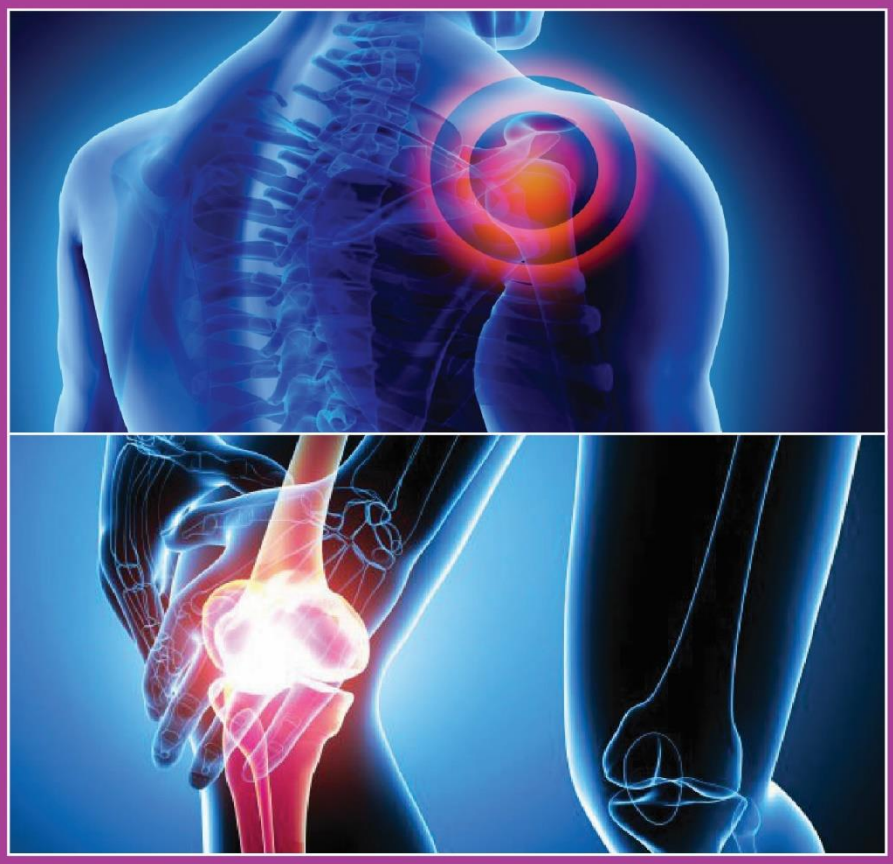
STUDY GUIDE

Block - II

Musculoskeletal & Locomotion - I Module

1st Year MBBS



Department of Medical Education

Aziz Fatimah Medical & Dental College

Faisalabad

Contents

1. List of Abbreviations

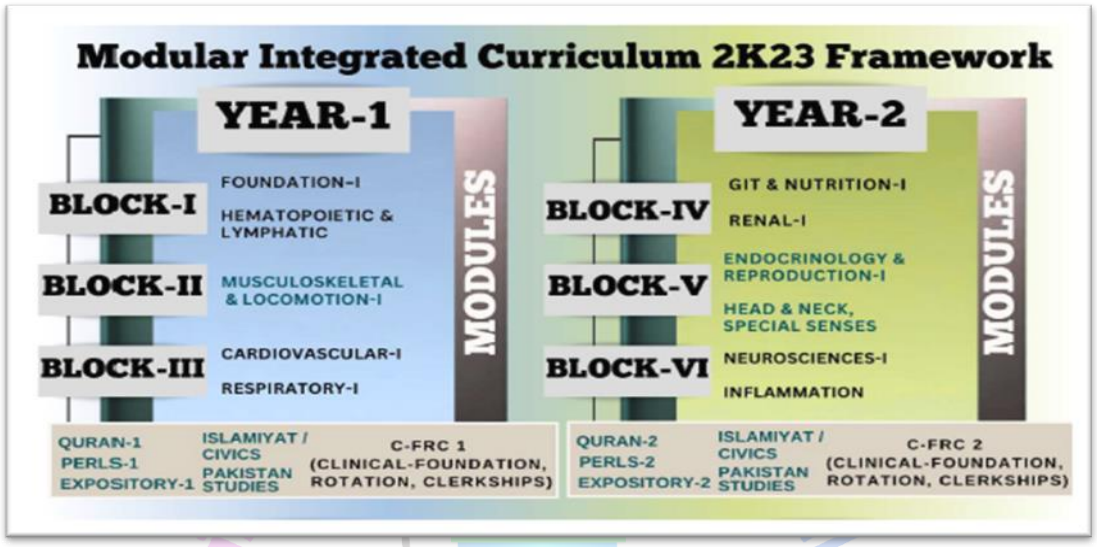
Abbreviations	Subjects
A	Anatomy
ABCDE	Airway, Breathing, Circulation, Disability, Exposure
ABG	Arterial Blood Gas
ACS	Acute Coronary Syndromes
Ag	Aging
AKI	Acute Kidney Injury
ALT	Alanine Transaminase
AMI	Acute Myocardial Infarction
AMP	Adenosine Monophosphate
ANA	Antinuclear Antibody
ANCA	Antineutrophil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

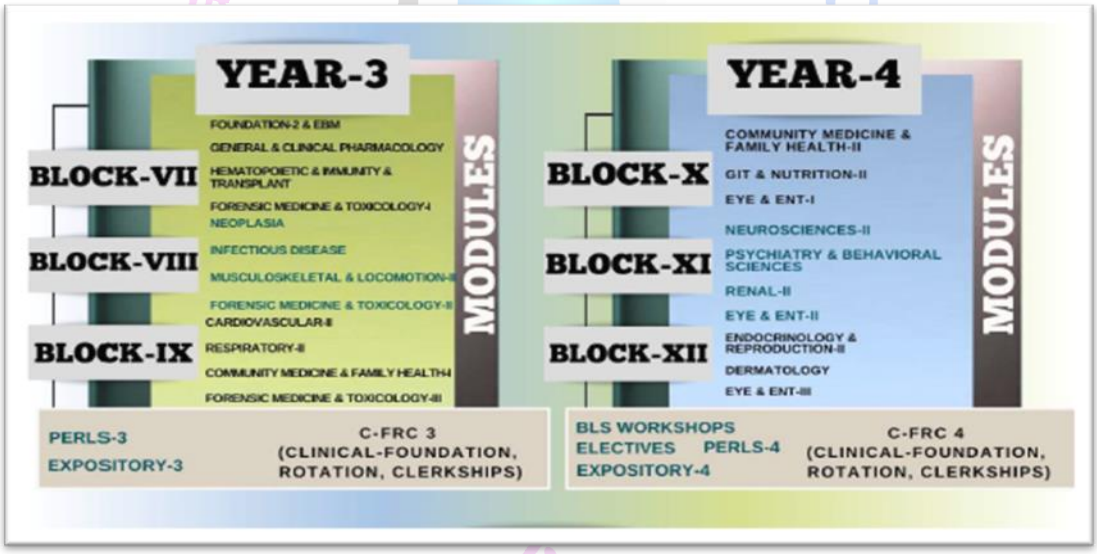
C. trachomatis	*Chlamydia trachomatis*
CA	Cancer
CABG	Coronary Artery Bypass Grafting
CAD	Coronary Artery Disease
CBC	Complete Blood Count
CCR5	Cysteine-Cysteine Chemokine Receptor 5
CD31	Cluster of Differentiation 31
CD34	Cluster of Differentiation 34
CD4	Clusters of Differentiation 4
CF	Cystic Fibrosis
CK	Creatine Kinase
CK	Creatine Kinase
CLED	Cystine Lactose Electrolyte Deficient
CLL	Chronic Lymphocytic Leukemia
CM	Community Medicine
CML	Chronic Myelogenous Leukemia
CMV	Cytomegalovirus
CNS	Central Nervous System
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CODIS	Combined Dna Index System
COPD	Chronic Obstructive Pulmonary Disease
COVID-19	Corona Virus Disease 2019
COX	Cyclooxygenase
CPR	Cardio Pulmonary Resuscitation
CR	Clinical Rotation
CRP	C- Reactive Protein
CSF	Cerebrospinal Fluid
CT	Computed Tomography
CT	Computerized Tomography
CV	Cardiovascular
CVA	Cerebral Vascular Accident
CVDs	Cardiovascular Diseases
CVS	Cardiovascular System
D. medinensis	Dracunculus Medinensis
DALY	Disability-Adjusted Life Year

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

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

2. Curriculum 2k23 Framework





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. Implementation Team for 1st Professional MBBS

Academic Year In charge	**Prof. Dr Quddus ur Rehman**		
Head of Medical Education	**Dr. Ayesha Sadiq**		
Block Coordinator	**Block I** Prof. Dr. Shakeel Ahmad	**Block 2** Prof. Dr. Quddus ur Rehman	**Block 3** Prof. Dr. Qamar Mehboob
Module In-charges	**Same**		
Subject leads	Anatomy Biochemistry Physiology Community medicine Pathology Pharmacology Medicine Surgery BS PERL's CFRC	Anatomy Biochemistry Physiology Community medicine Pathology Pharmacology Medicine Surgery Orthopedics Radiology BS PERL's CFRC	Anatomy Biochemistry Physiology Community medicine Pathology Pharmacology Cardiology Pulmonology Radiology Surgery BS PERL's CFRC
Assessment coordinator	**Dr. Ayesha Sadiq**		
Timetable coordinator	**Miss Huma Afzal**		
Principal AFMDC	**Prof. Dr. Ghulam Abbas Sheikh**		

5. Block–2 Module Committee

BASIC HEALTH SCIENCES	CLINICAL SCIENCES
Anatomy: Prof. Dr. Quddus Ur Rehman	**Medicine:** Prof. Dr. Ghulam Abbas Sheikh
Physiology: Prof. Dr. Qamar Mehboob	**Surgery:** Prof. Dr. Asrar
Biochemistry: Prof. Dr. Shahzad Farooq	**Radiology:** Asst. Prof. Dr. Shemona
Community Medicine: Prof. Dr. Humayun Suqrat	**Gynecology:** Prof. Dr. Nazia Musarrat
Pathology: Prof. Dr. Kashif Baig	
Pharmacology: Dr. Sarwat Jahan	
Behavioral Sciences: Dr. Yawar	
Medical Education: Dr. Ayesha Sadiq	

Block Coordinator	**Prof. Dr. Quddus-ur-Rehman**

Principal AFMDC	**Prof. Dr. Ghulam Abbas Sheikh**

MUSCULOSKELETAL & LOCOMOTION-1 MODULE

6. 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.

6.1. 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.

6.2. 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.

6.3. Learning Objectives

6.3.1. Knowledge

➢ **Gross Anatomy**

Topic	Sub Topic	Learning objectives
Upper Limb	Pectoral Region	• Describe the topographical anatomy of Pectoral Region • Perform dissection of the Pectoral Region or use models to identify the key structures • Describe muscles of the Pectoral Region with their origin, insertion, nerve supply and actions.
	Dermatomes and cutaneious innervation of Upper Limb	• Describe the cutaneous nerves & superficial veins of the Upper Limb. • Describe the extent, attachments, and structures passing through Clavipectoral Fascia
	Pectoral region & Back	• Define the boundaries of auscultation and state its clinical significance • Describe the osteology of the bones in pectoral region. • Enumerate the superficial muscles of back, connecting shoulder girdle with vertebral column. • Describe the 1. Attachments 2. Nerve supply • Actions of Trapezius, Latissimus Dorsi, Rhomboidmajor and minor. Mention the neurovascular supply of pectoral region and correlate with important clinical conditions. • Describe superficial muscles of the back with their origin, insertion, nerve supply and actions.

	Bones of Upper Limb: Clavicle & Scapula	• Describe the Osteology of Clavicle (Morphological features, side determination, attachments, ossification) • Describe the correlates functions of Clavicle (clavicle fracture, its role in terms of weight transmission of upper limb, compression of neurovascular structures) • Describe the Osteology of Scapula (morphological features, attachments, ossification) • Determine the side and identify the landmarks of scapula • Describe the movements of Scapula associated with movements of Shoulder Girdle • Tabulate the muscles of scapular region and give their attachments, nerve supply and action • Tabulate the attachments, origin, insertion, innervation, and actions of Anterior Axioappendicular Muscles
	Bones of thorax, Joints of Upper Limb: Sternoclavicular Joint	• Describe the Sternoclavicular Joint in terms of articulating surfaces, ligaments, articular disc, and nerve supply.
	Axila	• Develop clear concepts of the topographical anatomy of Axilla and its contents • Describe the boundaries of Axilla. (Identification of muscles forming the boundaries of axilla) • List the contents of Axilla • Perform dissection/ Identify the Axilla and its Contents • Describe Axillary Artery with reference to its 3 parts their relations, branches, and anastomoses • Describe the formation, tributaries, and drainage of Axillary Vein • Identify and demonstrate the course/ relation and branches/tributaries of axillary vessels • Describe the Axillary Lymph Nodes in terms of location, grouping, areas of drainage and clinical significance • Describe the course, relations, root value and distribution of Axillary nerve.

		• Describe the boundaries and contents of quadrangular space.
	Bones of upper limb: Humerus	• Describe the Osteology of Humerus (Side • Determination, morphological features, attachments, ossification)
	Joints of Upper Limb: Shoulder Joint	• Describe the Shoulder Joint under the following headings: Articulation, Type/ Variety, Capsule, Ligaments, Innervation, Blood supply, Movements. • Describe the 3 parts of Deltoid Muscle and correlate them with its unique functions. • Explain its role in abduction of shoulder joint. • Explain mechanism of Abduction of arm • Identify and demonstrate the movements of scapula and shoulder joint. • Draw and label the arterial anastomosis around shoulder joint • Describe, in detail, the Scapula-Humeral Mechanism in relation to movement of abduction. Discuss important clinical conditions
	Rotator Cuff	• Describe Rotator Cuff Muscles, state their • Anatomical significance and explain Rotator Cuff Tendinitis • Clinical correlates of shoulder joint. (shoulder joint stability, dislocation and shoulder pain)
	Nerves of Upper Limb	• Describe the formation of Brachial Plexus; Infra and Supraclavicular parts. • Discuss Brachial plexus injuries • Demonstrate and identify the formation of brachial plexus and its branches • List the branches of brachial plexus and give their areas of distribution and muscles they innervate • Enlist and tabulate the muscles of anterior compartment of arm with their attachments, nerve supply and action. • Identify & Describe Musculocutaneous Nerve in terms of its Origin, Course, Termination, Relations, Branches, and distribution. • Describe and illustrate the cutaneous innervation of the arm.
	Blood supply of arm	• Describe the Brachial Artery in terms of its course, relations, branches, and distribution • Tabulate the attachments, innervation, and

		actions of Triceps brachii as a muscle of Posterior Fascial Compartment of Arm • Identify & Describe the Profunda Brachii Artery giving its course, relations, branches, and distribution
	Muscles of Arm	• Describe Cubital Fossa with emphasis on its boundaries, contents, and clinical significance • Demonstrate surface marking of superficial veins of arm and forearm for IV (Intra venous) injections • Demonstrate biceps brachi reflex, triceps reflex and brachioradialis reflex
	Bones of Forearm	• Determine the side and identify the landmarks of radius and ulna. • Describe the Osteology of Radius (Side • Determination, morphological features, attachments). • Describe the Osteology of Ulna (Side Determination, morphological features, attachments).
	Muscle of Anterior/Flexor Compartment of Forearm	• Describe osseofascial compartment of forearm. • Tabulate flexor and pronators muscles of forearm, their attachments, actions and nerve supply. • Describe the action of paradox with examples
	Muscle of Lateral and Posterior/Extensor Compartment of Forearm	• Tabulate the attachments, innervation, and actions of Extensor Muscles of the Forearm • Tabulate the attachments, innervation, and actions of Lateral Muscles of the Forearm
	Nerves of Forearm	• Identify the muscles and nerves of flexor and extensor compartments of forearm • Describe and illustrate the cutaneous innervation of the Forearm • Describe ulnar, median and radial nerves in forearm.
	Blood supply of forearm	• Describe the Origin, Course, Relations, and branches of Ulnar and radial Artery in Forearm • Describe the Origin, Course, Relations and list the tributaries of veins of Forearm. • Surface marking of Brachial artery, Cephalic, • Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous

		artery
	Retinacula of Forearm	• Identify the Extensor & Flexor Retinacula and describe their attachments and relations
	Carpal tunnel syndrome	• Demonstrate the formation of carpal tunnel and identify the contents • Describe Carpel Tunnel Syndrome • Describe the features, attachments, relations and structures passing under Flexor Retinaculum
	Forearm: Blood supply and Venous drainage	• Describe the Origin, Course, Relations, and branches of Ulnar Artery in Forearm • Describe the Origin, Course, Relations and list the tributaries of veins of Forearm • Surface marking of Brachial artery, Cephalic, • Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous artery
	Joints of Upper Limbs: Elbow Joint	• 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. • Describe Carrying Angle and justify its importance in limb movement
	Joints of Upper Limbs: Radioulnar Joint	• Describe the Radioulnar Joints in terms of articular surfaces, type, variety, ligaments, and muscles producing movements, nerve supply and radiological imaging. • Describe the wrist joint in terms of articular surfaces, type, variety, ligaments, and muscles producing movements, nerve supply and radiological imaging. • Demonstrate mechanisms of movements of Pronation & Supination
	Interosseous membrane	• Describe the features of Interosseous • Membrane with structures that pierce through it
	Fascia & Muscles of Hand	• Describe the features and explain the importance of Fibrous Flexor Sheaths, synovial flexor sheaths and extensor expansion
	Hand & Actions of Muscles of Upper Limb as	• Demonstrate the attachments and actions of the muscles of hand • Identify the muscles and neurovasculature of palm.

	a Functional Unit	• Explain the morphology and tabulate the attachments, innervation and actions of intrinsic muscles of hand. • Explain the fascial spaces of palm and pulp space of fingers • Describe Dupuytren contracture, mallet finger and buttonaire deformity. • Describe hand as a functional unit. (position of hand, movement of thumb and fingers while performing different functions) • Discuss cupping of hand and fist formation.
	Blood vessels of forearm and hand	• Draw the Radial Artery course, relation and termination in hand with its clinical significance in the region • Describe the Ulnar Artery's Course, relation and termination in hand with its clinical significance in the region • Describe the formation, branches, and areas of distribution of Superficial and Deep Palmar Arch
	Nerves of forearm and hand	• Describe the course, relations and branches of Ulnar, Median and Radial Nerves in the Hand
	Joints of Hands	• Describe the First Carpometacarpal Joint in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation, movements. • Demonstrate the movements of the 1st carpometacarpal joint • Describe the Metacarpophalangeal & interpharyngeal Joints in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation & Movements
	Skills	• Palpate the arteries of the upper limb on a subject • Identify the topographical features of upper limb in a cross-sectional model/ specimen. • Demonstrate and identify the anatomical landmarks of upper limb on radiographs/ CT (Computed tomography)/ MRI (Magnetic resonance imaging) • Mark the anatomical landmarks and surface marking on a subject/ simulated model
Lower Limb	Hip Bone	• Draw and label the Parts of the hip bone, with its attachments.

		• Describe the parts, attachments of hip bone • Identify the parts and bony features of the hip bone, with its attachments, important relations • Demonstrate the side determination of hip bone, its bony features, attachments
	Femur	• Describe the parts, attachments, side determination of femur • Identify the parts and bony features of the femur, with its attachments. • Demonstrate the side determination of femur, its bony features, attachments, and important relations (correlate these with fractures) • Describe coxa Vara and coxa valga and their clinical significance
	Fascia Lata	• Describe the extent, attachments, and modifications of Fascia Lata • Demonstrate the attachment of fascia Lata, iliotibial tract
	Neurovascular Supply of thigh	• Describe the cutaneous nerves and vessels of thigh • Draw and label the cutaneous nerve supply of thigh • Describe the formation, course, relations, tributaries, and termination of the superficial veins • Explain the anatomical justification of venesection, varicose veins, and saphenous venous grafts • Describe the lymphatic drainage of the region with special emphasis on afferent and efferent of inguinal lymph nodes • Identify the superficial and deep lymph nodes • Explain the anatomical justification for enlargement of inguinal lymph nodes
	Femoral Triangle & Canal	• Describe and identify the Boundaries and contents of femoral triangle • Draw and label the Boundaries and contents of femoral triangle • Identify the femoral sheath with its compartments • Describe the formation of femoral sheath and its significance • Describe the formation of femoral canal and its contents and significance • Describe the formation and significance of

		femoral ring • Compare and contrast the anatomical features of femoral and inguinal hernias
	Muscles of Anterior Compartment of Thigh	• Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions • Demonstrate and identify the muscles of anterior compartment of thigh with their proximal and distal attachments • Demonstrate the actions of muscles of anterior compartment of thigh • Explain the anatomical basis of psoas abscess
	Neurovascular supply of Anterior Compartment of Thigh	• Identify and demonstrate the nerves and vessels of anterior compartment of thigh along with their branches • Describe the origin, course, relations, branches, distribution, and termination of femoral artery • Describe the origin, course, relations, tributaries, area of drainage and termination of femoral vein • Describe the origin, course, relations, branches, distribution, and termination of femoral nerve • Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions.
	Adductor Canal	• Describe the formation, boundaries, contents of adductor canal • Identify and demonstrate the boundaries and contents of adductor canal
	Muscles of Medial Compartment of Thigh	• Describe Muscles of medial compartment of thigh with their proximal and distal attachments, innervation and actions • Identify the muscles of medial compartment of thigh with their proximal and distal attachments • Demonstrate the actions of the muscles of the compartment on self/ subject
	Neurovascular supply of Medial Compartment of Thigh	• Describe the origin, course, relations, branches/tributaries, distribution, and termination of neurovascular structures of medial compartment of thigh • Identify the nerves and vessels of medial compartment of thigh along with their

		branches • Describe and identify the lumbar and sacral plexus and its branches supplying the lower limb • Describe the cutaneous nerve supply and lymphatics of the region
	Gluteal Region	• List the structures passing through the greater and lesser sciatic foramen. • Describe the muscles of gluteal region with their proximal and distal attachments, innervation, and actions • Identify the muscles of gluteal region with their proximal and distal attachments • Describe the origin, course, relations, branches/tributaries, distribution, and termination of neurovascular structures of gluteal region • Demonstrate the actions of the muscles of gluteal region • Explain the anatomical basis of the consequences of wrongly placed gluteal intramuscular injections • Damage to Gluteus medius & minimus due to poliomyelitis • Demonstrate and identify the origin, course, relations, branches/tributaries and termination of nerves and vessels of gluteal region
	Muscles of Posterior Compartment of Thigh	• Describe the Attachments of muscles of posterior compartment of thigh with the innervation and action • Identify the muscles of posterior compartment of thigh with their proximal and distal attachments • Demonstrate the actions of muscles of posterior compartment of thigh • Describe the anatomical basis of signs and Symptoms of sciatica.
	Blood supply of Posterior compartment thigh	• Describe the origin, course, relations, branches, distribution, and termination of Profunda femoris artery • Describe blood supply on back of thigh
	Sciatic Nerve	• Describe the origin, course, relations, branches, distribution, and termination of sciatic nerve • Describe the anatomical basis, signs and

		symptoms of compression of or injury to sciatic nerve
	Hip Joint	• Describe the hip joint with its type, articulations, ligaments, stabilizing factors • Movements, and neuro-vascular supply with clinical significance. • Perform the movements of hip joint at various angles and be able to describe the muscles producing the movement. • Discuss important associated clinical conditions (Hip dislocation, Arthritis, Hip joint stability and Trendelenburg sign) movements, and neurovascular supply with clinical significance.
	Popliteal Fossa	• 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 • Draw and label boundaries and contents of popliteal fossa • Identify the boundaries and contents of popliteal fossa • Describe the origin, course, relations, branches/tributaries, distribution and termination of popliteal artery and vein
	Knee Joint	• Describe parts of tibia and fibula, with their attachments, important relations and side determination • Identify the parts and bony features of the tibia & fibula, their bony features, attachments, important relations. • Draw and label Parts of patella with its attachments • Describe features of patella, and name the factor responsible for stabilizing Patella • Describe the knee joint with its type, articulations, ligaments, movements, and neuro-vascular supply • Explain the mechanism of locking and unlocking of knee joint with the foot on ground and off the ground • Describe the attachments and role of popliteus in locking and unlocking of the knee joint

		• Describe the factors responsible for stability of knee joint. Discuss important associated clinical conditions.
	Muscles of leg	• Describe the Muscles of anterior, lateral, and posterior compartments of leg with their proximal & distal attachments, innervation, and actions
	Neurovascular supply of Leg	• Identify the muscles of anterior, lateral, and posterior compartments of leg with their proximal and distal attachments
	Neurovascular supply of Leg	• 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 • Describe the cutaneous nerves and veins of leg. • Draw and label the cutaneous nerve supply and dermatomes of leg
	Flexor, Extensor, and Peroneal Reticula	• Identify the extensor, flexor, and peroneal retinacula and demonstrate the structures related to them • Describe the attachments, relations, and structures passing under cover of, extensor, peroneal, and flexor retinacula • Identify and demonstrate the nerves and vessels of anterior, lateral, and posterior compartments of leg along with their branches • Describe the formation of noncalcareous (Achilles tendon)
	Tibio-fibular Joint	• Describe the articulations, muscles and nerve supply and movements at Tibiofibular joints
	Ankle Joint	• Describe the ankle joint with its type, articulations, ligaments, movements, and nerve supply • Describe the factors stabilizing the ankle joint. • Discuss important associated clinical conditions. • Identify and demonstrate the articulating surfaces and ligaments of ankle joint
	Plantar Fascia	• Describe the formation, attachments, and clinical significance of plantar aponeurosis • Explain the anatomical basis of the signs and

		symptoms of plantar fasciitis.
	Muscles of foot	• Identify the parts and bony features, attachments, and important relations of the articulated foot • Describe the muscles of the dorsum and sole of foot with their proximal & distal attachments, innervation and actions emphasizing the role of interossei and lumbricals. • Draw and label the muscles of the layers of sole of foot • Demonstrate and identify the muscles and tendons with their proximal and distal attachments in the sole of foot
	Small joints of foot	• Describe the interphalangeal, subtalar and midtarsal joints with their types, articulation, movements, and ligaments.
	Arches of foot	• Describe the formation, components, stabilizing and maintaining factors of the arches of foot • Describe the clinical significance of arches of foot with respect to flat foot, claw foot.
	Retinacula of foot	• Describe the fibrous flexor sheaths, extensor expansions and synovial flexor sheaths
	Neurovascular supply of foot	• Describe the origin, course, relations, branches/tributaries, distribution, and termination of plantar vessels • Identify the nerves and vessels on the foot along with their branches • Describe the cutaneous nerves of foot • Draw and label the cutaneous nerve supply and dermatomes of foot • Identify the nerves and vessels in the sole of foot along with their branches • Describe the palpation of dorsalis pedis artery & explain the clinical significance of dorsalis pedis artery
	Arterial and Venous drainage of lower limb	• Describe the surface anatomy, course, relations, tributaries, and communications of the superficial veins of the lower limb • Draw a concept map of the superficial veins of lower limb • List the factors favoring venous return of the lower limb • Explain the anatomical basis of the formation,

	Human Gait	• Explain the anatomical basis of the formation, and signs and symptoms of deep venous thrombosis • Discuss Clinical correlations of Lower Limb Arteries (palpation of femoral, popliteal, posterior tibial & dorsalis pedis arteries, collateral circulation, intermittent claudication, occlusive arterial disease)
	Lymphatic drainage of lower limb	• Draw a concept map of the lymphatic drainage of lower limb
	Cutaneous dermatomes & nerve supply of lower limb	• Draw and label the cutaneous nerves & dermatomes of the lower limb • Discuss clinical correlates of Lower limb nerves (Femoral nerve injury, Sciatic Nerve injury, Common fibular, tibial & obturator nerve injury) • Describe the anatomical basis of knee jerk, ankle jerk, and plantar reflex
	Topographical and radiological anatomy of lower limb	• Demonstrate the surface marking of nerves and vessels of lower limb • Demonstrate the surface marking of bony landmarks of lower limb • Identify the topographical features of lower limb in a cross-sectional model • Demonstrate and identify the features of bones and joints of lower limb on radiograph/ CT scan/ MRI
	Bone Fracture	• Describe the common fractures of the following bone with the risk factors, clinical presentations, and management: 1. Clavicle 2. Humerus 3. Radius 4. Ulna 5. Small bones of hand 6. Hip bone 7. Femur 8. Tibia 9. Fibula 10. Small bones of foot
	Joint Dislocation	• Describe the dislocations of the following joints with the risk factors and clinical presentations, and brief management: • Shoulder joint 1. Elbow joint

		2. Interphalangeal joint of hand 3. Hip joint 4. Knee joint 5. Ankle joint
Embryology & Post-Natal Development	Development of Muscles	• Name the molecular and genetic factors involved in the development of musculoskeletal system • Describe the development of skeletal muscle and innervation of axial skeletal Muscles- developmental basis of myotome • Briefly discuss the development of cardiac and smooth muscle (Detail to be covered in respective modules later).
	Development of Limb	• Describe the process of limb development and limb growth
	Development of Nerve supply of limbs	• Describe the embryological basis of cutaneous innervation of limb • Describe the embryological basis of blood supply of limbs and concept of axial artery • Describe the embryological basis of congenital anomalies related to muscular system.
	Congenital anomalies of limbs	• Describe the clinical presentations and embryological basis of; i. Amelia ii. Meromelia iii. Phocomelia iv. Cleft Hand and Foot v. Polydactyly, Brachydactyly, Syndactyly vi. Congenital club foot
	Development of Cartilage	• Describe the developmental process of cartilage and bone • Describe the process of histogenesis of cartilage of Cartilage and bone
Microscopic Anatomy	Histology of Muscles	• Describe the microscopic structure and ultramicroscopic structure of skeletal muscle • Explain the basis of myasthenia gravis. • Describe the microscopic and ultramicroscopic structure of cardiac muscle • Describe the microscopic and Histology ultramicroscopic structure of smooth muscle • Compare and contrast the histological features of three types of muscle tissue
	Functional	• Describe Myosatellite Cells & their role in regeneration of muscle, hyperplasia, and

	Histology	hypertrophy of muscle fiber • Explain the histopathological basis of leiomyoma
	Histology of Osseous tissue	• Describe the light and electron microscopic structure of bone cells • Describe the light and electron microscopic structure of compact and spongy bone • Describe the histological justification for Osseous tissue osteoporosis, Osteopetrosis • Describe the histological basis for bone repair after Pathology fractures.
	Histology of Bone	• Compare and contrast the microscopic features of compact and spongy bone • Explain the characteristic features of ossification (Intramembranous & Endochondral ossification) • Describe the zones seen in an epiphyseal growth plate
	Functional Histology of Bone	• Describe the metabolic role of bone • Describe the clinical presentation of osteoporosis, osteopenia
	Histology of Cartilage	• Describe the microscopic and ultramicroscopic structure of all types of cartilage • Compare and contrast the structure of cartilage and bone matrix • Tabulate the differences between three types of cartilage
	Mechanism of Bone growth	• Describe the histological basis for bone & Cartilage growth and repair

➢ Physiology

Topic	Sub Topic	Learning objectives
	Diffusion / Equilibrium Potentials	• Explain the Physiological basis of membrane Potential • Explain diffusion potentials of Na & K
	Nernst potential	• Define Nernst potential • Explain Physiological Basis of Nernst potential • Write the Nernst equation. • Calculate Nernst potential for Na & K

Medical Physiology		• Explain the effects of altering the concentration of Na+, K+, Ca on the equilibrium potential for that ion
	Goldman Equation	• Describe the normal distribution of Na+, K+, Ca and Cl- across the cell membrane • Explain physiological basis of Goldman equation • Clarify the role of Goldman equation in generation of Resting Membrane Potential (RMP).
	Resting Membrane Potential in Neurons	• Describe the Physiological basis of generation of RMP. • Explain the effects of hyperkalemia and Hypokalemia on the Resting Membrane Potential (RMP) • Name the membrane stabilizers • Explain the physiological basis of action of Local Anesthetics.
	Neurons	• Describe the Physiological anatomy of Neurons • Discuss the axonal transport • Enlist & give functions of Neuroglial cells • Explain process of myelination in Central Nervous System (CNS) & Peripheral Nervous System (PNS)
	Classification of Neurons & Fibers	• Classify neurons functionally. • Classify nerve fibers according to Erlanger & Gasser Classification
	Autonomic nervous system	• Discuss Components of ANS (Autonomic nervous system) • Explain the physiological anatomy of sympathetic and parasympathetic nervous system • Describe the types of adrenergic and cholinergic receptors and their function • Explain the effects of sympathetic and parasympathetic on various organs/system of body
	Action Potential of Neurons	• Define Action Potential • Enlist the Properties of action potential • Describe the ionic basis of an action potential. • Explain the phases of action potential. • Explain the effects of hyperkalemia and • Hypokalemia on the action potential. • Draw monophasic action potential.

		• Explain absolute and relative refractory period
	Role of other ions in action potential	• Explain the role of other ions in action potential. • Elaborate the effect of hypocalcemia on neuron excitability.
	Local / Graded potentials	• Explain Physiological basis& properties of Graded potential • Draw & explain Physiological basis & properties of compound action potential. • Contrast between action potential and graded potential • Describe the ionic basis of excitatory Post Synaptic • Potential (EPSP), Inhibitory Post Synaptic Potential (IPSP), End Plate Potential (EPP).
	Synapse	• Classify and explain Physiological basis of different types of synapses • Elaborate how signal transmission takes place across chemical synapse
	Conduction of Nerve Impulse	• Explain the mechanism of conduction of Nerve impulse in myelinated and unmyelinated nerve fibers. • Elaborate significance of saltatory conduction
	Nerve Degeneration	• Enlist the types of nerve injury • Explain Wallerian degeneration. • Describe the process of regeneration of nerve fiber. • Describe the causes, features & pathophysiology of Multiple sclerosis, GB syndrome.
	Skeletal muscle	• Discuss the physiological anatomy of skeletal muscles. • Differentiate b/w skeletal, smooth, and cardiac muscle • Describe the structure of Sarcomere
	Characteristics of whole muscle contraction	• Differentiate between isometric and isotonic contraction by giving examples • Compare the fast and slow muscle fibers.
	Mechanics of muscle contraction	• Explain the mechanism of summation and Tetanization. • Describe staircase effect/Treppe phenomena • Discuss the mechanism of skeletal muscle fatigue. • Explain the remodeling of skeletal muscle to

		match the function. Describe the development of macro motor units in poliomyelitis. • Explain the physiological basis of rigor mortis
	Neuromuscular junction	• Describe the physiological anatomy of Neuro Muscular Junction (NMJ) • Mechanism of Neuromuscular transmission & generation of End Plate Potential • Explain features, pathophysiology & treatment of myasthenia Gravis • Describe the enhancers or blockers of neuromuscular transmission at the neuromuscular junction. • Discuss the steps/ events of excitation contraction coupling in skeletal muscle
	Smooth Muscle	• Differentiate between types of smooth muscles. • Describe mechanism of smooth muscle contraction in comparison to skeletal muscle. • Explain the physiological anatomy of neuromuscular junction of smooth muscle • Explain the excitatory and inhibitory transmitters secreted at Neuro Muscular Junction (NMJ) of smooth muscles. • Explain the depolarization of multiunit smooth muscles without action potentials. • Explain the local tissue factors and hormones that can cause smooth muscle contraction without action potential. • Explain the regulation of smooth muscle contraction by calcium ions. • Explain membrane potential and action potentials in smooth muscles. • Explain the phenomena of stress relaxation and reverse stress relaxation in smooth muscles. • Explain the LATCH mechanism • Describe the significance of LATCH mechanism. • Explain the nervous and hormonal control of Smooth Muscle Contraction.

➢ Medical Biochemistry

Topic	Sub Topic	Learning objectives
Medical Biochemistry	Classification carbohydrates	• Classify carbohydrates along with the structure and biomedical importance of each class
	Carbohydrates	• Explain the isomerization of carbohydrates • Describe the physical and chemical properties of carbohydrates
	Extracellular matrix	• Describe the physical and chemical properties of carbohydrates • Differentiate between proteoglycan and • glycoproteins • Describe the components of extracellular matrix: 1. Describe structure, functions and clinical significance of glycosaminoglycans 2. Discuss structure and functions of Fibrous proteins (collagen and Elastin) 3. Interpret diseases associated with them on basis of sign/symptoms and data 4. Interpret the importance of vitamin C in collagen synthesis 5. Describe sources, active form, functions and deficiency diseases of vitamin C 6. Identify the defects in collagen synthesis based on given data (Ostegenesis Imperfecta) • Interpret genetic basis of Duchene muscular Dystrophy • Explain the transport and uptake of glucose in cells, steps of glycolysis and citric acid cycle along with enzymes, co enzymes and cofactors involved
	Glycolysis and Tricarboxylic acid cycle (TCA)	• Discuss the provision of energy to the muscles and cells through glycolytic pathway and TCA cycle • Explain the hormonal and allosteric regulation of glycolysis and TCA
	Protein Digestion & Transport across cell	• Describe the digestion and absorption of proteins in mouth, stomach and small intestine. • Discuss the uptake of amino acids by cells
	Reactions involve in catabolism	• Explain following reactions with enzymes involved in it:

		1. Transamination 2. Deamination decarboxylation 3. Deamidation 4. Trans deamination. 5. Oxidative deamination.
	Transportation of ammonia to the liver	• Role of pyridoxal phosphate, glutamate, glutamine, alanine and discuss the mechanism of transport of ammonia to liver.
	Urea cycle	• Illustrate steps of urea cycle with enzymes and its importance • Discuss ammonia intoxication • Interpret different types of hyper ammonia on basis of sign symptoms and data
	Protein metabolism	• Discuss the metabolism of aliphatic, aromatic, branched chain, sulfur containing, hydroxyl group containing amino acids with the products formed and enzymes and vitamins involved in them
	Inborn errors of amino acid metabolism	• Interpret the following on basis of given data: 1. Phenylketonuria 2. Tyrosinemia 3. Albinism 4. Homocystinuria 5. Maple syrup urine disease 6. Alkaptonuria

➢ Pathology

Topic	Sub Topic	Learning objectives
General Pathology	Muscle remodeling	• Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber • Explain the histopathological basis of leiomyoma
	Diseases of Muscle	• Describe the histological basis of Duchenne Muscular Dystrophy and myopathy.
	Diseases of	• Describe the clinical presentation and histological justification for osteoporosis,

	Bone	osteopetrosis • Describe the histological basis for bone repair after fractures
	Disease of Cartilage	• Describe the histological basis for cartilage growth and repair after fracture and cartilage growth and repair.

➢ Aging

Topic	Sub Topic	Learning objectives
Aging	Bone	• Discuss the effect of age on bone fragility and its implications with management.
	Cartilage	• Discuss the effect of age on loss of cartilage resilience and its implications and management
	Muscle	• Discuss the effect of age on Muscular strength and its implications and management
	Effect of estrogen on BMD	• Explain the protective effect of estrogen (female sex hormone) on bone mineral density and relate it to increased prevalence of postmenopausal fractures in women.

➢ Pharmacology and Therapeutics

Topic	Sub Topic	Learning objectives
General Pharmacology	Drugs acting on Neuromuscular Junction (NMJ)	• Explain the mechanism by which drugs can stimulate NMJ. • Explain the mechanism by which drugs can block NMJ.
	Drugs in Myasthenia Gravis	• Discuss briefly the therapeutic effect of drugs used in myasthenia gravis.
	Local Anesthetics	• Discuss briefly the therapeutic effect of drugs used as local anesthetics.

➢ Disease Prevention & Impact

Topic	Sub Topic	Learning objectives
	Back Pain	• Explain causes of low back pain • Describe prevention of low back pain

Community medicine and public Health	Work related Musculoskeletal disorders	• Describe work related musculoskeletal disorders addition with its burden/epidemiology • Identify risk factors of Musculoskeletal disorders MSD at workplace • Describe prevention of exposure to risk factors related to workplace
	MSD related to mobile usage	• Describe MSD related to mobile addition with its burden/epidemiology • Describe MSD related to mobile usage (Text neck, • Trigger thumb, DeQuervain Syndrome, Carpel Tunnel Syndrome) • Identify risk factors related to MSD due to excessive mobile usage. • Describe the preventive strategies for mobile addiction-related MSD.
	Ergonomics	• Describe the application of ergonomics in MSD related to the above disorders.
	Noncommunicable disease	• Describe the concept of non-communicable Musculoskeletal diseases
	Risk factor assessment of Musculoskeletal diseases	• Identify the risk factors in the community for Osteoporosis • Learn and apply interventions to prevent the risk factors for various musculoskeletal diseases in the community.
Behavioral Sciences	Psychosocial factors influencing chronic illnesses	• 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
	Psychosocial Impact of Disease and its management	• Identify the psychosocial risk factors as mediating factors between illness and its effect. • Discuss the role of psychological variables like coping, social support, and other health cognitions in mediating between illness and its effect.

6.3.2. Skills

➢ **Practical**

Topic	Sub Topic	Learning objectives
Histology	Histology of Muscles	• Draw and label the histology of skeletal muscle • Draw and label the histology of smooth muscle • Draw and label the histology of cardiac muscle
	Histology of Bones	• Draw and label the histological picture of compact bone • Draw and label the histological picture of spongy bone
	Histology of Cartilage	• Draw and label the microscopic structure of hyaline cartilage • Draw and label the microscopic structure of elastic cartilage • Draw and label the microscopic structure of fibrocartilage
Physiology	Locomotion	• 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
	Nerve Fibers	• Interpret the graph of local/action potential/compound action potential from the recording of nerve fibers, & nerve trunk.
	Muscles	• Interpret the graph of local/action potential from the recording of skeletal, & smooth muscles. • Interpret the graph of frequency summation and tetanization
Biochemistry	Total proteins	• Estimation of total proteins by kit method/dipstick methods.
	Albumin/globulin	• Estimation of albumin and globulin
Pharmacology	NMJ Blockers	• Label the diagram of the neuromuscular

		junction showing non depolarizing/depolarizing blockage. • Enumerate drugs for Myasthenia Gravis. • Label the diagram to show the effect of Neostigmine in the treatment of Myasthenia Gravis • Identify Ampules of neuromuscular blocking agents (e.g., Succinylcholine and Atracurium) and local Aesthetics (or their pictures) with their MOA, clinical uses and adverse effects.
Pathology	Leiomyoma	• Identify the salient gross and microscopic features of Leiomyoma.
	Bone healing	• Identify the salient gross and microscopic features of steps of bone healing (Pictorial) with factors and complications affecting bone healing.

6.3.3. C-FRC for Musculoskeletal & Locomotion-1 Module

MUSCULOSKELETAL AND LOCOMOTION MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
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

7. Attitude

➢ PERL's for Block-2

Domain	Topic	Specific Learning Objectives	Proposed Portfolio Entry
Professionalism	Respect for the Human Body/Remain	• 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.	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. https://web2.qatar.cmu.edu/~mhhammo/15440-f16/assignments/HowtocritiqueaJournalarticle.pdf 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 POLCIY AND TOS OF UHS

8. 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

9. 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.

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.

10. Assessment Policy (UHS)

Regulations

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 prerequisites of the examination?
   - **c.** Has his/her marks of internal assessment in all the Blocks/Clinical Clerkships sent to the Controller of Examinations through office of the Principal of the concerned college, at the end of each Block/Clinical Clerkships, as well as at the conclusion of the academic session along with the admission form for the professional examination.
   - **d.** Has been certified by the principal of his/her college:
     - **i.** of good character;
     - **ii.** of having attended not less than cumulative 75%* of the full course of lectures delivered, practical and clinical rotations conducted in the particular academic session, while maintaining 75 % attendance in each Block/Clinical Clerkship,
     - **iii.** of having appeared at the Block/Clinical Clerkship Examinations conducted by the college of enrolment with at least 50 % marks* in each Block/Clinical Clerkship examination, as well as in aggregate score of all Blocks/Clinical Clerkships examinations for the concerned year;
2. Written/Theory paper in all Professional Examinations in Modular Integrated MBBS or BDS Curricula shall consist of MCQs alone, with effect from Annual 2026 Examinations. (Ref: No. UHS/REG-25/2379, dated 17.11.2025)
3. The minimum number of marks required to pass the professional examination for each Block/Clinical Clerkship shall be fifty percent (50%) in Written and fifty percent (50%) in the 'Oral/Practical/Clinical' examinations and fifty percent (50%) in aggregate, independently and concomitantly, at one and the same time.
4. A candidate failing in one or more Blocks/Clinical Clerkships in the annual examination shall be provisionally allowed to join the next professional class till the commencement of supplementary examinations. The candidate, however, shall have to pass the failed Block/s

or Clinical Clerkship in this supplementary examination failing which he / she shall be detained in the professional year. Under no circumstances, a candidate shall be promoted to the next professional class till he/she has previously passed all the Blocks/Clinical Clerkships in the preceding professional examination.

If a student appears in the Supplementary Examination for the first time as he/she did not appear in the annual examination for any reason and failed in any Block/Clinical Clerkship in the Supplementary Examination, he/she will be detained in the same class and will not be promoted to the next class.

*Notification No.UHS/REG-25/2351 Dated 13-11-2025

5. Only one annual and one supplementary of each Professional Examination shall be allowed in a particular academic session. However, 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.
6. Any student who fails to clear the First or Second Professional MBBS / First Professional BDS Examination, in four consecutive attempts, each, inclusive of both availed as well as un-availed attempts, after becoming eligible for the examination, and has been expelled on that account shall not be eligible for continuation of studies and shall not be eligible for admission as a fresh candidate in either MBBS or BDS.
7. The application for admission of each candidate to the professional examination shall be submitted to the Controller of Examination, through the Principal of the College, on the prescribed format, as per notified schedule, accompanied by the prescribed fee.
8. The candidates shall pay their fee through the principal of their respective Colleges, who shall forward the Examination Forms along with the duly paid challan of the examination fee generated from the Online Examination Form.
9. The continuous internal assessment through the Block/Clinical Clerkship, conducted by the college of enrollment, shall carry 20% weightage in the total allocated marks for the concerned Block/Clinical Clerkship in the Professional Examination conducted by the university. The score will be equally distributed to the Written and "Oral/Practical/Clinical" Examinations.

10. The marks of internal assessment through Blocks/Clinical Clerkships examination and attendance record shall be submitted to Controller of Examinations, along with question papers and keys for the Block/Clinical Clerkship examination, within two weeks of completion of each Blocks/Clinical Clerkships examination.

Further, parent-teacher meetings shall be arranged by the colleges after every Block/Clinical Clerkship examination to share feedback on the progress of students with their parents. Minutes of parent teacher meetings, academic timetables/schedule of Blocks/Clinical Clerkships and academic year study guides shall be submitted to the Department of Medical Education UHS, as well.

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 department/s in the colleges.

12. The colleges may arrange remedial classes and one re-sit for each Block/Clinical Clerkship examination after fulfillment of prescribed requirements given below. 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:

Block/Clinical Clerkship Attendance	Remedial Classes
<75%, ≥ 50% (50-74%)	**1.** Principal of the college may conduct remedial classes and submit result to the Examination Department, UHS, independently. **2.** Principal of the college may conduct remedial classes for detained students, who have short attendance in the first Block/Clinical Clerkship of a professional year after detention. The college may submit record of the remedial classes to the Examination Department, UHS, independently.

<50%	**1.** Principal of the college may submit attendance record of such students to Department of Medical Education, UHS, and seeking permission for conduct of remedial Classes. The conduct of remedial classes in such cases shall be arranged only after permission from the Competent **2.** Authority in the university. **3.** The colleges shall also have to provide the university with the reasons submitted by the candidates for short attendance along with documentary evidence for the same duly verified by the principal. **4.** The following shall be considered as valid reasons for short attendance of the students for consideration of permission for remedial classes: **a.** Illness/accident/surgery of the student or sickness/death of an immediate relative/being afflicted by a natural/man-made calamity or disaster or detained students (missed the first Block/Clinical Clerkship of the year), students clearing their preceding professional examination in supplementary, or late **b.** admitted students who have been permitted for joining by UHS

Marks in Block/ Clinical Clerkship Examination	**Re-sit Examination**
<50% Marks/ Absence from Block /Clinical Clerkship Examination	**1.** Principal of the college may submit record of such students to Department of Medical Education, UHS, and seeking permission for conduct of re-sit examination. **2.** The conduct of re-sit examination in all cases shall be arranged only after permission from the Competent Authority in the university.

	3. The colleges shall also have to provide the university with the reasons submitted by the candidates for absence from the Block/Clinical Clerkship examination, along with documentary evidence for the same duly verified by the principal. **4.** The following shall be considered as valid reasons for absence of a student from Block/Clinical Clerkship examination, and for consideration of permission for re-sit examination: **a.** Illness/accident/surgery of the student or sickness/death of an immediate relative/being afflicted by a natural/man-made calamity or disaster or detained students (missed the first **b.** Block/Clinical Clerkship of the year), students clearing their preceding professional examination in supplementary, or late admitted students who have been permitted for joining by UHS

13. The following policy shall be applicable for transition of students From Traditional Subject-Based Scheme to the Modular Integrated Curriculum Scheme:

a. The students who fail in all subjects of the professional examination, either by taking the examination or due to non-appearance, and are detained in the respective professional year, shall follow the Modular Integrated Curriculum Scheme for their teaching and assessment.

b. The students who fail in one or more subjects but not all the subjects of a professional examination, either by taking the examination or due to non- appearance, and are detained in the respective professional year, shall attend classes with students following the Modular Integrated Curriculum Scheme, but they will be examined in the failed subject/s according to their parent scheme, i.e., the Traditional Subject-Based Curriculum Scheme.

MBBS YEAR-1						
Subject	**Theory**		**Practical**			**Total**
Block 1 **Modules** (Foundation-I + Hematopoietic and Lymphatic)	Part I MCQs (140)	140 Marks	Practical /Clinical Examination	011 OSPE 02 OSCE 03 OSVE	**Marks** 88 10 42	**350**
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	**175**	Total	**175**		
Block 2 **Modules** (Musculoskeletal & Locomotion-I)	Part I MCQs (140)	140 Marks	Practical /Clinical Examination	11 OSPE 02 OSCE 03 OSVE	**Marks** 88 10 42	**350**
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	**175**	Total	**175**		
Block 3 **Modules** (Cardiovascular-I & Respiratory-I)	Part I MCQs (140)	140 Marks	Practical /Clinical Examination	11 OSPE 02 OSCE 03 OSVE	Marks 88 10 42	**350**
	Internal Assessment 10%	35 Marks	Internal Assessment 10%	35 Marks		
	Total	**175**	Total	**175**		
					Total Marks:	**1050**

11. Internal Assessment Policy by UHS

INTERNAL ASSESSMENT

It shall constitute 20% of the total assessment at the end of the academic year.

	Scoring Parameter	Weightage (Percentage)
Theory 10 %	Attendance	75% attendance -1 % >85% attendance -2 %
	Block Exam	5 %
	Continuous assessment	3 %
Practical 10 %	Attendance	75% attendance -1 % >85% attendance -2 %
	Block Exam (OSCE / OSPE / OSVE / Short case)	5 %
	Portfolio-clinical logbooks (CFRC / PERLs / Clinical Clerkship)	3 %

12. Internal Assessment Policy by AFMDC

Internal Assessment Policy for Block 2 (1st Year MBBS)

(Theory = 10% = 35 Marks)

Block weightage (Total Marks = 18)

Criteria for Block weightage

Less than 50%= 08 Marks

50%= 09 Marks

51-55%=11 Marks

56-60%=13 Marks

61-65% =14 Marks

66-70%= 15 Marks

71-75% = 16 Marks

More than 75% = 18 Marks

Attendance (Total Marks = 07)

Criteria for Attendance

75% Attendance = 3.5 Marks

>85 Attendance = 07 Marks

Individual Subjects Weightage (Total Marks = 10)

Criteria for individual subjects Weightage

Sr. No	Subject	Total Marks
1.	Anatomy	04 Marks
2.	Physiology	03 Marks
3.	Biochemistry	03 Marks

Internal Assessment Policy for Block 2 (1st Year MBBS)

(Practical = 10% = 35 Marks)

Block weightage (Total Marks = 18)

Criteria for Block weightage

Less than 50%= 08 Marks

50%= 09 Marks

51-55%=11 Marks

56-60%=13 Marks

61-65% =14 Marks

66-70%= 15 Marks

71-75% = 16 Marks

More than 75% = 18 Marks

Attendance (Total Marks = 07)

Criteria for Attendance

75% Attendance = 3.5 Marks

>85 Attendance = 07 Marks

CFRC Log book & Portfolio Weightage (Total Marks = 10)

Criteria for individual subjects Weightage

Sr. No	Subject	Total Marks	Responsibility
1.	CFRC Log book	05 Marks	Block Coordinator
2.	Portfolio	05 Marks	DME

13. 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.

14. Table of Specification (TOS)

MBBS 1st Professional

Block-2

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

15. Frame work of Block-2 Module Timetable 2024-25

AZIZ FATIMAH MEDICAL & DENTAL COLLEGE FAISALABAD

TIME TABLE Framework 1st YEAR MBBS CLASS SESSION 2025-26 Musculoskeletal Module

DAY	1	2	3		4	5
	08:00 am - 09:30 am	09:30 am - 10:30 am	10:30 am - 12:30 pm		12:30 pm - 13:00 pm	13:00 pm - 14:00 pm
Monday	Practical Group A: Anatomy Group B: Physiology Group C: Biochemistry	Anatomy Lecture	Dissection		Break/Namaz Break	Community Medicine
Tuesday	Practical Group B: Anatomy Group C: Biochemistry Group A: Physiology	Biochemistry Lecture	Dissection			PERL's
Wednesday	Practical Group C: Anatomy Group A: Biochemistry Group B: Physiology	Physiology Lecture	Dissection			Pathology
Thursday	SGD Group A: Anatomy Group B: Biochemistry Group C: Physiology	Physiology Lecture	Dissection			Pathology
DAY	1	2	3	4	5	Jummah Prayers
	08:00 am - 09:30 am	09:30 am - 10:30 am	10:30 am - 11:00 am	11:00 am - 12:00 pm	12:00 pm - 13:00 pm	
Friday	SGD Group B: Anatomy Group C: Biochemistry Group A: Physiology	Biochemistry Lecture	SDL/Break	Physiology Lecture	Anatomy Lecture	
DAY	08:00 am - 09:30 am	09:30 am - 10:30 am	10:30 am - 12:30 pm		12:30 pm - 13:00 pm	13:00 pm - 14:00 pm
Saturday	SGD Group C: Anatomy Group A: Biochemistry Group B: Physiology	Biochemistry Lecture Topic: Teacher	Dissection		Break/Namaz Break	BS Topic: Teacher:

Resource Books

16. Learning Resources

Anatomy	• Snell's Clinical Anatomy 10th ed. • Langman's Medical Embryology 12th ed • Medical Histology by Laiq Hussain Siddiqui 8th ed. • General Anatomy by Laiq Hussain Siddiqui 6th ed.
Physiology	• Guyton AC and Hall JE. Textbook of Medical Physiology, W.B. Saunders & Co. Philadelphia • Essentials of Medical Physiology by Mushtaq Ahmad
Biochemistry	• Harpers illustrated Biochemistry 32nd edition. Rodwell.V.W MCGrawHill publishers. • Lippincott illustrated Review 8th edition Kluwer.W. • Essentials of Medical Biochemistry vol 1&2 by Mushtaq Ahmed.
Community Medicine	• Parks Textbook of Preventive and Social Medicine, K. Park (Editor) • Public Health and Community Medicine Ilyas Ansari (Editors)
Pharmacology	• Basic and clinical Pharmacology by Katzung. McGraw-Hill • Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins
Pathology	• Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders. • Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and • Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt. • Walter and Israel. General Pathology. • Churchill Livingstone.
Medicine	• Davidson's Principles and Practice of Medicine
Surgery	• Bailey & Love Short Practice of Surgery
Islamiyat	• Standard Islamiyat (compulsory) for B.A, B.Sc, MA, Msc, MBBS by Prof. M Sharif Islahi • Ilmi Islamiyat (compulsory) mfor B.A, B.sc & equilent.
Behavioral Sciences	• Handbook of Behaioural Sciences by Prof. Mowadat H. Rana, 3rd Edition. • Medical and Psychosocial Aspects of Chronic illness and Disability Sixth Edition Donna R. Falvo, PHD Beverley E. Holland, PHD RN.