STUDY GUIDE	
PROGRAM	**MBBS**
MODULE TITLE	**Locomotor- II**
ACADEMIC YEAR	**3rd year -2026**
INTRODUCTION	Locomotor-2 module is designed to integrate the students' knowledge of pathology, pharmacology, community medicine, and forensic medicine, with the basic science knowledge acquired during the Locomotor-1 module in Spiral-1. It revolves around the diagnosis, treatment, and prevention of conditions afflicting the musculoskeletal system, ranging from common disorders of bone and cartilages to severely disabling limb trauma, accidents, and disasters.
RATIONALE	In order to understand the basis of locomotors -related disorders which the students of 3rd year MBBS will come across in their clinical postings, it is imperative that they have a firm grasp on the underlying mechanisms of the diseases and their treatment and prevention aspects
OUTCOMES	By the end of the module, students should be able to justify initial plans of management and prevention of common Locomotor system-related conditions based on knowledge of relevant basic and clinical sciences
DEPARTMENTS INVOLVED	1. Community Medicine, 2. Forensic Medicine & Toxicology 3. Internal Medicine 4. Orthopedics

	5. Pathology & Microbiology 6. Pharmacology 7. Radiology
MODULE OBJECTIVES	**By the end of the module, students will be able to:**
LECTURES **COMMUNITY MEDICINE**	**1. Accidents, Injury and its Prevention** • Describe accidents • Describe epidemiology of accidents and injury • Explain the risk factors for different types of injuries • Discuss measures in prevention and control of accidents and injury **2. Disaster management** • Describe disaster • Enumerate the steps in planning disaster management • Describe the steps of surveillance cycle **3. Sports medicine** • Describe sport medicine • Explain the role of sports physician in the practice of sports medicine • Discuss the female triad • Describe the pharmacological & legal aspects of Ergogenic aids in athletes **4. Ergonomics** • Describe concept of Ergonomics in Occupational Health • Describe the role of ergonomics science in work place

FORENSIC MEDICINE	**1. Personal Identity-I** • Define complete and partial identification • Briefly explain the role of objective and subjective methods of • Identification in forensic and medical settings • Discuss the cases in which identification of living and dead bodies is required • Describe the parameters of identification • List the criteria of determination of race **2. Personal identity-II** • Briefly explain the importance of odontological and radiological data in determination of age. • Describe the types of evidence of Sex determination (appearance and nuclear sexing) in normal and doubtful cases. • Explain the variations of normal sex • Describe the role of Dactylography in identification **3. Personal identity- III** • Describe the molecular basis of DNA • Explain the DNA Typing techniques (RFLP, PCR, STR, MT DNA, Y Chromosome Analysis) • Discuss the methods of collection and uses of DNA evidence • Justify the use of DNA in forensic sciences **4. Personal identity-IV** • Explain the identification of dead and decomposed bodies

	• Discuss the medico-legal importance of scars, acquired and congenital deformities, tattoo marks and hair in identificatio **5. Firearm Injuries lecture –I** • Describe basic terms related to ballistics & its types, types of cartridges/projectiles, and parts of a firearm weapon • List the types of gun powder • Explain the mechanism of fire in firearm weapons **6. Firearm injuries lecture – II** • Describe characteristic features of wound of entry and exit of firearms • Estimate distance of fire • List the features of fabricated firearm injuries • Explain the postmortem findings in cases of firearm injuries **7. Mass disasters** • Define Mass disasters according to World Health Organization • Describe Triage and its types, i.e., simple, Advance and Reverse • Explain the methods of identification of decomposed bodies, mutilated & burnt bodies, skeletal & fragmentary remains • Describe Super-imposition photography
INTERNAL MEDICINE	**1. Osteoarthritis** • Describe the clinical features, differential diagnoses and investigations for Osteoarthritis

	• Discuss the outline of management plan for the condition **2. Osteoporosis, Rickets and Osteomalacia** • Describe the etiology, clinical features, differential diagnoses and investigations for each of the conditions • Discuss the outline of management plan for the conditions **3. Musculoskeletal diseases (Inflammatory Arthritis)** • Describe the clinical features, laboratory tests, and imaging of the following musculoskeletal diseases: i. Rheumatoid Arthritis ii. Seronegative Spondylo-arthropathies
ORTHOPEDICS	**1. Presenting problems and investigations of Musculoskeletal diseases** • Describe the presenting problems and investigations of Musculoskeletal diseases **2. Fractures** • Classify the different types of fractures • Describe the specific types of fractures (hip, Colles', and pelvic fractures) • Discuss the general principles of management of fractures • Describe the therapeutic measures for different fractures, the principles of fracture treatment in children and common complications of fractures • Discuss the principles of fracture fixation
PATHOLOGY AND MICROBIOLOGY	**1. Overview of bone disease** • Briefly discuss matrix and cellular components of bone • Summarize development, homeostasis and remodeling

	of bone. **2. Developmental Disorders of Bone and Cartilage** • Discuss: I. Defects in nuclear proteins &transcription factors (Brachydactyly Cleidocranial dysplasia) II. Defects in hormones & signal transducing Proteins (Achondroplasia) III. Defects in extracellular structural proteins (Osteogenesis Imperfecta) diseases associated with mutations of Types II, IX, X, and XI collagen) IV. Defect in metabolic pathways (Osteopetrosis). **3. Acquired disorders of bone & cartilage I** • Define osteopenia & osteoporosis • Categorize generalized osteoporosis • Discuss the pathophysiology of postmenopausal & senile osteoporosis • Describe the clinical & morphological features of osteoporosis • Define Paget disease (osteitis deformans) • List the three phases of Paget disease • Discuss the pathogenesis of Paget disease • Describe the clinical & morphological features of Paget disease **4. Acquired disorders of bone & cartilage II** • Define rickets & osteomalacia. • Discuss the morphology & clinical features of rickets & osteomalacia.

- Discuss the role of parathyroid hormone in calcium homeostasis.
- Describe the morphological features of hyperparathyroidism.
- Define renal osteodystrophy.
- Discuss the pathogenesis of renal dystrophy

5. Fractures & osteonecrosis

- Define fractures & Osteonecrosis
- List the types of fractures & the conditions causing Osteonecrosis
- Describe the mechanism of bone repair after fractures
- Discuss the morphology & clinical course of osteonecrosis

6. Osteomyelitis

- Define Osteomyelitis
- List the organisms causing Osteomyelitis with various predisposing factors.
- Discuss the route, causes, morphological & clinical features of Pyogenic Osteomyelitis.
- Briefly discuss Mycobacterium Osteomyelitis & Skeletal Syphilis

7 Degenerative and autoimmune joint disease

- Define Osteoarthritis and Rheumatoid Arthritis (RA)
- Describe pathogenesis & morphological features of Osteoarthritis and RA
- Discuss clinical & specific laboratory diagnostic features of Osteoarthritis and RA
- Discuss treatment & complications of RA

8. Juvenile idiopathic arthritis (JIA), seronegative spondylarthropathies, Infectious arthritis

- Define juvenile idiopathic arthritis (JIA)
- Compare JIA with Rheumatoid arthritis.
- Briefly discuss its risk factors & classification
- Explain the features of seronegative spondyloarthritis
- Briefly discuss ankylosing spondylitis, reactive arthritis, enteritis associated arthritis & psoriatic arthritis
- Discuss the causative agents & presentation of supportive, mycobacterial, Lyme & viral arthritis

9. Crystal-induced arthritis (Gout & pseudo gout) and Joint tumors & tumors like conditions

- Classify gout
- Describe the pathogenesis, morphology & clinical features of gout & pseudo-gout
- Briefly discuss ganglion & synovial cyst
- Discuss pathogenesis, morphology & clinical features of teno-synovial giant cell tumor

10. Bone Tumors and Tumor-Like Lesions I

- Briefly discuss Osteoid Osteoma and Osteoblastoma
- Describe pathogenesis, morphology, clinical course of Osteosarcoma, Osteochondroma, Chondromas, and Chondrosarcoma

11. Bone Tumors and Tumor-Like Lesions II

- Describe pathogenesis, morphology, clinical course of

	Ewing Sarcoma, Giant Cell Tumor, and Aneurysmal Bone Cyst. • Discuss Fibrous Cortical Defect, Non-Ossifying Fibroma, Fibrous Dysplasia, and Metastatic Tumors.
PHARMACOLOGY	• **Pharmacology of Eicosanoids** • Classify eicosanoids • Discuss the synthesis, receptor mechanisms and organ system effects of eicosanoids • **Pain Management/Non-Steroidal Anti-Inflammatory Drugs (NSAIDs)-1** • Discuss the rationale of pain management • Classify NSAIDs • Describe their basic and clinical pharmacology • **Pain Management-II (Opioid Analgesics)** • Discuss the role of opioids in the management of moderate to severe pain • Classify narcotic analgesics • Describe the basic and clinical pharmacology of narcotic analgesics • **Anti-Rheumatic Agents-I & II** • Classify the drugs used in the treatment of rheumatoid arthritis and osteoarthritis • Discuss their basic and clinical pharmacology • **Drug Used in Osteoporosis and Osteomalacia** • Describe the rationale of management of osteoporosis& osteomalacia • Classify the drugs used in the treatment of osteoporosis and osteomalacia

	• Discuss their basic and clinical pharmacology **6. Drugs Used in Gout** • Describe the rationale of management of gout • Describe the drugs used in the treatment of gout • Discuss their mode of action, pharmacokinetics, dynamics and adverse effects.
RADIOLOGY	**1. Imaging of musculo-skeletal system** • Explain the role of radiologic imaging in musculo-skeletal system diseases • Describe the principles of MRI, isotope bone scans and CT scans
TUTORIALS **COMMUNITY MEDICINE**	**1. Disaster Management** • Demonstrate the steps of triage in a disaster Scenario • Produce an emergency medical kit checklist for disaster situations • Create a step-by-step plan for managing mass casualties in a disaster • Demonstrate the use of communication tools during a disaster response
FORENSIC MEDICINE	**1. Personal identity I (Forensic odontology)** • Determine the age of an individual from Odontological data and x-rays analysis, based on a minimum of ten case scenarios**.** **2. Personal identity II (Age estimation by Radiology)** • Describe the medico legal importance of age • Explain the medico legal importance of general examination and ossification data in age determination • Estimate age using skeletal maturity indicators from X-rays of long bones (epiphyseal fusion), based on a minimum of ten case scenarios.

	3. Personal identity III (Sex determination from bones) • Discuss the features of male vs female skeleton. • Determine the sex of an individual from the major differentiating bones (pelvis, skull, mandible, and sternum), based on a minimum of ten pictures, X-rays, or case scenarios. Describe the determination of sex in intersex states. **4. Personal identity IV (Osteometric indices)** • Describe the role of Osteometric indices of bones in determination of age, sex, and race and stature
PATHOLOGY	**1. Histopathology of bone tumors** • Discuss the morphological features of cartilage forming, bone forming tumors and tumors of unknown origin. **2. Clinical implication of synovial fluid analysis** • Correlate synovial fluid analysis with their representative diseases
PHARMACOLOGY	**1. Pain Management** • Discuss the basic and clinical pharmacology of NSAIDs and Opioids used in pain management **2. Treatment of Rheumatic Arthritis and Osteoarthritis** • Classify the drugs used in the management of rheumatoid Arthur and osteoarthritis • Discuss the basic and clinical pharmacology of drugs used in OA **3. Drug Management in Osteoporosis & Osteomalacia** • Classify the drugs used in the management of Osteoporosis and Osteomalacia • Discuss the basic and clinical pharmacology of drugs used in Osteoporosis and Osteomalacia

	4. Treatment of Gout • Classify the drug used in the management of Gout • Discuss the pharmacokinetics and dynamics of drugs used in Gout
INTERNAL ASSESSMENT	• Internal assessment will be according to JSMU policy. The details of internal assessment will be determined by the Respective institutions. Internal assessment carries 20% weightage in the final, end-of-year examination
ANNUAL EXAMINATION	MCQs and OSPE/ OSCE
Module Evaluation	Course will be evaluated through a feedback form which will be posted on the JSMU website