Faisalabad Medical University

BLOCK B

1st Year MBBS

Contents

Musculoskeletal Module 1

MODULE COMMIITTEE

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Introduction to Module

Musculoskeletal system Module is designed to provide guidance on introduction to the basics of human musculoskeletal system. Moreover, the module is aligned to the general outcomes required at the exit level, and includes introductory sessions on preventive medicine, communication skills, professionalism, self- management, and developing scholarly skills. The module committee will facilitate the students with any issues that they have, while settling down in the new environment. You will also learn the skills required for practical implications in the field of medicine. Moreover, working within teams will enhance your co-operative and approachable working style

GENERAL LEARNING OUTCOMES

By the end of this module the students should be able to;

Knowledge

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

1. Develop an understanding of the fundamental components of the musculoskeletal system.
2. Explain the structure & function of the musculoskeletal (MSK) components of limbs and back. 3.
Describe how injury and disease alter the MSK structure & function.
4. Integrate concepts relating to various metabolic processes, their disorders and relevant lab investigations in the study of human MSK system.
5. Describe the role of the limbs (upper/lower) in musculoskeletal support, stability and movements.
6. Describe the development of the limbs & correlate it with organization and gross congenital anomalies of the limbs.
7. Identify the anatomical features of bones, muscles & neurovascular components of the limbs and correlate them with their functions, injuries and clinical problems.
8. Describe the types, formation, stability, function & clinical significance of joints of the upper and lower limb. 9.
Describe the basic histology of muscle fibers including its molecular structure (Sarcomere).
10. Explain the mechanism of excitation and contraction of skeletal and smooth muscles.
11. Describe the basis for the use of therapeutic agents to modulate neuromuscular transmission.
12. Describe the general principles of MSK pain management.
13. Describe ergonomics and its principles. Prevention of different MSK disorders.
14. Interpret the mechanism of post-mortem rigidity. (spiral II)
15. Give an overview of pathology of bones, muscles and joints.
16. Explain the role of different minerals, hormones and specific metabolic products related to the musculoskeletal system and correlate them with their relevant clinical metabolic disorders.
17. Interpret the relevant laboratory investigations for diagnosis of common musculoskeletal disorders. (Spiral two)
18. To develop the critical thinking and analysis in the context of various case scenarios pertaining to locomotors system.

Skills

By the end of this module, it is a core objective that students should have acquired the following skills:

1. Demonstrate the anatomical structures of the limbs in a dissected cadaver/Model/prosecuted specimen & X-ray.
2. Demonstrate the provision of first aid measures in case of a limb fracture.
3. Communicate effectively in a team with colleagues and teachers**.**

Attitude

While not necessarily taught explicitly, students are expected to develop following attitudes throughout the course:

1. Demonstrate respect and care for the cadaver and prosected parts.
2. Demonstrate humbleness and use socially acceptable language during academic and social interactions with colleagues and teachers.
3. Make ethically competent decisions when confronted with an ethical, social or moral problem related to MSKS in professional or personal life.
4. Discuss ethical issues social and preventive aspect of health care in the context of MSK system.
5. To create awareness about the ethical, social and preventive aspect of health care in the context of locomotor system

THEMES FOR MUSCULOSKELETAL I MODULE

SNO	Theme	Duration
1	Orientation and shoulder pain	2 weeks
2	Weak grip and painful hand	1 week
3	Pain lower limb/limping	2 weeks
4	Bony arches and fracture of foot	1 week
5	Backache	1 week
6	Muscle weakness and fatigue	1 week

Orientation and shoulder pain

1	Histology	**Histology of bones**	Describe the histological features of bone. Describe histological changes in bone in osteoporosis, rickets and osteomalacia.	Lecture	1hour	MCQ
2	Histology	**Histology of bones**	Identification of slide under Microscope Draw & Label the histological structure of bone	Skill Lab	2 hours	OSPE
3		**Histology of cartilage**	Describe the histological features of different types of cartilage	Lecture	1 hour	MCQS
4		**Histology of cartilage**	Identification of slide under Microscope Draw & Label the histological structure of Cartilage	Skill Lab	2 hours	OSPE
5	Histology	**Histology of muscle**	Explain the histological features of Skeletal muscle Cardiac muscle Smooth muscle	Lecture	1hour	MCQ
6	Embryology	**Development of muscle**	Describe the development of muscles. Enlist common anomalies	Lecture	1hour	MCQ
7	Histology	**Histology of cartilage**	Describe the histological features of cartilage. Describe the histological changes in cartilage in degenerative diseases	Lecture	1hour	MCQ
8	Embryology	**Development of bones and cartilage in the limbs**	Describe the development of bones and cartilage in the limb. Enlist stages in the development of limbs Explain the difference between intramembranous and endochondral ossification with examples.	Lecture	1hour	MCQ
9	Gross Anatomy	**Clavicle**	Identify important bony land marks of clavicle Identify the attachment of clinically important muscles Identify the attachment of clinically important	SGD	2 hours	MCQ

			ligaments Identify common sites of fracture of clavicle with the help of radiographs			
10	Gross Anatomy	**Scapula**	Identify important bony land marks of scapula Identify the attachment of clinically important muscles Identify the attachment of clinically important ligaments Identify the common sites of fracture of scapula on radiographs correlating its predisposition to fracture	SGD	2 hour	OSPE
11	Gross Anatomy	**Scapular Region I**	Identify important bony land marks of scapula Identify the attachment of clinically important muscles Identify the attachment of clinically important ligament Identify the common sites of fracture of scapula on radiographs correlating its predisposition to fracture	SGD	2 hour	MCQS

12	Gross anatomy	**Humerus**	Identify important bony land marks of humerus Identify the attachment of clinically important muscles Identify the attachment of clinically important ligaments Identify common sites of fracture of humerus with the help of radiographs	Skill Lab	2 hours	OSPE and MCQ

13	Gross Anatomy	**Pectoral region**	Enumerate the muscles of pectoral region. Explain the actions of pectoral muscles in relation to their origin, insertion and nerve supply. Enumerate the arteries and veins of pectoral region.	Skill Lab	2 hours	MCQ
14	Gross Anatomy	**Rotator cough & intra muscular spaces**	Identify the muscle forming rotator cough Identify the boundaries of intra muscular spaces Identify the contents of spaces	Lecture	1 hour	MCQS
15	Gross Anatomy	**Brachial plexus**	Describe formation of brachial plexus Enumerate nerves originating from ➢ Cords ➢ Roots ➢ Trunks Describe injuries to inferior parts of the brachial plexus (Klumpke paralysis) Describe injuries to superior parts of the brachial plexus (Erb-Duchenne palsy)	Lecture	1hour	MCQS 7 OSPE
16	Gross Anatomy	**VESSELS IN ARM**	Describe the extent of axillary artery, brachial ,ulnar and radial arteries Describe the parts and branches of each part of axillary artery along with relations. Describe branches of arteries of arm. Describe the anatomical sites of lesion of artery correlating them to ischemia within area of distribution.	Lecture	1hour	MCQ

17	Gross Anatomy	**Muscles of arm**	Relate the attachment of muscles of anterior and posterior compartment of arm with their action Perform dissection to identify main muscles of arm along with their nerve supply.	SGD	2hrs	MCQ

18	Gross Anatomy	**Nerves of arm**	Describe formation of axillary and musculocutaneous nerve Describe distribution of nerve Describe clinically important relations. Describe lesion of nerve correlating them to sensory and motor loss within area of distribution.	Lecture	1hour	MCQ
19	Gross Anatomy	**Shoulder region**	Identify various muscles which help in scapular movements. Identify clinically important ligaments of shoulder joint Identify the movements of shoulder joint Relate the type of shoulder joint with movements occurring at the joint and muscles producing these movement Enlist factors responsible for stability of shoulder joint Describe anatomical structures involved in dislocation of shoulder joint	Lecture	1 hour	MCQ
20	Gross Anatomy	**Axilla**	Identify boundaries of axilla Identify the contents Describe the contents	SGD2	2 hours	MCQS & OSPE
21	Gross Anatomy	**Ulna**	Identify important bony land marks of ulna Identify the attachment of clinically important muscles Identify the attachment of clinically important ligaments Identify the common sites of fracture of ulna on radiographs correlating its predisposition to fracture	SGD	2 hours	OSPE
22	Gross Anatomy	**Muscles of anterior compartment of for arm**	Identify main muscles of anterior compartment of forearm on given modal of upper limb Identify muscles forming boundaries of cubital fossa Identify contents of cubital	SGD	2 hours	MCQ

			fossa. Associate action of muscle with their			
23	Gross Anatomy	**Muscles of posterior compartment of for arm**	Perform dissection to Identify main muscles of posterior compartment of forearm Identify the main blood vessels of posterior compartment. Relate the location of radial artery with its clinical significance.	SGD	2 hours	MCQ
24	Gross Anatomy	**Muscles of for arm**	Identify muscles of for arm Describe attachment & action of muscles	Skill Lab	2 hours	MCQS & OSPE
25	Gross Anatomy	**Nerves & vessels of For arm**	Identify nerves & vessels of for arm Identify area of supply of nerves Identify area of supply of vessels	Skill Lab	2 hours	MCQS & OSPE
26	Gross Anatomy	**Elbow Joint**	Identify important ligaments of elbow joint on given model. Correlate the muscle attachment with various movements of joint Enumerate nerve supply and blood supply of joint Explain the anatomical significance of carrying angle Discuss anatomical structures involved in Subluxation and Dislocation	Lecture	1 hour	MCQ
27	Gross Anatomy	**Radio ulnar joint**	Identify the bones participating in radioulnar joints Discuss the mechanism of supination and	Lecture	1 hour	MCQ
28	Gross Anatomy	**Fascia of upper limb**	Describe the fasciae in the upper limbs (including retinacula) Describe the fascial septas of upper limbs. Enumerate the structures passing under and superficial to each retinaculum. Describe their clinical relevance to compartment	Lecture	1hour	MCQ

29	Gross Anatomy	**Cutaneous Nerve Supply Of Upper limbs**	Describe the cutaneous nerve supply of upper limb	Lecture	1hour	MCQ
30	Gross Anatomy	**Venous & Lymphatic drainage of UL**	Describe venous drainage of UL Describe Lymphatic drainage of UL	Lecture	1hour	MCQ
31	Nerve physiology	**Properties of Nerve fiber**	Discuss the properties of nerve fibers.	Interactive lecture	1 hour	MCQ
32		**Nernst potential and resting membrane potential**	Describe the physiological basis of Nernst potential. Explain the physiological basis of resting membrane	Interactive lecture	1 hour	MCQ
33		**Nerve action potential**	Describe the different phases of nerve action potential. Describe the role of different ion channels in	Interactive lecture	1 hour	MCQ
34		**Propagation of action potential**	Outline the features of propagation of action potential. Discuss compound action potential	Interactive lecture	1 hour	MCQ
35		**Comparison of action potentials**	Compare the different phases of action potential in: Skeletal muscle, Smooth muscle and Cardiac muscle	SGD	2 hours	MCQ
36	Biochemistry	**Classification and properties of proteins**	Discuss Biomedical importance and classification (biologic functions, nutritional value; and overall shape of molecule) of proteins	SGD 1	2hours	MCQ
37	Biochemistry	**Biomedical importance of proteins**	Explain Structure, functions and properties of amino acids	Lecture	1hour	MCQ

38	Biochemistry	**Biomedical importance Amino Acids**	Describe biologically important non-standard (non-proteinogenic) amino acids and their	Lecture	1hour	MCQ
39	Biochemistry	**Classification of amino**	Classify standard (proteinogenic) amino acids (based upon side chain structure, polarity of side chain, nutritional, and metabolic end-products)	SGD2	2 hours	MCQ
40	Biochemistry	**Mechanism of buffering action of proteins**	Describe Dissociation and titration of amino acids, determination of pl of amino acids with two and three dissociable groups Describe importance of amino acids in the maintenance of pH; and mechanism of buffering action of proteins	Lecture	1hour	MCQ
41	Biochemistry	**Structural organization of proteins**	Explain Structural organization of proteins Details of four orders of protein structure (primary, secondary, tertiary, and quaternary) Describe denaturation of proteins	Lecture	1hour	MCQ

42	Biochemistry	**Techniques for separation of proteins**	Tests for protein detection. Describe Important techniques for separation of proteins • Electrophoresis • isoelectric focusing, • Paper chromatography, • Fractional Precipitation • centrifugation, and dialysis)	4 Skill lab	2hours each	MCQ
	Biochemistry	**Techniques for separation of proteins**	Demonstrate Important techniques for separation of proteins (electrophoresis, isoelectric focusing, chromatography, filtration, centrifugation, and dialysis)	SGD	2hours	OSPE
43	Biochemistry	**Glycoproteins**	Describe components of glycoproteins (overview of linkages between proteins and carbohydrates- and O-linked oligosaccharides) Discuss the provision of energy o muscles and cells through glycolytic pathway and TCA cycle	SGD and lecture	2hours	MCQ

Weak grip and painful hand

44	Gross Anatomy	**Articulated hand**	Enumerate the bones of hand. Describe functions of small muscles in hand Describe the fibrous of sheaths of the digits of the hand Discuss the clinical anatomy of structures of hand	SGD	2hour	MCQ & OSPE

45	Histology	**Histology of Muscles**	Identify slide of Muscles under Microscope	Skill Lab	2 hours	OSPE
46	Gross Anatomy	**Blood supply Nerves & vessels of hand**	Describe the formation of superficial and deep palmer arches in hand Compare the contribution of ulnar and radial arteries for formation of arches Describe the structures involved in laceration of Palmar arches Describe boundaries and contents of fascial spaces of	Lecture	2hour	MCQ
47		**Wrist Joint**	Enumerate the clinically important ligaments of wrist joint Enumerate the movements of joint Enumerate nerve supply and blood supply of joint Identify facial retinacula on anterior and posterior surface of wrist joint. Enumerate the structures passing superficial and deep to flexor and extensor	Lecture	1hour	MCQ
48	Gross Anatomy	**Venous and lymphatic drainage of upper limb**	Describe the formation of basilic vein Describe the formation of cephalic vein Describe the location of median cubital vein Describe the areas of drainage of above veins Discuss the importance of median cubital vein for venipuncture.	Lecture	1hour	MCQ
49	Biochemistry	**Collagen**	Describe in detail the biochemistry of Collagen. (types & structure, biosynthesis & degradation of collagen) Describe collagenopathies (Ehlers-Danlos Syndrome (EDS) and Osteogenesis imperfecta (OI)	Lecture	1 hour	MCQ

50	Biochemistry	**Glycosaminoglycan**	Discus the role of glycosaminoglycan (GAG) in the formation of the connective tissues, cartilage, skin, blood vessels and tendons	SGD4	2hrs	MCQ
51	Biochemistry	**Elastin**	Describe in detail the biochemistry of Elastin. (Structural characteristics, role of alpha 1-antitrypsin in elastin degradation, major biochemical differences between collagen and elastin) Discuss genetic disorders of elastin, William-Beuren syndrome, supra-aortic stenosis, pulmonary emphysema and aging of skin)	Lecture	1hrs	MCQ
52	Biochemistry	**Fibrillin**	Describe Fibrillin-1 as a protein of microfibrils, Marfan Syndrome, fibronectin and its role in cell adhesion and migration, Describe laminin as a protein component of renal glomerular and other basal laminas	Lecture	1hrs	MCQ
Pain lower limb and limping						
53		**Hip bone**	Identify important bony land marks of hip bone Identify the attachment of clinically important muscles Identify the attachment of clinically important ligaments Identify the common sites of fracture of hip bone on radiographs correlating its predisposition to fracture	Skill lab	2 hours	OSPE

54		**Femur**	Identify important bony land marks of femur Identify the attachment of clinically important muscles Identify the attachment of clinically important ligaments Identify the common sites of fracture of femur	Skill Lab	2 hours	OSPE
55	Gross Anatomy	**Front of thigh**	Describe the boundaries of femoral canal and femoral triangle. Describe the contents of femoral triangle and femoral canal. Describe the course and distribution of femoral artery.	Lecture	1hour	MCQ
56		**Femoral Triangle Femoral Canal Femoral Sheath**	Describe the boundaries of femoral canal and femoral triangle. Describe the contents of femoral triangle and femoral canal. Describe the course and	Lecture	1 hour	MCQ
57	Gross Anatomy	**Nerves and vessels of front of thigh**	Describe the origin, course and distribution of Sciatic nerve Obturator nerve Femoral nerve and vessels	Lecture	1hour	MCQ
58	Gross Anatomy	**Medial compartment of thigh**	Identify muscles of the medial compartment of the thigh on given modal. Relate the attachment of muscles of medial compartment with their action	SGD	2hour	MCQ
59	Gross Anatomy	**Anastomosis on Back of thigh**	Identify types of anastomosis Identify vessels forming anastomosis	Lecture	1 hour	MCQS
60	Gross Anatomy	**Posterior compartment of thigh**	Identify muscles of posterior compartment of thigh Describe attachment & action of muscles	SGD	1hour	MCQS

61		**Gluteal region**	Identify Muscles of gluteal region on modal of lower limb. Identify the proper site for intramuscular injection on modal. Relate muscle attachment with nerve supply and action	Lecture	1 hour	MCQ
62	Gross Anatomy	**Hip joint**	Identify important ligaments of hip joint on given model. Correlate the muscle attachment with various movements of joint Enumerate nerve supply and blood supply of joint Explain the importance of artery to the ligament of the femoral head in Fractures of the Femoral Neck Explain the anatomical structures involved in Dislocation of Hip Joint	Lecture	1 hour	MCQ
63		**Tibia**	Identify important bony land marks of tibia Identify the attachment of clinically important muscles Identify the attachment of clinically important ligaments Identify the common sites of fracture of tibia on radiographs correlating its predisposition to fracture	Skill Lab	2 hour	OSPE
64		**Fibula**	Identify important bony land marks of fibula Identify the attachment of clinically important muscles Identify the attachment of clinically important ligaments Identify the common sites of fracture of fibula on radiographs correlating its predisposition to fracture	Skill Lab	2 hour	OSPE
65	Gross Anatomy	**Adductor Canal**	Identify Boundaries of canal Identify the contents	SGD	2 hour	MCQS

66		**Knee joint**	Classify knee joint Discuss the mechanism of locking and unlocking of knee joint Identify all intra and extra capsular ligaments of knee joint. Correlate the muscle attachment with various movements of joint Enumerate nerve supply and blood supply of joint	Lecture	1 hour	MCQ
67		**Muscles of Anterior compartment of leg**	Identify main muscles in anterior and lateral compartment of leg on given modal. Relate muscle attachment with movements produced	Skill Lab	2 hours	MCQ
68 69 Gross Anatomy		**Muscles of posterior compartment of leg** **Popliteal fossa**	Identify muscles of posterior compartment of the leg on given modal. Relate muscle attachment with movements produced Describe the boundaries of popliteal fossa Enumerate contents of popliteal fossa Describe the course and branches of popliteal artery. Describe the clinical significance of genicular anastomosis.	Skill Lab Lecture	2 hours 1hour	MCQ MCQ
71	Muscle physiology	**Physiological anatomy of skeletal muscle**	Describe the following characteristics of Skeletal muscle Muscle mass Muscle fiber Myofibril Define and explain sarcomere in skeletal muscle Describe the function of contractile element of muscle Describe the (Proteins) sarco tubular system Motor unit	Interactive lecture	1 hour	MCQ

72		**Mechanism of skeletal muscle contraction 1**	Describe structural-functional relationship of skeletal muscle Elaborate mechanism of contraction of the skeletal muscle.	Interactive lecture	1 hour	MCQ
73		**Mechanism of skeletal muscle contraction 2**	Describe the walk along theory (sliding filament) and relate it to the molecular events during muscle contraction Explain relationship of muscle length to tension	Interactive lecture	1 hour	MCQ
74		**Energetics and Characteristics of muscle contraction**	Describe the three sources of energy for muscle contraction Differentiate between the isometric and isotonic contraction Describe the following type of fibers: Fast fibers Slow fibers	Interactive lecture	1 hour	MCQ
75		**Mechanics of muscle contraction**	Describe Motor Unit Discuss the mechanism of summation and tantalization The Staircase Effect (Treppe) Skeletal Muscle Tone	Interactive lecture	1 hour	MCQ
76	Biochemistry	Vitamins	Define and classify vitamins Differentiate between water- and fat-soluble vitamins	Interactive lecture	1 hour	MCQ

77	Biochemistry	Vitamin B1(Thiamine)	Describe the role of Vitamin B1(Thiamine) Discuss natural sources of vitamin B1(Thiamine)E Vitamin B1(Thiamine) Explain the therapeutic uses of Vitamin B1(Thiamine)	Interactive lecture	1 hour	MCQ

78	Biochemistry	Vitamin B2 Riboflavin	Describe the role of Vitamin Riboflavin Discuss natural sources of Vitamin Riboflavin Discuss natural resources of Vitamin Riboflavin Explain the therapeutic uses of Vitamin Riboflavin	SGD5	2 Hours	MCQ
79	Biochemistry	Vitamin B3 NIACIN	Describe the role of Vitamin NIACIN Discuss natural sources of Vitamin NIACIN Explain the therapeutic uses of Vitamin NIACIN Describe the diseases associated with inadequate intake of vitamins Describe the toxicity of excessive intakes of the vitamins	Interactive lecture	1 hour	MCQ
80	Biochemistry	Vitamin B5 Pantothenic acid	Define a vitamin B5 Describe the sources, metabolism B5 Describe Principal function B5 Describe the diseases associated with inadequate intake of vitamin B5 Describe the toxicity of excessive intakes of the vitamin B5	Interactive lecture	1 hour	MCQ
81	Biochemistry	Vitamin B6 Pyridoxine	Define a vitamin B6 Describe the sources, metabolism B6 Describe Principal function B6 Describe the diseases associated with inadequate intake of vitamin B6 Describe the toxicity of excessive intakes of the	Lecture	1hour	MCQ

			vitamin B6			
82	Biochemistry	Vitamin B7 Biotin	Describe the sources, metabolism & principal functions of B7 Describe the diseases associated with inadequate intake of vitamin B7 Describe the toxicity of excessive intakes the vitamin B7	Interactive lecture	1 hour	MCQ
Bony arches and fracture of foot						
83		**Articulated foot**	Identify and describe features of Tarsal and meta tarsals	Lecture	1 hour	MCQ
84		**Sole of foot**	Perform dissection to identify main muscles of foot along with their nerve supply Name muscles present in various layers of sole of foot Enlist ligaments of sole of foot	Lecture	2 hours	MCQ
85		**Nerves and vessels of sole**	Describe the neurovascular plane of sole of foot	Lecture	1 hour	MCQ

86	Gross Anatomy	**Arches of foot**	Enumerate arches of foot. Describe the components of arches of foot Describe clinical importance of arches in walking.	Lecture	1hour	MCQ
87		**Ankle joint**	Identify important ligaments of ankle joint on given model. Correlate the muscle attachment with various movements of joint Enumerate nerve supply and blood supply of joint. Identify the facial retinacula attached in the ankle region Explain the anterior talofibular ligament injuries	Lecture	1 hour	MCQ
88	Gross Anatomy	**Joints of foot**	Enlist Joints of foot Describe the mechanism of inversion and eversion	Lecture	1 hour	MCQ
89	Gross Anatomy	**Fascia of lower limb**	Describe the fasciae in the lower limbs (including retinacula) Describe the fascial spaces of lower limbs. Enumerate the structures passing under and superficial to each retinaculum. Describe their clinical relevance to compartment Syndrome.	Lecture	2hour	MCQ

90	Gross Anatomy	**Dorsum of foot**	Identify contents of dorsum of foot Identify course of dorsalis pedis artery Identify the branches of artery	SGD	2 hour	MCQS
91	Gross Anatomy	**Venous and lymphatic drainage of lower limb**	Describe the formation of dorsal venous arch Great saphenous vein Small saphenous vein Describe the distribution of deep veins Describe the anatomical structures involved in varicose veins, Thrombosis Thromboembolism Describe the use of saphenous vein in saphenous veingrafts Describe the distribution of superficial lymphatic vessels deep lymphatic vessels.	Lecture	1hour	MCQ
92	Forensic	**Injury**	Define injury on medico legal basis. Classify injury. Define mechanical injury Classify mechanical injury Describe mechanisms of injury. Interpret the nature (manner) of injury.	Lecture	1 hour	MCQS

93		**Wound**	Define wound. Define hurt. Identify factors affecting appearance of wound	Lecture	1 hour	MCQS
94	Muscle physiology	**Lever system of body and muscle fatigue**	Explain Lever system of body Elaborate Muscle fatigue	SGD	2 hours	MCQ
95		**Muscle remodeling**	Describe denervation of muscles, hypertrophy, hyperplasia and dystrophy. Describe effects of muscle relaxants& Acetylcholinesterase Inhibitors	SGD	2 hours	MCQ
96		**Rigor mortis Botulism tetanus Organophosphorus compounds**	Describe pathophysiology of Rigor mortis Botulism tetanus Organophosphorus compounds	SGD	2 hours	MCQ
97	Biochemistry	**Role of vitamin C**	Define a vitamin C Describe the metabolism Describe Principal functions Describe the diseases associated with inadequate intake of vitamin C Describe the toxicity of excessive intakes of the vitamin C Describe the role of Vitamin C in the formation of connective tissues and bones.	Lecture	1 hour	MCQ

98	Biochemistry	**Sources, Metabolism of vitamin D**	Define a vitamer of vitamin D Describe the metabolism of vitamin D	Lecture	1 hour	MCQ
99	Biochemistry	**Deficiency and Toxicity of vitamin D**	Describe the diseases associated with inadequate intake of vitamins of vitamin D Describe the toxicity of excessive intakes of the vitamins of vitamin D	SGD6	2hours	MCQ
100	Biochemistry	**Vitamin D**	Describe the role of Vitamin D in the formation of connective tissues and bones. Describe Principal functions of vitamin D	Lecture	1 hour	MCQ

101	Biochemistry	**Vitamin A 1**	Describe role of Vitamin A Discuss natural sources of vitamin a Discuss Vitamers of Vitamin A Discuss its mechanism of action as a nuclear messenger with its applied aspect	Lecture	1hour	MCQ
102	Biochemistry	**Vitamin A 2**	Discuss the visual cycle Explain the therapeutic uses of Vitamin A Discuss the deficiencies and hypervitaminosis of Vit A	Lecture	1hour	MCQ
103	Biochemistry	**Vitamin E**	Describe the role of Vitamin E Discuss natural sources of vitamin E Discuss Vitamins of Vitamin E Explain the role of Vitamin E as antioxidant Explain the therapeutic uses of Vitamin E	Lecture	1hour	MCQ

104	Biochemistry	**Vitamin K**	Define a vitamin K Describe the sources, metabolism K Enlist vitamers of vitamin K Describe Principal function B5 Describe the diseases associated with inadequate intake of vitamin K Describe the toxicity of excessive intakes of the vitamin K	Lecture	1hour r	MCQ
105	Biochemistry	**Introduction to minerals**	Define Minerals, Define major and minor minerals Describe classification of minerals	Lecture	1 hour	MCQ
106	Biochemistry	**Role of Calcium and Phosphorus**	Explain the role of Calcium and phosphorus in formation of cellular matrix and bone	Lecture	1 hour	MCQ
107	Biochemistry	**Iodine in Biology**	Discuss RDA, serum Levels Iodine Enlist sources of Iodine Describe functions Discuss absorption excretion of Iodine Describe disorders related to increase and decrease in amount of Iodine	Lecture	1hour	MCQ

108	Pathology	**Introduction to bone pathology**	Define and differentiate osteopenia, osteoporosis, osteomalacia Define osteomyelitis Enlist various forms of arthritis	Lecture	1 hour	MCQS

Backache

109	Embryology	**Development of vertebral column**	Describe the development of vertebral column. Enumerate the developmental anomalies.	Lecture	1 hour	MCQS
110	Gross anatomy	**Lumbosacral plexuses**	Describe formation and distribution of lumbar plexus. Describe formation and distribution of sacral plexus. Describe effects of lesion of branches of sacral plexus.	Lecture	1 hour	MCQS
111	Muscle physiology	**Neuromuscular junction and transmission**	Draw and label the neuromuscular junction. Explain the physiologic anatomy of neuromuscular junction. Explain the transmission across neuromuscular junction. Explain Formation and Secretion of acetylcholine at nerve terminals Describe Action of acetylcholine at postsynaptic membrane Describe Degradation/Destruction of released acetylcholine Describe End plate potential Describe Fatigue of junction	lecture	1 hour	MCQ

112		**Myasthenia gravis**	Discuss pathophysiology of Myasthenia gravis myopathies and neuropathies	SGD	2 hours	MCQ

113		**Muscle action potential Excitation contraction coupling**	Describe the muscle action potential. Describe excitation contraction coupling in skeletal muscles	Interactive lecture	1 hour	MCQ

114	Community medicine	**Back pain**	Explain the causes of low back pain z Describe the prevention of low back pain z Describe the causes & prevention of msd related to child labor	Lecture	1 hour	MCQS

115	Biochemistry	**Phosphorus and Magnesium in biology**	Discuss RDA, serum Levels Enlist sources of Phosphorus and Magnesium Describe functions Discuss absorption excretion Describe disorders related to increase and decrease in amount of Phosphorus and Magnesium	SGD 7	2 hours	MCQ
116	Biochemistry	**Sulphur in biology**	Discuss RDA, serum Levels Enlist sources of Sulphur Describe functions Discuss absorption excretion, Describe disorders related to increase and decrease in amount of Sulphur	Lecture	1 hour	MCQS

Muscle weakness and fatigue

117	Muscle Physiology	Characteristic and Mechanism of smooth muscle contraction	Describe different types of smooth muscles and their characteristics Explain the chemical and physical basis of smooth muscle contraction	Lecture	1 hour	MCQ
118		**Membrane potentials and action potentials in smooth muscle**	Describe the membrane potentials and action potentials in smooth muscles. Describe Spike potentials Describe Action potentials with plateaus Describe Role of calcium channels in generating the smooth muscle action potential Describe Slow wave potentials Describe Excitation of visceral smooth muscle by muscle stretch 12Describe Depolarization of multi-unit smooth muscle without action potentials	lecture	1 hour	MCQ

119		**Nervous and hormonal control of smooth muscle**	• Describe the nervous and hormonal control of smooth muscle contraction • Describe the characteristics of cardiac muscle • Compare the characteristics of Skeletal, Smooth and Cardiac muscles	Interactive lecture	1 hour	MCQ
120		**Skeletal vs smooth muscle**	• Differentiate between skeletal muscle and smooth muscle.	SGD	1 hour	MCQ
121	Biochemistry	**IODINE in Biology**	Discuss RDA, serum Levels IODINE • Enlist sources of • Describe functions • Discuss absorption excretion, • Describe disorders related to increase and decrease in amount of IODINE	Lecture	1hour	MCQ
122	Biochemistry	**Copper and cobalt in Biology**	• Discuss RDA, serum Levels Copper and cobalt • Enlist sources and Describe their functions • Discuss absorption and excretion, • Describe disorders related to increase and decrease in amount of Copper and cobalt	SGD	2	MCQ

123	Pharmacology	**Membrane stabilizing drugs relevant to MSK**	Explain the site and mechanism of depolarizing and non-depolarizing muscle relaxants	Lecture	1 hour	MCQS
124	Community Medicine	**MSK Diseases**	Explain the risk factors for different types of msd's Describe the preventive measures for different types of risk factors for msd's	Lecture	1 hour	MCQS
125	Community Medicine	**Epidemiology and prevention of MSD**	Describe work related msd's Identify risk factors of msd at workplace. Describe prevention of exposure to risk factors related to workplace. Describe the preventive strategies and safety guidelines in order to reduce the incidence of msds related to work place.	Lecture	1 hour	MCQS

Assessment Plan

Final distribution of MCQS for first year MBBS (MSK Module)

Subject	Number of MCQS
Gross Anatomy	71
Histology	8
Embryology	4
Physiology	16
Biochemistry	16
PRIME including research	1
Pharmacology	1
Pathology	2
Community medicine	1
Total	120

OSPE (MSK)

Final distribution of OSPE station for first year /9 MSK Module)

Subject	MSK Module	Viva station	Total OSPE Stations (for final exam)
Gross Anatomy	9	2	8
Histology	4		
Embryology	0		
Physiology	2	2	2
Biochemistry	3	2	2
Total	18	6	12+6=18

Internal Assessment:

Sr. No.	Criteria	Numbers
Theory:		
1.	Attendance (>90%=3,80-89%=2,70-79%=1,<70%=0)	3
2.	Creative work/assignments/Task	1
3.	Continuous Assessment throughout block	2
4.	Block examination theory	3
5.	Pre prof Examination of block	4
	Total	**13**
Sr. No.	**Criteria**	**Numbers**
OSPE:		
1.	Attendance (>90%=3,80-89%=2,70-79%=1,<70%=0)	3
2.	Log Book	3
3.	Discipline, Responsibility and team work	2
4.	Block examination OSPE	2
	Total	**10**