment and attendance shall be submitted to Controller of Examinations three times, within two weeks of completion of each block examination
10. At the end of each block, the colleges are required to submit question papers and keys for the block examination, internal assessment marks and attendance record to the Department of Examinations UHS. Further, parent-teacher meetings shall be arranged by the colleges after every block examination to share feedback on the progress of students with their parents, Minutes of parent teacher meetings shall be submitted to the Department of Medical Education UHS.
11. It is emphasized that fresh internal assessment or a revision of assessment for supplementary examination shall not be permissible. However, a revised internal assessment for the detained students can be submitted. The internal assessment award in a particular year will not be decreased subsequently detrimental to the detainee candidate. A proper record of the continuous internal assessment shall be maintained by the concerned departments in the colleges.
12. The candidates shall pay their fee through the Principals of their respective colleges who shall forward a bank draft / pay order / crossed cheque in favor of Treasure, university of Health Sciences Lahore, along with their Admission Forms.
13. Only one annual and one supplementary of First and Second Professional MBBS Examinations shall be allowed in a particular academic session. In exceptional situations i.e., national calamities, war or loss of solved answer books in case of accident, special examination may be arranged after having observed due process of law. This will require permission of relevant authorities, i.e., Syndicate and Board of Governors.

## 11. Examination Rules AFMDC

- Students must report to examination hall/ venue at least 30 minutes before the exam.
- Exam will start sharp at time.
- Late comers arriving at the examination hall more than 15 minutes after the start of the paper will not be allowed to enter the examination hall.
- All students should wear Lab coats before appearing in the exam.
- Students are not allowed to take into the examination hall textbooks, notes or manuscript of any kind.
- Students must bring the necessary stationary items for exam with them e.g. pen/pencil/eraser/ball point/sharpener etc.
- Mobile phones and gadgets are strictly prohibited in examination hall. If any student found with Mobile Phone (Silent/Switched off/on) he/she will not be allowed to continue the exam.



## 12. Table of Specification (TOS)

**MBBS 1<sup>st</sup> Professional**  
**Block-2**

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam				Marks
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (5 marks each observed)	OSVE (14 marks each observed)	Marks	
Normal Structure	Anatomy applied/clinical	35	04	55	05	-	01	54	
Normal Function	Physiology applied/clinical	17	02	27	02	-	01	30	
	Biochemistry applied/clinical	13	02	23	02	-	01	30	
Disease Burden & Prevention	Community Medicine & Public Health	06	-	06	-	-	-	-	
	Behavioral Sciences	04	-	04	-	-	-	-	
Pathophysiology & pharmacotherapeutics	Pathology	10	01	15	01	-	-	08	
	Pharmacology	05	01	10	01	-	-	08	
CFRC	CF-I	-	-	-	-	01	-	05	
PERLs	PERLs-I	-	-	-	-	01	-	05	
<b>Total</b>		<b>90</b>	<b>10x5=50</b>	<b>140</b>	<b>11 stations x 08 = 88</b>	<b>02 stations x 05 = 10</b>	<b>03 stations x 14=42</b>	<b>140</b>	



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*Handwritten signature and initials*

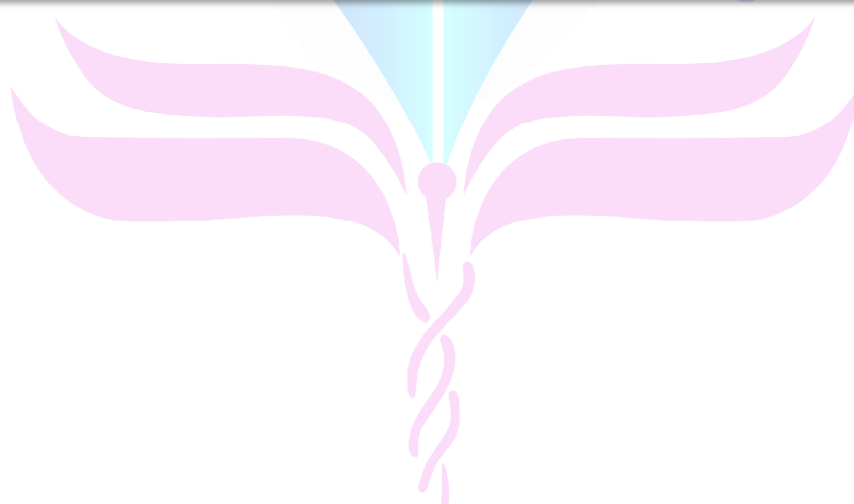
### 13. Frame work of Block-2 Module Timetable 2024-25

<b>AZIZ FATMAH MEDICAL &amp; DENTAL COLLEGE FAISALABAD</b>						
<b>TIME TABLE 1st YEAR MBBS CLASS SESSION 2023-24 (Week 1) Musculoskeletal Module</b>						
DAY	1	2	3	4	5	6
	08:00 am - 09:00 am	09:00 am - 10:00 am	10:00 am - 11:00 am	11:00 am - 12:30 pm	12:30 pm - 01:00 pm	01:00 pm - 02:00 pm
Monday, May 13, 2024	Lecture	Lecture	Lecture	Lecture	Break	Lecture
Tuesday, May 14, 2024	Lecture	Lecture	Lecture	Lecture	Break	Lecture
Wednesday, May 15, 2024	Lecture	Lecture	Lecture	Lecture	Break	Lecture
	08:00 am - 09:30 am	09:30 am - 10:30 am	10:30 am - 12:30 pm		12:30 pm - 01:00 pm	01:00 pm - 02:00 pm
Thursday, May 16, 2024	Practical	Lecture	Dissection		Break	Lecture
Friday, May 17, 2024	Practical	Lecture	10:30 am - 11:00 am SDL	11:00 am - 01:00 pm Dissection	Jumma Prayers	
Saturday, May 18, 2024	Practical	Lecture	10:30 am - 12:30 pm Dissection		Break	Lecture

*Note: In SDL Students are directed to visit library for self learning or they can visit their respective teachers for clarification of their concepts regarding subjects.*



## *Resource Books*



## 14. Learning Resources

Anatomy	<ul style="list-style-type: none"> <li>• Snell's Clinical Anatomy 10th ed.</li> <li>• Langman's Medical Embryology 12th ed</li> <li>• Medical Histology by Laiq Hussain Siddiqui 8th ed.</li> <li>• General Anatomy by Laiq Hussain Siddiqui 6th ed.</li> </ul>
Physiology	<ul style="list-style-type: none"> <li>• Guyton AC and Hall JE. Textbook of Medical Physiology, W.B. Saunders &amp; Co. Philadelphia</li> <li>• Essentials of Medical Physiology by Mushtaq Ahmad</li> </ul>
Biochemistry	<ul style="list-style-type: none"> <li>• Harpers illustrated Biochemistry 32nd edition. Rodwell.V.W MCGrawHill publishers.</li> <li>• Lippincott illustrated Review 8th edition Kluwer.W.</li> <li>• Essentials of Medical Biochemistry vol 1&amp;2 by Mushtaq Ahmed.</li> </ul>
Community Medicine	<ul style="list-style-type: none"> <li>• Parks TextBook of Preventive and Social Medicine, K. Park(Editor)</li> <li>• Public Health and Community Medicine Ilyas Ansari(Editors)</li> </ul>
Pharmacology	<ul style="list-style-type: none"> <li>• Basic and clinical Pharmacology by Katzung. McGraw-Hill</li> <li>• Pharmacology by Champe and Harvey, Lippincott Williams &amp; Wilkins</li> </ul>
Pathology	<ul style="list-style-type: none"> <li>• Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.</li> <li>• Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and</li> <li>• Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.</li> <li>• Walter and Israel. General Pathology.</li> <li>• Churchill Livingstone.</li> </ul>
Medicine	<ul style="list-style-type: none"> <li>• Davidson's Principles and Practice of Medicine</li> </ul>
Surgery	<ul style="list-style-type: none"> <li>• Bailey &amp; Love Short Practice of Surgery</li> </ul>
Islamiyat	<ul style="list-style-type: none"> <li>• Standard Islamiyat (compulsory) for B.A, B.Sc, MA, Msc, MBBS by Prof. M Sharif Islahi</li> <li>• Ilmi Islamiyat (compulsory) mfor B.A, B.sc &amp; equilent.</li> </ul>
Behavioral Sciences	<ul style="list-style-type: none"> <li>• Handbook of Behaioural Sciences by Prof. Mowadat H. Rana, 3<sup>rd</sup> Edition.</li> <li>• Medical and Psychosocial Aspects of Chronic illness and Disability Sixth Edition Donna R. Falvo, PHD Beverley E. Holland, PHD RN.</li> </ul>