Study Guide
Block-II

1st Year MBBS

Sharif Medical & Dental College, Lahore

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Vision & Mission

Vision & Mission of UHS

Vision statement

UHS is a leading university aiming to keep its graduates apt with the ever-emerging global health challenges evolving educational methodologies and emerging technological advancements to maintain its distinguishable positions as a Medical University.

Mission statement

UHS shall we continue to strive for producing a human resource par and excellence to cater for the health needs of the people of Punjab and Pakistan.

Vision & Mission of SMDC

Vision

To be recognized for the provision of a safe and functional environment conducive to collaborative teaching & learning, comfortable working atmosphere and conducting world class research through professionalism and excellence.

'Veritas et Devotio'

Mission

Sharif Medical & Dental College is dedicated to best serving the nation through preservation and dissemination of advanced knowledge and educating the students by latest trends in learning and research reaching levels pars excellence.

The Institution is committed to provide standardized quality medical education to its students by inculcating professional knowledge, skills, and responsibilities in them with the aim of:

- Preparing them as modern physicians having initiative to act as future leaders in their respective fields and becoming lifelong learners.
- Encouraging the spirit of critical thinking through research and publication.
- Building up an understanding of the ethical values compatible with our religion, culture, and social norms.
- Developing a sense of being responsible citizens of society possessing professional competence and instilling in them the values of hard work and dedication thus preparing them to be accountable to the stakeholders and the state.

The Institution is devoted to keep abreast its faculty with the latest trends in Medical Education encompassing teaching/learning methodologies, assessment tools, research opportunities and professionalism to facilitate their professional development, competencies, and commitment towards continues learning.

Our patient-centered mission is achieved by outstanding medical care & services in professional practice with due emphasis and focus on our local health needs.

Our mission further elaborates upon establishing academic and research facilities in areas of local demand under global gold standards and leading advancement in research, education & patient care.

LIST OF ABBREVIATIONS

Abbreviations	Subjects
A	Anatomy
Ag	Aging
B	Biochemistry
BS	Behavioral sciences
C	Civics
CSIM	Clinical Skills in Medicine
CM	Community Medicine
P	Physiology
Ph	Pharmacology
Pa	Pathology
FM	Forensic Medicine
ENT	Ear Nose Throat
O	Ophthalmology
Psy	Psychiatry
M	Medicine
S	Surgery
Pe	Pediatrics
GO	Gynaecology and Obstetrics
QI	Quran and Islamiyat
PERLs	Professionalism, Ethics, Research, Leadership

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INSTRUCTIONAL STRATAGIES

Large Group interactive Session (LGIS)

Lecture format is the most widely used approach to teaching, especially in a large class size with an average attention span of 20-30 mins. Interactive lecturing involves a two-way interaction between the presenter and the participants. Interactive methods like brainstorming, buzz group, simulation, role play, and clinical cases can be used.

Significance of its usage

- Relaxed environment, diverse opinions, active involvement
- Increase attention and motivation.
- Independence and group skills. Cost
- effective.
- Suitable for taking advantage of available audiovisual technologies.

Team Based Learning (TBL)

TBL is a uniquely powerful form of small group learning. It provides a complete coherent framework for building a flipped course experience. There are four essential elements of TBL which include:

- Teams must be properly formed and managed (5-7 students) Getting
- students ready.
- Applying course concepts
- Making students accountable

Significance of its usage

- Students are more engaged.
- Increased excitement in TBL classroom Teams
- outperforms best members.
- Students perform better in final and standardized exams.

Problem based learning (PBL)

It is an instructional student-centered approach in which students work in small groups on a health problem, identifying their own educational needs and being responsible for the acquisition of the knowledge required to understand the scenario.

Significance of its usage

- Teamwork
- Critical evaluation of literature
- Self-directed learning and use of resources
- Presentation skills
- Leadership

Case based learning (CBL)

It is an inquiry structured learning experience utilizing live or simulated patient cases to solve, or examine a clinical problem, with the guidance of a teacher and stated learning objectives.

Significance of its usage

- Induce a deeper level of learning by inculcating critical thinking skills. Flexibility on
- use of case
- Helps students acquire insightful information.
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Small Group Discussion (SGD)

SGD is a class or short series of classes, in which one or more instructors provides intensive instruction on some subject to a small group.

Significance of its usage

- Develop and assess the extent of background knowledge of students, which enables them to properly understand concepts which may not have been understood in lectures.
- Develop practice of self-learning.
- Reduced time to understand the topic.

Reflective Writing

It is a metacognitive process that occurs before, during and after the situation with the purpose of developing greater understanding of both the self and situation so that future encounters with the situation are informed from previous encounters.

Significance of its usage

- Questioning attitude and new perspectives. Areas
- for change and improvement.
- Respond effectively to new challenges. Critical thinking and coping skills

Bedside Teaching

Teaching and learning that occurs with actual patient as the focus. It occurs in wards, emergency departments, operating rooms, and high dependency units.

Significance of its usage

- Stimulus of clinical contact Psychomotor skills
- Communication skills
- Language Skills Interpersonal
- Skills
- Professional attitudes and empathy Role modelling

Skills Laboratories

It refers to specifically equipped practice rooms functioning as training facilities offering hands on training for the practice of clinical skills within non-threatening environment prior to their real-life application This applies to both basic clinical skills as well as complex surgical skills.

Significance of its usage

- Controlled, anxiety-free, and risk-free learning environment to students.
- A platform for repeated practice for mastery in relevant clinical skills Increase the preparedness of student learners before transitioning to the real hospital setting.
- Build strong communication skills.
- Enable learners to make critical decisions.

Laboratory Practical

Lab practical involves things like identifying a structure, a type of stain through a microscope, a problem with preparation, reading biochemical test results and answering safety questions. These simulations allow students to attempt the experiments in the laboratory in a risk-free way that provides the opportunity to make mistakes and learn how to correct them using the immediate feedback generated.

Significance of its usage

- Enhance mastery of subject matter.
- Develop scientific reasoning.
- Develop practical skills.

Develop teamwork abilities.

Demonstrations

The demonstration method in teaching can be defined as giving a demo or performing a specific activity or concept. It is a teaching-learning process carried out in a very systematic manner.

Significance of its usage

- Promotes learning and correlates theory with practice.
- Sharpens observation skills.
- Sustain interests in learning environment.

Case Presentations

It is a teaching method which provides descriptive information about a clinical patient scenario and to share this educational experience with the general medical and scientific community. It prepares students for clinical practice, using authentic clinical cases by linking theory to practice with the help of inquiry-based learning methods.

Significance of its usage

- Cultivate the capacity for critical analysis.
- Judgement and Decision making Facilitate creative problem solving.

Allow students to develop realistic solutions to complex problems

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RATIONALE OF MODULE

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.

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

CURRICULUM OF INDIVIDUAL SUBJECTS

HUMAN ANATOMY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS =		MIT (Mode of information transfer)
	GROSS ANATOMY UPPER LIMB	DISCIPLINE	TOPIC	
MS-A-001	• 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.	Human Anatomy	Pectoral Region	LGIS (Large group interactive session)
MS-A- 002	• Describe the fasciae, cutaneous nerves. And blood vessels of the Upper Limb. • Describe the extent, attachments, and structures passing through Clavipectoral Fascia	Human Anatomy	Fascia & Myotomes of upper limb	LGIS (Large group interactive session)
MS-A- 003	• Describe the extent, structure, neurovascular supply, lymphatic drainage of Breast (Mammary Glands)	Human Anatomy	Pectoral region & Back + Mammary Glands	LGIS (Large group interactive session)
	• Define the boundaries of Triangle of Auscultation and state its clinical significance.	Human Anatomy Integrate with Medicine		LGIS (Large group interactive session)
	• Demonstrate palpation of breast and define its relation to the Fibrous septa in Carcinoma of Breast.	Human Anatomy Integrate with Surgery		LGIS (Large group interactive session)
	• Explain the anatomical basis of position adopted for breast examination and mammography.	Human Anatomy Integrate with Radiology		LGIS (Large group interactive session)
	• Describe the osteology of the bones in pectoral region. • Enumerate the muscles of pectoral girdle. • Describe the attachments of muscle of pectoral girdle, nerve supply and actions (Pectoralis Major and minor, Subclavius, Trapezius, Latissimus Dorsi, Rhomboid major and minor, Levator Scapulae and Serratus anterior) • Explain the role of muscles of pectoral region in stabilizing the pectoral girdle. • Describe the triangle of auscultation. • Mention the neurovascular supply of pectoral region and • Correlate with important clinical conditions. Describe muscles of the back with their origin, insertion, nerve supply	Human Anatomy		SGD (Small Group Discussion) LGIS (Large group interactive session)

	and actions.			
MS-A- 004	• Describe the Osteology of Clavicle (morphological features, side determination, attachments, ossification) • Describe the functions of Clavicle in terms of weight transmission of upper limb. • 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 movements of scapula with muscles acting on it • Tabulate the attachments, origin, insertion, innervation, and actions of Anterior Axio-appendicular Muscles	Human Anatomy	Bones of Upper Limb: Clavicle & Scapula	SGD (Small group discussion)
MS-A- 005	• Describe the Sternoclavicular Joint in terms of articulating surfaces, ligaments, articular disc, nerve supply, blood supply, axes and planes of movements and stability factors.	Human Anatomy	Bones of thorax, Joints of Upper Limb: Sternoclavicular Joint	LGIS (Large group interactive session)
MS-A- 006	• 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 cutaneous nerves	Human Anatomy	Axilla	LGIS (Large group interactive session)
MS-A- 007	• Describe the Osteology of Humerus (Side Determination, morphological features, attachments, ossification)	Human Anatomy	Bones of upper limb: Humerus	SGD (Small group discussion)

MS-A- 008	• 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 Axio-appendicular Muscles on Skeleton/Model • 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	Human Anatomy	Joints of Upper Limb: Shoulder Joint	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 009	• Describe Rotator Cuff Muscles, state their Anatomical significance and explain Rotator Cuff Tendinitis	Human Anatomy	Rotator Cuff	LGIS (Large group interactive session)
	• Describe Frozen Shoulder in relation to anatomical features.	Human Anatomy Integrate with Surgery		LGIS (Large group interactive session)
MS-A- 010	• 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. • Develop clear concepts of the topographical anatomy of Scapular Region • Tabulate the attachments, innervation, and actions of muscles of Scapular Region • Identify & Describe Musculocutaneous Nerve in terms of its Origin, Course, Termination, Relations, Branches, and distribution. • Describe and illustrate the cutaneous innervation of the arm.	Human Anatomy	Nerves of Upper Limb	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 011	• 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	Human Anatomy	Blood supply of arm	LGIS (Large group interactive session)
MS-A- 012	• Describe Cubital Fossa with emphasis on its boundaries, contents, and clinical significance. • Demonstrate surface marking of superficial veins of arm and forearm for IV injections. • Determine the side and identify the landmarks of radius and ulna	Human Anatomy	Muscles of Arm	LGIS (Large group interactive session)

MS-A- 013	• Describe the Osteology of Radius (Side Determination, morphological features, attachments, ossification) • Describe the Osteology of Ulna (Side Determination, morphological features, attachments, ossification)	Human Anatomy	Bones of Forearm	SGD (Small group discussion)
MS-A- 014	• Describe in detail the features of each flexor muscle of forearm, proximal & distal attachments, relations, and actions. • Describe the action of paradox with examples	Human Anatomy	Muscle of Anterior/Flexor Compartment of Forearm	LGIS (Large group interactive session)
MS-A- 015	• Tabulate the attachments, innervation, and actions of Extensor Muscles of the Forearm • Describe in detail, the features of each muscle of extensor compartment of forearm, proximal & distal attachments, relations, and actions with nerve supply.	Human Anatomy	Muscle of Posterior/Extensor Compartment of Forearm	LGIS (Large group interactive session)
MS-A- 016	• Identify the muscles and neurovascular of flexor and extensor compartments of forearm. • Develop clear concepts of the topographical anatomy of Forearm. • Describe and illustrate the cutaneous innervation of the Forearm. • Compartmentalize the forearm and give its anatomical basis. • Tabulate the attachments, innervation, and actions of Flexor & Pronator Muscles of the Forearm	Human Anatomy	Forearm: Neurovascular supply & topographical anatomy	SGD (Small group discussion)
MS-A- 017 MS-A- 018	• Identify the Extensor & Flexor Retinacula and describe their attachments and relations	Human Anatomy	Retinacula of Forearm	SGD (Small group discussion)
	• Demonstrate the formation of carpal tunnel and identify the contents	Human Anatomy	Carpel Tunnel	SGD (Small group discussion)
	• Describe Carpel Tunnel Syndrome	Integrate with Surgery		LGIS (Large group interactive session)
	• Describe the features, attachments, relations, and structures passing under Flexor Retinaculum	Human Anatomy		LGIS (Large group interactive session)
MS-A- 019	• 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	Human Anatomy	Forearm: Blood supply and Venous drainage	LGIS (Large group interactive session) SGD (Small group discussion)

MS-A- 020	• 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.	Human Anatomy	Joints of Upper Limbs: Elbow Joint	LGIS (Large group interactive session)
	• Describe Carrying Angle and justify its importance in limb movement	Human Anatomy Integrate with Surgery		SGD (Small group discussion)
MS-A- 021	• Describe the Radioulnar Joints in terms of articular surfaces, type, variety, ligaments, muscles producing movements, blood supply, nerve supply and radiological imaging. • Demonstrate mechanisms of movements of Pronation & Supination	Human Anatomy	Joints of Upper Limbs: Radioulnar Joint	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 022	• Describe the features of Interosseous Membrane with structures that pierce through it	Human Anatomy	Interosseous membrane	LGIS (Large group interactive session)
MS-A- 023	• Describe the features and explain the importance of Fibrous Flexor Sheaths, synovial flexor sheaths and extensor expansion	Human Anatomy	Fascia & Muscles of Hand	LGIS (Large group interactive session)
MS-A- 024	• Demonstrate the attachments and actions of the muscles of hand. • Identify the muscles and neuro vasculature of the palm. • Explain the morphology and tabulate the attachments, innervation, and actions of Intrinsic Muscles of the Hand	Human Anatomy	Hand	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 025	• Demonstrate the various grips. Explain the mechanism of writing	Human Anatomy	Actions of Muscles of Upper Limb as a functional Unit	SGD (Small group discussion)
MS-A- 026	• Describe the Radial Artery's course, relations, and termination in hand with its clinical significance in the region. • Describe the Ulnar Artery's course 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	Human Anatomy	Blood Vessels of Forearm& Hand	LGIS (Large group interactive session)
MS-A- 027	• Describe the course, relations, and branches of Ulnar, Median and Radial Nerves in the Hand	Human Anatomy	Nerves of Forearm& Hand	LGIS (Large group interactive session)
MS-A- 028	• 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,	Human Anatomy	Joints of Hands	LGIS (Large group interactive session) SGD (Small group discussion)

	Relations, Blood Supply, Innervation & Movements			
MS-A- 029	• Palpate the arteries of the upper limb on a subject.	Human Anatomy Integrate with Medicine	Skills	SGD (Small group discussion)
	• Identify the topographical features of upper limb in a cross-sectional model/ specimen.	Human Anatomy Integrate with Radiology		
	• Demonstrate and identify the anatomical landmarks of upper limb on radiographs/ CT/ MRI			
	• Mark the anatomical landmarks on a subject/simulated model	Human Anatomy		
LOWER LIMB				
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DESCIPLINE**	**TOPIC**	**MIT (Mode of Information)**
MS-A- 030	• Draw and label the Parts of the hip bone, with its attachments, • Describe the parts, attachments, and ossification 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, sex differences, and important relations	Human Anatomy	Hip Bone	SGD (Small group discussion)
MS-A- 031	• Describe the parts, attachments, ossification, side determination, and Sex differences of femur. • Identify the parts and bony features of the femur, with its attachments, important relations. • 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	Human Anatomy	Femur	SGD (Small group discussion)
MS-A- 032	• Describe the extent, attachments, and modifications of Fascia Lata • Demonstrate the attachment of fascia Lata, iliotibial tract	Human Anatomy	Fascia Lata	LGIS (Large group interactive session)
MS-A- 033	• 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	Human Anatomy	Neurovascular Supply of thigh	LGIS (Large group interactive session) SGD (Small group discussion)

	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			
MS-A- 034	• 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	Human Anatomy	Femoral Triangle & Canal	SGD (Small group discussion)
	• Compare and contrast the anatomical features of femoral and inguinal hernias	Human Anatomy Integrate with Surgery		
MS-A- 035	• Describe the Muscles of anterior compartment of thigh with their proximal and distal attachments, actions, and innervation. • 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	Human Anatomy	Muscles of Anterior Compartment of Thigh	LGIS (Large group interactive session) SGD (Small group discussion)
	• Explain the anatomical basis of psoas abscess	Human Anatomy Integrate with Surgery		LGIS (Large group interactive session)
MS-A- 036	• 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	Human Anatomy	Neurovascular supply of Anterior Compartment of Thigh	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 037	• Describe the formation, boundaries, contents, and significance of an adductor canal. • Identify and demonstrate the boundaries and contents of adductor canal	Human Anatomy	Adductor Canal	SGD (Small group discussion)
MS-A- 038	• Describe Muscles of medial compartment of thigh with their proximal and distal attachments, innervation, and actions	Human Anatomy	Muscles of Medial Compartment of Thigh	LGIS (Large group interactive session)

	• Identify the muscles of medial compartment of thigh with their proximaland distal attachments. • Demonstrate the actions of the muscles of the compartment on self/ subject			SGD (Small group discussion)
MS-A- 039	• 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	Human Anatomy	Neurovascular supply of Medial Compartment of Thigh	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 040	• Describe the subcutaneous tissue of 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. • Draw and label the cruciate and trochanteric anastomosis	Human Anatomy	Gluteal Region	LGIS (Large group interactive session) SGD (Small group discussion)
	• Explain the anatomical basis of the consequences of wrongly placed gluteal intramuscular injections and injury to superior and inferior gluteal nerves	Human Anatomy Integrate with Medicine		LGIS (Large group interactive session)
	• Demonstrate and identify the origin, course, relations, branches/tributaries and termination of nerves and vessels of gluteal region	Human Anatomy		SGD (Small group discussion)
MS-A- 041	• 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 proximaland distal attachments. • Demonstrate the actions of muscles of posterior compartment of thigh.	Human Anatomy	Muscles of Posterior Compartment of Thigh	SGD (Small group discussion)
	• Describe the anatomical basis of signs and symptoms of Piriformis syndrome	Human Anatomy Integrate with Surgery		SGD (Small group discussion)
MS-A- 042	• Describe the origin, course, relations, branches, distribution, and termination of Profunda femoris artery.	Human Anatomy	Blood supply of thigh	LGIS (Large group interactive session)

	• Describe the formation and distribution of chain anastomoses of thigh (and its clinical significance)			
MS-A- 043	• Describe the origin, course, relations, branches, distribution, and termination of sciatic nerve	Human Anatomy Integrate with Surgery	Sciatic Nerve	LGIS (Large group interactive session)
MS-A- 044	• 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.	Human Anatomy	Hip Joint	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 045	• Describe the Boundaries, relations, and contents of popliteal fossa. • Draw and label boundaries, relations, 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	Human Anatomy	Popliteal Fossa	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 046	• Enlist the bones in the knee joint. • Describe parts of tibia and fibula, with their attachments, important relations, ossifications, and side determination • Identify the parts and bony features of the tibia & fibula, their bony features, attachments, important relations.	Human Anatomy	Knee Joint	LGIS (Large group interactive session) SGD (Small group discussion)
	• Describe the anatomical basis for using fibula as graft.	Human Anatomy Integrate with Surgery		LGIS (Large group interactive session)
	• Describe the attachments and role of popliteus in locking and unlocking of the knee joint. • Draw and label Parts of patella with its attachments. • Describe features and ossification of patella. • Enlist the factors responsible for stabilizing the 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 factors responsible for stability of knee joint. Discuss important associated clinical conditions.	Human Anatomy		LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 047	• Describe the Muscles of anterior, lateral, and posterior compartments of leg with their proximal & distal attachments, innervation, and actions.	Human Anatomy	Muscles of leg	LGIS (Large group interactive session) SGD

	• Identify the muscles of anterior, lateral, and posterior compartments of leg with their proximal and distal attachments			(Small group discussion)
MS-A- 048	• Describe the origin, course, relations, branches/tributaries and termination of nerves and vessels of anterior, lateral, and posterior compartments of leg. • Describe the cutaneous nerves and vessels of leg. • Draw and label the cutaneous nerve supply and dermatomes of leg	Human Anatomy	Neurovascular supply of Leg	SGD (Small group discussion)
MS-A- 049	• 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)	Human Anatomy	Flexor, Extensor, and peroneal Reticula	SGD (Small group discussion)
MS-A- 050	• Describe the articulations, muscles and neurovasculature and movements at Tibiofibular joints	Human Anatomy	Tibio-fibular Joint	LGIS (Large group interactive session)
MS-A- 051	• Describe the anklejoint with its type, articulations, ligaments, movements, and neuro-vascular supply. • Describe the factors stabilizing the ankle joint. Discuss important associated clinical conditions. • Identify and demonstrate the articulating surfaces and ligaments of ankle joint	Human Anatomy	Ankle Joint	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 052	• Describe the formation, attachments, and clinical significance of plantar aponeurosis	Human Anatomy	Plantar Fascia	LGIS (Large group interactive session) SGD (Small group discussion)
	• Explain the anatomical basis of the signs and symptoms of plantar fasciitis.	Integrate with Orthopedics		
MS-A- 053	• 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	Human Anatomy	Muscles of foot	SGD (Small group discussion)

MS-A- 054	• Describe the interphalangeal, subtalar and midtarsal joints with their types, articulation, ligaments, stabilizing factors, movements, and neurovascular supply	Human Anatomy	Small joints of foot	LGIS (Large group interactive session)
MS-A- 055	• Describe the formation, components, stabilizing and maintaining factors of the arches of foot	Human Anatomy	Arches of foot	LGIS (Large group interactive session)
	• Describe the clinical significance of arches of foot with respect to flat foot, claw foot.	Integrate with Orthopedics		SGD (Small group discussion)
MS-A- 056	• Describe the fibrous flexor sheaths, extensor expansions and synovial flexor sheaths	Human Anatomy	Retinacula of foot	LGIS (Large group interactive session)
MS-A- 057	• 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 and vessels of the 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	Human Anatomy	Neurovascular supply of foot	LGIS (Large group interactive session) SGD (Small group discussion)
MS-A- 058	• Describe the surface anatomy, course, relations, tributaries, and communications of the superficial and deep veins of the lower limb. • Draw a concept map of the superficial and deep veins of the lower limb. • List the factors favoring venous return of the lower limb	Human Anatomy		LGIS (Large group interactive session)
	• Explain the anatomical basis of the formation, and signs and symptoms of deep venous thrombosis	Human Anatomy Integrate with Surgery		SGD (Small group discussion)
	• Describe the anatomical basis of knee jerk, ankle jerk, and plantar reflex	Human Anatomy Integrate with Medicine		LGIS (Large group interactive session)
MS-A- 059	• Describe the mechanism of walking	Human Anatomy	Human Gait	SGD (Small group discussion)
	• Describe the phases of gait cycle with muscles involved in each phase. • Describe the propulsive and shock-absorbing mechanisms of foot	Human Anatomy Integrate with Orthopedics		SGD (Small group discussion)
	• Describe the weight bearing/ line of weight transmission in lower limb	Human Anatomy		SGD (Small group discussion)
MS-A- 060	• Draw a concept map of the lymphatic drainage of lower limb	Human Anatomy	Lymphatic drainage of lower limb	LGIS (Large group

				interactive session)
MS-A- 061	• Draw and label the cutaneous nerves & dermatomes of the lower limb	Human Anatomy	Cutaneous dermatomes of lower limb	SGD (Small group discussion)
MS-A- 062	• 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	Human Anatomy	Topographical and radiological anatomy of lower limb	LGIS (Large group interactive session) SGD (Small group discussion)
	• Demonstrate and identify the features of bones and joints of lower limb on radiograph/ CT scan/ MRI	Human Anatomy Integrate with Radiology		LGIS (Large group interactive session)
MS-A- 063	• Describe the common fractures of the following bone with the risk factors, clinical presentations, and management: ◦ Clavicle ◦ Humerus ◦ Radius ◦ Ulna ◦ Small bones of hand ◦ Hip bone. ◦ Femur ◦ Tibia Fibula ◦ Small bones of foot	Orthopedics and trauma	Bone Fracture	LGIS (Large group interactive session)
MS-A- 064	• Describe the dislocations of the following joints with the risk factors and clinical presentations, and brief management: ◦ Shoulder joint ◦ Elbow joint ◦ Interphalangeal joint of hand ◦ Hip joint. ◦ Knee joint ◦ Ankle joint	Orthopedics and trauma	Joint Dislocation	LGIS (Large group interactive session) SGD (Small group discussion)
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 1**		
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**	**MIT (Mode of Information Transfer)**
MS-A-065	• Name the molecular and genetic factors involved in the development of Musculoskeletal system. • Describe the development of skeletal muscle. • List the derivatives of epaxial and hypaxial musculature of limb. • Briefly discuss the development of cardiac and smooth muscle (Detail to be covered in respective modules later). • Describe the developmental basis of myotome. • Draw a concept map highlighting the	Human Embryology	Development of Muscles	LGIS (Large group interactive session)

	sequence of events pertaining to smooth/ cardiac/ skeletal muscles			
MS-A- 066	• List the factors contributing to the development of limbs. • Describe the role of AER and Zone of polarizing activity in development of limb • Describe the process of limb development and limb growth. • Draw a concept map pertaining to the development of limbs. • Compare and contrast the development of upper limb with the development of lower limb	Human Embryology	Development of Limb	LGIS (Large group interactive session)
MS-A-067	• Describe the embryological basis of cutaneous innervation of limb. • Describe the embryological basis of blood supply of limbs and concept of axial artery	Human Embryology	Development of Neurovascular supply of limbs	LGIS (Large group interactive session)
MS-A- 068	• Describe the embryological basis of congenital anomalies related to muscular system. • Describe the clinical presentations and embryological basis of Amelia Meromelia Phocomelia Split-Hand/Foot Malformations Polydactyly, Brachydactyly, Syndactyly Congenital club foot	Integrate with Paedriatics	Congenital anomalies of limbs	LGIS (Large group interactive session)
MS-A- 069	• Describe the developmental process of cartilage and bone. • Describe the process of histogenesis of cartilage and bone	Human Embryology	Development of Cartilage	LGIS (Large group interactive session)
MS-A- 070	• Describe the developmental process of intramembranous and endochondral ossification	Human Embryology	Process of Ossification	LGIS (Large group interactive session)
MS-A- 071	• List the factors contributing to the development of Axial skeletal system. • Describe the clinical picture and explain the embryological basis of Axial skeletal anomalies. • Describe the developmental process of Vertebral Column	Human Embryology	Development of Axial skeleton	LGIS (Large group interactive session)
MICROSCOPIC ANATOMY			**Total Hours = 06**	
CODE	**SPECIFIC LEARNING OBJECTIVES**	**DISCIPLINE**	**TOPIC**	**MIT (Mode of Information Transfer)**
MS-A- 072	• Describe the microscopic structure and ultra-microscopic structure of skeletal muscle	Histology	Histology of Muscles	LGIS (Large group interactive session)

	• Explain the basis of myasthenia gravis and Duchenne muscular dystrophy	Integrate with Medicine		LGIS (Large group interactive session)
	• Describe the microscopic and ultramicroscopic structure of cardiac muscle. • Describe the microscopic and ultramicroscopic of smooth muscle. • Compare and contrast the histological features of three types of muscle tissue	Histology		LGIS (Large group interactive session)
MS-A- 073	• Describe the regeneration of muscle, hyperplasia, and hypertrophy of muscle fiber	Integrate with Pathology	Functional Histology	LGIS (Large group interactive session)
	• Explain the histopathological basis of leiomyoma	Histology		LGIS (Large group interactive session)
	• Describe the histological basis of Duchenne Muscular Dystrophy	Integrate with Pathology		LGIS (Large group interactive session)
MS-A- 074	• Describe the light and electron microscopic structure of bone cells	Histology	Histology of Osseous tissue	LGIS (Large group interactive session)
	• Describe the histological justification for osteoporosis, osteopenia. • Describe the histological basis for bone repair after fractures.	Integrate with Pathology		LGIS (Large group interactive session)
MS-A- 075	• Describe the light and electron microscopic structure of compact and spongy bone. • Compare and contrast the microscopic features of compact and spongy bone. • Draw a concept map to explain the characteristic features of ossification. • Draw and label the zones seen in an epiphyseal growth plate	Histology	Histology of Bone	LGIS (Large group interactive session)
MS-A- 076	• Describe the metabolic role of bone	Integrate with Medicine	Functional Histology of Bone	LGIS (Large group interactive session)
	• Describe the clinical presentation of osteoporosis, osteopenia	Integrate with Orthopedics		
MS-A- 077	• 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	Histology	Histology of Cartilage	LGIS (Large group interactive session)

MS-A- 078	• Describe the histological basis for bone & Cartilage growth and repair	Histology	Mechanism of Bone growth	LGIS (Large group interactive session)

PRACTICAL

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 10		MIT (Mode of information transfer)
	HISTOLOGY	DISCIPLINE	TOPIC	
MS-A-079	• 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	Histology of Muscles	Laboratory Practical
MS-A-080	• Draw and label the histological picture of compact bone. • Draw and label the histological picture of spongy bone	Histology	Histology of Bones	Laboratory Practical
MS-A-081	• 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 fibro cartilage	Histology	Histology of Cartilage	Laboratory Practical

MEDICAL PHYSIOLOGY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 34		MIT (Mode of information transfer)
	NORMAL ORGAN FUNCTIONS	DISCIPLINE	TOPIC	
MS-P- 001	• Explain the physiological basis of membrane potential. • Explain diffusion potentials of Na & K • Define Nernst potential. • Explain Physiological Basis of Nernst potential. • Write the Nernst equation. • Calculate Nernst potential for Na & K • Explain the effects of altering the concentration of • Na+, K+, Ca on the equilibrium potential for that ion	Medical Physiology	Diffusion / Equilibrium Potentials & Nernst potential	LGIS (Large group interactive session)
MS-P- 002	• 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 RMP.	Medical Physiology	Goldman Equation	LGIS (Large group interactive session)
MS-P- 003	• Describe the Physiological basis of generation of RMP. • Explain the effects of hyperkalemia and Hypokalemia on the RMP • Name the membrane stabilizers	Medical Physiology	Resting Membrane Potential in Neurons	LGIS (Large group interactive session)
	• Explain the physiological basis of action of Local Anesthetics.	Medical Physiology integrate with Anesthesiology		LGIS (Large group interactive session)
MS-P- 004	• Describe the Physiological anatomy of Neurons. • Discuss axonal transport. • Enlist & give functions of Neuroglial cells. • Explain process of myelination in CNS & PNS	Medical Physiology	Neurons	LGIS (Large group interactive session)
MS-P- 005	• Classify neurons functionally. • Classify nerve fibers according to Erlanger & Gasser Classification	Medical Physiology	Classification of Neurons & Fibers	LGIS (Large group interactive session)
MS-P- 006	• 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.	Medical Physiology	Action Potential of Neurons	LGIS (Large group interactive session) SGD (Small group discussion)

MS-P- 007	• Explain the role of other ions in action potential. • Elaborate the effect of hypocalcemia on neuron excitability.	Medical Physiology	Role of other ions in action potential	LGIS (Large group interactive session) SGD (Small group discussion)
MS-P- 008	• 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).	Medical Physiology	Local / Graded potentials	LGIS (Large group interactive session)
MS-P- 009	• Classify and explain Physiological basis of different types of synapses. • Elaborate how signal transmission takes place across chemical synapse	Medical Physiology	Synapse	LGIS (Large group interactive session)
MS-P- 010	• Explain the mechanism of conduction of Nerve impulse in myelinated and unmyelinated nerve fibers. • Elaborate significance of saltatory conduction	Medical Physiology	Conduction of Nerve impulse	LGIS (Large group interactive session)
MS-P- 011	• Enlist the types of nerve injury. • Explain Wallerian degeneration. • Describe the process of regeneration of nerve fiber.	Medical Physiology	Nerve Degeneration	LGIS (Large group interactive session)
	• Describe the causes, features & pathophysiology of Multiple sclerosis, GB syndrome.	Medical Physiology integrate with Medicine		LGIS (Large group interactive session)
MS-P- 012	• Discuss the physiological anatomy of skeletal muscles. • Differentiate b/w skeletal, smooth, and cardiac muscle	Medical Physiology	Skeletal muscle	LGIS (Large group interactive session)
MS-P- 013	• Describe the structure of Sarcomere. • Differentiate between isometric and isotonic contraction by giving examples. • Compare the fast and slow muscle fibers.	Medical Physiology	Characteristics of whole muscle contraction	LGIS (Large group interactive session)
MS-P- 014	• Explain the mechanism of summation and Tetanization. • Describe staircase effect/Treppe phenomena. • Discuss the mechanism of skeletal muscle fatigue.	Medical Physiology	Mechanics of muscle contraction	LGIS (Large group interactive session)
	• Explain the physiological basis of rigor mortis	Medical Physiology integrate with Forensic medicine		LGIS (Large group interactive session)
MS-P- 015	• Describe the physiological anatomy of NMJ • Mechanism of Neuromuscular	Medical Physiology	Neuromuscular junction	LGIS (Large group interactive

	transmission & generation of End Plate Potential			session) SGD (Small group discussion)
	• Explain features, pathophysiology & treatment of myasthenia Gravis	Medical Physiology integrate with Medicine		LGIS (Large group interactive session) PBL (Problem based learning)
	• Discuss the steps/ events of excitation contraction coupling in skeletal muscle.	Medical Physiology		LGIS (Large group interactive session)
MS-P- 016	• 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 types of action potential in smooth muscles. • Explain the LATCH mechanism. • Describe the significance of LATCH mechanism. • Explain the nervous and hormonal control of Smooth Muscle Contraction.	Medical Physiology	Smooth Muscle	LGIS (Large group interactive session)
MS-P- 017	• Enlist various types of muscle disorders. • Describe the pathophysiology & features of muscular dystrophy.	Medicine	Muscular Disorders	LGIS (Large group interactive session)
MS-P- 018	• Define Myopathy • Enlist various causes of myopathy. • Outline management of myopathy	Medicine	Myopathy	LGIS (Large group interactive session)
MS-P- 019	• Define osteoporosis. • Identify risk factors for osteoporosis. • Outline management strategies	Geriatrics/ Medicine	Metabolic bone diseases: Osteoporosis	LGIS (Large group interactive session)
MS-P- 020	• Define osteomalacia. • Identify risk factors for osteomalacia. • Outline management strategies	Medicine/ Rheumatology	Metabolic bone diseases: Osteomalacia	LGIS (Large group interactive session)
MS-P- 021	• Define rickets. • Identify risk factors for rickets. • Outline management strategies	Pediatrics	Metabolic bone diseases: Rickets	LGIS (Large group interactive session)

MEDICAL BIOCHEMISTRY

THEORY

CODE	SPECIFIC LEARNING OUTCOMES BIOCHEMISTRY	TOTAL HOURS = 24 DISCIPLINE	 TOPIC	MIT (Mode of information transfer)
MS-B- 001	• Classify amino acids based on polarity, nutritional importance, and glucogenic/Ketogenic properties	Medical Biochemistry	Classification of Amino acids	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)/Assignment
MS-B- 002	• Explain the structure, physical, chemical properties of amino acids and their biomedical importance	Medical Biochemistry	Hemoglobinopathies/ RBCs/ Homeostasis	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)/Presentations
MS-B- 003	• Classify proteins based on functions and physicochemical properties. • Explain its biomedical importance. • Distinguish between class A and B proteins. • Discuss structure and functions of Fibrous proteins (collagen and Elastin)	Medical Biochemistry	Classification of Proteins	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)/Assignment
	• Interpret diseases associated with them on basis of sign/symptoms and data	Integrate with Medicine		LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)/Assignment
MS-B- 004	• Explain the structural levels of proteins. • Differentiate between alpha helix and beta pleated protein structures. • Identify bonding at different levels of proteins	Medical Biochemistry	Structure of proteins	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)/Assignment
MS-B- 005	• Describe the role of chaperons in protein folding.	Medical Biochemistry	Protein misfolding	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
	• Interpret disorders related to protein misfolding on basis of given data. disease/ prion disease.	Integrate with pathology & Medicine		
MS-B- 006	• Describe biomedical importance of Mono-, Oligo and Polysaccharides. • Discuss isomerization of carbohydrates • Explain physical and chemical properties of carbohydrates. • Differentiate proteoglycan and	Medical Biochemistry	Carbohydrates Chemistry	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)

	glycoprotein and explain their functions			
MS-B- 007	• Describe the components of extracellular matrix. • Describe the sources, metabolism, and biochemical functions of vitamin C • Describe structure, functions, and clinical significance of glycosaminoglycans. • Interpret the importance of vitamin C in collagen synthesis.	Medical Biochemistry	ECM and collagen synthesis	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
MS-B- 008	• Identify the defects in collagen synthesis based on given data. (Osteogenesis Imperfecta)	Integrate with Medicine	Vitamin D metabolism	LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
	• Explain dietary sources, metabolism, and biochemical functions of vitamin D	Medical Biochemistry		LGIS (Large group interactive session) / Tutorials / SGD (Small Group Discussion)
	• Interpret Rickets and osteomalacia on basis of sign. Symptoms and clinical data	Integrate with Medicine/ Orthopedics		LGIS (Large group interactive session)
MS-B- 009	• Explain dietary sources, metabolism and biochemical functions of calcium and phosphate	Medical Biochemistry	Calcium and Phosphate metabolism	LGIS (Large group interactive session)
	• Discuss regulation of calcium metabolism in bone metabolism and role of parathyroid and calcitriol in it	Integrate with Medicine		LGIS (Large group interactive session)
MS-B- 010	• Interpret genetic basis of Duchene muscular dystrophy	Integrate with Pathology	Genetic basis of disease	LGIS (Large group interactive session)

PRACTICAL

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 6		MIT (Mode of information transfer)
	BIOCHEMISTRY PRACTICALS	DISCIPLINE	TOPIC	
MS-B- 011	• Detection of amino acids by paper chromatography.	Medical Biochemistry	Chromatography	Demonstration
MS-B- 012	• Estimation of total proteins by kit method/dipstick methods.		Total proteins	Demonstration Performance
MS-B-013	• Estimation of albumin and globulin		Albumin/ globulin	Demonstration Performance
MS-B- 014	• Detection of calcium by micro lab.		Calcium	Demonstration Performance
MS-B- 015	• Prepare different types of solution Molar, Molal, Normal and percentages.		Solutions	Demonstration Performance

PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 4+7= 11		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
MS-Ph- 001	• Explain the mechanism by which drugs can stimulate NMJ. • Explain the mechanism by which drugs can block NMJ.	Pharmacology & Therapeutics	Drugs acting on Neuromuscular Junction (NMJ)	LGIS (Large group interactive session)
MS-Ph- 002	• Outline the pharmacological concepts of drugs used in Myasthenia gravis		Drugs in Myasthenia Gravis	LGIS (Large group interactive session)
MS-Ph- 003	• Outline the pharmacological concepts of drugs used as local anesthetics.		Local Anesthetics	LGIS (Large group interactive session)
MS-Pa- 001	• Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber. • Explain the histopathological basis of leiomyoma		Muscle remodeling	LGIS (Large group interactive session)
MS-Pa- 002	• Describe the histological basis of Duchenne Muscular Dystrophy • Describe the histopathological basis and clinical presentation of Alzheimer`s Disease, Multiple Sclerosis and Astrocytoma	Pathology	Diseases of Muscle	LGIS (Large group interactive session)
MS-Pa- 003	• Describe the clinical presentation and histological justification for osteoporosis, osteopetrosis. • Describe the histological basis for bone repair after fractures		Diseases of Bone	LGIS (Large group interactive session)
MS-Pa- 004	• Describe the histological basis for cartilage growth and repair		Disease of Cartilage	LGIS (Large group interactive session)

DISEASE PREVENTION AND IMPACT

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 16+3=19		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
MS-CM- 001	• Explain causes of low back pain • Describe prevention of low back pain	Community Medicine and Public Health	Back Pain	LGIS (Large group interactive session)
MS-CM- 002	• Describe causes and prevention of musculoskeletal disorders (MSD)related to child labour		MSD related to child labour	LGIS (Large group interactive session)
MS-CM- 003	• Describe work related musculoskeletal disorders addition with its burden/epidemiology. • Identify risk factors of MSD at workplace. • Describe prevention of exposure to risk factors related to workplace		Work related Musculoskeletal disorders	LGIS (Large group interactive session)
MS-CM- 004	• Describe MSD related to mobile addition with its burden/epidemiology. • Identify risk factors relates to MSD due to excessive mobile usage. • Describe the preventive strategies for mobile addiction related MSD.	Community Medicine and Public Health	MSD related to mobile usage	LGIS (Large group interactive session)
MS-CM- 005	• Describe application of ergonomics in MSD related to above disorders.		Ergonomics	LGIS (Large group interactive session)
MS-CM- 006	• Describe the concept of non-communicable diseases		Non- communicable disease	LGIS (Large group interactive session)
MS-CM- 007	• Identify the risk factors in the community for Osteoporosis. • Learn and apply interventions to prevent the risk factors for various musculoskeletal diseases in community.		Risk factor assessment of Musculoskeletal diseases	LGIS (Large group interactive session)
MS-BhS- 001	• Identify and deal with the various psychosocial aspects of Musculoskeletal conditions (such as Osteoarthritis, Osteomyelitis, Rheumatoid arthritis, Gout, chronic back pain, psycho- somatic complaints) and Neuromuscular conditions (Muscular dystrophy, Myasthenia Gravis, Sclerosis) on Individual, Family and Society.	Behavioral Sciences	Psychosocial factors influencing chronic illnesses	LGIS (Large group interactive session)
MS-BhS- 002	• 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.		Psychosocial Impact of Disease and its management	LGIS (Large group interactive session)

AGING

THEORY

CODE	SPECIFIC LEARNING OUTCOMES	TOTAL HOURS = 5		MIT (Mode of information transfer)
		DISCIPLINE	TOPIC	
MS-Ag- 001	• Discuss the effect of age on bone fragility and its implications with management.	Geriatrics/ Medicine/ Biochemistry	Bone	LGIS (Large group interactive session)
MS-Ag- 002	• Discuss the effect of age on loss of cartilage resilience and its implications and management		Glutathione	LGIS (Large group interactive session)
MS-Ag- 003	• Discuss the effect of age on Muscular strength and its implications and management		Muscle	LGIS (Large group interactive session)
MS-Ag- 004	• Explain the protective effect of estrogen (female sex hormone) on bone mineral density and relate it to increased prevalence of postmenopausal fractures in women.		Effect of estrogen on BMD	LGIS (Large group interactive session)

PERLs (PROFESSIONALISM, ETHICS, RESEARCH, LEADERSHIP)

CODE	SPECIFIC LEARNING OUTCOMES	DOMAIN	ATTRIBUTE	TOPIC	PORTFOLIO ENTRY	MIT
PERLs- 1-08	Demonstrate punctuality	Professionalism	Responsible & Accountable	Responsibility towards self and the profession	Attendance record	LGIS (Large group interactive session)
PERLs- 1-09	Manage time effectively	Leadership	Self-Directed Learner	Time Management	Self and/or teacher feedback	LGIS (Large group interactive session)
PERLs- 1-10	Demonstrate respect of diversity in gender, age, culture, race, religion, abilities, and sexual orientation for peers	Professionalism	Caring & Empathic	Diversity Equity Inclusion	An encounter with a especially abled person	LGIS (Large group interactive session)
PERLs- 1-11	Design a professional digital footprint and use appropriate online etiquette and follow rules for every Internet resource	Ethics	Digital Citizen	Professional Social Media Platforms Rules and regulations of two social media platforms	Professional profile on LinkedIn	LGIS (Large group interactive session)
	Describe responsibility			Learning styles Learning		LGIS (Large

PERLs- 1-12	to oneself Discuss responsibilities of being a learner	Professionalism	Responsible & accountable	Domains Motivation	Written assignment	group interactive session)
PERLs- 1-13	Discuss professional code of conduct	Professionalism	Responsible & accountable	Responsibilities of a doctor	Case analysis of non-professional practice	LGIS (Large group interactive session)
PERLs- 1-14	Work respectfully and effectively with their peers	Leadership	Team Player	Effective teamwork Building Rapport	Peer feedback	TBL
PERLs- 1-15	Set Learning Goals	Leadership	Self-directed learner	Value identification Goal setting	List of goals	LGIS (Large group interactive session)
PERLs- 1-16	Locate credible scientific evidence	Research	Evidence based practitioner	Sources of scientific data Databases Search Engines Grey Literature	Assignment on building a literature search	LGIS (Large group interactive session)

CLINICAL SKILLS (C-FRC)

CODE	Early Clinical Exposure	Total Hours = 15		MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OBJECTIVES	TOPIC	LOGBOOK ENTRIES	
C-M-1-01 1st VISIT	Measure body temperature using a mercury/digital thermometer	Body Temperature	3	Skills Lab / Demonstration / Bedside Teaching
C-M-1-02 2nd VISIT	Examine the wrist joint for functionality	Wrist joint examination	3	Skills Lab / Demonstration / Bedside Teaching
C-M-1-03 3rd VISIT	Examine strength of upper limb	Upper limb strengthened power examination	3	Skills Lab / Demonstration / Bedside Teaching
C-M-1-04 4th VISIT	Examine strength of lower limb	Lower limb strengthened power examination	3	Skills Lab / Demonstration / Bedside Teaching
C-M-1-05 5th VISIT	Examine the knee joint for functionality	Knee joint examination	2	Skills Lab / Demonstration / Bedside Teaching
C-M-1-06 6th VISIT	Examine the shoulder joint for functionality	Shoulder joint examination	3	Skills Lab / Demonstration / Bedside Teaching
C-M-1-07 7th VISIT	Examine the hip joint for functionality	Hip joint examination	2	Skills Lab / Demonstration / Bedside Teaching

HOLY QURAN AND ISLAMIYAT

CODE	The Holy Quran	Total Hours = 04		PORTFOLIO ENTRY	MIT (Mode of Information Transfer)
	SPECIFIC LEARNING OUTCOMES	DESCIPLINE	TOPIC		
QI-004	• Recognize the importance of physical purity (Taharah) • Discuss the philosophy of prayer and its role in purification of soul. • Recognize the importance of prayer in building personal character - sense of duty, patience, perseverance, punctuality, and self/social discipline. • Spiritual, moral, and social impact of prayer in building of righteous community • Role in creating brotherhood, equality, and unity in ummah. • Identify the conditions in which relaxation in prayer is allowed e.g. during operation, travelling etc.	WORSHIP (IBADAAT)	Prayer (Namaz)	One reflective writing One class quiz	LGIS (Large group interactive session)
QI-005	• Identify obligatory importance of Zakat and other items as outlined under the title of 'lnfaq-fee-sabilillah' • Categorize the people who can be the beneficiaries of Zakat. • Role of zakat in eradication of greed and love of material world • Effect of Zakat and sadaqat in circulation of wealth and alleviation of poverty • Explain the essence of zakat and sadaqat in building just communities. • Describe the role of state in collection and disbursement of zakat		Obligatory Charity (Zakat)		LGIS (Large group interactive session)
QI-006	• Discuss the importance and significance of fasting. • Relate the Holy Quran and the month of Ramadan. • Role of fasting in building personal qualities like self-control, piety and soft corner for the poor and needy persons • Identify the applications of "Taqwa" through fasting		Fasting (Roza)		LGIS (Large group interactive session)
QI-007	• Discuss the importance and significance of Hajj. • Identify the conditions in which Hajj becomes an obligation. • Role of manasik-e-Hajj in producing discipline and complete submission • Recognize the importance of Hajj in uniting the ummah.		Pilgrimage (Hajj)		LGIS (Large group interactive session)

	• Sacrifice for Allah subhan wa taala (essence of qurbani)				

PAKISTAN STUDIES

CODE	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	PORTFOLIO ENTRY	MIT (Mode of Information Transfer)
P-004 P-005	• Explain the ethnic and cultural distribution of the population of Pakistan. • Describe the Provinces and resources available in Pakistan.	Pakistan Studies	Demographic of pakistan	One reflective writing One class quiz	LGIS (Large group interactive session)

ASSESSMENT STRATEGIES

Assessment tools for Theory • Multiple Choice Questions (MCQ) • Structured Essay Questions (SEQ) • Reflective paper • Assignment • Presentation
Assessment tools for Practical, Clinical and Human (soft) skills • Objective Structured Practical Examination • Objective Structured Clinical Examination • Structured Viva • Short Case • Long Case • Logbook • Portfolio • Feedback (simple and/or 360 degree)

The marks distribution in each subject is given in Table.

Subject	Theory		Practical		Total
Block 2 (Musculoskeletal & Locomotion Module)	Part I MCQs Part 11 SEQS	85 Marks 35Marks	Oral and Practical/ Clinical Examination	120 Marks	**300**
	Internal Assessment	30 Marks	Internal Assessment	30 Marks	
		150		**150**	
				Total	**900**
***Islamic Studies/ Ethics and Pakistan Studies**		**Islamic Studies/Ethics** 3 LEQs to be attempted out of 5 LEQs		60 Marks	
		Pakistan Studies 2 LEQs to be attempted out of 4 LEQs		40 Marks	
				100	

(MUSCULOSKELETAL & LOCOMOTION MODULE TOTAL HOURS = 260

Anatomy = 140	Community Medicine = 19
Physiology = 36	PERLs = 03
Biochemistry = 32	Islamiyat/Pak studies = 05
C-FRC= 08	Pharmacology = 05
Pathology = 08	Aging = 04

RESOURCE BOOKS

Anatomy

- Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams, and Wilkins:
- The Developing Human by K.L. Moore.
- Snell's Clinical Neuroanatomy.
- Laiq H.S. Medical Histology. Paramount Books.

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology. W. B. Sunders & Co., Philadelphia.

Biochemistry

- Champe, P.C. & Harvey, E.A. Biochemistry (Lippincott's Illustrated
- Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell. Harper's Biochemistry. McGraw-Hill.
- ABC of Clinical genetics by H.M. Kingston.

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 andCotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.
- Walter and Israel. General Pathology. Churchill Livingstone.

Pharmacology

- Basic and Clinical Pharmacology by Katzung, McGraw-Hill.
- Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins

Behavioral Sciences

- Handbook of Behavioral Sciences by Prof. Mowadat H. Rana, 3rd Edition
- Integrating Behavioral Sciences in Healthcare by Asma Humayun & Michael Herbert.

Community medicine

- Parks Textbook of Preventive and Social Medicine. K. Park (Editor)
- Public Health and Community Medicine Ilyas, Ansari (Editors

lslamiyat/Pakistan studies Books

- Standard lslamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M. Sharif lslahi llmi lslamiyat (Compulsory) for B.A. B.Sc., & equivalent.
- Pakistan studies (Compulsory) for B.A. B.Sc., B.Com., Medical/Engineering by Prof. Shah Jahan Kahlun
- Pakistanstudies (Compulsory) for B.A, B.Sc., B.Com.,B.Ed., Medical/Engineering by Prof. Shah Jahan Kahlun