Dow University of Health Sciences

LOCOMOTION MODULE
(LCM 1)

First Year MBBS

FIVE YEAR CURRICULAR ORGANIZATION

<table>
<tr><th>Spiral</th><th>Year.</th><th colspan="5">Modules</th></tr>
<tr><td rowspan="4">First Spiral</td><td rowspan="2">I</td><td colspan="2">FND1- Foundation
Cell, Genetics & Cell Death (Basics of Anatomy, Physiology, Biochemistry,
Gen. Pathology, and Gen. Pharmacology, Community Medicine & Behavioral Sciences) 8 Weeks</td><td colspan="2">HEM1- Blood Module
Immunity, Inflammation, Tissue repair, Microbiology, Antimicrobials & Neoplasia
8 Week</td></tr>
<tr><td colspan="2">LCM1- Locomotion
Bones, Joints, Nerves & Muscles, 8 Week</td><td>RSP1- Respiratory System 4 wks</td><td>CVS1- Cardiovascular System 4Week</td></tr>
<tr><td rowspan="2">II</td><td colspan="2">NEU1- Nervous System
8 weeks</td><td>HNN1- Head & Neck & Special Senses 4 weeks</td><td>END1- Endocrinology
4 weeks</td></tr>
<tr><td colspan="2">GIL 1-GIT and Liver
8 week</td><td>EXC1- Renal and Excretory System
4 Week</td><td>REP1- Reproductive System 4 week</td></tr>
<tr><td rowspan="4">Second Spiral</td><td rowspan="2">III</td><td>IDD 1- Infectious diseases 4 week</td><td>HEM2- Hematology
4 week</td><td>RSP2- Respiratory System 4week</td><td>CVS2- Cardiovascular System 4 week</td></tr>
<tr><td colspan="2">GIL 2-GIT and Liver (including Nutritional Disorders) 8weeks</td><td>EXC2- Renal & Excretory System
4 wks</td><td>END2- Endocrinology
4 weeks</td></tr>
<tr><td rowspan="2">IV</td><td colspan="5">Half of the class will cover Ophthalmology in first 3 weeks of session and the other half will cover ENT modules during this period. The other half of batch will cover Eye/ENT in later half of session.</td></tr>
<tr><td colspan="2">OPH / ENT 3 week</td><td colspan="2">ORT2 Orthopedics / Trauma, 6 week</td><td>REP2- Reproductive System 8 Weeks</td></tr>
<tr><td>OPH / ENT 3 wk</td><td>PMR- Rheumatology & Rehabilitation 2 Weeks</td><td>DPS- Dermatology Plastic Surger / Burns 2 wk</td><td>GEN- Genetics 1 wk</td><td>NEU2- Neurosciences and Psychiatry
8 Weeks</td></tr>
<tr><td rowspan="2">Third Spiral</td><td rowspan="2">V</td><td colspan="5">Half of the class will cover Medicine & Allied and the other half will cover Surgery & Allied modules in first half of teaching year. The two halves will be exchanged in later half of teaching session.</td></tr>
<tr><td colspan="2">Clinical Rotation 9:30 onwards
(Ambulatory, Emergency, Intensive care)
In Medicine, Pediatrics, Cardiology and Neurology units
8:30 to 9:30 pm
▪ Lecture on problem based approach, twice a week
▪ Ward tutorial twice a week
▪ Student research presentation once a week</td><td colspan="3">Clinical Rotation 9:30 onwards
(Inpatient, Ambulatory, Emergency, Intensive care and Operation Theatres)
In Surgery, Gynecology & Obstetrics, Orthopedics and Neurosurgery.
8:30 to 9:30 pm
▪ Lecture on problem based approach, twice a week
▪ Ward tutorial twice a week
▪ Student research presentation once a week</td></tr>
<tr><td colspan="5">PARALLEL THEMES:
The following themes are not part of any individual module but shall run concurrently :
Communication Skills, Clinical Skills, Writing and Presentation Skills, Article Writing, Ethics</td></tr>
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RATIONALE

Timely diagnosis and management of bony, cartilaginous and neuromuscular disorders is essential to prevent disability and morbidity. A sound knowledge of structure and function of locomotor system forms the basis of understanding the rationale of diagnosis and management of the of limb disorders.

TERMINAL OBJECTIVE

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

- Describe anatomy of upper and lower limbs.
- Explain biochemistry of extracellular matrix related to cartilage and bones.
- Describe histology & embryology of bones, cartilages and muscles.
- Describe the role of calcium, Vit D and other minerals in bone metabolism
- Enlist and interpret various investigations used to diagnose diseases of locomotor system.

MODULE OBJECTIVES:

1. Describe the importance of mesoderm in embryology of skeletal system and related developmental disorders.
2. Identify the congenital anomalies of cartilages by discussing its structure and chemistry.
3. Correlate the types, structure and function of bones with background knowledge of mineral metabolism
4. Identify break in weight transmission from upper limb to axial skeleton due to fractures of bones of pectoral girdle & resulting disabilities
5. Associate the disorders of shoulder region such as winging of scapula and drooping of shoulder with structure of region involved.
6. Describe the structure of axillary and scapular region with associated clinical correlates.
7. Recognize the congenital anomalies of limbs by relating them with their development
8. Identify types of neuropathies due to damage to myelin sheath and axons by applying the knowledge of structure and function of nerves
9. Identify the disorders of neuromuscular transmission by relating them with physiology of neuromuscular junction
10. Relate the lesions of brachial plexus, with the knowledge of its formation and branches
11. Describe the structure of breast with special emphasis on lymphatic drainage of upper limb in carcinoma breast
12. Identify various nerve injuries of upper limb at different levels with the deformities they produce
13. Discuss the importance of brachial, radial and ulnar arteries
14. Describe the effects of humeral, radial and ulnar fractures on the structure and functions of limb
15. Recognize the importance of blood vessels around the elbow joint with localization of ante-cubital veins for drawing blood
16. Relate the actions of muscles with movements at joints of upper limb
17. Mark the surface anatomy of major nerves and vessels of upper limb ,
18. Identify the different landmarks in normal radiographs of upper limb
19. Identify the effects of break in weight transmission from axial skeleton to lower limb due to fractures of bones of pelvic girdle & thigh.
20. Identify the clinical effects of lumbosacral root and nerve compression
21. Recognize the importance of compartments of lower limb & the injuries as a result of wound of thigh.
22. Differentiate femoral from inguinal hernia
23. Discuss the importance of structures in gluteal region with special reference to Sciatica
24. Discuss hip joint & its movements to understand its deformities & dislocation
25. Discuss knee joint & its movements to understand its deformities

26. Discuss musculature and neurovascular supply of foot
27. Identify “flat foot” and its mechanical effects
28. Mark the surface anatomy of major nerves and vessels of lower limb
29. Identify the different landmarks in normal radiographs of lower limb

MODULE CONTENTS:

ANATOMY

Gross Anatomy:

1. LCM 1 Ang 1 **Osteology of clavicle**
2. LCM 1 Ang 2 **Osteology of scapula**
3. LCM 1 Ang 3 **Osteology of humerus**
4. LCM 1 Ang 4 **Muscles of pectoral girdle**
5. LCM 1 Ang 5 **Muscles of shoulder region with nerve supply,action**
6. LCM 1 Ang 6 **Shoulder joint & its movements**
7. LCM 1 Ang 7 **Structure of typical spinal nerve**
8. LCM 1 Ang 8 **Formation and relations of Brachial plexus Cutaneous Supply/dermatome of upper limb**
9. LCM 1 Ang 9 **Nerve injuries of upper limb**
10. LCM 1 Ang 10 **Axilla Boundaries and contents: Axillary Artery & Vein,axillary lymph nodes**
11. LCM 1 Ang 11 **Gross Anatomy of Breast**
12. LCM 1 Ang 12 **Muscles and nerves of arm**
13. LCM 1 Ang 13 **Brachial vessels + scapular anastomosis**
14. LCM 1 Ang 14 **Osteology of Ulna**
15. LCM 1 Ang 15 **Osteology of radius and hand**
16. LCM 1 Ang 16 **Elbow joint & arterial anastomosis around elbow**
17. LCM 1 Ang 17 **Superficial veins, lymphatics & lymph nodes of upper limb**
18. LCM 1 Ang 18 **Boundaries and contents of cubital fossa**
19. LCM 1 Ang 19 **Muscles of front of forearm& flexor retinaculum & space of parona**
20. LCM 1 Ang 20 **Muscles of back of forearm &extensor retinaculum**
21. LCM 1 Ang 21 **Nerves and vessels of forearm**
22. LCM 1 Ang 22 **Muscles of hand, movement of thumb, palmar aponeurosis, anatomical snuff box**
23. LCM 1 Ang 23 **Nerves & vessels of hand**
24. LCM 1 Ang 24 **Wrist joints & small joints of hands**
25. LCM 1 Ang 25 **Spaces of palm**
26. LCM 1 Ang 26 **Surface marking of structures of Upper Limb**
27. LCM 1 Ang 27 **Osetology of Hip Bone I**
28. LCM 1 Ang 28 **Osetology of Hip Bone II**
29. LCM 1 Ang 29 **Femur I: Osetology**
30. LCM 1 Ang 30 **Femur II: attachments**
31. LCM 1 Ang 31 **Formation of lumbosacral plexus, cutaneous supply, dermatomes of lower limb**
32. LCM 1 Ang 32 **Nerve injuries of lower limb**
33. LCM 1 Ang 33 **Superficial Veins of lower limb; Formation of great & small saphenous veins, Lymphatic Drainage**
34. LCM 1 Ang 34 **Deep fascia of thigh, iliotibial tract, saphenous opening**

35. LCM 1 Ang 35 **Muscles of anterior compartment of thigh**
36. LCM 1 Ang 36 **Nerves & vessels of anterior compartment of thigh**
37. LCM 1 Ang 37 **Medial compartment of thigh**
38. LCM 1 Ang 38 **Posterior compartment of thigh**
39. LCM 1 Ang 39 **Popliteal fossa**
40. LCM 1 Ang 40 **Femoral Sheath, Femoral ring and femoral canal + femoral triangle & its contents**
41. LCM 1 Ang 41 **Gluteal region**
42. LCM 1 Ang 42 **Hip joint & movements**
43. LCM 1 Ang 43 **Osteology of Tibia**
44. LCM 1 Ang 44 **Osteology of Fibula & bones of foot**
45. LCM 1 Ang 45 **Anterior & Lateral Compartment of Leg, Dorsum of foot**
46. LCM 1 Ang 46 **Posterior compartment of leg**
47. LCM 1 Ang 47 **Gross features, movement and applied anatomy of knee joint & genicular anastomosis**
48. LCM 1 Ang 48 **Sole, layers of Muscles, neurovascular supply of foot**
49. LCM 1 Ang 49 **Joints of foot : Ankle and superior and inferior tibiofibular**
50. LCM 1 Ang 50 **Arches of foot**
51. LCM 1 Ang 51 **Surface Anatomy of lower limb**
52. LCM 1 Ang 52 **Topographic Anatomy of upper limb Nomenclature**

Anatomy Histology:

1. LCM 1 Anh 1 **Classification& histology of cartilages**
2. LCM 1 Anh 2 **Histology of cartilage (LAB)**
3. LCM 1 Anh 3 **Classification & histology of bones**
4. LCM 1 Anh 4 **Histology of Bone (LAB)**
5. LCM 1 Anh 5 **Histology of Muscle (Lab)**

Anatomy Embryology:

1. LCM 1 Ane 1 **Development of mesoderm, Paraxial Mesoderm and Sclero-Myotome and formation of cartilages**
2. LCM 1 Ane 2 **Development of Bone, cartilage & joints**
3. LCM 1 Ane 3 **Development of Limbs, Congenital Anomalies of limbs**
4. LCM 1 Ane 4 **Development of Muscle**
5. LCM 1 Ane 5 **Development & histology of mammary gland**

PATHOLOGY

1. LCM 1 Pth 1 **Bone structure and function with developmental disorders**
2. LCM 1 Pth 2 **Pathology of bone associated with defects of Hormone**
3. LCM 1 Pth 3 **Pathology of bone associated with metabolic pathways**
4. LCM 1 Pth 4 **Acquired Disorders of bone and cartilage**
5. LCM 1 Pth 5 **Infections of bones**
6. LCM 1 Pth 6 **Developmental disorders of bones (LAB)**
7. LCM 1 Pth 7 **Fractures ; bone repair**

PHARMACOLOGY

1. LCM 1 Pha 1 **Ca Preps, Vit D preps,**
2. LCM 1 Pha 2 **NSAIDs, 1 classification & mechanism (Aspirin)**
3. LCM 1 Pha 3 **Classification of Non-narcotic analgesics (Acetaminophen)**

PHYSIOLOGY

1. LCM 1 Phy 1 **Generation and propagation of action potential**
2. LCM 1 Phy 2 **Electrical Properties of neurons (RMP)**
3. LCM 1 Phy 3 **Functional classification of nerve fibers**
4. LCM 1 Phy 4 **Introduction to power lab**
5. LCM 1 Phy 5 **Synaptic transmission aspects of neuromuscular transmission**
6. LCM 1 Phy 6 **Disorders of neuromuscular transmission**
7. LCM 1 Phy 7 **Power Lab: Recording of NCV's**
8. LCM 1 Phy 8 **Properties of muscle fiber**
9. LCM 1 Phy 9 **Muscle Physiology 1**
10. LCM 1 Phy 10 **Muscle Physiology 2**
11. LCM 1 Phy 11 **Power Lab: EMG recording**
12. LCM 1 Phy 12 **Hormonal Regulation of bone metabolism**
13. LCM 1 Phy 13 **Physiology of Pain**
14. LCM 1 Phy 14 **Muscular adaptation to exercise (Sports physiology)**
15. LCM 1 Phy 15 **Simple muscle twitch (LAB)**
16. LCM 1 Phy 16 **Tetanization & Summation (LAB)**
17. LCM 1 Phy 17 **Fatigue (Practical)**
18. LCM 1 Phy 18 **Classification of Nerve fiber (Tutorial)**

BIOCHEMISTRY

1. **LCM 1 Bio 1 Extra Cellular matrix (Proteoglycans)**
2. **LCM 1 Bio 2 Extracellular matrix related to collagen**
3. **LCM 1 Bio 3 Chemistry of Cartilage**
4. **LCM 1 Bio 4 Biochemical Structure of Bone**
5. **LCM 1 Bio 5 Vitamin D Metabolism**
6. **LCM 1 Bio 6 Interpretation of markers of bone diseases**
7. **LCM 1 Bio 7 Regulation of Parathyroid hormones (Tutorial)**

NEUROLOGY

1. **LCM 1 Neur 1 Clinical examination of nerves of upper limb**
2. **LCM 1 Neur 2 Clinical examination of nerves of lower limb**

RADIOLOGY

1. **LCM 1 Rad 1 Introduction to Radio-Imaging Modalities**
2. **LCM 1 Rad 2 Application to radio imaging modalities with Respect to Skeletal system**
3. **LCM 1 Rad 3 Normal x-ray of Upper & lower limb**
4. **LCM 1 Rad 4 Cross section of Upper &lower limb**

COMMUNITY MEDICINE

1. **LCM 1 Com 1 Health transition**
2. **LCM 1 Com 2 Health promotion and Health education**
3. **LCM 1 Com 3 Disaster Management and control**
4. **LCM 1 Com 4 Health of elderly**
5. **LCM 1 Com 5 Snake Bite**

BEHAVIORAL SCIENCES

1. LCM 1 Beh 1 **Intro to Medical Ethics**
2. LCM 1 Beh 2 **Principal of Medical Ethics**
3. LCM 1 Beh 3 **Ethical analysis in clinical work**
4. LCM 1 Beh4 **Duties and responsibilities of doctor**

ORTHOPAEDIC

1. LCM 1 Ort 1 **Trauma to upper limb (Fractures and dislocation)**
2. LCM 1 Ort 2 **Trauma to Lower limb (Fractures and dislocation)**
3. LCM 1 Ort 2 **Soft tissue disorders of upper limb**

Integrated Learning (CBL)

1. LCM 1 Cbl 1 **Osteomalacia**
2. LCM 1 Cbl 2 **Mass in the breast**
3. LCM 1 Cbl 3 **Supra condylar fractures of humerus**
4. LCM 1 Cbl 4 **Ulnar Nerve Palsy**
5. LCM 1 Cbl 5 **Gun Shot**
6. LCM 1 Cbl 6 **S1 Radiculopathy**
7. LCM 1 Cbl 7 **Myesthenia Gravis**

CASE BASED LEARNING

1. **CBL 1**

   - Define osteomalacia
   - Describe the pathophysiology of osteomalacia
   - Interpret role of Vit D and Calcium in bone formation
   - Elaborate the effect of Vit D and calcium deficiency

2. **CBL 2**

   - Describe the Anatomy of the axilla.
   - Describe the Anatomy of the breast and relationship to the axilla
   - Define Clinical importance of axilla in relation to breast diseases

3. **CBL3**

   - Identify the normal structures related to elbow joint
   - Relate the changes that may occur due to fracture in this area
   - Identify radiological anatomy of upper limb
   - Recognize that injury to one structure is not isolated but also involves other adjacent structures

4. **CBL 4**

   - Enumerate the normal structures of the elbow region
   - Describe the neurovascular relations of the elbow joint
   - Describe the common injury patterns of this region
   - Differentiate the various neurovascular injuries at the elbow

5. **CBL 5**

   - Describe anatomy of major vessels in the thigh.
   - Correlate Blood loss which can be associated with gunshot injury.
   - Explain clinical assessment of nerves of lower limb.
   - Describe that an injury at thigh can damage various tissues locally and can be associated with systemic complications

6. **CBL 6**

   - Describe the motor and sensory distribution of lumbar and sacral nerve roots.
   - Recognize the features that occur due to disease of a certain nerve root.
   - Correlate the motor and sensory impairment to identify the level of nerve root involved.

7. **CBL 7**

   - Recognize the causes of weakness in the limb.
   - Identify modalities of investigation of muscular disorders.
   - Recognize the genetic basis of muscle diseases.
     Understand the finding of Electrophysiology (EMG / NCVs)

LEARNING OBJECTIVE OF SKILL LAB CURRICULUM

❖ ORTHO 1: Locomotion Module:

I. VITAL SIGNS:

INTRODUCTION/RATIONALE:

This is one of the first skills that a healthcare professional needs when dealing with patients generally and specially in suspected cases of shock due to injuries. Accurate measurement of vital signs is of prime importance in the decision making process for diagnosis and management. Students will watch demonstration videos and then practice the measurement of five vital signs.

The module is divided into two sub modules and will be taught in two sessions.
Module 2A- Temperature, Pulse, Respiration and Pain
Module 2B- Measuring Blood Pressure

LEARNING OBJECTIVES:

After The Sessions The Student Should Be Able To:

- ❖ Demonstrate the correct methods of assessing Vital Signs.
- ❖ Demonstrate effective communication skills during and after assessment.

Sub Topic Learning Objectives

TEMPERATURE

1. Identify different types of thermometer
2. List the four sites for assessing temperature and Recognize expected differences between the measurements obtained at different sites.
3. Demonstrate how to take oral temperature and read the thermometer accurately.

PULSE

4. Identify seven sites where pulse may be counted (Superficial Temporal radial, carotid, femoral, popliteal, posterior tibial, dorsalis pedis)
5. Demonstrate correct palpation of radial pulse, count the pulse rate and note its rhythm accurately.
6. Describe method of assessing pulse in infants (heart rate in neonates and brachial pulse in infants)

RESPIRATORY RATE

7. Demonstrate how to count and record respiratory rate accurately

PAIN

8. Demonstrate the ability to use a pain measurement scale (faces pain scale, visual analog

scale) to evaluate the intensity of patient's pain.

9. Demonstrate the ability to empathize with the patient in pain

BLOOD PRESSURE:

10. Identify the different parts of the instruments (stethoscope and sphygmomanometer) and their types.
11. Demonstrate proper placement of BP cuff on the arm and thigh.
12. Demonstrate how to measure and record blood pressure accurately
13. Describe and demonstrate the methods used to assess blood pressure in different pediatric age groups.
14. Demonstrate appropriate communication skills before, during and after the procedure.

II. Basic life Support:

Rationale:

The skills learned in this class will enable students to recognize emergencies such as sudden cardiac arrest &know how to respond to them, as cardiac arrest is a leading cause of death worldwide.

Learning Objectives:

At the end of the session student should be able to

1. Demonstrate the basic steps of CPR for adults & infants

ASSESMENT PLAN:

SUMMATIVE ASSESMENT	WEIGHTAGE
ANNUAL EXAM	**70%**
MODULE EXAM (INTERNAL EVALUATION)	**30%**

CREDIT HOURS	
Locomotor module	**9**

CREDIT HOURS

Discipline	Credit Hours
Anatomy	4.874
Biochemistry	0.405
Physiology	1.031
Pathology	0.437
Pharmacology	0.187
Community Medicine	0.375
Behavioral Sciences	0.218
Neurology	0.156
Radiology	0.312
Orthopedic	0.218
CBL	0.562
Skill Lab	0.125

BOOKS

ANATOMY

- **CLINICALLY ORIENTED ANATOMY**
  KEITH.L.MOORE, Arthur F. Dalley, Anne M.R. Agur
  7th or Latest EDITION

- **GRAY'S ANATOMY FOR STUDENTS**
  Drake & Vogl & Mitchell
  3rd or Latest EDITION

- **CLINICAL ANATOMY BY REGIONS (REFERENCE BOOK)**
  Richard S. SNELL
  9th EDITION

- **LAST'S ANATOMY: REGIONAL & APPLIED (REFERENCE BOOK)**
  Chummy S. Sinnatamby
  12th or Latest EDITION

- **ATLAS OF HUMAN ANATOMY**
  FRANK H.NETTER
  6th EDITION

EMBRYOLOGY

- **LANGMAN'S MEDICAL EMBRYOLOGY**
  T.W.SADLER
  13th EDITION

- **THE DEVELOPING HUMAN CLINICALLY ORIENTED EMBRYOLOGY (REFERENCE BOOK)**
  MOORE & PERSAUD & TORCHIA
  10th EDITION

HISTOLOGY

- **MEDICAL HISTOLOGY**
  LAIQ HUSSAIN SIDDIQUI
  5TH or Latest EDITION

- **WHEATERS FUNCTIONAL HISTOLOGY**
  BARBARA YOUNG
  5th EDITION

- **BASIC HISTOLOGY(TEXT AND ATLAS) (REFERENCE BOOK)**
  LUIZ JUNQUEIRA, JOSE CARNEIRO
  11th or Latest EDITION

PHYSIOLOGY

- **GUYTON AND HALL TEXTBOOK OF MEDICAL PHYSIOLOGY**
  GUYTON AND HALL
  13th EDITION
- **GANONGS REVIEW OF MEDICAL PHYSIOLOGY**
  25TH EDITION

BIOCHEMISTRY

- **LIPPINCOTT'S ILLUSTRATED REVIEWS SERIES**
  DENISE R. FERRIER
  6th EDITION

- **HARPERS ILLUSTRATED BIOCHEMISTRY (REFERENCE BOOK)**
  VICTOR RODWELL, DAVID BENDER, KATHLEEN M. BOTHAM, PETER J. KENNELLY,
  P. ANTHONY WEIL
  28th EDITION

PATHOLOGY

- **ROBBINS BASIC PATHOLOGY**
  KUMAR & ABBAS
  9TH EDITION

- **ROBBINS & COTRAN PATHOLOGIC BASIS OF DISEASE (REFERENCE BOOK)**
  KUMAR & ABBAS & ASTER
  9th EDITION

COMMUNITY MEDICINE

- **PUBLIC HEALTH AND COMMUNITY MEDICINE**
  SHAH, ILYAS, ANSARI
  7th EDITION

PHARMACOLOGY

- **LIPPINCOTT'S ILLUSTRATED REVIEW PHARMACOLOGY**
  KAREN WHALEN
  6th or Latest Edition

- **BASIC AND CLINICAL PHARMACOLOGY (REFERENCE BOOK)**
  BERTRAM G. KATZUNG
  11th EDITION

MICROBIOLOGY

- **REVIEW OF MEDICAL MICROBIOLOGY AND IMMUNOLOGY**
  WARREN LEWINSON
  14th EDITION

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Approved by:
Dean, Basic Sciences
Chairpersons Basic Sciences
Curriculum Committee

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