

**RYK MEDICAL COLLEGE**

Department of Medical Education



Study Guide

**Module 2: Hematopoietic & Lymphatic (Block 1)**

Academic Year 2024-25

(3 Weeks)

Integrated and Modular Curriculum

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 the integrated curriculum based on specific systems, clinical clerkships, Quran and Professionalism.

|  |
| --- |
| **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 the 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:** Module 2 (Block 1)Hematopoietic & Lymphatic

**Block duration:** 11 weeks (8 weeks foundation + 03 weeks hematopoietic & Lymphatic

**Module duration**: 03 weeks

**Year:** 1st

**Module:** 2nd

**Start Date:** ---/---/2024-25

**End Date:** ---/---/2024-25

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

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

**No. of hours:** 8 hours per day (1 Hour for prayer / Quran / Lunch)

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

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

**End module MCQ exam:**  (8:00-9:00 AM) (Theory integrated)

**Active learning sessions details**

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

**THEMES:**

1. Red Blood cells (RBC)
2. Platelets
3. White blood cells (WBC)

**CLINICAL RELEVANCE**

Aplastic anemia

 Hemolytic anemia

 Blood loss anemia

 Nutritional anemia

 Polycythemia

 Hemoglobinopathies

 Jaundice

 Acute and chronic lymphocytic and myelogenous Leukemia

 Allergy (Type I, Type II & Type III)

**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, Dr Raja Faisal Zulfiqar
* Biochemistry: Dr Khalida Anwar, Dr Dost M kalhoro
* Physiology: Prof Dr Tehseen Iqbal, Dr Rahila Adil, Dr Sadia
* Pharmacology: M Amir Rafique
* Pathology: Prof Dr Abdul Hakeem, Dr Syed Naqeeb Ali
* Community medicine: Dr Ali Hussain,
* Medicine: Dr Abdul Waheed
* Surgery: Dr Jahangeer
* Pediatrics: Dr Masood
* Gynecology & obstetrics: Dr Farhat Yasmeen
* Behavioral sciences: Dr Mahwish Adnan
* Holy Quran & Islamiyat: Mr Jaffar
* Pakistan studies: Mr Jaffar
* Civics: Dr Majid

**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 HEMATOPOIETIC MODULE**

|  |  |  |  |
| --- | --- | --- | --- |
| **GROUPING** | **LECTURES** | **PBL/CBL** | **SMALL GROUP DISCUSSION** |
| **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 | Anatomy → DR - 05Physio → DR - 02Biochem → DR - 01Patho → DR 04Pharma → DR 03Com med → DR 06 | SGD room2nd floor |
| **TEAM BASED LEARNING** |
| * Multi - purpose hall
* Skill lab
* Corresponding lab
* Mosque
 |
| **(PRACTICALS)** |
| Corresponding labs |

**WEEKLY TIME TABLES**

|  |
| --- |
| **(Week 1) Block 1, Module 2: Hematopoietic & Lymphatic = / /2024-25 to / /2024-25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20****am** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:20****2:00****Pm** | **02:00-4:00** |
| **Monday** | **LGIS****Anatomy**HL-A-001-aDr G.Ansari | **LGIS****Physiology**HL-P-001Dr Tehseen.I | **Tea break** | **LGIS****Biochemistry**HL-B-001-aDr Shafqat | **LGIS****Com.Med** HL-CM-001 Dr Ali.H | **LGIS****Pathology**HL-P-001-aDr Hakeem.Ch | **Prayer & lunch break** | **Practical/Skill Lab 1**Group A **Skill Lab – 1**Group B **Physiology (P-1)**Group C **Biochemistry (P-1)** |
| **Tuesday** | **LGIS****Anatomy**HL-A-001-bDr Z.Alvi | **LGIS****Physiology**HL-P-002-aDr Raheela.A | **LGIS****Biochemistry**HL-B-001-bDr Dost.M | **LGIS****Physiology** HL-P-002-b Dr Sadia.J | **LGIS****Pharmacology**HL-PH-001-aDr Zameer.AS | **Practical/Skill Lab 1**Group A **Biochemistry (P-1)**Group B **Anatomy (P-1)**Group C **Skill Lab – 1** |
| **Wednesday** | **LGIS****Anatomy**HL-A-OO1-cDr R.Faisal | **LGIS****Physiology**HL-P-OO3Dr Safi.R | **LGIS****Biochemistry**HL-B-001-cDr Khalida.A | **LGIS****Civics**HL-001Dr A.Majid | **LGIS****PERLS – 1-06****Dr M Tariq.k** | **Practical/Skill Lab 1**Group A **Physiology (P-1)**Group B **Skill Lab – 1**Group C **Anatomy (P-1)** |
| **Thursday** | **LGIS****Anatomy**HL-A-001-dDr G.Ansari | **LGIS****Physiology**HL-P-004Dr Tehseen.I | **LGIS****Biochemistry**HL-B-001-dDr Shafqat | **LGIS****Physiology**HL-P-005-aDr Raheela.A | **LGIS****Pathology**HL-P-001-bDr Hakeem.Ch | **Practical 1**Group A **Anatomy (P-1)**Group B **Biochemistry (P-1)**Group C **Physiology (P-1)** |
| **Friday** | **LGIS****Physiology**HL-P-005-bDr Sadia.J | **LGIS****Biochemistry**HL-B-002-aDr Dost.M | **LGIS****Anatomy**HL-A-002Dr Z.Alvi | **LGIS****Holy Quran**HL-001Dr A.Majid | **LGIS****Biochemistry**HL-B-002-bDr Khalida.A | **CLINICAL SKILL FOUNDATION 1**(Please refer to clinical skills manual for groups and wards distribution) |

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| **(Week 2) Block 1, Module 2: Hematopoietic & Lymphatic = / /2024 - 25 to / /2024 - 25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:00****10:20****am** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:2002:00****pm** | **02:00-4:00** |
| **Monday** | **Group A Physio** 005-c,006-a **(Tuto)****Group B** **Biochem** 003-a & b **(PBL)****Group C Pathology** 1 c & d **(SGD)** | **Tea break** | **LGIS****Beh.Science**HL-BHS-001Dr Mehwish.A | **LGIS****Com.Med**HL-CM-002Dr Ali.H | **LGIS****Physiology**HL-P-006-bDr Raheela.A |  **Prayer & lunch break** | **Practical/Skill Lab 2**Group A **Skill Lab – 2**Group B **Physiology (P-2)**Group C **Biochemistry (P-2)** |
| **Tuesday** | **Group A Biochem** 003-a & b **(PBL)****Group B** **Pathology** 001 c & d **(SGD)****Group C Physio** 005-c,006-a **(Tuto)** | **Group A Pathology** 001 c & d **(SGD)****Group B** **Physio** 005-c,006-a **(Tuto)****Group C Biochem** 003-a & b **(PBL)** | **LGIS****Pharmacology**HL-PH-001-bDr Zameer.AS | **Practical/Skill Lab 2**Group A **Biochemistry (P-2)**Group B **Anatomy (P-2)**Group C **Skill Lab – 2** |
| **Wednesday** | **LGIS****Physiology**HL-P-007-bDr Safi.R | **LGIS****Biochemistry**HL-B-003-cDr Khalida.A | **LGIS****Physiology**HL-P-007-aDr Sadia.J | **LGIS****Biochemistry**HL-B-004-aDr Shafqat | **LGIS****Pak-Studies**HL-002Mr Jaffar | **Practical/Skill Lab 2**Group A **Physiology (P-2)**Group B **Skill Lab – 2**Group C **Anatomy (P-2)** |
| **Thursday** | **LGIS****Physiology**HL-P-007-cDr Tehseen.I | **LGIS****Biochemistry**HL-B-004-bDr Dost.M | **LGIS****Physiology**HL-P-007-dDr Raheela.A | **LGIS****Com.Med**HL-CM-001Dr Ali.H | **LGIS****Biochemistry**HL-B-005-aDr Khalida.A | **Practical/Skill Lab 2**Group A **Anatomy (P-2)**Group B **Physiology (P-2)**Group C **Biochemistry (P-2)** |
| **Friday** | **LGIS****Physiology**HL-P-008Dr Sadia.J | **LGIS****Biochemistry**HL-B-005-bDr Shafqat | **LGIS****Civics**HL-002Dr A.Majid | **LGIS****PERLS–1-07**Dr M Tariq.K | **LGIS****English 1**E – 1Mr.Yasir | **CLINICAL SKILL FOUNDATION 2****(**Please refer to clinical skills manual for groups and wards distribution) |

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| **(Week 3) Block 1, Module 2: Hematopoietic & Lymphatic = / /2024 - 25 to / /2024 - 25** |
| **Days** | **8:00-9:00** | **9:00-10:00** | **10:0010:20****am** | **10:20-11:20** | **11:20-12:20** | **12:20-01:20** | **01:2002:00****pm** | **02:00-4:00** |
| **Monday** | **LGIS****Physiology**HL-P-9-aDr Safi.R | **LGIS****Biochemistry**HL-B-005-cDr Dost.M | **Tea break** | **LGIS****Biochemistry**HL-B-006Dr Khalida.A | **LGIS****Com.Med**HL-CM-002Dr Ali.H | **LGIS****Pathology**HL-P-001-eDr Hakeem.Ch | **pngtree-islamic-mosque-drawing-islamic-mosque-vector-png-image_6773201.pngPrayer & lunch break** | **Practical 3**Group A **Anatomy (P-3)**Group B **Physiology (P-3)**Group C **Biochemistry (P-3)** |
| **Tuesday** | **LGIS****Physiology**HL-P-09-bDr Tehseen.I | **LGIS****Biochemistry**HL-B-007-aDr Shafqat | **LGIS****Beh.Science**HL-BHS-002Dr Mehwish.A | **LGIS****Islamiat**HL-002Miss Kanwal | **LGIS****Pharmacology**HL-PH-001-cDr Zameer.AS | **Practical 3**Group A **Biochemistry (P-3)**Group B **Anatomy (P-3)**Group C **Physiology (P-3)** |
| **Wednesday** | **LGIS****Physiology**HL-P-010Dr Raheela.A | **LGIS****Biochemistry**HL-B-007-bDr Dost.M | **LGIS****Pathology**HL-P-001-fDr Hakeem.Ch | **LGIS****Physiology**HL-P-011-aDr Sadia.J | **LGIS****Biochemistry**HL-B-007-cDr Khalida.A | **Practical 3**Group A **Physiology (P-3)**Group B **Biochemistry (P-3)**Group C **Anatomy (P-3)** |
| **Thursday** | **LGIS****Physiology**HL-P-011-bDr Safi.R | **LGIS****Biochemistry**HL-B-007-dDr Shafqat | **LGIS****Biochemistry**HL-B-008-aDr Dost.M | **LGIS****Com.Med**HL-CM-003Dr Ali.H | **LGIS****Pak-Studies**HL-001Mr.Jaffar | **LGIS****Aging**HL-Ag-001Dr A Yar.M | **LGIS****English**E–2Mr Yasir |
| **Friday** | **LGIS****Physiology**HL-P-012Dr Tehseen.I | **LGIS****Biochemistry**HL-B-08-bDr Khalida.A | **LGIS****Civics**HL-003Dr A.Majid | **LGIS****English**E – 3Mr Yasir | **LGIS****Biochemistry**HL-B-008-cDr Shafqat | **LGIS****Holy Quran**HL-002Dr A.Majid | **LGIS****English**E-4Mr Yasir |

**DISTRIBUTION AND DURATION OF TEACHING ACTIVITIES**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Subject  | Hours theory  | HoursPractical | SGD/TBLPBL/CBL | Total hours |
| Anatomy | 5 | 3 Practical = 6 hours | ------- | **11** |
| Physiology | 19 | 3 Practical = 6 hours | 2 | **27** |
| Biochemistry | 20 | 3 Practical = 6 hours | 2 | **28** |
| Pharmacology | 03 | ------- | ------- | **03** |
| Pathology | 04 | ------- | 2 | **06** |
| Community medicine | 05 | ------- | ------- | **05** |
| Aging | 01 | ------- | ------- | **01** |
| Behavioral sciences | 02 | ------- | ------- | **02** |
| PERLs | 02 | ------- | ------- | **02** |
| Clinical skill foundation | ------- | 4 | ------- | **04** |
| Skill lab | ------- | 4 | ------- | **04** |
| Holy Quran | 02 | ------- | ------- | **02** |
| Islamiat | 01 | ------- | ------- | **01** |
| Pakistan studies | 02 | ------- | ------- | **02** |
| Civics | 03 | ------- | ------- | **03** |
| English | 04 | ------- | ------- | **04** |
| Self directed learning | 00 | ------- | ------- | **00** |
| Total  | **7 hours/day=35 hours/week × 3 weeks = 105 hours** | **105** |

**MODULE RATIONALE**

"Blood is Life". Unlike any other organ, components of blood and immunity reflect/reveal disease processes in other organs as well. Therefore, studying blood is like opening a book to all aspects of medicine. Hence, this module has been designed to enable students to have a basic understanding about the normal structure, function and biochemistry of blood, immune and Lymphatic systems. Not only that, but students would also learn, when normal physiology and composition of blood and immune system is disturbed, what disorders result in our community. Emphasis has been given to incorporate deranged laboratory findings into the clinical problem solving.

**Aims:**

The aims of the hematopoietic and lymphatic module are to:

**1.** **Understand Structure and Function:** Learn the anatomy, physiology, and development of the hematopoietic and lymphatic systems.

**2. Recognize Diseases:** Identify common disorders like anemia, leukemia, and lymphomas, understanding their patho-physiology.

**3. Develop Diagnostic Skills:** Interpret hematological tests and recognize abnormal findings.

**4. Apply Clinical Knowledge:** Diagnose and manage common hematologic and lymphatic conditions, understanding therapeutic approaches.

**5. Integrate Learning:** Correlate knowledge across subjects for a holistic understanding of diseases.

**6. Promote Ethical Practice:** Understand ethical considerations in blood donation, transfusion, and patient care.

**7. Enhance Communication and Teamwork:** Develop skills to work in interdisciplinary teams and communicate effectively with patients and peers.

**IMPLEMENTATION TORs**

* The time calculation for completion of modules and blocks is based on 40 hours per week. Total hours of teaching, learning and formative/summative internal assessment to be completed in a year are 1260. Five year of MBBS course has a total of 6200 hours.
* 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 respective three block exams for internal assessment.

**MODULE OUTCOMES**

1. Explain the function of all the organs / structures involved in this system and the mechanisms controlling them. (Spleen, lymph nodes, thymus, bone marrow, RBS’s, WBC’s and platelets
2. Explain the etiology and pathogenesis of common blood & lymphatic diseases, particularly those of importance in Pakistan.
3. Explain the rationale for the use of common therapeutic agents for the diseases related to Blood and immunity.
4. Describe the role of immunity in the body
5. Discuss the working & uses of laboratory instruments in diagnostic lab visit
6. Relate red cell indices with health and disease
7. Recognize ABO/RH blood grouping system
8. Describe the role of Reticuloendothelial system in the body
9. Explain the events of hemostasis
10. Extrapolate the biochemical aspects of plasma proteins
11. Discuss the pharmacological treatment of iron deficiency anemia
12. Discuss Blood composition and function
13. Discuss the role of liver in hemolytic anemia
14. Practice history taking of a patient presented with blood disorders

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

|  |
| --- |
| **GROSS ANATOMY THEORY** |
| **CODE** |  **SPECIFIC LEARNING OUTCOMES** |
| HL-A-001 | A. Identify the components of the Hematopoietic & Lymphoid Tissue and their functionB. Describe the location, coverings, relations of Spleen Origin, course branches and distribution of Splenic arteryC. Describe the venous drainage of Spleen, Portal vein formation, tributaries, and area of drainage. D. Describe the location and relations of Thymus. Age related changes in Thymus |
|  | **EMBRYOLOGY & POST-NATAL DEVELOPMENT** |
| HL-A002 | Intrauterine Development of spleen |

|  |
| --- |
|  **HISTOLOGY PRACTICAL** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| HL-A003 | 1. Light microscopic structure of Spleen, tonsils and MALT including Appendix.
2. Light microscopic structure of Thymus
3. Light microscopic structure of Lymph nodes
 |

|  |
| --- |
|  **MEDICAL PHYSIOLOGY** |
| **CODE** |  **SPECIFIC LEARNING OBJECTIVES** |
| HL-P- 001 |  Define anemia and classify anemia on the basis of morphology and cause Discuss the effects of anemia on the body |
| HL-P- 002 | 1. Define polycythemia and explain types of polycythemias
2. Discuss the effects of polycythemia on the body
 |
| HL-P- 003 | Define hemostasis and describe the mechanisms by which hemostasis is secured |
| HL-P-004 | Discuss the characteristics and functions of platelets Explain the mechanism of formation of platelet plug |
| HL-P- 005 | 1. Enlist the clotting factors in blood explain the conversion of Prothrombin to Thrombin & formation of Fibrin Fibers
2. Explain the Intrinsic & extrinsic clotting pathway name & explain the mechanism of anticoagulants used in laboratory. explain the factors that prevent intravascular coagulation Explain the role of Calcium ions in Intrinsic and Extrinsic pathways
3. Enlist the vitamin K dependent clotting factors explain the prothrombin time, INR, and its clinical significance.
 |
| HL-P-006 | 1. Enlist and explain the conditions that cause excessive bleeding
2. Define thrombocytopenia Enlist the causes and consequences of Thrombocytopenia
 |
| HL-P- 007 | 1. Define immunity Classify immunity explain humoral immunity explain Innate immunity elaborate cell mediated immunity.
2. Describe the structure of antigen and immunoglobulin Describe the role of Helper T-cells in cell mediated immunity
3. Enlist the types of Immunoglobulins along with their functions explain the role of memory cells in enhancing antibody response (secondary response)
4. Describe the mechanism of action of antibodies elaborate the complement system.
 |
| HL-P- 008 | Elaborate Immune tolerance explain the process of clone selection during T cell processing |
| HL-P- 009 | 1. Discuss the failure of tolerance mechanism discuss immunization define passive Immunity Explain features and physiological basis of delayed reaction allergy.
2. Explain features and physiological basis of Atopic allergy explain features and physiological basis of anaphylaxis, urticaria and Hay fever.
 |
| HL-P- 010 | Discuss the pathophysiology, features and treatment of ABO and RH incompatibility |
| HL-P- 011 | 1. Discuss the features and complications of mismatched blood transfusion reaction
2. Elaborate the Transplantation of Tissues and Organs
 |
| HL-P- 012 |  Explain the process of tissue typing explain prevention of Graft Rejection by suppressing immune system |
| **MEDICAL BIOCHEMISTRY** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| HL-B- 001 | 1. Discuss the biochemical role and types of hemoglobin Differentiate Hemoglobin and myoglobin
2. Explain oxygen dissociation curve of hemoglobin and myoglobin and factors regulating them
3. Interpret CO toxicity on basis of sign and symptoms
4. explain the role of 2,3 BPG in fetal circulation
 |
| HL-B- 002 | 1. Discuss Heamoglobinopathies and their biochemical and genetic basis with special emphasis on sickle cell anemia, Thalassemia and methemoglobinemia
2. Discuss the following types of anemia on the basis of signs and symptoms and laboratory data:
* Hypochromic microcytic
* Normochromic microcytic
* Normochromic normocytic
* Microcytic (megaloblastic)
 |
| HL-B- 003 | 1. Explain the iron metabolism with mechanism of absorption and factors affecting it. Interpret Iron deficiency anemia on basis of given data and microscopic findings
2. Interpret folic acid and cobalamin in relation to anemias on given data and microscopic findings
3. Discuss biochemical role of pyridoxine and vitamin C in microcytic anemia
 |
| HL-B- 004 | 1. Discuss the degradation of heme in macrophages of reticuloendothelial system
2. Describe the formation of bile pigments, their types and transport Discuss the fate of bilirubin
 |
| HL-B- 005 | 1. Discuss hyperbilirubinemias and their biochemical basis
2. Differentiate types o jaundice on basis of sign/symptoms and data
3. Evaluate the genetic basis of jaundice on the basis of lab investigations
 |
| HL-B- 006 |  Classify and Explain the biomedical importance of each class of plasma proteins |
| HL-B- 007 | 1. Explain the structure and biochemical role of immunoglobulins
2. Describe the production, structure and functions of B cells, plasma cells, and antibodies (IgA, IgD, IgE, IgG, and IgM).
3. Discuss the functions of the cytokines (ILs, TNFs, IFs, PDGF, and PAF).
4. Interpret multiple myeloma on basis of given data
 |
| HL-B- 008 | 1. Explain and interpret pedigree of single gene defect
2. Explain sickle cell anemia (Autosomal recessive)
3. C. Explain Beta Thalassemia ( x linked recessive)
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| **BIOCHEMISTRY PRACTICAL** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |

 |
| HL-P- 013 | 1. Interpret the Red Blood Cell Count, Hemoglobin concentration, Hematocrit and RBC Indices by Automated Cell Counter
2. Interpret the Total Leucocyte Count, Differential Leucocyte Count Platelet Count by automated Cell Counter.
 |
| HL-P- 014 | Determine Bleeding Time determine Clotting Time. |
| HL-B- 009 | 1. Interpret jaundice on the basis of estimation of Bilirubin Perform estimation of ALT and interpret the findings
2. Perform estimation of AST and interpret the findings
3. Perform estimation of ALP and interpret the findings Interpret graph based on oxy HB curve and 23 BPG Interpret different types of anemias & porphyrias on basis of s/s and data
 |
|  **PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| HL-Ph- 001 | 1. Describe the oral and parenteral iron preparations including their pharmacokinetics, uses, adverse effects
2. Vitamin B12 preparations, Iron AntidotesShould know the terms: Hematopoietic growth factors, their name, mechanism of actions , uses and adverse effects
3. Define and classify anemias according to underlying mechanism and MCV/MCH
4. Discuss the causes and investigations of iron deficiency anemia and megaloblastic anemia Classify the benign and malignant disorders of WBCs
5. Discuss the causes leading to reactive leukocytosis Interpretation of anemias on the basis of peripheral

blood smear and bone marrow findings1. Classify bleeding disorders Discuss first line laboratory investigations for bleeding disorders Describe the basic concept of blood grouping and acute hemolytic transfusion reaction
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|  **DISEASE PREVENTION AND IMPACT** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| HL-CM- 001 | Describe the nutritional aspects of iron deficiency anemia and psychological aspects of diseases |
| HL-CM- 002 | Enlist most common blood borne diseases in Pakistan Describe the routes of spread of blood borne disease |
| HL-CM-003 | Genetic counseling of parents |
| HL-BhS- 001 | Psychological Counselling of patients and their families |
| HL-BhS- 002 | 1. Identify and deal with the various psychosocial aspects of Hematopoietic System disorders.
2. Describe Sickle Cell Disease, Hemophilia, and Conditions of the Blood) on Individual, Family and Society.
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| **AGING**  **Theory** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| HL-Ag- 001 | Discuss the role of platelets in PRP treatment in old age (for skin, hairs and joints) |
| HL-Ag-002 | Explain the role of glutathione in skin whitening |

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| **PERLs Module Year 1** |
| **PROFESSIONALISM, ETHICS, RESEARCH AND LEARDERSHIP** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **PERLs1-06** | Discuss Science and scientific evidence  |
| **PERLs1-07** | Identify gaps in learning through reflection  |
| **CIVICS** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| Relationship with Social Sciences | Compare civics with political science, history, economics, sociology and ethics |
| **HOLY QURAN** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **Akhirat** | 1. Appraise continuity of life beyond material world
2. Concept of Doomsday and its various stages
3. Concept of Day of Judgment and accountability in the Hereafter
4. Concept of "Meezan
 |
| **ISLAMIAT** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **ZAKAT** | i. Identify obligatory importance of Zakat and other items as outlined under the title of 'Infaq-fee-sabilillah'ii. Categorize the people who can be the beneficiaries of Zakatiii. Role of Zakat in eradication of greed and love of material worldiv. Effect of Zakat and sadaqat in circulation of wealth and alleviation of povertyv. Explain the essence of Zakat and sadaqat in building just communitiesvi. Describe the role of state in collection and disbursement of zaka |
| **PAKISTAN STUDIES** |
| **CODE** |  **SPECIFIC LEARNING OBJECTIVES** |
|  | Explain the basis for the creations of Pakistan |
| **CLINICAL SKILLS FOUNDATION** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **CSF-6** | Detail the steps of drawing blood from a vein. |
| **CSF -7** | Check for pallor in the conjunctiva, tongue, and palm of hands  |
| **SKILL LAB** |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** |
| **SL-6** | Detail the steps of drawing blood from a vein.  |
| **SL-7** | Check for pallor in the conjunctiva, tongue, and palm of hands  |
| **ENGLISH** |
| **E-1** | **Essay writing:** understand what writing assignment involves. Understand 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:-

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| **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) Hematopoietic and Lymphatic 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 | 20 | 3 | **35** | 3 | ---------- | 1 | **40** |
| Normal function | Physiology & applied/clinical | 22 | 2 | **32** | 2 | ---------- | 1 | **32** |
| Biochemistry & applied/clinical | 22 | 2 | **32** | 2 | ---------- | 1 | **32** |
| Disease burden & prevention | Community medicine & public health | 05 | ---------- | **05** | ---------- | ---------- | ---------- | ---------- |
| Behavioral sciences | 05 | ---------- | **05** | ---------- | ---------- | ---------- | ---------- |
| Pathophysiology & pharmacotheraeutics | pathology | 06 | ---------- | **06** | ---------- | ---------- | ---------- | ---------- |
| pharmacology | 05 | ---------- | **05** | ---------- | ---------- | ---------- |  |
| CFRC | CF1-1 | ---------- | ---------- | ------- | ---------- | 1 | ---------- | 8 |
| PERLS | PERLs1-1 | ---------- | ---------- | ------- | ---------- | 1 |  | 8 |
|  |  | **85** | **7×5=35** | **120** | **7 stations×8=****56** | **2stations×8=16** | **3 viva ×16=48** | **120** |

**ASSESSMENT SCHEDULE & OSPE/OSCE/VIVA SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
| **DATE** | **EXAMINATION** | **TIME** | **VENUE** |
| ---/---/2025 | Theory | 09:00 - 12:00 Pm | Roll no 1 - 50 (multipurpose hall) |
| Roll no 51 – 100 (skill lab) |
| ---/---/2025 | OSPE/OSCE | 08:00 – 04:00 Pm | Roll no 1 – 50 (multipurpose hall) |
| ---/---/2025 | OSPE/OSCE | 08:00 – 04:00 Pm | Roll no 51 – 1000 (multipurpose hall) |

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| --- | --- | --- | --- | --- | --- | --- |
| **Station # 5****OSPE****Observed****Anatomy** | **→** | **Station # 6****Rest Station** | **→** | **Station # 7****OSCE****Observed****PERLs** | **→** | **Station # 8****Structured****Viva****Biochemistry** |
| **↑** | **Hematopoietic & Lymphatic Module OSPE/OSCE/Viva Scheme Map** | **↓** |
| **Stations breakdown** | **Station numbers** |
| **Station # 4****Structured****Viva****Anatomy** | **Anatomy OSPE Stations =**3**Anatomy Viva Station =** 1**Physiology OSPE stations =** 2**Physiology viva station =** 1**Biochemistry OSPE stations =** 2**Biochemistry Viva station =** 1**C-FRC OSCE station =** 1**PERLS OSCE station =** 1**Rest stations =** 2**Total stations =** 14 | 1/5/1042/9133/1181276/14 | **Station # 9****OSPE****Observed****Physiology** |
| **↑** | **↓** |
| **Station # 3****OSPE****Observed****Biochemistry** | **Station # 10****OSPE****Observed****Anatomy** |
| **↑** | **↓** |
| **Station # 2****OSPE****Observed****Physiology** | **Station # 11****OSPE****Observed****Biochemistry** |
| **↑** | **↓** |
| **Station # 1 OSPE****Observed****Anatomy** | **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:**

A 25 year old male patient presented with complains of productive cough, breathlessness and wheezing. He has been diagnosed with chronic obstructive pulmonary disease.

The most common risk factor for the disease is:

a) Air pollution

b) Coal mining

c) Glass industries

d) Pharmaceutical industries

 e) Tobacco smoke

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

* 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 the same content by the same examiner in the 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.
* 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.

**Pathology**

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

**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

**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- Musculoskeletal will start from ----- of ------- 2024-25**