RAI FOUNDATION MEDICAL COLLEGE

MUSCULOSKELETAL - I MODULE

FIRST YEAR MBBS, ACADEMIC SESSION 2024-25

BLOCK: II(MUSCULOSKELETAL - I)
Academic Year: 2025
Duration: 8 Weeks

DISCLAIMER

- Developing a study guide is a dynamic process and undergoes iteration according to the needs and priorities.
- This study guide is subjected to the change and modification over the whole academic year.
- However, students are advised to use it as a guide for respective modules.
- It is to declare that the learning objectives (general and specific) and the distribution of assessment tools (both theory and practical) are obtained from Rai Foundation Medical College, Sargodha. These can be obtained from: https://www.uhs.edu.pk/
- The time tables are for guiding purpose. It is to advise that final timetables are always displayed over the notice boards of each lecture hall.
- Students are encouraged to provide feedback via module coordinator.

Vision Statement

To be an institution of excellence in medical education, research, and patient care, fostering innovation, compassion, and a profound commitment to addressing healthcare challenges at local and global levels.

Mission Statement

We are dedicated to producing competent, ethical medical graduates who exemplify empathy, social accountability, and excellence in patient care. Through innovative education and critical thinking, they will advance clinical practice, scientific research, and lifelong learning to meet local and global healthcare needs.

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Module Committee

Sr.no	Name	Department	Role
1.		Principal	
2.		DME	Director
3.		DME	Assistant Director
4.		DME	Senior Demonstrator
Module Team			
5.		Professor & HOD Anatomy	Block Coordinator
6.		Asst. Prof. Anatomy	Module Coordinator
7.		Asst. Professor DME	Module Developer
8.		Senior Demonstrator	Module Developer
9.		Professor Anatomy	Member
10.		Professor Physiology	Member
11.		Professor & HOD Biochemistry	Member
12.		Associate Professor Pharmacology	Member
13.		Professor Surgery	Member
14.		Professor Medicine	Member
15.		Senior Demonstrator Pathology	Member
16.		Senior Demonstrator Biochemistry	Member
17.		Senior Lecturer Community Medicine	Member
18.		Asst. Prof. Psychiatry (Behavioral Science)	Member
19.		Asst. Professor Orthopedics	Member

Introduction to Study Guide

It is an aid to Inform students how student learning program of the module has been organized, to help students organize and manage their studies throughout the module and guide students on assessment methods, rules and regulations.

The Study Guide:

— Communicates information on organization and management of the module.
— This will help the student to contact the right person in case of any difficulty.
— Defines the objectives which are expected to be achieved at the end of the module.
— Identifies the learning strategies such as lectures, small group teachings.

Module Outcomes:

— Provides a list of learning resources such as books, computer-assisted learning programs, web links, and journals, for students to consult in order to maximize their learning.
— Highlights information on the contribution of continuous on the student's overall performance.
— Includes information on the assessment methods that will be held to determine every student's performance.

Achievement of Objectives:

- Focuses on information pertaining to examination policy, rules and regulations.

Students will experience an integrated curriculum.

Integrated Curriculum:

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

Marks Distribution

BLOCK II – Musculoskeletal - 1 Module					
Theory	Part I - MCQs	85 Marks	**Practical**	OSPE	56 Marks
				OSCE	16 Marks
	Part II- SEQs	35 Marks		OSVE	48 Marks
	Internal Assessment	30 Marks		Internal Assessment	30 Marks
	Total	150 Marks		Total	150 Marks

Theme	Subject	MCQ (1 Mark)	SEQ (5 Mark each)	Marks	Oral / Practical / Clinical Exam			
					OSPE (08 Marks each)	OSCE (10 Marks each)	Structured OSVE (16 Marks each)	Marks
Normal Structure	Anatomy & Applied / Clinical	35	4	55	5	-	1	**56**
Normal Function	Physiology & Applied / Clinical	17	2	27	1	-	1	**24**
	Biochemistry & Applied / Clinical	11	1	16	1	-	1	**24**
Disease Burden & Prevention	Community Medicine Public Health	06	-	06	-	-	-	**-**
	Behavioral Sciences	04	-	04	-	-	-	**-**
Pathophysiology & Pharmaco-therapeutics	Pathology	07	-	07	-	-	-	**-**
	Pharmacology	05	-	05	-	-	-	**-**
CFRC	CFRC 1-1	-	-	-	-	1	-	**08**
PERLS	PERLS 1-1	-	-	-	-	1	-	**08**
		85	**7×5 = 35**	**120**	**08×7 = 56**	**2×08 = 16**	**3 × 16= 48**	**120**

Organization of Module

INTRODUCTION

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. This study guide has been developed to help guide you and keep you focused on the objectives for this module.

Welcome to the field of medicine and hope that the journey ahead will be exciting and fulfilling for you all!!

Teaching and learning strategies:

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

1. Interactive Lectures
2. Hospital / Clinic visits
3. Small Group Discussion
4. Practical
5. Skills session in skill labs
6. Case-Based Learning (tutorials)
7. Directed Self-Learning

- **Interactive lectures:**
  An interactive lecture is an easy way for instructors to intellectually engage and involve students as active participants in a lecture - based class of any size.

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

- **Small group discussion (SGD):**
  Students learn from each other. Everyone gets more practice at expressing their ideas. A two-way discussion is almost always more creative than individual thoughts. Social skills are practiced in a 'safe' environment e.g. tolerance, cooperation.

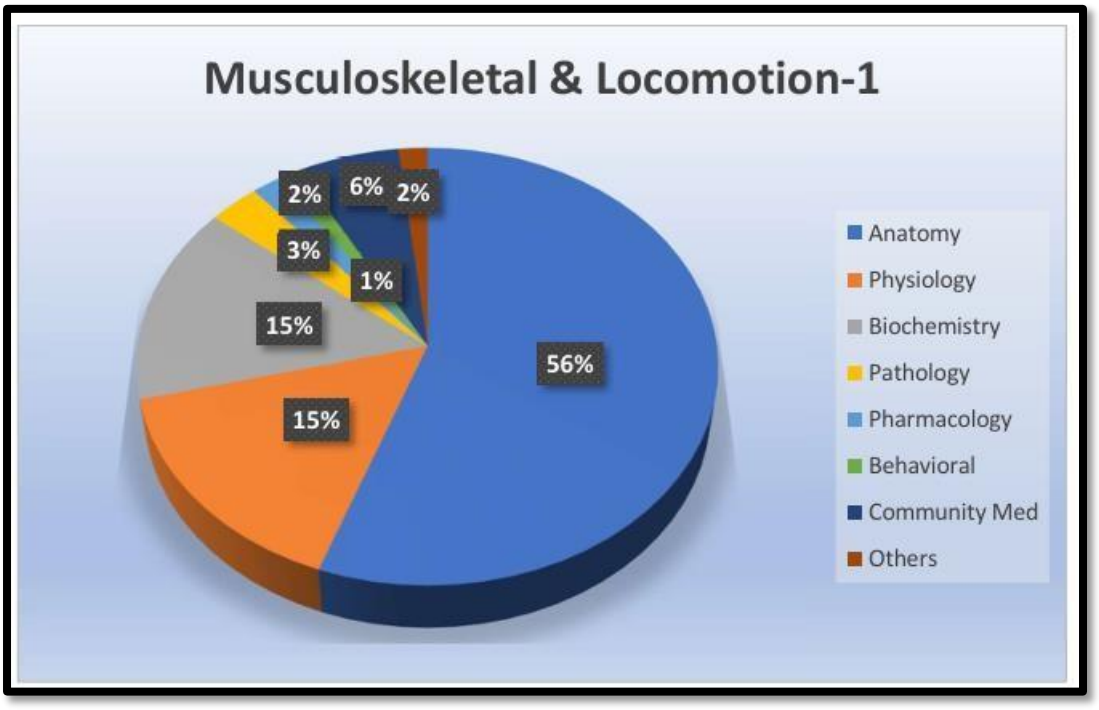
- **Skills session:**
  Skills relevant to respective module are observed and practiced where applicable in skills laboratory or Laboratories of various departments.

- **Case Based Learning (CBL):**

  A small group discussion format where learning is focused on a series of questions based on a clinical scenario. Students discuss and answer the questions by applying relevant knowledge gained previously in clinical and basic health sciences during the module and construct new knowledge. The CBD will be provided by the concerned department. It is an active learning & teaching strategy which promotes application of foundational knowledge in relevant clinical scenarios.

- **Directed Self-learning (DSL):**
  Directed Self-learning, which involves studying with indirect supervision in a classroom/Library, is a valuable way to learn and is quickly growing in popularity among parents and students.
  Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Centre, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-study.

INTEGRATING DISCIPLINES OF MUSCULOSKELETAL MODULE



Module Outcomes

By the end of Musculoskeletal-I module, students of 1st year MBBS will be able to

- 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 the normal development 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 effect of injury and disease to 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.

Themes of Musculoskeletal- I Module

S. No	Theme	Duration
1.	Shoulder Joints & Movement	1 week
2.	Arm Region	1 week
3.	Forearm Region	1 week
4.	Hands	1 week
5.	Gluteal Region	1 week
6.	Thigh	1 week
7.	Leg	1 week
8.	Foot	1 week

Specific Learning Objectives

ANATOMY				
UPPER LIMB REGION				
GROSS ANATOMY				
Topic	**Specific Learning objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Pectoral Region	Describe the topographical anatomy of Pectoral Region.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the osteology of the bones in pectoral region.		C2	
	Describe muscles of the Pectoral Region with their origin, insertion, nerve supply and actions.		C2	
	Perform dissection of the Pectoral Region or use models to identify the key structures		C2 / P2	
Dermatome & Cutaneous Innervation	Describe the cutaneous nerves. and Superficial veins of the Upper Limb.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the extent, attachments, and structures passing through Clavipectoral Fascia.	SGD	C2	
Back + Mammary Glands	Describe the extent, structure, vascular supply, lymphatic drainage of Breast (Mammary Glands)	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Define the boundaries of auscultation and state its clinical significance		C1 / C2	
	Explain the anatomical basis of position adopted for breast examination and mammography. .		C2	
	Demonstrate palpation of breast along with defining its relation to the Fibrous septa in Carcinoma of Breast		C2 / P2	
	Enumerate the superficial muscles of back, connecting shoulder girdle with vertebral column.		C1	
	Describe the attachments, nerve supply and actions of Trapezius, Latissimus Dorsi, Rhomboid Major and Minor.		C2	
	Discuss the neurovascular supply of pectoral region		C2	
	Correlate neurovascular supply of pectoral region with important clinical conditions.		C3	
	Describe superficial muscles of the back with their origin, insertion, nerve supply and actions.		C2	
Clavicle	Describe the Osteology of Clavicle (morphological features, side determination, attachments, ossification).	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the correlates functions of Clavicle.		C2	

Scapular Region	Describe the Osteology of Scapula (morphological features, attachments, ossification)	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Determine the side and identify the landmarks of scapula.		C2	
	Describe the movements of scapula associated with movements of shoulder Girdle.		C2	
	Tabulate the muscles of scapular region along with their attachments, nerve supply and action.		C2	
	Tabulate the attachments, origin, insertion, innervation, and actions of anterior axio appendicular muscles		C2	
Sternoclavi-cular Joint	Describe the Sternoclavicular Joint in terms of articulating surfaces, ligaments, articular disc, nerve supply.		C2	
Axilla	Conceptualize the topographical anatomy of Axilla and its contents.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the boundaries of Axilla.		C2	
	List the contents of Axilla.		C1	
	Describe axillary artery with reference to its 3 parts their relations, branches, and anastomoses		C2	
	Describe the formation, tributaries, and drainage of axillary Vein		C2	
	Describe the axillary lymph nodes in terms of location, grouping, areas of drainage and clinical significance.		C2/ C3	
	Describe the course, relations, root value and distribution of axillary nerve.		C2	
	Describe the boundaries and contents of quadrangular space.		C2	
	Demonstrate the course/ relation and branches/tributaries of axillary vessels on given model.		C2 / P2	
Humerus	Describe the Osteology of Humerus (side determination, morphological features, attachments, ossification)		C2	MCQs, SEQs, OSVE, OSPE
Shoulder Joint	Discuss the Shoulder Joint in relation to its articulation, type/ variety, capsule, ligaments, innervation, blood supply & movements.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the 3 parts of Deltoid Muscle.		C2	
	Correlate parts of deltoid muscle with its unique functions.		C3	
	Explain mechanism of Abduction of arm with special reference to deltoid muscle.		C2	
	Demonstrate the movements of scapula and shoulder joint.		C2/ P2	
	Draw a labelled diagram of the arterial anastomosis around shoulder joint		C2	
	Describe, in detail, the Scapula-Humeral Mechanism in relation to movement of		C2	

	abduction.			
	Discuss important clinical conditions related to shoulder joint (shoulder joint stability, dislocation and shoulder pain).		C3	
Rotator Cuff Muscles	Describe rotator cuff muscles along with their anatomical significance.		C2	MCQs, SEQs, OSVE, OSPE
Brachial Plexus	Describe the formation of Brachial Plexus; Infra and supraclavicular parts.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Identify the formation of brachial plexus and its branches on given model.		C2 / P2	
	List the branches of brachial plexus.		C2	
	Describe their areas of distribution and muscles they innervate and their clinical correlates.	CBL	C2	
	Diagnose along with justification a case of brachial plexus injury in given clinical scenario.		C3	
Muscles of Arm	Tabulate the muscles of anterior compartment of arm with their attachments, nerve supply and action.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Identify muscles of anterior compartment on given model.		C2 / P2	
	Tabulate the attachments, innervation, and actions of Triceps brachii as a muscle of posterior fascial compartment of arm.		C2	
	Identify muscles of posterior compartment on given model.		C2 / P2	
Nerves of Arm	Describe msculocutaneous Nerve in terms of its origin, course, termination, relations, branches, and distribution.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe with the help of illustration the cutaneous innervation of the arm.		C2	
	Demonstrate biceps brachi reflex, triceps reflex and brachioradialis reflex	SGD	C2	
	Identify nerves of arm on given model.		C2 / P2	
Arterial & Venous Supply of Arm	Describe the Brachial Artery in terms of its course, relations, branches, and distribution	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the Profunda Brachii artery giving its course, relations, branches, and distribution.		C2	
	Identify brachial and profunda brachii artery on given model.		C2 / P2	
	Demonstrate surface marking of superficial veins of arm and forearm for IV (Intra venous) injections.		C2 / P2	
Cubital Fossa	Describe Cubital Fossa with emphasis on its boundaries, contents, and clinical significance.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
Radius & Ulna	Determine the side and landmarks of radius and ulna.		C2 / P2	MCQs, SEQs, OSVE, OSPE
	Describe the osteology of radius (side determination, morphological features, attachments).		C2	

	Describe the osteology of ulna (side determination, morphological features, attachments).		C2	
Muscles of Forearm	Describe osseofascial compartment of forearm.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Tabulate flexor and pronators muscles of forearm, their attachments, actions and nerve supply.		C2	
	Describe the action of paradox with examples.		C2	
	Tabulate the attachments, innervation, and actions of Lateral Muscles of the Forearm.		C2	
	Identify the muscles of flexor and extensor compartments of forearm on given model.		C2 / P2	
Nerves of Forearm	Describe with illustrated diagram the cutaneous innervation of the forearm.		C2	MCQs, SEQs, OSVE, OSPE
	Describe ulnar, median and radial nerves in fore arm.		C2	
Blood Supply of Forearm	Describe the origin, course, relations, and branches of ulnar and radial artery in forearm.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the origin, course, relations and tributaries of veins of forearm.		C2	
	Demonstrate surface marking of Brachial artery, Cephalic, Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous artery on given model / subject.		C2 / P2	
Retinacula	Describe the Extensor & Flexor Retinacula along with their attachments and relations.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Discuss the formation and contents of carpal tunnel.		C2	
	Describe carpel tunnel syndrome.		C2	
Joints of Upper Limb	Describe the Elbow Joint in terms of articular surfaces, type, variety, ligaments, muscles producing movements, blood supply & nerve supply and radiological imaging.		C2	MCQs, SEQs, OSVE, OSPE
	Describe Carrying Angle and justify its importance in limb movement		C2	
	Discuss clinical correlates of elbow joint.		C3	
	Describe the Radioulnar Joints in terms of articular surfaces, type, variety, ligaments, muscles producing movements, nerve supply and radiological imaging.		C2	MCQs, SEQs, OSVE, OSPE
	Describe the wrist joint in terms of articular surfaces, type, variety, ligaments, muscles producing movements, nerve supply and radiological imaging.		C2	
	Demonstrate mechanisms of movements of Pronation & Supination.		C2 / P2	
Fascia & Interosseous Membrane	Describe the features of Interosseous Membrane with structures that pierce through it.	SGD (Dissection Hall &	C2	MCQs, SEQs, OSVE, OSPE

	Describe the features and importance of fibrous flexor sheaths, synovial flexor sheaths and extensor expansion.	Museum)	C2	
Hand	Describe the attachments and actions of the muscles of hand.		C2	MCQs, SEQs, OSVE, OSPE
	Identify the muscles and neurovasculature of palm on given model.		C2 / P2	
	Tabulate the attachments, innervation and actions of intrinsic muscles of hand.		C2	
	Explain the fascial spaces of palm and pulp space of fingers.		C2	
	Describe dupuytren contracture, mallet finger and buttonaire deformity.		C3	
	Describe hand as a functional unit in terms of position, movement of thumb and fingers while performing different functions		C2	
	Discuss cupping of hand and fist formation.		C2	
Neuro-Vascular Supply of forearm & Hand	Draw the Radial Artery course, relation and termination in hand with its clinical significance in the region.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Draw the Ulnar Artery's Course, relation and termination in hand with its clinical significance in the region.		C2	
	Describe the formation, branches, and areas of distribution of Superficial and Deep Palmar Arch.		C2	
	Describe the course, relations and branches of Ulnar, Median and Radial Nerves in the Hand.		C2	
Joints of Hands	Describe the first Carpometacarpal Joint in terms of; type, variety, articular surfaces, ligaments, relations, blood supply, innervation, movements.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Demonstrate the movements of the 1st carpometacarpal joint.		C2 / P2	
	Describe the metacarpophalangeal & interpharyngeal joints in terms of; type, variety, articular surfaces, ligaments, relations, blood supply, innervation, movements.		C2	
Radiograph	Identify the anatomical landmarks of upper limb on radiographs/ CT / MRI (Magnetic resonance imaging).	SGD (Dissection Hall & Museum)	C2/ P2	MCQs, SEQs, OSVE, OSPE
	Identify clinical correlates of upper limb on radiographs (Fractures, dislocation, tear).		C3 / P3	
LOWER LIMB				
GROSS ANATOMY				
Topic	**Specific Learning objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Hip Bone	Draw and label the Parts of the hip bone, with its attachments.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the parts, attachments, and ossification of hip bone.		C2	

	Identify the parts and bony features of the hip bone, with its attachments, important relations in model.		C2 / P2	
	Demonstrate the side determination of hip bone, its bony features, attachments, sex differences, and important relations.		C2 / P2	
Femur	Describe the parts, attachments, ossification, side determination, and Sex differences of femur.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Identify the parts and bony features of the femur, with its attachments, important relations.		C2 / P2	
	Demonstrate the side determination of femur, its bony features, attachments, and important relations (correlate these with fractures).		C2	
	Describe coxa vara and coxa valga and their clinical significance.		C2 /P	
Fascia Lata	Describe the extent, attachments, and modifications of Fascia Lata.	LGIS	C2	
	Demonstrate the attachment of fascia Lata, iliotibial tract in given model.		C2/P2	
Neuro-vascular Supply of Thigh	Describe the cutaneous nerves and vessels of thigh.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Draw a labeled diagram of the cutaneous nerve supply of thigh.		C2	
	Describe the formation, course, relations, tributaries, and termination of the superficial veins.		C2	
	Explain the anatomical justification of venesection, varicose veins, and saphenous venous grafts.		C2	
	Describe the lymphatic drainage of the region with special emphasis on afferent and efferent of inguinal lymph nodes.		C2	
	Identify the superficial and deep lymph nodes in given model.		C2 /P2	
	Justify anatomically the etiology for enlargement of inguinal lymph nodes.		C3	
Femoral Triangle & Canal	Describe the Boundaries and contents of femoral triangle.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Draw labeled diagram of the boundaries and contents of femoral triangle.		C2	
	Identify the femoral sheath with its compartments.		C2 / P2	
	Describe the formation of femoral sheath and its significance		C2	
	Describe the formation of femoral canal and its contents and significance		C2	
	Describe the formation and significance of femoral ring		C2	
Muscles of Anterior Compartment of Thigh	Describe the Muscles of anterior compartment of thigh with their proximal and distal attachments, actions, and innervation.	SGD (Dissection Hall & Museum)	C2	

	Demonstrate movements of the muscles of anterior compartment of thigh with their proximal and distal attachment.		C2 / P2	
	Demonstrate the actions of muscles of anterior compartment of thigh		C2/ P2	
	Explain the anatomical basis of psoas abscess.		C2	
Neurovascular supply of Anterior Compartment of Thigh	Demonstrate the nerves and vessels of anterior compartment of thigh along with their branches on given model.	LGIS	C2 / P2	MCQs, SEQs, OSVE, OSPE
	Describe the origin, course, relations, branches, distribution, and termination of femoral artery		C2	
	Describe the origin, course, relations, tributaries, area of drainage and termination of femoral vein		C2	
	Describe the origin, course, relations, branches, distribution, and termination of femoral nerve		C2	
	Tabulate the muscles of anterior compartment of thigh with their attachments, nerve supply and actions		C2	
Abductor Canal	Describe the formation, boundaries, contents, and significance of adductor canal.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Demonstrate the boundaries and contents of adductor canal on given model.		C2 / P2	
Muscles of Medial Compartment of Thigh	Describe Muscles of medial compartment of thigh with their proximal and distal attachments, innervation and actions.		C2	MCQs, SEQs, OSVE, OSPE
	Identify the muscles of medial compartment of thigh with their proximal and distal attachments in given model.		C2 / P2	
	Demonstrate the actions of the muscles of the compartment on self/ subject.		C2 / P2	
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.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Identify the nerves and vessels of medial compartment of thigh along with their branches.		C2 / P2	
	Describe and identify the lumbar and sacral plexus and its branches supplying the lower limb.		C2	
	Describe the cutaneous nerve supply and lymphatics of the region.		C2	
Gluteal Region	Describe the subcutaneous tissue of gluteal region	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	List the structures passing through the greater and lesser sciatic foramen.		C1	
	Describe the muscles of gluteal region with their proximal and distal attachments, innervation, and actions		C2	
	Identify the muscles of gluteal region with their proximal and distal attachments		C2 /P1	

	Describe the origin, course, relations, branches/ tributaries, distribution, and termination of neurovascular structures of gluteal region		C2	
	Demonstrate the actions of the muscles of gluteal region		C2 /P2	
	Draw a labelled diagram of the cruciate and trochanteric anastomosis		C2	
	Justify anatomically the consequences of wrongly placed gluteal intramuscular injections and injury to superior and inferior gluteal nerves		C3	
	Demonstrate the origin, course, relations, branches/tributaries and termination of nerves and vessels of gluteal region.		C2 / P2	
Muscles of Posterior Compartment of Thigh	Describe the Attachments of muscles of posterior compartment of thigh with the innervation and action	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Identify the muscles of posterior compartment of thigh with their proximal and distal attachments		C2 / P2	
	Demonstrate the actions of muscles of posterior compartment of thigh		C2 / P2	
	Describe the anatomical basis of signs and symptoms of Piriformis syndrome		C2	
Blood Supply of Thigh	Describe the origin, course, relations, branches, distribution, and termination of Profunda femoris artery.		C2	
	Describe the formation and distribution of thigh chain anastomoses of thigh (and its clinical significance).		C2	
Sciatic Nerve	Describe the origin, course, relations, branches, distribution, and termination of sciatic nerve.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the anatomical basis of signs and symptoms of compression of or injury to sciatic nerve.		C2	
Hip Joint	Describe the hip joint with its type, articulations, ligaments, stabilizing factors, movements, and neuro-vascular supply with clinical significance.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the muscles producing movements of hip joint.		C2	
	Perform the movements of hip joint at various angles.		C2 / P2	
	Discuss important associated clinical conditions.		C2	
Tibia & Fibula	Enlist the bones in the knee joint.	SGD (Dissection Hall & Museum)	C1	MCQs, SEQs, OSVE, OSPE
	Describe parts of tibia and fibula, with their attachments, important relations, ossifications, and side determination.		C2	
	Identify the parts and bony features of the tibia & fibula, their bony features, attachments, important relations.		C2 / P2	
	Describe the anatomical basis for using fibula as graft.		C2	

	Describe the attachments and role of popliteus in locking and unlocking of the knee joint.		C2	
	Draw parts of patella with its attachments along with label.		C2	
	Describe features and ossification of patella.		C2	
	Enlist the factors responsible for stabilizing the patella.		C1	
Knee Joint	Describe the knee joint with its type, articulations, ligaments, movements, and neuro-vascular supply.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Explain the mechanism of locking and unlocking of knee joint with the foot on ground and off the ground.		C2	
	Describe the factors responsible for stability of knee joint.		C2	
	Discuss important associated clinical conditions.		C2	
	Enlist the bones in the knee joint.		C1	
	Describe parts of tibia and fibula, with their attachments, important relations, ossifications, and side determination.		C2	
	Identify the parts and bony features of the tibia & fibula, their bony features, attachments, important relations.		C2 / P2	
	Describe the anatomical basis for using fibula as graft.		C2	
Muscles of leg	Describe the muscles of anterior, lateral, and posterior compartments of leg with their proximal & distal attachments, innervation, and actions.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSPE, OSVE
	Identify the muscles of anterior, lateral, and posterior compartments of leg with their proximal and distal attachments.		C2 / P2	
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.	LGIS	C2	
	Describe the cutaneous nerves and vessels of leg.		C2	
	Draw a labeled diagram of the cutaneous nerve supply and dermatomes of leg.		C2	
Flexor, Extensor, and peroneal Reticula	Identify the extensor, flexor, and peroneal retinacula and the structures related to them on given model.	SGD (Dissection Hall & Museum)	C2 / P2	MCQs, SEQs, OSPE, OSVE
	Describe the attachments, relations, and structures passing under cover of, extensor, peroneal, and flexor retinacula		C2	
	Identify the nerves and vessels of anterior, lateral, and posterior compartments of leg along with their branches on given model or diagram.		C2 / P2	
	Describe the formation of noncalcareous (Achilles tendon).		C2	
Tibio- fibular	Describe the articulations, muscles and	SGD	C2	

Joint	neurovasculature and movements at tibiofibular joints.	(Dissection Hall & Museum)		MCQs, SEQs, OSVE, OSPE
Ankle Joint	Describe the ankle joint with its type, articulations, ligaments, movements, and nerve supply.		C2	
	Describe the factors stabilizing the ankle joint.		C2	
	Identify the articulating surfaces and ligaments of ankle joint.		C2 / P2	
	Discuss important associated clinical conditions associated with lower limb joints.		C2	
Plantar Fascia	Describe the formation, attachments, and clinical significance of plantar aponeurosis.	SGD (Dissection Hall & Museum)	C2	
	Justify the anatomical basis of the signs and symptoms of plantar fasciitis.		C3	
Muscles of Foot	Identify the parts and bony features, attachments, and important relations of the articulated foot		C2 / P2	
	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.		C2	
	Draw and label the muscles of the layers of sole of foot		C2	
	Identify the muscles and tendons with their proximal and distal attachments in the sole of foot.		C2 / P2	
Small Joints of Foot	Describe the interphalangeal, subtalar and midtarsal joints with their types, articulation, ligaments, stabilizing factors, movements, and neurovascular supply.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
Arches of Foot	Describe the formation, components, stabilizing and maintaining factors of the arches of foot.		C2	
	Describe the clinical significance of arches of foot with respect to flat foot, claw foot.		C2	
	Describe the clinical significance of arches of foot with respect to flat foot, claw foot.		C2	
Flexor & Extensor Sheaths	Describe the fibrous flexor sheaths, extensor expansions and synovial flexor sheaths.		C2	
Neurovascular supply of foot	Describe the origin, course, relations, branches/ tributaries, distribution, and termination of plantar vessels along with their branches .	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Identify the nerves and vessels on the foot along with their branches		C2	
	Describe the cutaneous nerves of foot.		C2	
	Draw the cutaneous nerve supply and dermatomes of foot along with labels.		C2	
	Identify the nerves and vessels in the sole		C2 / P2	

	of foot on given model.			
	Describe the palpation of dorsalis pedis artery.		C2	
	Explain the clinical significance of dorsalis pedis artery.		C2	
Arterial and Venous drainage of lower limb	Describe the surface anatomy, course, relations, tributaries, and communications of the superficial veins of the lower limb	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Draw a concept map of the superficial veins of lower limb.		C2	
	List the factors favoring venous return of the lower limb.		C1	
	Justify the anatomical basis of the formation, and signs and symptoms of deep venous thrombosis.		C3	
	Discuss Clinical correlations of Lower Limb Arteries (palpation of femoral, popliteal, posterior tibial & dorsalis pedis arteries & collateral circulation)		C2	
	Justify the anatomical basis of intermittent claudication, occlusive arterial disease.		C3	
Lymphatic Drainage	Draw a concept map of the lymphatic drainage of lower limb.		C2	
Cutaneous dermatomes & nerve supply of lower limb	Draw and label the cutaneous nerves & dermatomes of the lower limb.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Apply knowledge of normal structure to explain clinical correlates of nerve injuries (femoral nerve injury, sciatic nerve injury, common fibular, tibial & obturator nerve injury)		C3	
	Describe the anatomical basis of knee jerk, ankle jerk, and plantar reflex.		C2	
Topographical anatomy of lower limb	Demonstrate the surface marking of nerves and vessels of lower limb.	SGD (Dissection Hall & Museum)	C2 / P2	OSVE, OSPE
	Demonstrate the surface marking of bony landmarks of lower limb.		C2 / P2	
	Identify the topographical features of lower limb in a cross-sectional model.		C2 / P2	
Radiology	Identify the features of bones and joints of lower limb on radiograph/ CT scan/ MRI.	LGIS	C2	OSVE,OSPE
EMBRYOLOGY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Development of Muscles	Name the molecular and genetic factors involved in the development of musculoskeletal system	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the development of skeletal muscle		C2	
	Briefly discuss the development of cardiac and smooth muscle.		C2	
Development of Limb	Describe the process of limb development and limb growth.	LGIS	C2	MCQs, SEQs, OSVE, OSPE

Development of Nerve supply of limbs	Describe the embryological basis of cutaneous innervation of limb.	LGIS	C2	
	Describe the embryological basis of blood supply of limbs and concept of axial artery.		C2	
Congenital Limb Anomalies	Describe the embryological basis of congenital anomalies related to muscular system.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Correlate clinical presentations and embryological basis of • Amelia • Meromelia • Phocomelia • Split-Hand/Foot Malformations • Polydactyly, Brachydactyly, Syndactyly • Congenital club foot		C3	
Development of Cartilage	Describe the developmental process of cartilage and bone.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the process of histogenesis of cartilage and bone.		C2	
Development of Axial Skeleton	List the factors contributing to the development of Axial skeletal system.	LGIS	C2	
	Describe the clinical picture and explain the embryological basis of Axial skeletal anomalies.		C2	
	Describe the developmental process of vertebral column.		C2	
MICROSCOPIC ANATOMY (HISTOLOGY)				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Muscle Histology	Describe the microscopic structure and ultra-microscopic structure of skeletal muscle	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Explain the basis of myasthenia gravis and Duchenne muscular dystrophy		C2	
	Describe the microscopic and ultramicroscopic structure of cardiac muscle		C2	
	Describe the microscopic and ultramicroscopic of smooth muscle		C2	
	Compare and contrast the histological features of three types of muscle tissue		C2	
Functional Histology	Describe the regeneration of muscle, hyperplasia, and hypertrophy of muscle fiber	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Explain the histopathological basis of leiomyoma		C2	
Osseous Tissue	Describe the light and electron microscopic structure of bone cells	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the histological justification for osteoporosis, osteopenia		C2	
	Describe the histological basis for bone repair after fractures		C2	
Bone	Describe the light and electron		C2	MCQs, SEQs,

Histology	microscopic structure of compact and spongy bone	LGIS		OSVE, OSPE
	Explain the characteristic features of ossification (Intramembranous & Endochondral ossification)		C2	
	Draw and label the zones seen in an epiphyseal growth plate		C2	
	Describe the metabolic role of bone.		C2	
	Describe the clinical presentation of osteoporosis, osteopenia.		C2	
Cartilage Histology	Describe the microscopic and ultramicroscopic structure of all types of cartilage	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Compare and contrast the structure of cartilage and bone matrix		C2	
	Tabulate the differences between three types of cartilage		C2	
	Describe the microscopic and ultramicroscopic structure of all types of cartilage		C2	
	Describe the histological basis for bone & Cartilage growth and repair		C2	

MICROSCOPIC ANATOMY (HISTOLOGY) PRACTICAL

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Muscles	Draw and label the histology of skeletal muscle.	Practical	C2 / P	Integrated OSPE
	Draw and label the histology of smooth muscle.			
	Draw and label the histology of cardiac muscle.			
Bone	Draw and label the histological picture of compact bone.	Practical	C2 / P	Integrated OSPE
	Draw and label the histological picture of spongy bone.			
Cartilage	Draw and label the microscopic structure of hyaline & elastic cartilage.	Practical	C2 / P	Integrated OSPE
	Draw and label the microscopic structure of fibro cartilage. .			

PHYSIOLOGY

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Membrane Potentials	Explain the Physiological basis of membrane potential.	LGIS / SGD	C2	MCQs, SEQs, OSVE
	Explain diffusion potentials of Na & K.		C2	
	Define Nernst potential.		C1	
	Explain Physiological Basis of Nernst potential .		C2	

	Write the Nernst equation.		C2	
	Calculate Nernst potential for Na & K.		C2	
	Explain the effects of altering the concentration of Na+, K+, Ca on the equilibrium potential for that ion.		C2	
Goldman Equation	Describe the normal distribution of Na+, K+, Ca and Cl- across the cell membrane	LGIS/ SGD	C2	MCQs, SEQs, OSVE
	Explain physiological basis of Goldman equation		C2	
	Clarify the role of Goldman equation in generation of RMP.		C2	
Resting Membrane Potential	Describe the Physiological basis of generation of RMP.	LGIS/ SGD	C2	MCQs, SEQs, OSVE
	Explain the effects of hyperkalemia and Hypokalemia on the RMP		C2	
	Name the membrane stabilizers		C1	
	Explain the physiological basis of action of Local Anesthetics.		C2	
	Describe the Physiological basis of generation of RMP.		C2	
Neurons & Nerve Fibers	Describe the physiological anatomy of Neurons.	LGIS/ SGD	C2	MCQs, SEQs, OSVE
	Discuss the axonal transport		C2	
	Describe functions of Neuroglial cells		C2	
	Explain process of myelination in CNS & PNS		C2	
	Classify neurons functionally.	LGIS	C2	MCQs, SEQs, OSVE
	Classify nerve fibers according to Erlanger & Gasser Classification		C2	
Action Potential	Define Action Potential	LGIS	C1	MCQs, SEQs, OSVE, OSPE
	Enlist the Properties of action potential		C1	
	Describe the ionic basis of an action potential.		C2	
	Explain the phases of action potential.		C2	
	Explain the effects of hyperkalemia and Hypokalemia on the action potential.		C2	
	Draw monophasic action potential.		C2	
	Explain absolute and relative refractory period		C2	
	Explain the role of other ions in action potential.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Elaborate the effect of hypocalcemia on neuron excitability.		C2	
Local & Graded Potentials	Explain physiological basis & properties of Graded potential	LGIS/ SGD	C2	MCQs, SEQs, OSVE,OSPE

	Explain the properties of compound action potential with help of labeled diagram.		C2	
	Differentiate between action potential and graded potential.		C2	
	Describe the ionic basis of excitatory post synaptic potential (EPSP), inhibitory post synaptic potential (IPSP), end plate potential (EPP).		C2	
Synapse	Classify different types of synapses.	LGIS	C2	
	Explain physiological basis of different types of synapses		C2	
	Elaborate the mechanism of signal transmission takes place across chemical synapse.		C2	
Nerve Impulse Conduction	Explain the mechanism of conduction of Nerve impulse in myelinated and unmyelinated nerve fibers.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Elaborate significance of saltatory conduction.		C2	
Nerve Injury	Enlist the types of nerve injury	LGIS	C1	MCQs, SEQs, OSVE, OSPE
	Explain Wallerian degeneration.		C2	
	Describe the process of regeneration of nerve fiber.		C2	
	Describe the causes, features & pathophysiology of Multiple sclerosis, GB syndrome.		C2	
Muscle Fibers	Discuss the physiological anatomy of skeletal muscles.	LGIS/ SGD	C2	MCQs, SEQs, OSVE
	Differentiate b/w skeletal, smooth, and cardiac muscle		C2	
Muscle Contraction	Differentiate between isometric and isotonic contraction long with examples.	LGIS/ SGD	C2	
	Compare fast and slow muscle fibers.		C2	
	Explain the mechanism of summation and Tetanization.		C2	
	Describe staircase effect/Treppe phenomena		C2	
	Discuss the mechanism of skeletal muscle fatigue.		C2	
	Explain the physiological basis of rigor mortis.		C2	
	Explain the remodeling of skeletal muscle to match the function.		C2	
	Justify physiologically the development of macro motor units in poliomyelitis.		C3	
Neuromuscular Junction	Describe the physiological anatomy of Neuro Muscular Junction (NMJ).	LGIS/ SGD	C2	MCQs, SEQs, OSPE, OSVE
	Explain the Mechanism of		C2	

	Neuromuscular transmission & generation of End Plate Potential.	CBL		
	Explain features, pathophysiology & treatment of myasthenia Gravis		C2	
	Discuss the steps/ events of excitation contraction coupling in skeletal muscle.		C2	
	Describe the enhancers or blockers of neuromuscular transmission at the neuromuscular junction.		C2	
Smooth Muscles	Differentiate between types of smooth muscles.	LGIS / SGD	C2	MCQs, SEQs, OSPE, OSVE
	Describe mechanism of smooth muscle contraction in comparison to skeletal muscle.		C2	
	Explain the physiological anatomy of neuromuscular junction of smooth muscle.		C2	
	Explain the excitatory and inhibitory transmitters secreted at Neuro Muscular Junction (NMJ) of smooth muscles.		C2	
	Explain the depolarization of multiunit smooth muscles without action potentials.		C2	
	Explain the local tissue factors and hormones that can cause smooth muscle contraction without action potential.	LGIS	C2	
	Explain the regulation of smooth muscle contraction by calcium ions.		C2	
	Explain membrane potential and action potentials in smooth muscles.		C2	
	Explain the phenomena of stress relaxation and reverse stress relaxation in smooth muscles.		C2	
	Explain the LATCH mechanism along with its significance.		C2	
	Explain the nervous and hormonal control of smooth muscle contraction.		C2	
PRACTICAL PHYSIOLOGY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Locomotion	Demonstrate 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.	Practical	C2 /P2	OSPE, OSVE

BIOCHEMISTRY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Carbohydrates	Classify carbohydrates along with the structure and biomedical importance of each class.	LGIS / SGD	C2	MCQs, SEQs, OSVE
	Explain the isomerization of carbohydrates.		C2	
Extracellular Matrix	Describe the physical and chemical properties of carbohydrates.	LGIS / SGD	C2	MCQs, SEQs, OSVE
	Differentiate between proteoglycan and Glycoproteins.		C2	
	Describe structure, functions and clinical significance components of extracellular matrix 1.Glycosaminoglycan 2.Fibrous proteins (collagen and Elastin)		C2	
	Interpret diseases associated with them on basis of sign/symptoms and data	LGIS	C3	
	Discuss the importance of vitamin C in collagen synthesis.		C2	
	Describe sources, active form, functions and deficiency diseases of vitamin C.		C2	
	Interpret the defects in collagen synthesis based on given data (Osteogenesis Imperfecta).		C3	
	Interpret genetic basis of Duchene muscular dystrophy.		C3	
	Explain the transport and uptake of glucose in cells, steps of glycolysis and citric acid cycle along with enzymes, co enzymes and cofactors involved.		C2	
Glycolysis and Tricarboxylic acid cycle	Discuss the provision of energy to the muscles and cells through glycolytic pathway and TCA cycle.	LGIS / SGD	C2	MCQs, SEQs, OSVE
	Explain the hormonal and allosteric regulation of glycolysis and TCA.		C2	
Protein Digestion & Transport across cell	Describe the digestion and absorption of proteins in mouth, stomach and small intestine.	LGIS	C2	MCQs, SEQs, OSVE
	Discuss the uptake of amino acids by cells.			
Reactions involve in protein catabolism	Explain following reactions with enzymes involved in it: 1. Transamination 2. Deamination decarboxylation 3. Deamidation 4. Trans deamination. 5. Oxidative deamination.	LGIS	C2	MCQs, SEQs, OSVE
Transport of Ammonia	Describe the role of pyridoxal phosphate, glutamate, glutamine, alanine in transport of ammonia.	LGIS	C2	
Urea Cycle	Illustrate steps of urea cycle with enzymes and its importance.	LGIS / SGD	C2	MCQs, SEQs, OSVE

	Discuss ammonia intoxication		C2	
	Interpret different types of hyperammonemia on basis of sign symptoms and data.		C3	
Protein Metabolism	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.	LGIS	C2	
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	LGIS	C3	MCQs, SEQs, OSVE
Aging	Discuss the effect of age on Muscular strength and its implications and management.	LGIS	C3	-
PRACTICAL BIOCHEMISTRY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Proteins Estimation	Perform estimation of total proteins by kit method/dipstick methods.	Practical Lab	C2 / P	OSPE / OSVE
	Perform estimation of albumin and globulin.		C2 / P	

COMMUNITY MEDICINE				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Back Pain	Explain causes of low back pain.	LGIS	C2	MCQs
	Describe prevention of low back pain.		C2	
Work related Musculoskeletal Disorders (MSD)	Explain dimensions and determinants of health and their role in achieving positive health.		C2	
	Identify risk factors of MSD at workplace.	LGIS		MCQs
	Describe prevention of exposure to risk factors related to workplace.		C2	
MSD related to mobile usage	Describe MSD related to mobile usage (Text neck, Trigger thumb, DeQuervain Syndrome, Carpel Tunnel Syndrome)	LGIS	C2	
	Identify risk factors related to MSD due to excessive mobile usage.		C2	MCQs
	Describe the preventive strategies for mobile addiction-related MSD.		C2	
Ergonomics	Describe application of ergonomics in MSD related to above disorders.			

Risk factor assessment of MSD	Identify the risk factors in the community for Osteoporosis.	LGIS	C2	MCQs
	Discuss interventions to prevent the risk factors for various musculoskeletal diseases in community.		C2	
	Apply interventions to prevent the risk factors for various musculoskeletal diseases in community.		C3	

BEHAVIORAL SCIENCE				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Biological Basis of Behavior	Discuss 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 along with their management.	LGIS	C2	MCQs
Psychological Disorders	Briefly ascertain the psychosocial risk factors as mediating factors between illness and its effect.	LGIS	C1	MCQs
	Discuss the role of psychological variables like coping, social support, and other health cognitions in mediating between illness and its effect.		C2	
	Describe behavioral manifestations of stress, stress related multiple sclerosis and autoimmune diseases.		C2	

PHARMACOLOGY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Drugs acting on Neuromuscular Junction (NMJ)	Explain the mechanism by which drugs can stimulate NMJ.	LGIS	C2	MCQs
	Explain the mechanism by which drugs can block NMJ		C2	
Drugs in Myasthenia Gravis	Explain briefly the pharmacological concepts of drugs used in Myasthenia gravis.	LGIS	C2	MCQs
Local Anesthetics	Discuss briefly the therapeutic effect of drugs used as local anesthetics.	LGIS	C2	MCQs

PATHOLOGY				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Muscle Remodeling	Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber	LGIS	C2	MCQs
	Explain the histopathological basis of leiomyoma		C2	
Muscle Diseases	Describe the histological basis of Duchenne Muscular Dystrophy and myopathy.	LGIS	C1	MCQs
Bone & Cartilage Pathologies	Describe the clinical presentation and histological justification for osteoporosis, osteopetrosis	LGIS	C2	MCQs
	Describe the histological basis for bone repair after fractures		C2	
	Describe the histological basis for cartilage growth and repair.		C2	

ORTHOPEDIATICS & TRAUMA				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
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	LGIS	C2	MCQs, SEQs, OSVE, OSPE
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	LGIS	C2	

CLINICAL SKILLS (CSIM)				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Temperature	Measure body temperature using a mercury/digital thermometer.	Skill Lab	C2 / P2	OSCE
Joints Examination	Examine the shoulder, wrist, knee & ankle joints for functionality.	Skill Lab	C2 / P2	
Muscle Strength	Examine strength of the upper & lower limbs.	Skill Lab	C2 / P2	
X Rays of UpperLimb	Identify common fractures showing in x rays of upper limb.	Skill Lab	C2 / P1	

PERLS (PROFESSIONALISM, ETHICS, RESEARCH, LEADERSHIP SKILLS)				
Topic	**Specific Learning Objectives**	**Teaching strategy**	**Levels C/P/A**	**Assessment**
Professionalism	Reflective writing on responsibility towards self and the profession.	LGIS	C3	OSCE
	Write an account on an encounter with a specially abled person.		C3	
	Case analysis of nonprofessional Practice.		C4	
Digital Citizen	Create a professional profile on LinkedIn.	Computer Lab	C2	
Research	Write an assignment on steps of building a literature search.	LGIS		
Leadership	Verbal feedback of peer regarding a group activity.	Small Group Activity	C2	
	Feedback of teacher on time management in an written task / test.		C2	
	Enlist earning goals.		C2	

Time Tables:

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

Assessment Tools

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

Multiple Choice Questions (MCQ/SEQs):

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

Students mark their responses on specified computer-based sheet designed for the college.
The block exam will comprise of 85 MCQ/ 7 SEQs each of 5 marks and will be compiled according to the shared blueprint.

Short Essay Questions (SEQ)

Short Essay questions generally ask for brief, text-based responses. They can be used to assess students' understanding of and ability to think with subject matter content, discourage guessing of answers, in-depth knowledge of concepts, and formulation of an answer.

Objective Structured Practical or Clinical Examination (OSCE / OSPE)

- The content may assess application of knowledge, or practical skills.
- Student will complete task in define time at one given station.
- All the students are assessed on the same content by the same examiner in the same allocated time.
- A structured examination will have observed, interactive and rest stations.
- Observed and interactive stations will be assessed by internal or external examiners.
- Rest station is a station where there is no task given, and in this time student can organize his/her thoughts.
- The Block OSPE / OSCE will be comprise of 12 examined stations. The stations will be assigned according to the shared blueprint.

Internal Evaluation:

Internal evaluation is a process of quality review undertaken within an institution for its own ends. Internal evaluation criteria will be shared with faculty and 20 % on internal assessment will be observed in each module.

Attendance Requirement:

A minimum of 85% attendance is mandatory to sit for the examinations.

Professional Examination:

Criteria for appearing in Professional examination are according to rules and regulations shared by UHS which are available on their website. The criteria is;

- At least 85 % cumulative attendance in all blocks.
- At least 50 % cumulative score in all blocks
- Certificate of good conduct from college
- Certificate of having appeared in all block exams conducted by the college

Learning Resources for Students

Anatomy

- Snell Clinical Anatomy 10th ed
- B.D Churasia
- Nelter Atlas
- Langman Embryology (12th Edi)
- Laiq Hassain Basic Histology (8th Ed)
- Difore Atlas Histology

Physiology

- Guyton and Hall physiology (14th Ed)
- Essentials of Medical Physiology by Mushtaq Ahmed

Biochemistry

- Harpers Illustrated Biochemistry (32nd Ed)
- Lippincott's Biochemistry
- Essentials of Medical Biochemistry vol 1&2 by Mushtaq Ahmed.

Community Medicine:

- Parks Textbook of Preventive and Social Medicine. K. Park (Editor)

Pathology:

- Vinary Kumar, Abdul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.

Pharmacology:

- Basic and Clinical Pharmacology by Katzung, McGraw-Hill.

Behavioral Sciences:

- Handbook of Behavioral Sciences by Prof. Mowaddat H.Rana, 3rd Edition

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