

**RYK Medical College**

Department of Medical Education



**Study Guide**

**Module 3: Musculoskeletal/Locomotion (Block 2)**

**Academic Year 2024-25**

**(9 weeks & 3 Days)**

**Integrated and Modular**

**First year M.B.B.S**

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| LIST OF ABBREVIATIONS |
| A | Anatomy | **HCL** | Hydrochloric acid |
| ABG | Arterial blood gas | **H&E** | Hematoxylin and eosin |
| Ag | Aging | **HL** | Hematopoietic and lymphatic |
| AKI | Acute kidney injury | **HMP** | Hexose monophosphate |
| ALT | Alanine transaminase | **HNSS** | Head & neck special senses |
| AMP | Adenosine Monophosphate | **ICF** | Intra cellular fluid |
| ANS | Autonomic nervous system | **IL** | Interleukin |
| AST | Aspartate transaminase | **IN** | Inflammation |
| AV | Atrioventricular | **INR** | International normalized ratio |
| B | Biochemistry | **IUD** | Intrauterine device |
| Bhs | Behavioral sciences | **IUGR** | Intra uterine growth restriction |
| C | Civics | **JVP** | Jugular venous pressure |
| CBC | Complete blood count | **LDH** | Lactate dehydrogenase |
| C-FRC | Clinical-Foundation Rotation Clerkship | **M** | Medicine |
| CK | Creatine kinase |  **MALT** |  Mucosa associated lymphoid tissue |
| CM | Community medicine | **MCH** | Mean corpuscular hematocrit |
| CNS | Central nervous system | **MCV** | Mean corpuscular volume |
| CO | Carbon monoxide | **MRI** | Magnetic resonance imaging |
| CO2 | Carbon dioxide | **MS** | Musculoskeletal |
| COPD | Chronic obstructive pulmonary disease | **MSD** | Musculoskeletal disorders |
| COX | Cyclooxygenase | **NEAA** | Non essential amino acids |
| CPR | Cardio pulmonary resuscitation | **NMJ** | Neuromuscular junction |
| CT | Computed tomography | **NS** | neurosciences |
| CV | Cardiovascular | **O** | Ophthalmology |
| CVA | Cerebral vascular accident | **Or** | Orientation |
| DALY | Disability adjusted life year | **P** | Physiology |
| DCMLS | Dorsal column medial lemniscus system | **Pa** | Pathology |
| DLC | Differential leukocyte count | **PAF** | Platelet activating factor |
| DNA | Deoxy ribonucleic acid | **PBL** | Problem based learning |
| ECF | Extra cellular fluid | **PCR** | Polymerase chain reaction |
| ECG | Electrocardiography | **PDGF** | Platelet derived growth factor |
| ECP | Emergency contraceptive pill | **Pe** | Pediatrics |
| EEG | Electroencephalogram | **PEM** | Protein energy malnutrition |
| EnR | Endocrinology and reproduction |  **PERLs** | Professio Ethic Research Leadership |
| ENT | Ear Nose Throat | **PH** | Pharmacology |
| ER | Emergency room | **PNS** | Peripheral nervous system |
| F | Foundation | **Psy** | Psychiatry |
| FEV1 | Forced expiratory volume 1 | **PVC** | Premature ventricular contraction |
| FM | Forensic medicine | **QALY** | Quality adjusted life years |
| FVC | Forced vital capacity | **QI** | Quran & Islamiat |
| GFR | Glomerular filtration rate | **R** | Renal |
| GIT | Gastrointestinal tract | **Ra** | Radiology |
| GMP | Guanosine monophosphate | **RBCs** | Red blood cells |
| GO | Gynecology and obstetrics | **SA** | Sinoatrial |
| RDA | Recommended dietary allowance | **TCA** | Tricarboxylic acid cycle |
| Re | Respiratory | **TNA** | Tumor necrosis factor |
| RFLP | Restriction fragment length polymorphism | **USG** | Ultrasonography |
| RMP | Resting membrane potential | **UTI** | Urinary tract infection |
| RNA | Ribonucleic acid | **WBCs** | White blood cells |
| S | Surgery |  |  |

**CURRICULUM FRAMEWORK**

 The University of Health Sciences Lahore has designed a five year modular framework For integrated curriculum based on specific systems, clinical clerkships, Quran and Professionalism.

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| **Curriculum framework** |
| **Year 01** | **Modules** | **Block 1** | **Block 2** | **Block 3** |
| * Foundation -1
* Hematopoietic & Lymphatic
 | * Musculoskeletal and locomotion - 1
 | * Cardiovascular -1
* Respiratory - 1
 |
| PERLS-1, Quran-1, Islamiat & Civics, Pakistan Studies, English |
| C-FRC -1(Clinical-Foundation, Rotation, Clerkship) |
|  |
| **Year 02** | **Modules** | **Block 4** | **Block 5** | **Block 6** |
| * GIT & Nutrition –1
* Renal – 1
 | * Endocrinology & Reproduction – 1
* Head & Neck, Special senses
 | * Neurosciences – 1
* Inflammation - 1
 |
| PERLS-2, Quran Pak-2, Islamiat, Civics & Pakistan Studies, English |
| C-FRC -2(Clinical-Foundation, Rotation, Clerkship) |
|  |
| **Year 03** | **Modules** | **Block 7** | **Block 8** | **Block 9** |
| * Foundation – 2
* Infectious Diseases
* Neoplasia
* Musculoskeletal & Locomotion - 2
 | * Hematopoietic, Immunity & Transplant
* Cardiovascular - 2
 | * Respiratory – 2
* Forensic Medicine
* Community Medicine & Family Health - 1
 |
| PERLS - 3, Quran Pak – 3 |
| C-FRC -3 (Clinical-Foundation, Rotation, Clerkship) |
|  |  |  |
| **Year 04** | **Modules** | **Block 10** | **Block 11** | **Block 12** |
| * Renal – 2
* Endocrinology & Reproduction – 2
* GIT & Nutrition-2
* Neurosciences - 2
 | * Maternal & Child Health
* Ophthalmology
* Otorhinolaryngology
 | * Community Medicine & Family Health - 2
* Psychiatry & Behavioral Sciences
 |
| PERLS – 4, Quran Pak – 4, Electives & BLS Workshops |
| C-FRC - 4 (Clinical-Foundation, Rotation, Clerkship) |
|  |
| **Year 05** | **Modules** | * Gynecology & Obstetrics
* Pediatrics
* Medicine & Allied
* Surgery & Allied
 |
| C-FRC -5 (Clinical-Foundation, Rotation, Clerkship) |

**INTRODUCTION TO STUDY GUIDE**

**WHAT IS A STUDY GUIDE?**

This study guide is prepared for the students of 1st year MBBS admitted in RYKMC for session 2024-25 affiliated with University of Health Sciences Lahore (UHS). The learners (1st year MBBS students) will be able to:-

* Organize the learning program module for the session 2024-25.
* Manage their studies as per guidance provided throughout the module.
* Learn the assessment tools, rules & regulations governing the module.

**THE STUDY GUIDE:**

* Communicates information on organization and management of the module. This will help the student to contact the right person in case of any difficulty.
* Defines the objectives which are expected to be achieved at the end of the module.
* Identifies the learning strategies such as lectures, small group teachings, clinical skills, demonstration, tutorial and case based learning that will be implemented to achieve the module objectives.
* Provides a list of learning resources such as books, computer assisted learning programs, web- links, and journals for students to consult in order to maximize their learning.
* Highlights information on the contribution of continuous and Term examinations on the student’s overall performance.
* Includes information on the assessment methods that will be held to determine every student’s achievement of objectives.
* Focuses on information pertaining to examination policy, rules and regulations.

**MODULE INTRODUCTION**

**Module/ course Name:** Musculoskeletal/Locomotion (Module 3, Block 2)

**Block duration:** 9 weeks & 3 Days

**Module duration**: 9 weeks & 3 Days

**Year:** 1st

**Block:** 2

**Start Date:** --- of ------ 2024-25

**End Date:** ---- of -------- 2024-25 (end date may be changed as per summer holidays announced by University of Health Sciences Lahore)

**Departments** = Anatomy, Physiology, Biochemistry, pharmacology, pathology, community medicine, clinical skill foundation (hospital), medicine, surgery, gynecology & obstetrics, pediatrics, behavioral sciences, Holy Quran/Islamiat & Pakistan studies.

**Daily timings:** 8:00 AM to 4:00 PM

**No. of hours:** 8 hours per day including (20 min tea break & 40 min prayer/lunch break)

**Teaching hours:** Teaching hours 07 per day, 35 hours per week

**Test dates : ----/-----/2024/25**

**Class test venue:** ----- of ------ 2024-25 (02:00-04:00 Pm)

(Roll # 0/1-50 multipurpose hall, 51 -100 skill lab).

(All subjects MCQs only)

**Active learning details**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subjects** | **TBL** | **PBL** | **CBL** | **SGD** | **Tuto** | **Demo** |
| **Anatomy** | × | × | × | × | × | 14 |
| **Physiology** | 1 | 1 | 1 | 1 | 2 | 1 |
| **Biochemistry** | 1 | 1 | 1 | 1 | 1 | 1 |
| **Pharmacology** | × | × | × | × | × | × |
| **Pathology** | × | × | × | × | × | × |
| **Com medicine** | × | × | × | × | × | × |
| **Behav sciences** | × | × | × | × | × | × |

**THEMES**

 Pectoral Region & Axilla

 Upper limb

 Pelvic Girdle

 Lower Limb

**CLINICAL RELEVANCE**

 Congenital anomalies of limb

 Joint Dislocation

 Fracture

 Multiple Sclerosis, Astrocytoma, Alzheimer’s Disease

 Myopathy, Muscular Dystrophy

**YEAR 1 & MODULE COMMITTEES**

**Year 1 committee**

* Prof Dr Tariq M Rehan (HOD DME) (Principal)
* Prof Dr Tehseen Iqbal (HOD Physiology) (Vice. Principal)
* Prof Dr Ghaffar Ansari (HOD Anatomy), Prof Dr Zia ur Rehman Alvi
* Prof Dr Dr Shafqat Nazeer (HOD Biochemistry)
* Prof Dr Abdul Hakeem (HOD Pathology)
* Prof Dr M Amir Rafique (HOD Pharmacology)
* Prof Dr Javed Akhter (HOD Community Medicine)
* Prof Dr M saleem (HOD Forensic medicine)

**Module committee**

* Dr Raja Faisal Zulfiqar (Anatomy)
* Dr Rahil Adil (Physiology)
* Dr khalida anwar (Biochemistry)
* Dr Naqeeb (Pathology)
* Dr Ali Hussain (community medicine)

**PBL, TBL & CBL Committee**

* Prof Dr Tariq M Rehan (HOD DME) (Principal)
* Prof Dr Tehseen Iqbal (HOD Physiology) (Vice. Principal)
* Prof Dr Ghaffar Ansari (HOD Anatomy), Prof Dr Zia ur Rehman Alvi
* Prof Dr Dr Shafqat Nazeer (HOD Biochemistry

**Mentoring committee**

* Prof Dr Abdul Hakeem (HOD Pathology)
* Prof Dr M Amir Rafique (HOD Pharmacology)
* Prof Dr Javed Akhter (HOD Community Medicine)
* Prof Dr M saleem (HOD Forensic medicine)

**Module coordinator:**

* Anatomy: Dr Raja Faisal Zulfiqar
* Biochemistry: Dr Dost M kalhoro
* Physiology: Dr Sadia Javiad
* Pharmacology: Dr Tesneem Yasmin
* Pathology: Dr Syed Naqeeb
* Community medicine: Dr Ali Hussain
* Medicine: Dr Abdul Waheed
* Surgery: Dr Jahangeer
* Pediatrics: Dr Masood
* Gynecology & obstetrics: Dr Farhat Yasmeen
* Behavioral sciences: Dr Mehwish Adnan

**Planning committee**

Department of medical education

**TEACHING FACULTY**

* Anatomy: Prof Dr Ghaffar Ansari, Prof Dr Zia Ur Rehman Alvi, Dr Raja Faisal Zulfiqar
* Biochemistry: Prof Dr Shafqat Nazir, Dr Khalida Anwar, Dr Dost M kalhoro
* Physiology: Prof Dr Tehseen Iqbal, Dr Rahila Adil, Dr Sadia Javaid
* Pharmacology: M Amir Rafique
* Pathology: Prof Dr Abdul Hakeem, Dr Syed Naqeeb Ali
* Community medicine: Dr Ali Hussain,
* Medicine: Prof Dr Akhter Masood
* Surgery: Prof Dr Tariq Mehmood Rehan
* Pediatrics: Prof Dr Hafiz M Tayyab
* Gynecology & obstetrics: Assoc Prof Dr Iffat Yasmin
* Behavioral sciences: Dr Mehwish Adnan
* Holy Quran & Islamiyat: Miss Kanwal
* Pakistan studies: Mr Jaffar
* Civics: Dr A Majid
* PERLs: Dr M Tariq Karim
* English: Miss Anum

**TEACHING METHODOLOGIES/STRATEGIES**

* Large group interactive sessions
* Tutorials
* Demonstrations
* Lab practical
* Simulations
* Team based learning
* Case based learning
* Problem based learning
* Small group discussions

**VENUE MUSKULOSKELETAL MODULE**

|  |  |  |  |
| --- | --- | --- | --- |
| **GROUPING** | **LECTURES** | **PBL/CBL** | **SGD** |
| **Group A** (1-33)**Group B** (34-66)**Group C** 67-100) | Anatomy → LH - 05Physiology → LH - 02Biochemistry → LH - 01Pathology → LH 04Pharmacology → LH 03Com medicine → LH 03Rest of all → LH 01**(PRACTICALS)**Corresponding labs | Anatomy → DR - 05Physio → DR - 02Biochem → DR - 01Patho → DR 04Pharma → DR 03Com med → DR 06 | Tutorial room2nd floor |
| **Demonstrations****Anatomy****1-25 =** DR 5**26-50 =** DR 6**51-75 =** DR 3**76-100 =** DR 4 | **TBL/Demo****Group A**Multi - purpose hall**Group B**Skill lab**Group C**Corresponding lab |
| **TUTORIAL**  **Group A** - Skill lab **Group B** - Tutorial room**Group C**-Corresponding lab |

**WEEKLY TIME TABLES**

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| **(Week 1): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Anatomy**MS-A-072**Histology**Dr G.Ansari | **LGIS****PERLS**1-08Dr M Tariq.K | **Tea break** | **Demonstration Anatomy**MS-A-003-C | **LGIS****Physiology**MS-P-001-ADr Tehseen.I | **Pray & lunch break** | **Practical/Skill Lab/Tutorial 1**Group A **SKILL LAB 1**Group B **Physiology**-Tuto-MSP-001BGroup C **Biochemistry** **(P-1)** |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Tuesday** | **LGIS****Anatomy**MS-A-065**Embryology**Dr Z.Alvi | **LGIS****Biochemistry**MS-B-001-ADr Shafqat | **Demonstration** **Anatomy**MS-A-004-A | **LGIS****Physiology**MS-P-001-CDr Raheela.A | **Practical/Skill Lab/Tutorial 1**Group A **Biochemistry** **(P-1)**Group B **Anatomy (P-1)**Group C **SKILL LAB 1** |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Wednesday** | **LGIS****Pakistan studies**EthnicityMr Jaffar | **LGIS****Anatomy**MS-A-001-AGrossDr R.Faisal | **LGIS****Anatomy**MS-A-001-B**Gr-anatomy**Dr G.Ansari | **LGIS****Physiology**MS-P-002-ADr Sadia.J | **LGIS****Anatomy**MS-A-002-A**Gr-anatomy**Dr Z.Alvi | **Practical/Skill Lab/Tutorial 1**Group A **Physiology**-Tuto-MSP-001BGroup B **SKILL LAB 1**Group C **Anatomy (P-1)** |
| **Thursday** | **LGIS****Pharmacology**MS-Ph-001ADr Zameer.AS | **LGIS****Anatomy**MS-A-002-B**Gr-anatomy**Dr R.Faisal | **LGIS****Anatomy**MS-A-003-A**Gr-anatomy**Dr G.Ansari | **LGIS****Biochemistry**MS-B-001-BDr Dost.M | **LGIS****Anatomy**MS-A-003-B**Gr-anatomy**Dr Z.Alvi | **Practical/Skill Lab/Tutorial 1**Group A **Anatomy (P-1)**Group B **Biochemistry** **(P)**Group C **Physiology**-Tuto-MSP-001B |
| **Friday** | **LGIS****Pathology**MS-Pa-001ADr Hakeem.Ch | **LGIS****Physiology**MS-P-002-BDr Safi.R | **LGIS****Anatomy**MS-A-003-D**Gr-anatomy**Dr R.Faisal | **LGIS****Biochemistry**MS-B-002-ADr Khalida.A | **LGIS****Anatomy**MS-A-003-E**Gr-anatomy**Dr G.Ansari | **CLINICAL SKILLS FOUNDATION - 1** Please refer to clinical skills manual for Wards and groups distribution |

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| **(Week 2): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Anatomy** MS-A-073**Histology**Dr Z.Alvi | **PERLS****1-09** | **Tea break** | **LGIS****Anatomy** MS-A-003-F**Gr-anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-003-ADr Tehseen.I | **LGIS****Anatomy** MS-A-004-B**Gr-anatomy**Dr G.Ansari | **Pray & lunch break** | **Practical/Skill Lab/CBL/TBL 2**Group A **SKILL LAB 2**Group B **Physiology**-**CBL**-MSP-003-BGroup C **Biochemistry**-**TBL**-MSB-002B |
| **Tuesday** | **LGIS****Anatomy** MS-A-066**Embryology**Dr Z.Alvi | **LGIS****Biochemistry**MS-B-003ADr Shafqat | **LGIS****Anatomy** MS-A-005**Gr-anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-004-ADr Raheela.A | **LGIS****Anatomy** MS-A-006-A**Gr-anatomy**Dr G.Ansari | **Practical/Skill Lab/CBL/TBL 2**Group A **Biochemistry**-**TBL**-MSB-002BGroup B **Anatomy (P-2)**Group C **SKILL LAB 2** |
| **Wednesday** | **LGIS****Pathology**MS-Pa-001BDr Hakeem.Ch | **LGIS****Anatomy** MS-A-006-B**Gr-anatomy**Dr Z.Alvi | **Demonstration** **Anatomy**MS-A-007 | **LGIS****Physiology**MS-P-004-BDr Sadia.J | **Practical/Skill Lab/CBL/TBL 2**Group A **Physiology**-**CBL**-MS-P-003-BGroup B **SKILL LAB 2**Group C **Anatomy (P-2)** |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Thursday** | **LGIS****Aging**MS-Ag-001Dr A Yar.M | **LGIS****Anatomy** MS-A-006-C**Gr-anatomy**Dr R.Faisal | **LGIS****Anatomy** MS-A-008-A**Gr-anatomy**Dr G.Ansari | **LGIS****Biochemistry**MS-B-003-BDr Dost.M | **LGIS****Anatomy** MS-A-008-B**Gr-anatomy**Dr Z.Alvi | **Practical/Skill Lab/CBL/TBL 2**Group A **Anatomy (P-2)**Group B **Biochemistry-TBL**-MSB-002BGroup C **Physiology**-**CBL**-MS-P-003-B |
| **Friday** | **LGIS****Com Med**MS-CM-001-ADr Ali.H | **LGIS****Anatomy** MS-A-008-C**Gr-anatomy**Dr R.Faisal | **LGIS****Anatomy** MS-A-009**Gr-anatomy**Dr G.Ansari | **LGIS****Physiology**MS-P-004-CDr Safi.R | **LGIS****Anatomy** MS-A-010-A**Gr-anatomy**Dr Z.Alvi | **CLINICAL SKILLS FOUNDATION - 2** Please refer to clinical skills manual for Wards and groups distribution |

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| **(Week 3): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Anatomy** MS-A-074**Histology**Dr R.Faisal | **LGIS****PERLS**1-10Dr M Tariq.K | **Tea break** | **LGIS****Anatomy** MS-A-010-B**Gr-anatomy**Dr G.Ansari | **LGIS****Biochemistry**MS-B-003-CDr Khalida.A | **LGIS****Anatomy** MS-A-010-C**Gr-anatomy**Dr Z.Alvi | **Pray & lunch break** | **Practical/Skill Lab/SGD/Tutorial 3**Group A **SKILL LAB – 3**Group B **Physiology**-SGD-MS-P-005Group C **Biochemistry**-**Tuto**-MSB-004A |
| **Tuesday** | **LGIS****Com Med**MS-CM-001-BDr Ali.H | **LGIS****Biochemistry**MS-B-004-BDr Shafqat | **LGIS****Anatomy** MS-A-011-A**Gr-anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-006-ADr Tehseen.I | **LGIS****Anatomy** MS-A-011-B**Gr-anatomy**Dr G.Ansari | **Practical/Skill Lab/SGD/Tutorial 3**Group A **Biochemistry**-**Tuto**-MSB004AGroup B **Anatomy (P-3)**Group C **SKILL LAB – 3** |
| **Wednesday** | **LGIS****Pharmacology**MS-Ph-001-BDr Zameer.AS | **LGIS****Anatomy** MS-A-067**Embryology**Dr Z.Alvi | **LGIS****Anatomy** MS-A-011-A**Gr.Anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-006-BDr Raheela.A | **LGIS****Anatomy** MS-A-012-A**Gr.Anatomy**Dr G.Ansari | **Practical/Skill Lab/SGD/Tutorial 3**Group A **Physiology**-SGD-MS-P-005Group B **SKILL LAB – 3**Group C **Anatomy (P-3)** |
| **Thursday** | **LGIS****Pathology**MS-Pa-002-ADr Hakeem.Ch | **LGIS****Anatomy** MS-A-012-B**Gr.Anatomy**Dr Z.Alvi | **Demonstration Anatomy** MS-A-013-A | **LGIS****Physiology**MS-P-006-CDr Sadia.J | **Practical/Skill Lab/SGD/Tutorial 3**Group A **Anatomy (P-3)**Group B **Biochemistry**-**Tuto**-MSB-004AGroup C **Physiology**-SGD-MS-P-005 |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Friday** | **Demonstration Anatomy** MS-A-13-B | **LGIS****Anatomy** MS-A-014**Gr.Anatomy**Dr R.Faisal | **LGIS****Com Med**MS-CM-002-ADr Ali.H | **LGIS****Biochemistry**MS-B-005-A**Gr.Anatomy****Dr Dost.M** | **CLINICAL SKILLS FOUNDATION - 3** Please refer to clinical skills manual for Wards and groups distribution |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |

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| **(Week 4): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Anatomy** MS-A-075**Histology**Dr G.Ansari | **LGIS****PERLS****1-11**Dr M Tariq.K | **Tea break** | **LGIS****Anatomy** MS-A-015-A**Gr.Anatomy**Dr Z.Alvi | **LGIS****Physiology**MS-P-007Dr Safi.R | **LGIS****Anatomy** MS-A-015-B**Gr.Anatomy**Dr R.Faisal | **Pray & lunch break** | **Practical/Skill Lab/TBL 4**Group A **SKILL LAB – 4**Group B **Physiology**-TBL-MSP-008-AGroup C **Biochemistry** **(P-2)** |
| **Tuesday** | **LGIS****Com Med**MS-CM-002-BDr Ali.H | **LGIS****Anatomy**MS-A-068**Embryology**Dr G.Ansari | **LGIS****Anatomy** MS-A-016-B**Gr.Anatomy**Dr Z.Alvi | **LGIS****Physiology**MS-P-008-BDr Tehseen.I | **LGIS****Anatomy** MS-A-017**Gr.Anatomy**Dr R.Faisal | **Practical/Skill Lab/TBL 4**Group A **Biochemistry** **(P-2)**Group B **Anatomy (P-4)**Group C **SKILL LAB – 4** |
| **Wednesday** | **LGIS****Pathology** MS-Pa-002-BDr Hakeem.Ch | **LGIS****Anatomy** MS-A-018**Gr.Anatomy**Dr G.Ansari | **LGIS****Anatomy** MS-A-019-A**Gr.Anatomy**Dr Z.Alvi | **LGIS****Physiology**MS-P-009Dr Raheela.A | **LGIS****Anatomy** MS-A-020**Gr.Anatomy**Dr R.Faisal | **Practical/Skill Lab/TBL 4**Group A **Physiology**-TBL-MSP-008-AGroup B **SKILL LAB – 4**Group C **Anatomy (P-4)** |
| **Thursday** | **LGIS****Aging**MS-Ag-002Dr A Yar.M | **LGIS****Anatomy** MS-A-021**Gr.Anatomy**Dr G.Ansari | **Demonstration Anatomy**MS-A-019-B | **LGIS****Biochemistry**MS-B-005-BDr Khalida.A | **Practical/Skill Lab/TBL 4**Group A **Anatomy (P-4)**Group B **Biochemistry** **(P-2)**Group C **Physiology**-TBL-MSP-008-A |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Friday** | **LGIS****Com Med**MS-CM-003-ADr Ali.H | **LGIS****Anatomy** MS-A-022**Gr.Anatomy**Dr Z.Alvi | **LGIS****Anatomy** MS-A-023**Gr.Anatomy**Dr R.Faisal | **LGIS****Biochemistry**MS-B-005-CDr Shafqat | **Self Directed Learning** | **CLINICAL SKILLS FOUNDATION - 4** Please refer to clinical skills manual for Wards and groups distribution |

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| **(Week 5): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:2002:00** | **02:00-4:00** |
| **Monday** | **LGIS****Anatomy** MS-A-076 &78**Histology**Dr G.Ansari | **LGIS****PERLS**1-12Dr M Tariq.K | **Tea break** | **Demonstration** **Anatomy** MS-A-024-A | **LGIS****Physiology**MS-P-010Dr Sadia.J | **Pray & lunch break** | **Practical/Skill Lab/SGD/Tutorial 5**Group A **SKILL LAB – 5**Group B **Physiology**-Tuto-MSP-011-AGroup C **Biochemistry**-**SGD**-MSB006-A |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Tuesday** | **LGIS****Holy Quran**AngelsDr A.Majid | **LGIS****Anatomy** MS-A-069-70**Embryology**Dr Z.Alvi | **LGIS****Anatomy** MS-A-024-B**Gr.Anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-011-BDr Safi.R | **LGIS****Anatomy** MS-A-025**Gr.Anatomy**Dr G.Ansari | **Practical/Skill Lab/SGD/Tutorial 5**Group A **Biochemistry**-**SGD**- MSB006-AGroup B **Anatomy (P-5)**Group C **SKILL LAB – 5** |
| **Wednesday** | **LGIS****Pharmacology**MS-Ph-002Dr Zameer.AS | **LGIS****Anatomy** MS-A-026-A**Gr.Anatomy**Dr Z.Alvi | **LGIS****Anatomy** MS-A-026-B**Gr.Anatomy**Dr R.Faisal | **LGIS****Biochemistry**MS-B-006-BDr Dost.M | **LGIS****Anatomy** MS-A-027**Gr.Anatomy**Dr G.Ansari | **Practical/Skill Lab/SGD/Tutorial 5**Group A **Physiology**-Tuto-MSP-011-AGroup B **SKILL LAB – 5**Group C **Anatomy (P-5)** |
| **Thursday** | **LGIS****Pathology**MS-Pa-003-ADr Hakeem.Ch | **LGIS****Anatomy** MS-A-028-A**Gr.Anatomy**Dr Z.Alvi | **Demonstration** **Anatomy**MS-A-029 | **LGIS****Physiology**MS-P-012Dr Tehssen.I | **Practical/Skill Lab/SGD/Tutorial 5**Group A **Anatomy (P-5)**Group B **Biochemistry**-**SGD**-MSB006-AGroup C **Physiology**-Tuto-MSP-011-A |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Friday** | **LGIS****Com Med**MS-CM-003-BDr Ali.H | **LGIS****Anatomy** MS-A-028-B**Gr.Anatomy**Dr R.Faisal | **Demonstration** **Anatomy** MS-A-30 | **LGIS****Biochemistry**MS-B-006-CDr Khalida.A | **CLINICAL SKILLS FOUNDATION – 5**Please refer to clinical skills manual for Wards and groups distribution |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |

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| **(Week 6): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Pathology**MS-Pa-003-BDr Hakeem.Ch | **LGIS****Anatomy** MS-A-032**Gr.Anatomy**Dr G.Ansari | **Tea break** | **Demonstration** **Anatomy** MS-A-031 | **LGIS****Biochemistry**MS-B-007-ADr Shafqat | **Pray & lunch break** | Group A **SKILL LAB – 6**Group B **Class Test (MCQs only)**(Anatomy, pathology & Pharmacology)Group C **Class Test (MCQs only)**Physiology, biochemistry com-medicine |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Tuesday** | **LGIS****Aging**MS-Ag-003Dr A Yar.M | **LGIS****PERLS****1-13**Dr M Tariq.K | **LGIS****Anatomy** MS-A-033-A**Gr.Anatomy**Dr Z.Alvi | **LGIS****Physiology**MS-P-013Dr Raheela.A | **LGIS****Anatomy** MS-A-033-B**Gr.Anatomy**Dr R.Faisal | Group A **Class Test (MCQs only)**(Anatomy, pathology & Pharmacology)Group B **Class Test (MCQs only)**(Physiology, biochemistry com-medicine)Group C **SKILL LAB – 6** |
| **Wednesday** | **LGIS****Com Med**MS-CM-003-CDr Ali.H | **LGIS****Anatomy** MS-A-034-A**Gr.Anatomy**Dr G.Ansari | **LGIS****Anatomy** MS-A-034-B**Gr.Anatomy**Dr Z.Alvi | **LGIS****Physiology**MS-P-014Dr Sadia.J | **LGIS****Anatomy** MS-A-034-C**Gr.Anatomy**Dr R.Faisal | Group A **Class Test (MCQs only)**(Physiology, biochemistry com-medicine)Group B **SKILL LAB – 6**Group C **Class Test (MCQs only)**(Anatomy, pathology & Pharmacology) |
| **Thursday** | **LGIS****Com Med**MS-CM-004-ADr Ali.H | **LGIS****Anatomy** MS-A-035-A**Gr.Anatomy**Dr G.Ansari | **LGIS****Anatomy** MS-A-035-B**Gr.Anatomy**Dr Z.Alvi | **LGIS****Biochemistry**MS-B-007-BDr Dost.M | **LGIS****Anatomy** MS-A-036-A**Gr.Anatomy**Dr R.Faisal | **Demonstration Anatomy** MS-A-036-B |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Friday** | **LGIS****Com Med**MS-CM-004-BDr Ali.H | **LGIS****Anatomy** MS-A-036-C**Gr.Anatomy**Dr G.Ansari | **LGIS****Anatomy** MS-A-037**Gr.Anatomy**Dr Z.Alvi | **LGIS****Physiology**MS-P-014-BDr Safi.R | **LGIS****Anatomy** MS-A-038-A**Gr.Anatomy**Dr R.Faisal | **CLINICAL SKILLS FOUNDATION - 6**Please refer to clinical skills manual for Wards and groups distribution |

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| **(Week 7): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Pathology**MS-Pa-004Dr Hakeem.Ch | **PERLS**1-14 | **Tea break** | **LGIS****Anatomy** MS-A-038-B**Gr.Anatomy**Dr G.Ansari | **LGIS****Physiology**MS-P-015-ADr Tehseen.I | **LGIS****Anatomy** MS-A-039-A**Gr.Anatomy**Dr Z.Alvi | **Pray & lunch break** | **Practical/Skill Lab/PBL/Demonstration 6**Group A **SKILL LAB – 7**Group B (**Physiology**-PBL-MS-P-015-B)Group C (**Biochemistry**-**Demo**-MSB-007C) |
| **Tuesday** | **LGIS****Com Med**MS-CM-004-CDr Ali.H | **LGIS****Anatomy** MS-A-039-B**Gr.Anatomy**Dr R.Faisal | **LGIS****Anatomy** MS-A-039-C**Gr.Anatomy**Dr G.Ansari | **LGIS****Physiology**MS-P-016-ADr Raheela.A | **LGIS****Anatomy** MS-A-040-A**Gr.Anatomy**Dr Z.Alvi | **Practical/Skill Lab/PBL/Demonstration 6**Group A (**Biochemistry**-**Demo-**MSB-007C)Group B **Anatomy (P-6)**Group C **SKILL LAB – 7** |
| **Wednesday** | **LGIS****Pharmacology**MS-Ph-003Dr Zameer.AS | **LGIS****Anatomy** MS-A-040-B**Gr.Anatomy**Dr R.Faisal | **LGIS****Anatomy** MS-A-040-C**Gr.Anatomy**Dr G.Ansari | **LGIS****Biochemistry**MS-B-008-ADr Khalida.A | **LGIS****Anatomy** MS-A-040-D**Gr.Anatomy**Dr Z.Alvi | **Practical/Skill Lab/PBL/Demonstration 6**Group A (**Physiology**-PBL-MS-P-015-B)Group B **SKILL LAB – 7**Group C **Anatomy (P-6)** |
| **Thursday** | **LGIS****Beh Sciences**MS-BhS-001ADr Mehwish.A | **LGIS****Anatomy** MS-A-071**Embryology**Dr R.Faisal | **LGIS****Anatomy** MS-A-041-A**Gr.Anatomy**Dr G.Ansari | **LGIS****Physiology**MS-P-016-BDr Sadia.J | **LGIS****Anatomy** MS-A-041-B**Gr.Anatomy**Dr Z.Alvi | **Practical/Skill Lab/PBL/Demonstration 6**Group A **Anatomy (P-6)**Group B (**Biochemistry**-**Demo-**MSB-007C)Group C (**Physiology**-PBL-MS-P-015-B) |
| **Friday** | **LGIS****Com Med**MS-CM-005-ADr Ali.H | **LGIS****Anatomy** MS-A-077**Histology**Dr R.Faisal | **LGIS****Anatomy** MS-A-043**Gr.Anatomy**Dr G.Ansari | **LGIS****Biochemistry**MS-B-008-BDr Shafqat | **LGIS****Anatomy** MS-A-044**Gr.Anatomy**Dr Z.Alvi | **CLINICAL SKILLS FOUNDATION – 7**Please refer to clinical skills manual for Wards and groups distribution |

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| **(Week 8): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Com Med**MS-CM-005-BDr Ali.H | **LGIS****PERLS**1-15Dr M Tariq.K | **Tea break** | **LGIS****Anatomy** MS-A-045-A**Gr.Anatomy**Dr R.Faisal | **LGIS****Biochemistry**MS-B-009-ADr Dost.M | **LGIS****Anatomy** MS-A-045-B**Gr.Anatomy**Dr G.Ansari | **Pray & lunch break** | **Practical/Skill Lab/PBL 7**Group A **SKILL LAB – 8**Group B **Physiology** **(P-1)**Group C (**Biochemistry**-**PBL**- MSB- 014- 015) |
| **Tuesday** | **LGIS****Aging**MS-Ag-004Dr A Yar.M | **LGIS****Anatomy** MS-A-046-B**Gr.Anatomy**Dr Z.Alvi | **LGIS****Anatomy** MS-A-047-A**Gr.Anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-017Dr Safi.R | **LGIS****Anatomy** MS-A-047-B**Gr.Anatomy**Dr G.Ansari | **Practical/Skill Lab/PBL 7**Group A **Biochemistry**- **PBL**-MS-B-014- 015)Group B **Anatomy (P-7)**Group C **SKILL LAB – 8** |
| **Wednesday** | **LGIS****Com Med**MS-CM-006-ADr Ali.H | **LGIS****Anatomy** MS-A-048**Gr.Anatomy**Dr Z.Alvi | **LGIS****Anatomy** MS-A-049-A**Gr.Anatomy**Dr R.Faisal | **LGIS****Biochemistry**MS-B-009-BDr Khalida.A | **LGIS****Anatomy** MS-A-049-B**Gr.Anatomy**Dr G.Ansari | **Practical/Skill Lab/PBL 7**Group A **Physiology** **(P-1)**Group B **SKILL LAB – 8**Group C **Anatomy (P-7)** |
| **Thursday** | **LGIS****Beh Sciences**MS-BhS-001BDr Mehwish.A | **LGIS****Anatomy** MS-A-050**Gr.Anatomy**Dr Z.Alvi | **LGIS****Anatomy** MS-A-051**Gr.Anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-019Dr Tehseen.I | **LGIS****Anatomy** MS-A-052**Gr.Anatomy**Dr G.Ansari | **Practical/Skill Lab/PBL 7**Group A **Anatomy (P-7)**Group B (**Biochemistry**- **PBL-** MS-B-014-015)Group C **Physiology** **(P-1)** |
| **Friday** | **LGIS****Com Med**MS-CM-006-BDr Ali.H | **LGIS****Anatomy** MS-A-053-B**Gr.Anatomy**Dr Z.Alvi | **LGIS****Anatomy** MS-A-053-C**Gr.Anatomy**Dr R.Faisal | **LGIS****Physiology**MS-P-020Dr Raheela.A | **LGIS****Anatomy** MS-A-053-D**Gr.Anatomy**Dr G.Ansari | **CLINICAL SKILLS FOUNDATION - 8**Please refer to clinical skills manual for Wards and groups distribution |

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| **(Week 9): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **LGIS****Beh Sciences**MS-BhS-002Dr Mehwish.A | **English****E-1** | **Tea break** | **LGIS****Anatomy** MS-A-054**Gr.Anatomy**Dr Z.Alvi | **LGIS****Com Med**MS-CM-007-ADr Ali.H | **LGIS****Anatomy** MS-A-055**Gr.Anatomy**Dr R.Faisal | **Pray & lunch break** | **Practical/Skill Lab/CBL/Demonstration 8**Group A **SKILL LAB – 9**Group B (**Physiology**-Demo-MS-P-021)Group C (**Biochemistry**-**CBL**- MSB- 010- 011) |
| **Tuesday** | **English****E - 2** | **LGIS****Anatomy** MS-A-056**Gr.Anatomy**Dr G.Ansari | **LGIS****Anatomy** MS-A-057-A**Gr.Anatomy**Dr Z.Alvi | **LGIS****Com Med**MS-CM-007-BDr Ali.H | **LGIS****Anatomy** MS-A-057-B**Gr.Anatomy**Dr R.Faisal | **Practical/Skill Lab/CBL/Demonstration 8**Group A (**Biochemistry**-**CBL**- MSB- 010- 011)Group B (**Anatomy (P-8)**Group C **SKILL LAB – 9** |
| **Wednesday** | **English** **E - 3** | **LGIS****Biochemistry**MS-B-009-CDr Shafqat | **LGIS****Anatomy** MS-A-059**Gr.Anatomy**Dr G.Ansari | **LGIS****Islamiyat**Quran as guideMiss Kanwal | **LGIS****Anatomy** MS-A-060-61**Gr.Anatomy**Dr Z.Alvi | **Practical/Skill Lab/CBL/Demonstration 8**Group A.**Physiology**-Demo-MS-P-021Group B. **SKILL LAB – 9**Group C.**Anatomy (P-8)** |
| **Thursday** | **LGIS****Civics**FamilyDr A.Majid | **LGIS****Anatomy** MS-A-063**Gr.Anatomy**Dr R.Faisal | **LGIS****Anatomy** MS-A-064-A**Gr.Anatomy**Dr G.Ansari | **Demonstration Anatomy** MS-A-042 | **Practical/Skill Lab/CBL/Demonstration 8**Group A **Anatomy (P-8)**Group B.**Biochemistry-CBL**- MSB - 010- 011Group C (**Physiology**-Demo- MS-P-021) |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Friday** | **Demonstration Anatomy** MS-A-053-A | **English****E – 4** | **Demonstration Anatomy** MS-A-062 | **CLINICAL SKILLS FOUNDATION – 9**Please refer to clinical skills manual for Wards and groups distribution |
| **1-25 = DR 5** | **26-50 = DR 6** | **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** | **51-75 = DR 4** | **76-100 = DR 3** |

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|  | **(Week 10): Block 2, Module 3, Musculoskeletal / Locomotion / /2024-25 to / /2024-25** |
| **Time** | **08:00-09:00** | **09:00-10:00** | **10:00****10:20** | **10:20-11:20** |  | **01:20****02:00** | **02:00-4:00** |
| **Monday** | **PERLS**1-16 | **LGIS****Civics**CommunityDr A.Majid | **Tea break** | **Holy Quran**Qadr | **Demonstration** **Anatomy** MS-A-064-B | **Prayer and lunch break** | **SELF DIRECTED LEARNING** |
| **1-25 = DR 5** | **26-50 = DR 6** |
| **51-75 = DR 4** | **76-100 = DR 3** |
| **Tuesday** | **Group A** Surface marking-Anatomy**Group B** Dissection-Anatomy**Group C** Osteo/Radio-Anatomy | **Group A** Dissection-Anatomy**Group B** Osteo/Radio-Anatomy**Group C** Surface marking-Anatomy | **Self directed learning** | **Group A** osteo/Radio-Anatomy**Group B** Surface marking-Anatomy**Group C** Dissection-Anatomy |
| **Wednesday** | **Group A** Surface marking-Anatomy**Group B** Dissection-Anatomy**Group C** Osteo/Radio-Anatomy | **Group A** Dissection-Anatomy**Group B** Osteo/Radio-Anatomy**Group C** Surface marking-Anatomy | **Self directed learning** | **Group A** osteo/Radio-Anatomy**Group B** Surface marking-Anatomy**Group C** Dissection-Anatomy |
| **Thursday** | **EOM Examination** | **EOM Examination** | **EOM Examination** |

**DISTRIBUTION AND DURATION OF TEACHING ACTIVITIES/HOURS**

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| Subject  | Hours theory  | HoursPractical | SGD/TBL/DemoPBL/CBL/Tuto | Total hours |
| Anatomy | 105 | 10 (Histology)04 Dissection04 osteo/radio04 surface mar | 30 | **157** |
| Physiology | 27 | 1 Practical = 2 Hours | 14 | **43** |
| Biochemistry | 20 | 2 Practical = 4 Hours | 12 | **36** |
| Pharmacology | 04 | ------- | ------- | **04** |
| Pathology | 07 | ------- | ------- | **07** |
| Community Medicine | 18 | ------- | ------- | **18** |
| Aging | 04 | ------- | ------- | **04** |
| Behavioral Sciences | 03 | ------- | ------- | **03** |
| PERLs | 09 | ------- | ------- | **09** |
| Clinical skill Foundation (CSF) | ------- | 18 | ------- | **18** |
| Skill lab | ------- | 18 | ------- | **18** |
| Holy Quran | 02 | ------- | ------- | **02** |
| Islamiat | 01 | ------- | ------- | **01** |
| Pakistan studies | 01 | ------- | ------- | **01** |
| Civics | 02 | ------- | ------- | **02** |
| English | 04 | ------- | ------- | **04** |
| Self directed learning | 05 | ------- | ------- | **05** |
| Class test  | 04 | ------- | ------- | **04** |
| Total  | **35 hours/week × 9 weeks & 3 Days =336 hours** | **336** |

**MODULE RATIONALE**

Tomorrow’s Doctor is required to acquire competencies, which could align his knowledge base and skill set for his professional practices.

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.

**Aims:**

**The aims of Musculoskeletal Module are as following:**

1. Understand the anatomy, physiology, and biomechanics of the musculoskeletal system.
2. Identify common musculoskeletal disorders and their pathophysiology.
3. Develop skills in diagnosing and managing musculoskeletal conditions.
4. Correlate knowledge across disciplines for comprehensive care.
5. Promote ethical practice and effective teamwork in clinical settings

**IMPLEMENTATION TORs**

* The time calculation for completion of modules and blocks is based on 35 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1260.
* The hours mentioned within each module are the mandatory minimum required. The rest of the hours are left to the discretion of the institution that can be used in teaching, learning and assessment as per decision of the institutional academic council.
* The content and the intended learning outcomes written are mandatory, to be taught, at the level required, as the end year assessment will be based on these. However, the level of cognition can be kept at a higher level by the institution.
* The Table of Specifications provided will be used for the three papers of the first professional examination. The same table of specifications should be used for the three block exams for internal assessment.

**MODULE OUTCOMES**

1. Develop and understanding of the fundamental components of the musculoskeletal system.
2. Develop an understanding of the fundamental components of the musculoskeletal system.
3. 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.
4. Identify the anatomical features of bones, muscles & neurovascular components of the limbs with clinical correlation.
5. Describe how injury and disease alter the MSK structure & function.
6. Integrate concepts relating to various metabolic processes, their disorders and relevant lab investigations in the study of human MSK system.
7. Describe the role of the limbs (upper/lower) in musculoskeletal support, stability, and movements.
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 their molecular 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.

**COURSE CONTENTS, CODES & SPECIFIC LEARNING OBJECTIVE**

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|  **ANATOMY (UPPER LIMB)** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-A-001** | 1. Describe the topographical anatomy of Pectoral Region

 Perform dissection of Pectoral Region or use models to identify the key structures1. Describe muscles of the Pectoral Region with their origin, insertion, nerve supply &actions.
 |
| **MS-A-002** | 1. Describe the fasciae, cutaneous nerves. and blood vessels of the Upper Limb.
2. Describe the extent, attachments, and structures passing through Clavipectoral Fascia
 |
| **MS-A-003** | 1. Describe the extent, structure, neurovascular supply, lymphatic drainage of Breast
2. Define boundaries of Triangle of Auscultation & state its clinical significance. Demonstrate palpation of breast & define its relation to Fibrous septa in Carcinoma of Breast. Explain anatomical basis of position adopted for breast examination and mammography.
3. Describe osteology of bones in pectoral region. Enumerate muscles of pectoral girdle.
4. 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) 1. Explain muscles of pectoral region, neurovascular supply of pectoral region role in stabilizing pectoral girdle. Describe triangle of auscultation & Correlate important clinical conditions.
2. Describe muscles of the back with their origin, insertion, nerve supply and actions.
 |
| **MS-A-004** | 1. Describe 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 1. 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
 |
| **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. |
| **MS-A-006** | 1. Develop clear concepts of topographical anatomy of Axilla & its contents. Describe boundaries of Axilla. (Identify muscles forming boundaries). List contents of Axilla
2. Describe Axillary Artery with reference to its 3 parts their relations, branches & anastomoses.
3. Describe formation, tributaries & drainage of Axillary Vein. Identify & demonstrate course/ relation & branches/tributaries of axillary vessels. Describe 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
 |
| **MS-A-007** | Osteology of Humerus (Side Determination, attachments, morphology & ossification) |
| **MS-A-008** | 1. Describe the Shoulder Joint under following headings: Articulation, Type/ Variety,

Capsule, Ligaments, Innervation, Blood supply, Movements. 1. Describe parts of Deltoid Muscle & correlate its functions. Explain its role in abduction of shoulder joint. Explain mechanism of Abduction of arm. Identify & demonstrate movements of Axio-appendicular Muscles on Model. Describe, in detail, the Scapula-Humeral Mechanism in relation to movement of abduction. Discuss important clinical conditions
2. Draw and label the arterial anastomosis around shoulder joint
 |
| **MS-A-009** | Describe Rotator Cuff Muscles, state their Anatomical significance and explain Rotator Cuff Tendinitis. Describe Frozen Shoulder in relation to anatomical features. |
| **MS-A-010** | 1. Describe formation of Brachial Plexus; Infra & Supraclavicular parts. Discuss Brachial plexus injuries 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
2. Develop clear concepts of the topographical anatomy of Scapular Region. Tabulate the attachments, innervation, and actions of muscles of Scapular Region
3. Identify & Describe Musculocutaneous Nerve in terms of its Origin, Course, Termination,

Relations, Branches, & distribution. Describe & illustrate cutaneous innervation of arm. |
| **MS-A-011** | 1. Describe Brachial Artery in terms of its course, relations, branches, and distribution Identify & Describe the Profunda Brachii Artery giving its course, relations, branches, and distribution
2. Tabulate attachments, innervation & actions of Triceps brachii.
 |
| **MS-A-012** | 1. Describe Cubital Fossa with emphasis on its boundaries, contents, and clinical significance
2. Demonstrate surface marking of superficial veins of arm and forearm for IV injections
 |
| **MS-A-013** | 1. Describe Osteology of Radius (Side Determination, morphology, attachments, ossification)
2. Describe Osteology of Ulna (Side Determination, morphology, attachments, ossification)
 |
| **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 |
| **MS-A-015** | 1. Tabulate attachments, innervations & actions of Extensor Muscles of Forearm
2. Describe in detail features of each muscle of extensor compartment of forearm, proximal

& distal attachments, relations, and actions with nerve supply. |
| **MS-A-016** | 1. Identify the muscles and neurovasculature of flexor and extensor compartments of forearm. Develop clear concepts of the topographical anatomy of Forearm Tabulate the attachments, innervation, and actions of Flexor & Pronator Muscles of the Forearm.
2. Describe cutaneous innervation of Forearm Compartments & its anatomical basis.
 |
| **MS-A-017** | Identify Extensor & Flexor Retinacula and describe their attachments and relations Describe the features, attachments, relations and structures passing under Flexor Retinaculum |
| **MS-A-018** | Demonstrate formation of carpal tunnel & contents. Describe Carpel Tunnel Syndrome |
| **MS-A-019** | 1. 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
2. Surface marking of Brachial artery, Cephalic, Median cubital, Basilic Vein, Radial & Ulnar arteries, anterior &posterior interosseous artery
 |
| **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. Describe Carrying Angle and justify its importance in limb movement |
| **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 |
| **MS-A-022** | Describe the features of Interosseous Membrane with structures that pierce through it |
| **MS-A-023** | Describe features & explain importance of Fibrous Flexor Sheaths, synovial flexor sheaths & extensor expansion |
| **MS-A-024** | 1. Demonstrate the attachments and actions of the muscles of hand
2. Identify the muscles and neurovasculature of the palm. Explain morphology & tabulate attachments, innervation, and actions of Intrinsic Muscles of the Hand
 |
| **MS-A-025** | Demonstrate the various grips. Explain the mechanism of writing |
| **MS-A-026** | 1. Describe radial artery’s course relations & termination in hand with its clinical significance. Describe ulnar artery’s course, relations & termination in hand with its clinical significance.
2. Describe formation, branches & areas Of distribution of superficial & deep palmar Arch
 |
| **MS-A-027** | Describe course, relations & branches of Ulnar, Median & Radial Nerves in Hand |
| **MS-A-028** | 1. Describe First Carpometacarpal Joint in terms of; Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation, movements.
2. Describe Metacarpophalangeal & interpharyngeal Joints in terms of Type, Variety, Articular Surfaces, Ligaments, Relations, Blood Supply, Innervation & Movements
 |
| **MS-A-029** | Palpate arteries of upper limb on a subject. Identify topographical features of upper limb in a cross-sectional model.Demonstrate & identify the anatomical landmarks of upper limb on radiographs/ CT/ MRI. Mark the anatomical landmarks on a subject/ simulated model |
|  **ANATOMY (LOWER LIMB)** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-A-030** | Draw & label Parts of the hip bone, with its attachments, Describe parts, attachments & ossification of hip bone Identify parts & bony features of hip bone, with its attachments, important relations. Demonstrate side determination of hip bone, its bony features, attachments, sex differences & important relations. |
| **MS-A-031** | Describe parts, attachments, ossification, side determination, and Sex differences of femur. Identify parts & bony features of femur, with its attachments, important relations, side determination of femur, its bony features, attachments & important relations (correlate with fractures). Describe coxa Vara & coxa valga & clinical significance |
| **MS-A-032** | Describe extent, attachments & modifications of Fascia lata & explain iliotibial tract |
| **MS-A-033** | 1. Describe cutaneous nerves of thigh. Draw & label cutaneous nerve supply of thigh. Describe formation, course, relations, tributaries & termination of superficial veins & arteries.
2. Explain anatomical justification of venesection, varicose veins & saphenous venous grafts

Describe lymphatic drainage of thigh (emphasise on afferent & efferent inguinal lymph nodes). Explain superficial & deep lymph nodes & enlargement of inguinal lymph nodes |
| **MS-A-034** | 1. Describe & identify Boundaries & contents of femoral triangle. Draw & label Boundaries & contents of femoral triangle.
2. Identify femoral sheath with its compartments. Describe formation of femoral sheath & its significance. Describe formation of femoral canal, its contents & significance.
3. Describe formation & significance of femoral ring. Compare & contrast anatomical features of femoral & inguinal hernias.
 |
| **MS-A-035** | 1. Describe & Muscles of anterior compartment of thigh with their proximal & distal attachments.
2. Demonstrate & identify muscles of anterior compartment of thigh with their actions. Explain anatomical basis of psoas abscess.
 |
| **MS-A-036** | 1. Describe origin, course, relations, branches, distribution & termination of femoral artery
2. Describe origin, course, relations, branches, distribution & termination of femoral nerve.
3. Tabulate muscles of anterior compartment of thigh, their attachments, nerve supply & actions. Describe origin, course, relations and tributaries, area of drainage & termination of femoral vein.
 |
| **MS-A-037** | Describe formation, boundaries, contents, & significance of adductor canal. Identify & demonstrate boundaries & contents of adductor canal. |
| **MS-A-038** | 1. Describe Muscles of medial compartment of thigh with their proximal & distal attachments, innervation & actions.
2. Identify muscles of medial compartment of thigh with their proximal & distal attachments. Demonstrate actions of muscles of medial compartment on self/ subject.
 |
| **MS-A-039** | 1. Describe & identify lumbar & sacral plexus & its branches supplying lower limb.
2. Identify nerves & vessels of medial compartment of thigh along with their branches.. Describe cutaneous nerve supply & lymphatics of region.
3. Describe origin, course, relations, branches/ tributaries, distribution, & termination of neurovascular structures of medial compartment of thigh
 |
| **MS-A-040** | 1. Describe muscles of gluteal region, their proximal & distal attachments, innervations & actions.
2. Describe origin, course, relations, branches/ tributaries, distribution, & termination of neurovascular structures of gluteal region.
3. Draw & label cruciate & trochanteric anastomosis. Explain anatomical basis of consequences of wrongly placed gluteal intramuscular injections & injury to superior & inferior gluteal nerves.
4. Demonstrate & identify origin, course, relations, branches/tributaries & termination of nerves & vessels of gluteal region.
 |
| **MS-A-041** | 1. Describe Attachments of muscles of posterior compartment of thigh with innervations, actions, proximal & distal attachments.
2. Demonstrate actions of muscles of posterior compartment of thigh. Describe anatomical basis of signs & symptoms of Piriformis syndrome.
 |
| **MS-A-042** | Describe origin, course, relations, branches, distribution & termination of Profunda femoris artery. Describe formation & distribution of chain anastomoses of thigh & its clinical significance. |
| **MS-A-043** | Describe origin, course, relations, branches, distribution, & termination of sciatic nerve. Describe anatomical basis of signs & symptoms of compression of or injury to sciatic nerve. |
| **MS-A-044** | Describe hip joint with its type, articulations, ligaments, stabilizing factors, Hip Joint movements, & neuro-vascular supply with clinical significance. Perform movements of hip joint at various angles & be able to describe muscles producing movements. Discuss associated clinical. |
| **MS-A-045** | 1. Describe & identify boundaries, relations & contents of popliteal fossa. Draw & label boundaries, relations, & contents of popliteal fossa.
2. Describe origin, course, relations, branches/tributaries, distribution & termination of popliteal vessels.
 |
| **MS-A-046** | 1. Describe parts of tibia & fibula, with their attachments, important relations, ossifications, & side determination. Identify parts & bony features of tibia & fibula, their bony features, attachments & important relations. Describe anatomical basis for using fibula as graft. Draw & label Parts of patella with its attachments. Describe features & ossification of patella, Enlist & factors responsible for stabilizing patella.
2. Enlist bones of knee joint. Describe attachments & role of popliteus in locking & unlocking of knee joint.

Describe knee joint with its type, articulations, ligaments, movements & neuro-vascular supply. Explain mechanism of locking & unlocking of knee joint with foot on ground & off ground. Describe factors responsible for stability of knee joint. Discuss important associated clinical conditions. |
| **MS-A-047** | 1. Describe Muscles of anterior & lateral compartments of leg with their proximal & distal attachments, innervations & actions.
2. Describe muscles of posterior compartments of leg with their proximal & distal attachments.
 |
| **MS-A-048** | Describe cutaneous nerves & vessels of leg. Draw & label cutaneous nerve supply & dermatomes of leg. |
| **MS-A–049** | 1. Identify extensor, flexor & peroneal retinaculam & structures related to them. Describe attachments, relations & structures passing under cover of, extensor, peroneal, & flexor retinaculam.
2. Identify & demonstrate nerves & vessels of anterior, lateral & posterior compartments of leg along with their branches. Describe noncalcareous (Achilles tendon)
 |
| **MS-A-050** | Describe articulations, muscles, neurovasculature & movements at Tibio fibular joints. |
| **MS-A-051** | Describe ankle joint with its type, articulations, ligaments, movements & neuro-vascular supply. Describe factors stabilizing ankle joint. Discuss important associated clinical conditions. Identify & demonstrate articulating surfaces & ligaments of ankle joint. |
| **MS-A-052** | Describe formation, attachments & clinical significance of plantar aponeurosis. Explain anatomical basis of & signs & symptoms of plantar fasciitis. |
| **MS-A-053** | 1. Identify parts, bony features, attachments, relations of articulated foot.
2. Describe muscles of dorsum of foot with their proximal & distal attachment, innervation, actions.
3. Describe muscles of sole of foot with their attachment, innervations & actions (3 layers).
4. Describe muscles of sole of foot with their attachment, innervations & actions (1 layer). emphasizing role of interossei & lumbricals. Draw & label muscles of layers of sole of foot. Demonstrate & identify muscles & tendons with their proximal & distal attachments in sole of foot.
 |
| **MS-A-054** | Describe interphalangeal, subtalar & midtarsal joints with their types, articulation, ligaments, stabilizing factors, movements & neurovascular supply. |
| **MS-A-055** | Describe formation, components, stabilizing & maintaining factors of arches of foot. Describe clinical significance of arches of foot with respect to flat foot, claw foot. |
| **MS-A-056** | Describe fibrous flexor sheaths, extensor expansions & synovial flexor sheaths. |
| **MS-A-057** | 1. Describe origin, course, relations, branches/tributaries, distribution & termination of plantar vessels. Identify vessels on foot along with their branches. Describe palpation of dorsalis pedis artery & explain clinical significance of dorsalis pedis artery.
2. Describe cutaneous nerves & vessels of foot. Draw & label cutaneous nerve supply & dermatomes of foot. Identify nerves & vessels in sole of foot along with their branches.
 |
| **MS-A-058** | Describe surface anatomy, course, relations, tributaries, & communications of superficial & deep veins of lower limb. Draw a concept map of superficial & deep veins of lower limb List factors favoring venous return of lower limb. Explain anatomical basis of formation, signs & symptoms of deep venous thrombosis. Describe anatomical basis of knee jerk, ankle jerk, & plantar reflex. |
| **MS-A-059** | Describe mechanism of walking. Describe phases of gait cycle & muscles involved in each phase. Describe propulsive & shock-absorbing mechanisms of foot. Describe weight bearing/ line of weight transmission in lower limb. |
| **MS-A-060-061** | Draw a concept map of lymphatic drainage of lower limb. Draw & label cutaneous nerves & dermatomes of lower limb. |
| **MS-A-062** | Demonstrate surface marking of nerves & vessels of lower limb. Demonstrate surface marking of bony landmarks of lower limb. Identify topographical features of lower limb in a cross-sectional model. Identify features of bones & joints of lower limb on radiograph/ CT scan/ MRI |
| **MS-A-063** | Describe common fractures of following with risk factors, clinical presentations & management :Clavicle-Humerus-Radius-Ulna-bones of hand-Hip bone-Femur-Tibia-Fibula–bones of foot |
| **MS-A-064** | 1. Describe dislocations of following with risk factors, clinical presentations & brief management:

Shoulder joint-Elbow joint-Interphalangeal joint of hand.1. Describe dislocations of following with risk factors, clinical presentations & brief management:

Hip joint-Knee joint-Ankle joint. |
|  **ANATOMY (EMBRYOLOGY)** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-A-065** | Name molecular & genetic factors involved in development of musculoskeletal system. Describe development of skeletal muscle. List derivatives of epaxial & hypaxial musculature of limb. Briefly discuss development of cardiac & smooth muscle (Detail to be covered in respective modules later). Describe developmental basis of myotome. Draw concept map showing sequence of events pertaining to smooth/cardiac & skeletal muscles |
| **MS-A-066** | List factors contributing to development of limb. Describe role of AER & Zone of polarizing activity in development of limb. Describe process of limb development & growth. Draw a concept map pertaining to development of limb. Compare & contrast development of upper & lower limb. |
| **MS-A-067** | Describe embryological basis of cutaneous innervation of limb. Describe embryological basis of blood supply of limbs & concept of axial artery. |
| **MS-A-068** | Describe embryological basis of congenital anomalies related to muscular system. Clinical presentations & embryological basis of Amelia-Meromelia-Phocomelia-Split-H & Foot Malformations-Polydactyly-Brachydactyly-Syndactly-club foot |
| **MS-A-069-****070** | Describe developmental process of cartilage & bone. Describe process of histogenesis of cartilage & bone.Describe developmental process of intramembranous & endochondral ossification. |
| **MS-A-071** | List factors contributing to development of Axial skeletal system. Describe clinical picture & explain embryological basis of Axial skeletal anomalies. Describe developmental process of Vertebral Column. |
|  **ANATOMY (HISTOLOGY)** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-A-072** | Describe microscopic structure & ultra microscopic structure of skeletal muscle. Explain basis of myasthenia gravis & Duchenne muscular dystrophy. Describe microscopic & ultramicroscopic structure of cardiac muscle. Describe microscopic & ultramicroscopic structure of smooth muscle. Compare & contrast histological features of three types of muscle tissue. |
| **MS-A-073** | Describe regeneration of muscle, hyperplasia & hypertrophy of muscle fiber. Explain histopathological basis of leiomyoma. Describe histological basis of Duchenne Muscular Dystrophy. |
| **MS-A-074** | Describe light & electron microscopic structure of bone cells. Describe histological justification for osteoporosis, osteopenia. Describe histological basis for bone repair after fractures. |
| **MS-A-075** | Describe light & electron microscopic structure of compact & spongy bone. Compare & contrast microscopic features of compact & spongy bone. Draw a concept map to explain characteristic features of ossification. Draw & label zones seen in an epiphyseal growth plate. |
| **MS-A 076-** **078** | Describe metabolic role of bone. Describe clinical presentation of osteoporosis & osteopenia. Describe histological basis for bone & Cartilage growth & repair. |
| **MS-A-077** | Describe microscopic & ultramicroscopic structure of all types of cartilage. Compare & contrast structure of cartilage & bone matrix. Tabulate differences between three types of cartilage. |
|  **ANATOMY (PRACTICALS)**  |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-A-079** | 1. Draw, identify and label the histology of skeletal muscle & smooth muscle.
2. Draw, identify and label the histology of cardiac muscle.
 |
| **MS-A-080** | Draw, identify and label histological picture of compact & spongy bone. |
| **MS-A-081** | 1. Draw, identify and label the microscopic structure of hyaline cartilage.
2. Draw, identify and label the microscopic structure of elastic & fibro cartilage.
 |
| **PHYSIOLOGY** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-P-001** | 1. Explain the Physiological basis of membrane potential. Explain diffusion potentials of Na & K.
2. Define Nernst potential. Explain Physiological Basis of Nernst potential. Write the Nernst equation.
3. Calculate Nernst potential for Na & K. Explain the effects of altering the concentration of Na+, K+, Ca on the equilibrium potential for that ion.
 |
| **MS-P-002** | 1. Describe the normal distribution of Na+, K+, Ca and Cl- across the cell membrane
2. Explain Goldman equation. Clarify role of Goldman equation in generation of RMP.
 |
| **MS-P-003** | 1. Describe the Physiological basis of generation of RMP. Explain the effects of hyperkalemia and Hypokalemia on the RMP.
2. Name the membrane stabilizers Explain the physiological basis of action of Local Anesthetics.
 |
| **MS-P-004** | 1. Describe the Physiological anatomy of Neurons. Discuss the axonal transport
2. Enlist & give functions of Neuroglial cells
3. Explain process of myelination in CNS & PNS
 |
| **MS-P-005** | Classify neurons functionally. Classify nerve fibers according to Erlanger & Gasser Classification |
| **MS-P-006** | 1. Define Action Potential. Enlist the Properties of action potential
2. Describe the ionic basis of an action potential. Explain the phases of action potential.
3. Explain the effects of hyperkalemia and Hypokalemia on the action potential. Draw monophasic action potential. Explain absolute and relative refractory period
 |
| **MS-P-007** | Explain role of other ions in action potential. Elaborate effect of hypocalcemia on neuron excitability. |
| **MS-P-008** | 1. Explain Physiological basis& properties of Graded potential Draw & explain Physiological basis & properties of compound action potential.
2. 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).
 |
| **MS-P-009** | Classify and explain Physiological basis of different types of synapses. Elaborate how signal transmission takes place across chemical synapse |
| **MS-P-010** | Explain the mechanism of conduction of Nerve impulse in myelinated and unmyelinated nerve fibers. Elaborate significance of saltatory conduction |
| **MS-P-011** | 1. Enlist the types of nerve injury Explain Wallerian degeneration.
2. Describe process of regeneration of nerve fiber. Describe causes, features & pathophysiology of Multiple sclerosis, GB syndrome.
 |
| **MS-P-012** | Discuss physiological anatomy of skeletal muscles. Differentiate b/w skeletal, smooth & cardiac muscle Describe the structure of Sarcomere |
| **MS-P-013** | Differentiate between isometric & isotonic contraction by examples. Compare fast & slow fibers. |
| **MS-P-014** | 1. Explain the mechanism of summation and Tetanization. Describe staircase effect/Treppe phenomena
2. Discuss the mechanism of skeletal muscle fatigue. Explain the physiological basis of rigor mortis
 |
| **MS-P-015** | 1. Describe physiological anatomy of NMJ Mechanism of Neuromuscular transmission & generation of End Plate Potential
2. Explain features, pathophysiology & treatment of myasthenia Gravis Discuss the steps/ events of excitation contraction coupling in skeletal muscle.
 |
| **MS-P-016** | 1. Differentiate between types of smooth muscles. Describe mechanism of smooth muscle contraction & compare with skeletal muscle. Explain physiological anatomy of NMJ of smooth muscle.
2. Explain types of action potential in smooth muscles. Explain LATCH mechanism. Describe significance of LATCH mechanism. Explain the nervous and hormonal control of Smooth Muscle Contraction.
 |
| **MS-P-017** | Enlist various types of muscle disorders Describe the pathophysiology & features of muscular dystrophy. |
| **MS-P-018** | Define Myopathy Enlist various causes of myopathy Outline management of myopathy |
| **MS-P-019** | Define osteoporosis Osteoporosis Identify risk factors for osteoporosis Outline management strategies |
| **MS-P-020** | Define osteomalacia Identify risk factors for osteomalacia Outline management strategies |
| **MS-P-021** | Define rickets. sIdentify risk factors for rickets Outline management strategies |

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| **BIOCHEMISTRY** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-B-001** | 1. Classify amino acids based on polarity, nutritional importance, and glucogenic/Ketogenic properties.
2. Classify amino acids based on polarity, nutritional importance, and glucogenic/Ketogenic properties
 |
| **MS-B-002** | 1. Explain the structure, physical, chemical properties of amino acids.
2. Explain the biomedical importance of aminoacids.
 |
| **MS-B-003** | 1. Classify proteins based on functions and physicochemical properties. Explain its biomedical importance.
2. Distinguish class A & B proteins. Discuss structure & functions of Fibrous proteins (collagen & Elastin)
3. Interpret diseases associated with them on basis of sign/symptoms and data
 |
| **MS-B-004** | 1. Explain structural levels of proteins. Differentiate alpha helix & beta pleated protein structures
2. Identify bondings at different levels of proteins
 |
| **MS-B-005** | 1. Describe the role of chaperons in protein folding.
2. Interpret disorders related to protein misfolding on basis of given data.
3. Describe the biochemical basis of alzheimer’s disease/ prion disease.
 |
| **MS-B-006** | 1. Describe biomedical importance of Mono-, Oligo & Polysaccharides. Discuss isomerization of carbohydrates
2. Explain physical and chemical properties of carbohydrates
3. Differentiate proteoglycan and glycoprotein and explain their functions
 |
| **MS-B-007** | 1. Describe the components of extracellular matrix.
2. Describe sources, metabolism, biochemical functions & importance of vitamin C in collagen synthesis.
3. Describe structure, functions, and clinical significance of glycosaminoglycans.
 |
| **MS-B-008** | 1. Identify the defects in collagen synthesis based on given data. (Osteogenesis Imperfecta)
2. Explain dietary sources, metabolism and biochemical functions of vitamin D Interpret Rickets and osteomalacia on basis of sign, Symptoms and clinical data.
 |
| **MS-B-009** | 1. Explain dietary sources, metabolism and biochemical functions of calcium and phosphate.
2. Discuss regulation of calcium metabolism in bone metabolism & role of parathyroid & calcitonin in it.
3. Interpret hyper and hypocalcemic conditions on basis of sign/symptoms and clinical data
 |
| **MS-B-010** | Interpret genetic basis of Duchene muscular dystrophy |
| **BIOCHEMISTRY (PRACTICALS)** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-B-011-012** | Detection of amino acids by paper chromatography. Estimation of total proteins by kit method/dipstick methods. |
| **MS-B-013-014** | Estimation of albumin and globulin. Detection of calcium by micro lab. |
| **MS-B-015** | Prepare different types of solution Molar, Molal, Normal and percentages. |
| **PATHOLOGY** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MSPa-001** | 1. Describe the hyperplasia, hypertrophy, and atrophy of muscle fiber
2. Explain the histopathological basis of leiomyoma
 |
| **MSPa-002** | 1. Describe the histological basis of Duchenne Muscular Dystrophy
2. Describe histopathological basis & clinical presentation of Alzheimer`s Disease, Multiple Sclerosis & Astrocytoma
 |
| **MSPa-003** | 1. Describe the clinical presentation and histological justification for osteoporosis,
2. Describe the histological basis for bone repair after fractures
 |
| **MSPa-004** | Describe the histological basis for cartilage growth and repair |
| **PHARMACOLOGY** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MSPh-001** | 1. Explain the mechanism by which drugs can stimulate NMJ.
2. Explain the mechanism by which drugs can block NMJ.
 |
| **MSPh-002** | Outline the pharmacological concepts of drugs used in Myasthenia gravis |
| **MSPh-003** | Outline the pharmacological concepts of drugs used as local anesthetics. |
| **COMMUNITY MEDICINE AND PUBLIC HEALTH** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-CM-001** | 1. Explain causes of low back pain
2. Describe prevention of low back pain
 |
| **MS-CM-002** | 1. Describe causes and prevention of musculoskeletal disorders (MSD) related to child labor.
2. Describe causes and prevention of musculoskeletal disorders (MSD) related to child labor.
 |
| **MS-CM-003** | 1. Describe work related musculoskeletal disorders addition with its burden/epidemiology
2. Identify risk factors of MSD at workplace
3. Describe prevention of exposure to risk factors related to workplace
 |
| **MS-CM-004** | 1. Describe MSD related to mobile addition with its burden/epidemiology
2. Identify risk factors related to MSD due to excessive mobile usage.
3. Describe the preventive strategies for mobile addiction related MSD.
 |
| **MS-CM-005** | Describe application of ergonomics in MSD related to above disorders. |
| **MS-CM-006** | 1. Describe the concept of non-communicable diseases
2. Describe the concept of communicable diseases
 |
| **MS-CM-007** | 1. Identify the risk factors in the community for Osteoporosis
2. Learn & apply interventions to prevent risk factors for various musculoskeletal diseases in community.
 |
| **AGING** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **MS-ag-001** | Discuss the effect of age on bone fragility and its implications with management. |
| **MS-ag-002** | Discuss the effect of age on loss of cartilage resilience and its implications and management |
| **MS-ag-003** | Discuss the effect of age on Muscular strength and its implications and management |
| **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. |
| **BEHAVIORAL SCIENCES** |
| **MSBhS-001** | Identify & deal with the various psychosocial aspects of Musculoskeletal conditions (Osteoarthritis, Osteomyelitis, Rheumatoid arthritis, Gout, chronic back pain, psychosomatic complaints) & Neuromuscular conditions (Muscular dystrophy, Myasthenia Gravis, Sclerosis) on Individual, Family & Society. |
| **MSBhS-002** | 1. Identify the psychosocial risk factors as mediating factors between illness and its effect.
2. Discuss the role of psychological variables like coping, social support, and other health cognitions in mediating between illness and its effect.
 |
| **PROFESSIONALISM, ETHICS, RESEARCH AND LEARDERSHIP** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **PERLs1-08** | Demonstrate punctuality  |
| **PERLs1-09** | Manage time effectively  |
| **PERLs1-10** | Demonstrate respect, diversity in gender, age, culture, race, religion, abilities & sexual orientation for peers  |
| **PERLs1-11** | Design professional digital footprint, use appropriate online etiquette & follow rules for every Internet resource  |
| **PERLs1-12** |  Describe responsibility to oneself. Discuss responsibilities of being a learner  |
| **PERLs1-13** | Discuss professional code of conduct  |
| **PERLs1-14** | Work respectfully and effectively with their peers  |
| **PERLs1-15** | Set Learning Goals  |
| **PERLs1-16** | Locate credible scientific evidence  |
| **CIVICS** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **Family** | Identify basic unit of social institution. Discuss and characterize the different types of family. Give the importance of basic unit of social institution in the development of a state. Enlist the responsibilities of family in general Analyze your role for betterment of the family. Compare and contrast the impact of the deterioration of family in the western society &give examples. |
| **Community** | Define community. Explain nature & significance of community. Discuss role of a family in community. Analyze the role of an individual for the betterment of the community. |
| **HOLY QURAN** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **Angels** | Discuss belief in angels and its significance. Describe the universal role of angels. (duties) |
| **Qadr** | Identify taqdeer as knowledge of Allah. Explain the concept of faith in good and evil. |
| **ISLAMIAT** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **Holy Quran** | Explain the Holy Quran as a guide for modern society and scientific development. |
| **PAKISTAN STUDIES** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **Ethnicity** | Explain ethnic and cultural distribution of Pakistan. |
| **CLINICAL SKILLS FOUNDATION** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **CSF-1** | Measure body temperature using a mercury/digital thermometer. |
| **CSF -2** | Examine the wrist joint for functionality. |
| **CSF -3** | Examine the strength of upper limb. |
| **CSF -4** | Examine the strength of lower limb. |
| **CSF -5** | Examine the knee joint for functionality. |
| **CSF -6** | Examine the shoulder joint for functionality. |
| **CSF -7** | Examine the hip joint for functionality. |
| **CSF -8** | Identify common fractures showing in x-rays of upper limb. |
| **CSF -9** | Identify common fractures showing in x-rays of lower limb. |
| **SKILL LAB** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **SL-1** | Measure body temperature using a mercury/digital thermometer. |
| **SL-2** | Examine the wrist joint for functionality. |
| **SL-3** | Examine the strength of upper limb. |
| **SL-4** | Examine the strength of lower limb. |
| **SL-5** | Examine the knee joint for functionality. |
| **SL-6** | Examine the shoulder joint for functionality. |
| **SL-7** | Examine the hip joint for functionality. |
| **SL-8** | Identify common fractures showing in x-rays of upper limb. |
| **SL-9** | Identify common fractures showing in x-rays of lower limb. |
| **ENGLISH** |
| **E-1** | **Essay writing:** understand what writing assignment involves. know functions of essays & reports. |
| **E-2** | **Interviewing skills:** how to prepare for interview |
| **E-3** | **Pressy:** |
| **E-4** | **Grammar:** basics of grammar and tenses |

**OPERATIONAL DEFINITIONS**

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| **Large group interactive session (LGIS)** |
| Lecture format is the most widely used approach to teaching especially in a large class size with average attention span of 20-30 mins. Interactive lecturing involves a two-way interaction between the presenter and the participants. Interactive methods like brain storming buzz group, simulation, role play, and clinical cases can be used.**Significance of its usage**Relaxed environment, diverse opinions, Increase attention & motivation. Independence & group skills. Cost effective. Suitable for taking advantage of available  |
| **Team Based learning** |
| 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 readyApplying 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 caseStudents acquire insightful information. Stay abreast with novel advancements in healthcare. |
| **Tutorial** |
| Tutorial is a class or short series of classes, in which one or more instructors provides intensive instruction on some subject to a small group. Its purpose is to explore point of view and guide towards directed, reflective learning skills.**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 problem-solving skills. Develop practice of self-learning. Reduced time to understand the topic. |
| **Skill lab** |
| 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. |
| **Lab practical** |
| Lab practical involve things like identifying a structure, a type of stain through a microscope, a problem with a 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. |
| **Demonstration** |
| 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 systematic manner.**Significance of its usage**Promotes learning and correlates theory with practice. Sharpens the observation skills.Sustain interests in learning environment. Helps teacher to evaluate students response |
| **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 modeling |
| **Simulation** |
| Person, device or set of conditions, which attempts to present education and evaluation of problems authentically. The student or trainee is required to respond to the problems as she/he would under natural circumstances.Significance of its usage Safety for patients Liberty to make mistakes. Manageable/variable complexity of tasks Opportunity to develop self-efficacy before real patient encounter. Repeatability of tasks Learning at different pace is permissible |
| **Clinical case based conference** |
| Clinical Case based conferences allow clinicians and medical students to present difficult case material and include discussions of diagnostic, clinical formulation, and/or treatment issues.Significance of its usage Provides detailed (rich qualitative) information. Provides insight for further research. Permitting investigation of otherwise impractical (or unethical) situations. |
| **Ward rounds** |
| It is a composite clinical practice to review inpatients’ management and progress, to make decisions about further investigations, treatment options and discharge from hospital. It is an opportunity for clinicians, students, and patients to participate in education and training at bedside.Significance of its usage Patient management skills History taking Physical examination Time management skills Communication skills |
| **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 |

**ASSESSMENT POLICY**

A student must get pass marks in every discipline (i.e. obtain minimum 50%) in the aggregate theory marks. He/ She must also get minimum of 50% in the aggregate of the practical/OSPE/OSCE exams in order to pass. A student must get an aggregate of 50% marks in both theory and practical in order to be declared as pass in that discipline.

**Attendance**

As per RYK Medical College, University of health sciences and Pakistan Medical & Dental Council guide lines, students are instructed to attend all the lectures, small group discussions, labs, clinical ward attachments and all other instructional activities. **80% attendance is mandatory to sit in End of module examination and Annual examination. No student will be allowed to appear in examination, if the attendance is short.**

**Internal Assessment:**

Each module’s internal assessment should be calculated as following:-

|  |
| --- |
| **INTERNAL ASSESSMENT BREAKDOWN PER MODULE (1st Year M.B.B.S)** |
| Foundation(8 Weeks) | Hematology & immunology(3 Weeks) | Musculoskeletal(9 Weeks) | Cardiovascular(7 Weeks) | Respiratory(5 Weeks) | Practical & viva |
| 4% | 1.5% | 4.5% | 3.5% | 2.5% | 4% |
| **Total = 20% (1st Year M.B.B.S)** |

* Students will be assessed comprehensively through multiple methods (MCQs, OSPE, OSCE, Viva and Practical Examinations.
* 20% marks of internal evaluation will be added to University of health sciences (UHS) final examination score as per university’s rules and regulations.

**Formative Assessment:**

Individual department may hold quiz or short answer questions to help students assess their own learning. The marks obtained are not included in the internal evaluation

**RYKMC EXAMINATION RULES & REGULATIONS**

* Student must report to examination hall/venue, 30 minutes before the exam.
* Exam will begin sharp at the given time.
* No student will be allowed to enter the examination hall after 15 minutes of scheduled examination time.
* Students must sit according to their roll numbers mentioned on the seats.
* Cell phones are strictly not allowed in examination hall.
* If any student is found with cell phone in any mode (silent, switched off or on) he/she will be not be allowed to continue their exam.
* No students will be allowed to sit in exam without University Admit Card, RYKMC College ID Card and Lab Coat
* Student must bring the following stationary items for the exam: Pen, Pencil, Eraser, and Sharpener.
* Indiscipline in the exam hall/venue is not acceptable. Students must not possess any written material or communicate with their fellow students.

**For UHS Examination Policy, please consult UHS website!**

**TABLE OF SPECIFICATIONS (TOS) MUSCULOSKELETAL MODULE**

|  |  |  |
| --- | --- | --- |
| **Theme** | **Written exam** | **Oral practical clinical examination** |
| subjects | MCQ(1 mark) | SEQ(5mark each) | Marks | **OSPE/OSCE/Viva stations** | **Marks** |
| OSPE(8 marks each observed) | OSCE(8 marks each observed | Structured viva (16 marks each) |
| Normal structure | Anatomy & applied/ clinical | 35 | 4 | **55** | 5 | ---------- | 1 | **56** |
| Normal function | Physiology & applied/clinical | 17 | 2 | **27** | 1 | ---------- | 1 | **24** |
| Biochemistry & applied/clinical | 11 | 1 | **16** | 1 | ---------- | 1 | **24** |
| Disease burden & prevention | Community medicine & public health | 06 | ---------- | **06** | ---------- | ---------- | ---------- | ---------- |
| Behavioral sciences | 04 | ---------- | **04** | ---------- | ---------- | ---------- | ---------- |
| Pathophysiology & pharmacotheraeutics | pathology | 07 | ---------- | **07** | ---------- | ---------- | ---------- | ---------- |
| pharmacology | 05 | ---------- | **05** | ---------- | ---------- | ---------- |  |
| CFRC | CF1-2 | ---------- | ---------- | ------- | ---------- | 1 | ---------- | 08 |
| PERLS | PERLs1-2 | ---------- | ---------- | ------- | ---------- | 1 |  | 08 |
|  |  | **85** | **7×5=35** | **120** | **7 stations×8=****56** | **2stations×8=16** | **3 viva ×16=48** | **120** |

**ASSESSMENT SCHEDULE & OSPE/OSCE SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
| **DATE/DAY** | **EXAMINATION** | **TIME** | **VENUE** |
| **Thursday**--/--/2024-25 | Theory | 09:00 - 12:00 | Roll # 1 - 50 (multipurpose hall) |
| Roll # 51 – 100 (skill lab) |
| **Friday**--/--/2024-25 | OSPE/OSCE | 08:00 – 04:00 | Roll # 1 – 50 (multipurpose hall) |
| **Monday**--/--/2024-25 | OSPE/OSCE | 08:00 – 04:00 | Roll # 51 – 100 (multipurpose hall) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Station # 5****OSPE****Observed****Biochemistry** | **→** | **Station # 6****Rest Station** | **→** | **Station # 7****OSCE****Observed****PERLs** | **→** | **Station # 8****OSPE****Observed****Anatomy (4)** |
| **↑** | **Foundation Module OSPE/OSCE/Viva Scheme Map** | **↓** |
| **Stations detailed breakdown** | **Station numbers** |
| **Station # 4****OSPE****Observed****Anatomy (3)** | **Anatomy OSPE Stations =**5**Anatomy Viva Station =** 1**Physiology OSPE stations =** 1**Physiology viva station =** 1**Biochemistry OSPE stations =** 1**Biochemistry Viva station =** 1**C-FRC OSCE station =** 1**PERLS OSCE station =** 1**Rest stations =** 2**Total stations =** 14 | 1/3/4/8/101102130509120706/14 | **Station # 9****Structured viva biochemistry** |
| **↑** | **↓** |
| **Station # 3****OSPE****Observed****Anatomy (2)** | **Station # 10****OSPE****Observed****Anatomy (5)** |
| **↑** | **↓** |
| **Station # 2****OSPE****Observed****Physiology** | **Station # 11****Structured viva Anatomy** |
| **↑** | **↓** |
| **Station # 1 OSPE****Observed****Anatomy (1)** | **START****&****END** | **Station # 14****Rest Station** | **←** | **Station # 13****Structured****Viva****Physiology** | **←** | **Station # 12****OSCE****Observed****C-FRC** |

**ASSESSMENT TOOLS & SAMPLE QUESTIONS**

**ASSESSMENT TOOLS:**

**Single best type** also known as MCQs (Multiple Choice Questions)

**MCQ:**

 A BCQ has a statement or clinical scenario of five options (likely answers).

**Correct answer carries one mark, and incorrect ‘zero mark’. There is NO negative marking.**

Students mark their responses on specified computer-based sheet designed for RYKMC.

**Sample BCQs:**

The bone of the body known as the beauty bone is:

a) Clavicle

b) Humerus

c) Radius

d) Scapula

 e) Ulna

**OSPE: Objective Structured Practical Examination (See the proposed plan of OSPE)**

**OSCE: Objective Structured Clinical Examination (See the proposed plan of OSCE)**

* It may comprise between 12- 25 stations.
* The content may assess application of knowledge, or practical skills.
* Student will complete task in define time at one given station.
* All the students are assessed on same content by same examiner in same allocated time.
* A structured examination will have observed, unobserved, interactive and rest stations.

**Observed and interactive stations:**

They will be assessed by internal or external examiners through the task or viva.

**Unobserved station (Static):**

It will be static station in which students will have to answer the questions related to the given pictures, models or specimens on the provided response sheet.

**Rest station**: It is a station where no task is given, and during this time student can organize his/her thoughts.

**BOOKS & RECOMMENDED READINGS**

**Anatomy**

* Gray’s anatomy.
* Langman’s medical embryology.
* Snell’s clinical anatomy.
* Snell’s clinical neuroanatomy. Walter kluwer.
* Laiq H.S Medical histology. Paramount books.
* Laiq H.S general anatomy. Paramount books.
* Wheater’s functional histology.

**Physiology**

* Guyton AC and Hall text book of medical physiology, W,B sunders & co.
* Essentials of medical physiology by Mushtaq Ahmad.
* Ganong Physiology.

**Biochemistry**

* Harper’s biochemistry by Robert k murray, daryl k, granner McGraw-hill.
* Lippincott’s illustrated reviews biochemistry Champe, P.C & Harvey.
* ABC of clinical genetics by H.M Kingston.

**Pathology**

* Pathologic basis of disease by Vinary kumar, abul K, Abbas WB saunders.
* Pocket companion to pathologic basis of diseases,Richard Mitchall, vinary.
* General pathology by walter. Churchil livingstone.

**Pharmacology**

* Basic and clinical pharmacology by katzung, MCGraw-hill
* Pharmacology by champe and Harvey, Lippincott Williams & wilkins.

**Behavioral sciences**

* Hand book of behavioral sciences by prof Mowadat H Rana 3rd edition
* Medical and psychosocial aspects of chronic illness and disability Donna R.

**Community medicine**

* Parks textbook of preventive and social medicine, K park
* Public health and community medicine Ilyas, Ansari

**Surgery**

* Bailey & love short practice of surgery

**Medicine**

* Davidson’s principles and practice of medicine

**Islamiyat/Pakistan studies**

* Standard islamiyat (compulsory) for B.A, B.sc, M.A, M.sc by professor M. sharif islahi
* Pakistan studies (compulsory) for B.A, B.sc,B.com, Medical/Engineering by prof Shah Jahan

**English**

* Oxford English grammar
* Oxford essay writing

**Next Module- Cardiovascular will start from ------ of --------- 2025/26**