

**RYK Medical College**

Department of Medical Education



**Study Guide M.B.B.S Second Professional**

**Module 10 (Block 6): Neurosciences-1**

**(6 Weeks & 3 Days)**

**Academic Year 2025/26**

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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 2nd year MBBS (RYKMC) for session 2025-26 affiliated with University of Health Sciences Lahore (UHS). The learners (2nd year MBBS students) will be able to:-

* Organize the learning program module for the session 2025-26.
* 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 10 (Block 6)Neurosciences-1

**Block duration:** 8 weeks & 2 days (Inflammation 1 = 1 week & 4 days)(Neuroscinences 1 =6 weeks & 3 days)

**Module duration**: Six (06) weeks & three (3) days

**Year:** 2nd Year MBBS

**Start Date:** ---/---/2026

**End Date:** ---/---/2026

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

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

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

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

**Test dates: ---/---/2026, ---/---/2026, ---/---/2026**

**End module MCQ exam:**  ---/---/2026 (Theory), ---/---/2026 (OSPE, OSCE, OSVE etc)

**Interactive/ active learning session details**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Subjects** | **TBL** | **PBL** | **CBL** | **SGD** | **Tutorial** | **Demo/diss** |
| **Anatomy** | **×** | **×** | **×** | **×** | **1** | **3+2** |
| **Physiology** | **×** | **1** | **×** | **×** | **×** | **×** |
| **Biochemistry** | **×** | **×** | **2** | **×** | **×** | × |
| **Pharmacology** | **×** | **×** | **×** | **×** | **×** | **×** |
| **Pathology** | **1** | **×** | **×** | **1** | **×** | **×** |
| **Medicine** | **×** | **×** | **×** | **1** | **×** | **×** |
| **Surgery** | **×** | **×** | **×** | **1** | **×** | **×** |

**Module themes**

* Neurons/ nerve fibers and receptor
* Cerebrum
* Spinal cord and tracks
* Cerebellum and brainstem, basal ganglia
* Autonomic Nervous System (ANS)

**Clinical relevance**

* Neurons/ nerve fibers and receptor anomalies
* Cerebrum and associated diseases
* Spinal cord and tracks compressions and trauma
* Cerebellum and brainstem, basal ganglia, parkinsons disease and others
* ANS associated diseases

**YEAR 2 & MODULE COMMITTEES**

**Year 2 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 (Skill lab)
* Team based learning
* Case based learning
* Problem based learning
* Small group discussions

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| **VENUE FOUNDATION MODULE** | | | |
| **GROUPING** | **LECTURES** | **PBL/CBL** | **SMALL GROUP DISCUSSION** |
| **Group A** (1-33)  **Group B** (34-66)  **Group C** 67-100) | Anatomy → LH - 05  Physiology → LH - 02  Biochemistry → LH - 01  Pathology → LH 04  Pharmacology → LH 03  Com medicine → LH 03  Rest of all → LH 01 | Anatomy → DR - 05  Physio → DR - 02  Biochem → DR - 01  Patho → DR 04  Pharma → DR 03  Com med → DR 06 | SGD room  2nd floor |
| **TEAM BASED LEARNING** |
| * Multi - purpose hall * Skill lab * Corresponding lab |
| **(PRACTICALS)** |
| Corresponding labs |

**TIME TABLES**

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| **(Week 1) Block 6 , Module 10: Neurosciences: / /2025-26 to / /2025-26** | | | | | | | | |
| **Days** | **8:00 am**  **9:00 am** | **9:00 am**  **10:00 am** | **10:00**  **10:20 am** | **10:20 am**  **11:20 am** | **11:20 am**  **12:20 pm** | **12:20 pm**  **01:20 pm** | **01:20**  **02:00 pm** | **02:00 pm - 4:00 pm** |
| **Monday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-001 (a) | **Physiology**  Dr Tehseen.I  NS-P-001 (a) | **Tea break** | **Biochemistry**  Dr Shafqat.N  NS-B-001 (a) | **Anatomy (H)**  Dr Faisal.R  NS-A-022 (a) | **Physiology**  Dr Raheela.A  NS-P-001 (b) | **Prayer & Lunch break** | **Practical 1**  Group A **Anatomy (P-1)**  Group B **Physiology (P-1)**  Group C **Biochemistry (P-1)** |
| **Tuesday** | **Anatomy(G)**  Dr Imran.A  NS-A-001 (b) | **Physiology**  Dr Sadia.J  NS-P-001 (c) | **Biochemistry**  Dr Javed.I  NS-B-001 (b) | **Anatomy (E&PND)**  Dr G.Ansari  NS-A-019 | **Physiology**  Dr M Irfan SR  NS-P-002 (a) | **Practical 1**  Group A **Physiology (P-1)**  Group B **Biochemistry (P-1)**  Group C **Anatomy (P-1)** |
| **Wednesday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-001 (c) | **Physiology**  Dr Tehseen.**I**  NS-P-002 (b) | **Biochemistry**  Dr Khalida.A  NS-B-002 (a) | **Anatomy (E&PND)**  Dr G.Ansari  NS-A-020 | **Physiology**  Dr Raheela.A  NS-P-002 (c) | **Practical 1**  Group A **Biochemistry (P-)**  Group B **Anatomy (P-1)**  Group C **Physiology (P-1)** |
| **Thursday** | **Anatomy(G)**  Dr Faisal.R  NS-A-002 (a) | **Physiology**  Dr Sadia.J  NS-P-003 (a) | **Pharmacology**  Dr Zameer AS  NS-Ph-001 | **Aging**  Dr A Yar M  NS-Ag-001 (a) | **Physiology**  Dr M Irfan SR  NS-P-003 (b) | **Tuto/PBL/CBL 1**  Group A **Anatomy (Tuto-1)**  Group B **Physiology (PBL-1)**  Group C **Biochemistry (CBL-1)** |
| **Friday** | **Anatomy(G)**  Dr Imran.A  NS-A-002 (b) | **Physiology**  Dr Tehseen.I  NS-P-003 (c) | **Pathology**  Dr Hakeem  NS-Pa-001 (a) | **Anatomy (E&PND)**  Dr G.Ansari  NS-A-021 | **PERLs**  2-16  Dr M Tariq K | **Group A** Anatomy Dissection  **Group B & C** Self directed learning |

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| **(Week 2) Block 6 , Module 10: Neurosciences: / /2025-26 to / /2025-26** | | | | | | | | |
| **Days** | **8:00 am**  **9:00 am** | **9:00 am**  **10:00 am** | **10:00**  **10:20 am** | **10:20 am**  **11:20 am** | **11:20 am**  **12:20 pm** | **12:20 pm**  **01:20 pm** | **01:20**  **02:00 pm** | **02:00 pm - 4:00 pm** |
| **Monday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-002 (c) | **Physiology**  Dr Raheela.A  NS-P-004 (a) | **Tea break** | **Biochemistry**  Dr Dost.MK  NS-B-002 (b) | **Anatomy (H)**  Dr Faisal.R  NS-A-022 (b) | **Physiology**  Dr Sadia.J  NS-P-004 (b) | **Prayer & Lunch break** | **Practical/Skill Lab/Demo 2**  Group A **Anatomy (Demo-1)**  Group B **Physiology (P-2)**  Group C (**Skill lab 1)** |
| **Tuesday** | **Anatomy(G)**  Dr Imran.A  NS-A-003 (a) | **Physiology**  Dr M Irfan SR  NS-P-004 (c) | **Biochemistry**  Dr Shafqat.N  NS-B-003 (a) | **Anatomy(G)**  Dr ZR.Alvi  NS-A-003 (b) | **Physiology**  Dr Tehseen.I  NS-P-005 (a) | **Practical/Skill Lab/TBL 2**  Group A **Physiology (P-2)**  Group B (**Skill lab 1)**  Group C **Anatomy (Demo-1)** |
| **Wednesday** | **Anatomy(G)**  Dr Faisal.R  NS-A-003 (c) | **Physiology**  Dr Raheela.A  NS-P-005 (b) | **Biochemistry**  Dr Javed.I  NS-B-003 (b) | **Anatomy(G)**  Dr Imran.A  NS-A-004 (a) | **Physiology**  Dr Sadia.J  NS-P-005 (c) | **Practical/Skill Lab/TBL 2**  Group A (**Skill lab 1)**  Group B **Anatomy (Demo-1)**  Group C **Physiology (P-2)** |
| **Thursday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-004 (b) | **Physiology**  Dr M Irfan SR  NS-P-006 (a) | **Holy Quran**  Riba or sood 1  Dr A Majid | **Islamiat**  Islam & modern science  Miss Kanwal | **Physiology**  Dr Tehseen.I  NS-P-006 (b) | **Tuto/PBL/CBL 1**  Group A **Physiology (PBL-1)**  Group B **Biochemistry (CBL-1)**  Group C **Anatomy (Tuto-1)** |
| **Friday** | **Anatomy(G)**  Dr Faisal.R  NS-A-004 (c) | **Physiology**  Dr Raheela.A  NS-P-006 (c) | **Pak studies**  Current problems  Mr Jaffar | **Civics**  Society/origin & elements of state  Dr A Majid | **PERLs**  2-17  Dr M Tariq K | **Group B** Anatomy Dissection  **Group A & C** Self directed learning |

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| **(Week 3) Block 6 , Module 10: Neurosciences: / /2025-26 to / /2025-26** | | | | | | | | |
| **Days** | **8:00 am**  **9:00 am** | **9:00 am**  **10:00 am** | **10:00**  **10:20 am** | **10:20 am**  **11:20 am** | **11:20 am**  **12:20 pm** | **12:20 pm**  **01:20 pm** | **01:20**  **02:00 pm** | **02:00 pm - 4:00 pm** |
| **Monday** | **Anatomy(G)**  Dr Imran.A  NS-A-005 (a) | **Physiology**  Dr Sadia.J  NS-P-007 (a) | **Tea break** | **Biochemistry**  Dr Khalida.A  NS-B-004 (a) | **Anatomy (H)**  Dr ZR.Alvi  NS-A-023 (a) | **Physiology**  Dr M Irfan SR  NS-P-007 (b) | **Prayer & Lunch break** | **Practical/CSF 3**  Group A **Anatomy (P-2)**  Group B **Physiology (P-3)**  Group C **(CSF 1)** |
| **Tuesday** | **Anatomy(G)**  Dr Faisal.R  NS-A-005 (b) | **Physiology**  Dr Tehseen.I  NS-P-008 (a) | **Biochemistry**  Dr Dost.MK  NS-B-004 (b) | **Anatomy(G)**  Dr Imran.A  NS-A-005 (c) | **Physiology**  Dr Raheela.A  NS-P-008 (b) | **Practical/CSF 3**  Group A **Physiology (P-3)**  Group B **(CSF 1)**  Group C **Anatomy (P-2)** |
| **Wednesday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-006 (a) | **Physiology**  Dr Sadia.J  NS-P-009 (a) | **Biochemistry**  Dr Shafqat.N  NS-B-005 (a) | **Anatomy(G)**  Dr Faisal.R  NS-A-006 (b) | **Physiology**  Dr M Irfan SR  NS-P-009 (b) | **Practical/CSF 3**  Group A **(CSF 1)**  Group B **Anatomy (P-2)**  Group C **Physiology (P-3)** |
| **Thursday** | **Anatomy(G)**  Dr Imran.A  NS-A-006 (c) | **Physiology**  Dr Tehseen.I  NS-P-010 (a) | **Pathology**  Dr Naqeeb  NS-Pa-001 (b) | **Islamiat**  Rizk-e-Halal  Miss Kanwal | **Physiology**  Dr Raheela.A  NS-P-010 (b) | **Tuto/PBL/CBL 1**  Group A **Biochemistry (CBL-1)**  Group B **Anatomy (Tuto-1)**  Group C **Physiology (PBL-1)** |
| **Friday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-007 (a) | **Physiology**  Dr Sadia.J  NS-P-011 (a) | **PERLs**  2-18  Dr M Tariq K | **English 10-1**  Miss Anum | **Holy Quran**  Riba or sood 2  Dr A Majid | **Group C** Anatomy Dissection  **Group A & C** Self directed learning |

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| **(Week 4) Block 6 , Module 10: Neurosciences: / /2025-26 to / /2025-26** | | | | | | | | |
| **Days** | **8:00 am**  **9:00 am** | **9:00 am**  **10:00 am** | **10:00**  **10:20 am** | **10:20 am**  **11:20 am** | **11:20 am**  **12:20 pm** | **12:20 pm**  **01:20 pm** | **01:20**  **02:00 pm** | **02:00 pm - 4:00 pm** |
| **Monday** | **Anatomy(G)**  Dr Faisal.R  NS-A-007 (b) | **Physiology**  Dr M Irfan SR  NS-P-011 (b) | **Tea break** | **Biochemistry**  Dr Javed.I  NS-B-005 (b) | **Anatomy (H)**  Dr Imran.A  NS-A-023 (b) | **Physiology**  Dr Tehseen.I  NS-P-012 (a) | **Prayer & Lunch break** | **Practical/Demo 4**  Group A **Anatomy (Demo-2)**  Group B **Physiology (P-4)**  Group C **Biochemistry (P-2)** |
| **Tuesday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-007 (c) | **Physiology**  Dr Raheela.A  NS-P-012 (b) | **Biochemistry**  Dr Khalida.A  NS-B-006 (a) | **Anatomy(G)**  Dr Faisal.R  NS-A-008 (a) | **Physiology**  Dr Sadia.J  NS-P-013 (a) | **Practical/TBL 4**  Group A **Physiology (P-4)**  Group B **Biochemistry (P-2)**  Group C **Anatomy (Demo-2)** |
| **Wednesday** | **Anatomy(G)**  Dr Imran.A  NS-A-008 (b) | **Physiology**  Dr M Irfan SR  NS-P-013 (b) | **Biochemistry**  Dr Dost.MK  NS-B-006 (b) | **Anatomy(G)**  Dr ZR.Alvi  NS-A-008 (c) | **Physiology**  Dr Tehseen.I  NS-P-014 (a) | **Practical/TBL 4**  Group A **Biochemistry (P-2)**  Group B **Anatomy (Demo-2)**  Group C **Physiology (P-4)** |
| **Thursday** | **Anatomy(G)**  Dr Faisal.R  NS-A-009 (a) | **Physiology**  Dr Raheela.A  NS-P-014 (b) | **Pharmacology**  Dr Zameer AS  NS-Ph-002 | **Community medicine**  Dr Ali.H  NS-CM-001 | **Physiology**  Dr Sadia.J  NS-P-015 (a) | **SGD/TBL 2**  Group A **Surgery (SGD-1)**  Group B **Pathology (TBL-1)**  Group C **Medicine (SGD-1)** |
| **Friday** | **Anatomy(G)**  Dr Imran.A  NS-A-009 (b) | **Physiology**  Dr M Irfan SR  NS-P-015 (b) | **Surgery**  Dr Tariq M  NS-S-001 | **Aging**  Dr A Yar M  NS-Ag-001(b) | **Medicine**  Dr.Akhter.M  NS-M-001 | **Group A** Anatomy Dissection  **Group B & C** Self directed learning |

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| **(Week 5) Block 6 , Module 10: Neurosciences: / /2025-26 to / /2025-26** | | | | | | | | |
| **Days** | **8:00 am**  **9:00 am** | **9:00 am**  **10:00 am** | **10:00**  **10:20 am** | **10:20 am**  **11:20 am** | **11:20 am**  **12:20 pm** | **12:20 pm**  **01:20 pm** | **01:20**  **02:00 pm** | **02:00 pm - 4:00 pm** |
| **Monday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-009 (c) | **Physiology**  Dr Tehseen.I  NS-P-016 (a) | **Tea break** | **Biochemistry**  Dr Shafqat.N  NS-B-007 | **Anatomy (H)**  Dr Faisal.R  NS-A-024 | **Physiology**  Dr Raheela.A  NS-P-016 (b) | **Prayer & Lunch break** | **Practical/Skill Lab 5**  Group A **Anatomy (P-3)**  Group B **Physiology (P-5)**  Group C (**Skill lab 2)** |
| **Tuesday** | **Anatomy(G)**  Dr Imran.A  NS-A-010 (a) | **Physiology**  Dr Sadia.J  NS-P-017 (a) | **Biochemistry**  Dr Javed.I  NS-B-008 | **Anatomy(G)**  Dr ZR.Alvi  NS-A-010 (b) | **Physiology**  Dr M Irfan SR  NS-P-017 (b) | **Practical/Skill Lab 5**  Group A **Physiology (P-5)**  Group B (**Skill lab 2)**  Group C **Anatomy (P-3)** |
| **Wednesday** | **Anatomy(G)**  Dr Faisal.R  NS-A-010 (c) | **Physiology**  Dr Tehseen.I  NS-P-018 (a) | **Biochemistry**  Dr Khalida.A  NS-B-009 | **Anatomy(G)**  Dr Imran.A  NS-A-011 (a) | **Physiology**  Dr Raheela.A  NS-P-018 (b) | **Practical/Skill Lab 5**  Group A (**Skill lab 2)**  Group B **Anatomy (P-3)**  Group C **Physiology (P-5)** |
| **Thursday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-011 (b) | **Physiology**  Dr Sadia.J  NS-P-019 (a) | **Pathology**  Dr Hakeem  NS-Pa-002 | **PERLs**  2-19  Dr M Tariq K | **Behavioral sciences**  Dr Mehwish A  NS-BhS-001 | **SGD/TBL 2**  Group A **Pathology (TBL-1)**  Group B **Medicine (SGD-1)**  Group C **Surgery (SGD-1)** |
| **Friday** | **Anatomy(G)**  Dr Faisal.R  NS-A-012 (a) | **Physiology**  Dr M Irfan SR  NS-P-019 (b) | **English 10-2**  Miss Anum | **Medicine**  Dr.Akhter.M  NS-M-002 | **Behavioral sciences**  Dr Mehwish A  NS-BhS-002 | **Group B** Anatomy Dissection  **Group A & C** Self directed learning |

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| **(Week 6) Block 6 , Module 10: Neurosciences: / /2025-26 to / /2025-26** | | | | | | | | |
| **Days** | **8:00 am**  **9:00 am** | **9:00 am**  **10:00 am** | **10:00**  **10:20 am** | **10:20 am**  **11:20 am** | **11:20 am**  **12:20 pm** | **12:20 pm**  **01:20 pm** | **01:20**  **02:00 pm** | **02:00 pm - 4:00 pm** |
| **Monday** | **Anatomy(G)**  Dr Imran.A  NS-A-012 (b) | **Physiology**  Dr Tehseen.I  NS-P-020 (a) | **Tea break** | **Biochemistry**  Dr Dost.MK  NS-B-010 | **Anatomy(G)**  Dr ZR.Alvi  NS-A-013 (a) | **Physiology**  Dr Raheela.A  NS-P-020 (b) | **Prayer & Lunch break** | **Practical/Demo/CSF 6**  Group A **Anatomy (Demo-3)**  Group B **Physiology (P-6)**  Group C **(CSF 2)** |
| **Tuesday** | **Anatomy(G)**  Dr Faisal.R  NS-A-013 (b) | **Physiology**  Dr Sadia.J  NS-P-021 (a) | **Biochemistry**  Dr Shafqat.N  NS-B-011 | **Anatomy(G)**  Dr Imran.A  NS-A-014 (a) | **Physiology**  Dr M Irfan SR  NS-P-021 (b) | **Practical/Demo/CSF 6**  Group A **Physiology (P-6)**  Group B **(CSF 2)**  Group C **Anatomy (Demo-3)** |
| **Wednesday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-014 (b) | **Physiology**  Dr Tehseen.I  NS-P-022 (a) | **Biochemistry**  Dr Javed.I  NS-B-012 | **Anatomy(G)**  Dr Faisal.R  NS-A-015 (a) | **Physiology**  Dr Raheela.A  NS-P-022 (b) | **Practical/Demo/CSF 6**  Group A **(CSF 2)**  Group B **Anatomy (Demo-3)**  Group C **Physiology (P-6)** |
| **Thursday** | **Anatomy(G)**  Dr Imran.A  NS-A-015 (b) | **Physiology**  Dr Sadia.J  NS-P-023 (a) | **Surgery**  Dr Tariq M  NS-S-002 | **Community Medicine**  Dr Ali.H  NS-CM-002 | **Physiology**  Dr M Irfan SR  NS-P-023 (b) | **SGD/TBL 2**  Group A **Medicine (SGD-1)**  Group B **Surgery (SGD-1)**  Group C **Pathology (TBL-1)** |
| **Friday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-016 (a) | **Physiology**  Dr Tehseen.I  NS-P-024 | **Civics**  Nation/Nationality  state functions  Dr A Majid | **Anatomy(G)**  Dr Faisal.R  NS-A-016 (b) | **Medicine**  Dr.Akhter.M  NS-M-003 | **Group C** Anatomy Dissection  **Group A & C** Self directed learning |

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| **(Week 7) Block 6 , Module 10: Neurosciences: / /2025-26 to / /2025-26** | | | | | | | | |
| **Days** | **8:00 am**  **9:00 am** | **9:00 am**  **10:00 am** | **10:00**  **10:20 am** | **10:20 am**  **11:20 am** | **11:20 am**  **12:20 pm** | **12:20 pm**  **01:20 pm** | **01:20**  **02:00 pm** | **02:00 pm - 4:00 pm** |
| **Monday** | **Anatomy(G)**  Dr Imran.A  NS-A-017 (a) | **Physiology**  Dr Sadia.J  NS-P-025 (a) | **Tea break** | **Biochemistry**  Dr Khalida.A  NS-B-013 | **Pediatrics**  Dr.M.Tayyab  NS-Pe-001 | **Physiology**  Dr M Irfan SR  NS-P-025 (b) | **Prayer & Lunch break** | **Practical/CBL 7**  Group A **Anatomy (P-4)**  Group B **Physiology (P-7)**  Group C **Biochemistry (CBL-2)** |
| **Tuesday** | **Anatomy(G)**  Dr ZR.Alvi  NS-A-017 (b) | **Physiology**  Dr Tehseen.I  NS-P-026 (a) | **Biochemistry**  Dr Dost.MK  NS-B-014 | **PERLs**  2-20  Dr M Tariq K | **Physiology**  Dr Raheela.A  NS-P-026 (b) | **Practical/CBL 7**  Group A **Physiology (P-7)**  Group B **Biochemistry (CBL-2)**  Group C **Anatomy (P-4)** |
| **Wednesday** | **Anatomy(G)**  Dr Faisal.R  NS-A-018 (a) | **Physiology**  Dr Sadia.J  NS-P-027 (a) | **Anatomy(G)**  Dr Imran.A  NS-A-018 (b) | **Surgery**  Dr Tariq M R  NS-S-003 | **Physiology**  Dr M Irfan SR  NS-P-027 (b) | **Practical/CBL 7**  Group A **Biochemistry (CBL-2)**  Group B **Anatomy (P-4)**  Group C **Physiology (P-7)** |
| **Thursday** | **End of Module examination (Theory)** | | | | | | | |
| **Friday** | **End of Module Examination (Practical/OSPE/OSCE/OSVE)** | | | | | | | |

**DISTRIBUTION AND DURATION OF TEACHING ACTIVITIES**

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| Block 6, Module10: Neurosciences–1 (6 weeks & 3 Days) | | | | |
| Subject | **Hours theory** | **Hours**  **Practical** | **SGD/TBL/Demo**  **PBL/CBL/Tuto/Diss** | **Total hours** |
| Anatomy | **46( GA)+03 E&PND+ 05 Histology= 54** | **4 practical =8 hours** | **(3-Demo)=6hours**  **(1-Tuot) =2 hours**  **2-disse = 4 hours** | **74** |
| Physiology | **59** | **07 practical =14 hours** | **(1-PBL)=2hours** | **75** |
| Biochemistry | **20** | **2 practical = 4 hours** | **(2-CBL)=4 hours** | **28** |
| Pharmacology | **02** | **-----** | **-----** | **02** |
| Pathology | **03** | **-----** | **(1-TBL)= 2 Hours** | **03** |
| Community Medicine | **02** | **-----** | **-----** | **02** |
| Aging | **02** | **-----** | **-----** | **02** |
| Behavioral Sciences | **02** | **-----** | **-----** | **02** |
| Medicine | **03** | **-----** | **(1-SGD)=2 hours** | **03** |
| Surgery | **03** | **-----** | **(1-SGD)= 2hours** | **03** |
| Pediatrics | **01** | **-----** | **-----** | **01** |
| PERLs | **04** | **-----** | **-----** | **04** |
| Clinical skill Foundation (CSF) | **-----** | **02=4hours** | **-----** | **04** |
| Skill lab | **-----** | **02=4 hours** | **-----** | **04** |
| Holy Quran | **02** | **-----** | **-----** | **02** |
| Islamiat | **02** | **-----** | **-----** | **02** |
| Pakistan studies | **02** | **-----** | **-----** | **02** |
| Civics | **02** | **-----** | **-----** | **02** |
| English 1 | **02** | **-----** | **-----** | **02** |
| Self directed learning | **08** | **-----** | **-----** | **08** |
| Class test | **-----** | **-----** | **-----** | **-----** |
| Total | **177** | **34** | **20** | **231** |
| Total | **7 hours/day × 33 days (6 weeks & 3 days) = 231** | | | **231** |

**MODULE RATIONALE**

The neurosciences module is crucial as understanding the brain and nervous system is essential for diagnosing and treating a wide range of neurological and psychiatric conditions. This includes conditions such as Alzheimer's disease, Parkinson's disease, epilepsy, migraines, traumatic brain injuries, depression, schizophrenia, and autism. By studying neurosciences, medical students will gain the knowledge and skills necessary to accurately diagnose and effectively treat these conditions.

**Aims:** The **Neurosciences Module** aims to:

1. Understand the structure, function, and regulation of the nervous system.
2. Identify common neurological disorders and their Patho-physiology.
3. Develop skills in diagnosing and managing neurological conditions.
4. Interpret clinical signs, imaging, and diagnostic tests related to the nervous system.
5. Promote ethical, patient-centered care and teamwork in neurological health management.

**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 Second professional examination. The same table of specifications should be used for the respective three block exams for internal assessment.

**MODULE OUTCOMES**

* Describe the neuroanatomy, histology and embryology of the central nervous system.
* Discuss the physiology of Autonomic Nervous System (ANS), motor and sensory system.
* Explain the pathophysiology of common diseases pertaining to the nervous system.
* Explain a basic management and prevention plan for common neurological disorders.
* Appreciate the burden of neuroscience disorders and their psychosocial impact

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

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| --- | --- | --- | --- |
| **CODE** | **SPECIFIC LEARNING OUTCOMES** | **DISCIPLINE** | **TOPIC** |
| **GROSS ANATOMY** | | | |
| NS-A-001 | Describe the basic organization of nervous system | Anatomy | Nervous system |
| Identify and describe the components of the Nervous system and their function | Human Anatomy |
| NS-A-002 | Trace the Origin, exit from vertebral canal, branches & Distribution of typical spinal nerve. | Human Anatomy | Spinal Nerves |
| NS-A-003 | Identify Location, Extent, Coverings & Blood supply of spinal cord | Human Anatomy | Spinal cord Clinical correlates  (Spinal cord) |
| Discuss & tabulate nuclear organization at different levels of Spinal cord. |
| Describe, draw & label the transverse section of spinal cord at mid cervical level showing ascending & descending tracts |
| Tabulate the sensory nerve endings, and anatomical sites of first, second, third order neurons of ascending tracts |
| Tabulate first, second, third order neurons of descending tracts. |
| Elaborate on the Cross-sectional details of white and gray matter of cervical, thoracic and lumbar segments of Spinal cord for localization of site of lesion. |
| NS-A-004 | Differentiate clearly between upper and lower motor neuron lesions | Anatomy | Brainstem |
| Location, Relations, Blood supply and external | Anatomy |
| features of medulla, pons midbrain. Cross sectional details of white and grey matter of Brain stem (mid brain, pons, medulla)  Discuss clinical correlates of brain stem Medial and lateral medullary syndrome Weber syndrome, Benedikt syndrome |  |  |
| NS-A-005 | Location, Relations, Functional classification & Blood supply along with major connections of Cerebellum (Cerebellar Peduncles)  Define important clinical correlates | Human Anatomy | Cerebellum |
| NS-A-006 | Identify the Lobes, Sulci & Gyri, Cortical areas.  Describe Venous drainage and arterial supply of each lobe | Human Anatomy | Cerebrum |
| Describe Functional areas of cerebrum. Draw and Label Homunculus. Define important clinical correlates |
| Describe internal structure of cerebral hemisphere; 1. white matter .2. Basal ganglia .3. Lateral ventricle |
| NS-A-007 | Describe components & functions of Limbic system & Reticular formation | Reticular formation |
| NS-A-008 | Explain the origin, exit from the brain and intracranial course of cranial nerves. Describe the Functional Components and specific functions of each cranial nerve. | Human Anatomy | Cranial nerves |
| NS-A-009 | Identify the Location and sub division of Diencephalon. | Anatomy | Diencephalon |
| NS-A-010 | Discuss the Location, Relations, Blood supply, nuclei and major connections of Thalamus, Hypothalamus, Epithalamus, Subthalamus, Metathamalus  Describe and Illustrate the Hypothalamic and pituitary gland Nuclei with their functions, location afferents. Describe the Hypothalamo-Hypophyseal Portal System  Describe the functions of Hypothalamus Explain the anatomical basis for the Thalamic Cauterization, Thalamic Pain, Thalamic Hand and Hypothalamic Disorders | Anatomy | Thalamus hypothalamu |
| NS-A-011 | Explain Gross anatomy of Intracranial fossae with intracranial foramina. | Human Anatomy | Intra cranial fossa |
| NS-A-012 | Explain the attachments, blood supply and nerve supply of the meninges of the brain | Human Anatomy | Meninges |
| NS-A-013 | Discuss the Origin, tributaries & area of drainage, termination of Dural venous sinuses | Human Anatomy | Dural venous sinuses |
| NS-A-014 | Explain the Formation, circulation and absorption into venous system of CSF (Cerebrospinal fluid) Describe ventricular system, Lateral, 3rd & 4th ventricles | Human Anatomy | CSF |
| NS-A-015 | Discuss the Origin, course, branches and distribution of internal carotid artery, vertebral artery. Formation, Location, branches and area of supply of Circle of Willis | Human Anatomy | Blood supply |
| NS-A-016 | Explain the Major subdivision of ANS into Sympathetic and parasympathetic nervous system with comparison of anatomical differences. | Human Anatomy | ANS |
| NS-A-017 | Describe the Location, connections and functions of autonomic ganglion | Human Anatomy | Autonomic ganglia |
| NS-A-018 | Explain the origin, termination and branches of the sympathetic chain Localize spinal cord lesions | Human Anatomy | Sympathetic chain |
|  | **EMBRYOLOGY & POST-NATAL DEVELOPMENT** | | |
| **CODE** | **SPECIFIC LEARNING OUTCOMES** | **DISCIPLINE** | **TOPIC** |
| NS-A-019 | Explain the Development of Neural tube and Brain vesicles. Discuss related clinical anomalies | Embryology | Neural tube development |
| NS-A-020 | Describe the development of the spinal cord and related clinical anomalies | Embryology | Spinal cord development |
| NS-A-021 | Describe development of Pituitary gland | Embryology | Pituitary gland |
| **CODE** | **MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)** | **TOTAL HOURS=05** | |
| **SPECIFIC LEARNING OBJECTIVES** | **DISCIPLINE** | **TOPIC** |
| NS-A-022 | Describe the histological structure of Nervous tissue, Neuron, Nerve fiber, Sensory & motor nerve endings, Neuroglia, Blood brain barrier, ganglia | Histology | Nervous tissue |
| NS-A-023 | Describe the histological structure of the spinal cord | Histology | Spinal cord |
| NS-A-024 | Describe the histological structure of Cerebrum, Cerebellum | Histology | Cerebrum, Cerebellum |
| **CODE** | **HISTOLOGY (Practical)** | | |
| **SPECIFIC LEARNING OBJECTIVES** | **DISCIPLINE** | **TOPIC** |
| NS-A-025 | Identify draw & label light microscopic structure of Peripheral nerve sensory ganglia, autonomic ganglia | Histology | CNS |
| NS-A-026 | Identify Draw & label the light microscopic structure of spinal cord | Histology | Cerebrum |
| NS-A-027 | Identify Draw & label the light microscopic structure of the Cerebrum | Histology | Cerebellum |
| NS-A-028 | Identify Draw & label the light m structure of the Cerebellum | Histology | Spinal Cord |
| **CODE** | **MEDICAL PHYSIOLOGY (Theory)** | | |
| **SPECIFIC LEARNING OBJECTIVES** | **DISCIPLINE** | **TOPIC** |
| NS-P-001 | Describe the general organization of nervous system  Classify synapses  Explain physiological anatomy of synapses  Describe the properties of synaptic transmission  Classify the substances that act as neurotransmitters  Classify all sensory receptors in the body  Enumerate the properties of receptors  Explain the mechanism of adaptation of receptors  Enlist the rapid adapting mechanism of receptors | Medical Physiology | Organization of Nervous System, Neurons and Synapses |
| NS-P-002 | Explain the properties of receptors  Explain the general classification of nerve fibers  Explain the numerical classification of nerve fibers  Explain Gasser classification of nerve fibers  Explain summation and its types | Nerve fibers |
| NS-P-003 | Describe the sensory areas of brain  Enlist Brodmann number of sensory areas  Describe the effects produced by damage to each sensory area of brain. Describe the pathophysiology and features of personal neglect syndrome | Sensory areas of the brain |
| NS-P-004 | Classify and explain somatic sensations | Medical Physiology | Somatic sensations |
| NS-P-005 | Enumerate the ascending tracts/Pathways |  | Ascending Tracts/pathways |
| NS-P-006 | Name the sensations carried by Dorsal column medial lemniscus system DCMLS |  | Antero lateral |

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| NS-P-007 | Trace the pathway of DCMLS  Classify pain  Differentiate between slow pain and fast pain  Describe the analgesia system in brain and spinal cord  Describe the cause and features of Brown Sequard Syndrome | Physiology | Pain |
| NS-P-008 | Describe the Physiological anatomy of spinal cord  Name the anterior motor neurons and their location  Explain the Renshaw cells feedback  Classify the spinal cord reflexes according to number of synapses | edical Physiology | Spinal cord |
| NS-P-009 | Describe the structure & functions of Muscle spindle  Trace the reflex arc of stretch reflex  Discuss the clinical significance of stretch reflex | Muscle Spindle |
| NS-P-110 | Define tone and how it is maintained | Tone |
| NS-P-011 | Trace the reflex arc of Golgi Tendon Organ GTO, Golgi tendon reflex  Explain the importance of Golgi tendon reflex | GTO |
| NS-P-012 | Name the motor areas of brain  Enlist Brodmann number of motor areas of brain Explain the features produced due to damage to the motor areas | Motor areas of the brain |
| NS-P-013 | Enlist the functions of brain stem | Medical Physiology | Brainstem |
| NS-P-014 | Enumerate the descending tracts  Describe the functions of Pyramidal tract  Describe the effect of lesions in motor cortex of brain or pyramidal tract | Descending tracts |

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| NS-P-015 | Discuss the location of upper and lower motor neuron  Explain the features of upper motor neuron lesion  Explain the features of lower motor neuron lesions |  | Location of motor neurons |
| NS-P-016 | Define spinal shock  Enumerate and explain the stages of spinal shock  Describe the features of hemi section of spinal cord (at the level, above the level, below the level) |  | Spinal shock and hemi section |
| NS-P-017 | Name the functional parts of cerebellum  Explain the functions of spinocerebellum  Describe the functions of cerebro cerebellum  Discuss the functions of vestibule cerebellum  Explain the clinical features of cerebellar disease | Cerebellum |
| NS-P-018 | Name the components of Basal ganglia  EXPLAIN the putamen and caudate circuits  Enlist the neurotransmitters in basal ganglia and enlist the functions of basal ganglia  Enumerate and explain the clinical abnormalities of putamen circuit  Explain the pathophysiology and features of Huntington’s disease  Explain the types of rigidity  Differentiate spasticity and rigidity  Define decerebrate rigidity | Basal Ganglia |
| NS-P-019 | Enumerate the components of vestibular Apparatus  Name the sensory organs of vestibular apparatus  Describe the role of vestibular Apparatus in maintenance of linear and angular equilibrium | Medical Physiology | Vestibular apparatus |
| NS-P-020 | Enlist the components of limbic system  Describe the functions of amygdala | Limbic system |

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|  | Explain the effects of bilateral ablation of the amygdala—The Klüver-Bucy Syndrome  Explain the functions of hippocampus  Explain the functions of Hypothalamus  Explain Functions of Thalamus  Discuss the Thalamic syndrome | Medical Physiology | Limbic system | |
| NS-P-021 | define brain stem reticular formation (BRF), name the neurotransmitters of BRF, enlist functions of BRF, differentiate between the functions of Pontine and medullary reticular Formation | Medical Physiology | Brainstem reticular formation | |
| NS-P-022 | Enumerate and discuss the physiological basis of Electroencephalogram EEG waves | Medical Physiology | EEG | |
| NS-P-023 | Explain the types of sleep  Discuss the stages of slow wave sleep  Explain the changes in EEG during sleep wake cycle  Enumerate the areas and hormones/ neurotransmitters involved in sleep  Describe sleep disorders (narcolepsy, cataplexy, insomnia, somnolence, somnambulism, bruxism, nocturnal enuresis and sleep apnea) | Sleep | |
| NS-P-024 | Enumerate different types of epilepsy  Explain the features and physiological basis and EEG waves in different types of epilepsy | Epilepsy | |
| NS-P-025 | Define memory .Classify memory on the basis of duration and information stored. Explain the Molecular Mechanism of Intermediate Memory. Enumerate the structural changes of long-term memory. Explain the higher intellectual functions of prefrontal association cortex. | Memory | |
| NS-P-026 | Explain the mechanism of consolidation of memory  Explain retrograde and anterograde amnesia  Explain the physiological basis and features of Alzheimer’s disease  Enlist the areas of speech  Explain the functions of motor and sensory areas of speech  Trace and explain the pathway of written and heard speech  Enlist the abnormalities of speech  Explain the features of motor aphasia  Elaborate the features of sensory aphasia  Define dyslexia, alexia, agraphia | Physiology | Speech | |
| NS-P-027 | Discuss Components of Autonomic nervous system  Explain the physiological anatomy of sympathetic and parasympathetic nervous system  Describe the types of adrenergic and cholinergic receptors  Explain the effects of sympathetic and parasympathetic on various organs/ system of body | Medical Physiology | ANS | |
| **CODE** | **MEDICAL BIOCHEMISTRY** | | | |
| **SPECIFIC LEARNING OBJECTIVES** | **DISCIPLINE** | | **TOPIC** |
| NS-B-001 | Explain the digestion and absorption of lipids with enzymes involved in it. Discuss role of bile acids and salts in lipid digestion and absorption | Medical Biochemistry | | Digestion and absorption |
| NS-B-002 | Explain the concept of lipid transport and storage | transport and storage |

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| NS-B-003 | Discuss the reactions of beta-oxidation, alpha and omega oxidation of unsaturated and saturated fatty acids  Calculate energy yield from palmitate in oxidation | Medical Biochemistry | Sphingolipidosis |
| NS-B-004 | Discuss role of carnitine shuttle | Carnitine shuttle |
| NS-B-005 | Discuss the role of citrate shuttle in fatty acid synthesis | Citrate shuttle |
| NS-B-006 | Explain the pathway of fatty acid synthesis and its regulation  Explain the steps of the reactions of hepatic ketogenesis and regulation | Fatty acid synthesis |
| NS-B-007 | Describe utilization of ketone bodies by extrahepatic tissue.  Describe the Synthesis and degradation of phospholipids and sphingolipids interpret the disorders related to enzyme deficiencies. | Metabolisms |
| NS-B-008 | Discuss the metabolism of glycolipids interpret the disorders related to enzyme deficiencies. | Glyco lipid metabolism |
| NS-B-009 | Explain fast feed cycle with reference to pathways activated and suppressed in each tissue in starved and fed state  Discuss integration of metabolism | Medical Biochemistry | Fast feed cycle |
| NS-B-010 | Explain fast. Discuss the structure, biochemical function and metabolism, dopamine, serotonin, histamine, GABA  Correlate the biochemical functions of these neurotransmitters with their deficiency diseases | Neuro transmitters |
| NS-B-011 | Explain proto-oncogene and oncogene concept. | Onco gene |
| NS-B-012 | Discuss tumor markers and their significance. | markers |

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| NS-B-013 | Explain the role of genetics in cancers especially breast, ovary, lung and colon. |  | Cancer |
| NS-B-014 | Discuss the concept of xenobiotics. | Xeno biotics |
| **CODE** | **BIOCHEMISTRY/PHYSIOLOGY (PRACTICALS)** | | |
| **SPECIFIC LEARNING OBJECTIVES** | **DISCIPLINE** | **TOPIC** |
| NS-B-015 | Interpret the lysosomal storage diseases on given data Neiman pick disease, Gaucher’s disease etc. | Biochemistry Practical | Data Interpret |
| NS-B-016 | Perform the estimation of triglycerides by kit method | Triglycerides  estimation |
| NS-P-028 | Examine the Sensory System | Physiology Practical | Sensory system |
| NS-P-029 | Examine the Superficial Reflexes | Superficial  Reflexes |
| NS-P-030 | Examine the Deep Reflexes | Deep Reflexes |
| NS-P-031 | Demonstrate Cerebellar Function Test | Cerebellar Tests |
| NS-P-032 | Demonstrate the testing of Cranial Nerve (CN) VII | CNVII |
| NS-P-033 | Demonstrate the Testing of Cranial Nerves (XI, XII) | CNX,XI,XII |
| NS-P-034 | Examine the Motor system | Motor system |
| **PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS** | | | |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** | **DISCIPLINE** | **TOPIC** |
| NS-Ph-001 | 1.Classify various opioid receptors  2.Describe Mechanism of Action (MOA), pharmacological actions, clinical uses and adverse effects of opioid agonist, mixed agonist -antagonist and antagonist | Pharmacology | Opioids |
| NS-Ph-002 | 1.Classify various CNS stimulants and depressants 2.Describe MOA, pharmacological actions, clinical uses and adverse effects of CNS stimulant and depressants | CNS stimulants &depressants |

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| NS-Pa-001 | Define cerebral vascular accident (CVA). Discuss the etiology and morphological changes of Cerebrovascular accidents | Pathology | CVA | |
| NS-Pa-002 | Define Meningitis , Identify types of meningitis | Meningitis | |
| **DISEASE PREVENTION AND IMPACT** | | | | |
| **CODE** | **SPECIFIC LEARNINGO BJECTIVES** | **DISCIPLINE** | **TOPIC** | |
| NS-CM-001 | Students should be able to depict the depth of problem in context of mental illnesses | Community Medicine and Public Health | Epidemiology of Mental Disorders | |
| NS-CM-002 | Able to learn the general approach to prevent mental illnesses at community level | Community based interventions for  MentalI llnesses | |
| NS-BhS- 001 | Explain the theoretical basis of classic conditioning, operant conditioning and observational learning with examples in medical practice  Incorporate learning principles to help prepare people for medical interventions | Behavioral Sciences | Learning and Behavior | |
| NS-BhS- 002 | Outline the structure of memory and explain the distinction between short- and long-term memory.  Describe memory improvement techniques and how the appropriate ones will help patients recall long and complex explanations | Memory | |
| NS-M-001 | Identify various types of CVA (cerebrovascular accident)  Describe various symptoms and signs  Outline management strategies | Medicine | Stroke/CVA | |
| NS-S-001 | Discuss the role of surgery in stroke | Surgery | Stroke/CVA | |
| NS-M-002 | Define Epilepsy  Enlist various types of epilepsy  Identify various symptoms and signs  Outline management strategies | Medicine | Epilepsy | |
| NS-M-003 | Enlist various types of meningitis  Describe symptoms and signs  Outline management strategies | Medicine/ Neurology | Meningitis | |
| NS-S-002 | Describe triage in ER Emergency Room | Surgery | Head injury | |
| NS-S-003 | Identify the various types of hematomas | Neurosurgery | Hematoma/  CVA | |
| NS-Pe-001 | Describe the clinical features of Cerebral Palsy | Pediatrics | Cerebral Palsy | |
| **AGING** | | | | |
| **CODE** | **SPECIFIC LEARNING OBJECTIVES** | **DISCIPLINE** | | **TOPIC** |
| NS-Ag-001 | Define dementia | Medicine | | Dementia |
| Discuss various causes for dementia |
| Discuss various risks for dementia |
| Outline management strategies |

**OPERATIONAL DEFINITIONS**

|  |
| --- |
| **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 ready  Applying 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 case  Students 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 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 or fail 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.**

**Table of specifications (TOS)**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Block 6 – Table of Specifications** | | | | | | | | |
| **Theme** | **Subject** | **Written Exam** | | | **Oral/Practical/Clinical Exam** | | | |
| **MCQ**  **(1 Mark each)** | **SEQ**  **(5 Mark each)** | **Total**  **Marks** | **OSPE**  **(8 marks each observed)** | **OSCE**  **(8 marks each observed** | **OSVE**  **(16 marks each observed)** | **Marks** |
| **Normal structure** | Anatomy applied/clinical | 24 | 03 | 39 | 03 | - | 01 | 40 |
| **Normal function** | Physiology applied/clinical | 26 | 03 | 41 | 03 | - | 01 | 40 |
| Biochemistry applied/clinical | 09 | 01 | 14 | 01 | - | 01 | 24 |
| **Disease burden & prevention** | Community medicine & public health | 04 | - | 04 | - | - | - | - |
| Behavioral sciences | 03 | - | 03 | - | - | - | - |
| **Pathophysiology & pharmacotherapeutics** | Pathology | 12 | - | 12 | - | - | - | - |
| Pharmacology | 07 | - | 07 | - | - | - | - |
| **CFRC** | CF-2-3 | - | - | - | - | 01 | - | 08 |
| **PERLs** | PERL-2-3 | - | - | - | - | 01 | - | 08 |
| **Total** |  | **85** | **7×5=35** | **120** | **07 stations ×08=56** | **02 stations×8=16** | **03 stations ×16=48** | **120** |

**Internal Evaluation**

* Students will be assessed comprehensively through multiple methods.
* 0% marks of internal evaluation will be added to UHS final exam. That 20% may include class tests, assignment, practicals and the internal exam which will all have specific marks allocation.

**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

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

**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.

**ASSESSMENT SCHEDULE, OSPE/OSCE/OSVE & PRACTICAL SCHEME**

|  |  |  |  |
| --- | --- | --- | --- |
| **DATE** | **EXAMINATION** | **TIME** | **VENUE** |
| ---/---/2026 | Theory | --:-- to --:-- | Roll no 1 - 50 (multipurpose hall) |
| Roll no 51 – 100 (skill lab) |
| ---/---/2026 | OSPE/OSCE/OSVE | --:-- to --:-- | Roll no 1 – 50 (multipurpose hall) |
| ---/---/2026 | OSPE/OSCE/OSVE | --:-- to --:-- | Roll no 51 – 1000 (multipurpose hall) |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Block 6 - OSPE/OSVE/OSCE/Practical Scheme** | | | | | | |
| **Station # 5**  **OSPE**  **Observed**  **Anatomy** | **→** | **Station # 6**  **Rest Station** | **→** | **Station # 7**  **OSCE**  **Observed**  **PERLs** | **→** | **Station # 8**  **Structured**  **OSVE**  **Biochemistry** |
| **↑** | |  |  |  | | --- | --- | --- | | **Subject** | **Total Stations** | **Station #** | | **Anatomy OSPE Stations** | 3 | 1-5-10 | | **Anatomy OSVE Station** | 1 | 4 | | **Physiology OSPE stations** | 3 | 2-9-11 | | **Physiology OSVE station** | 1 | 13 | | **Biochemistry OSPE stations** | 1 | 3 | | **Biochemistry OSVE station** | 1 | 8 | | **C-FRC OSCE station** | 1 | 12 | | **PERLS OSCE station** | 1 | 7 | | **Rest stations** | 2 | 6-14 | | **Total stations** | **14** |  | | | | | | **↓** |
| **Station # 4**  **Structured**  **OSVE**  **Anatomy** | **Station # 9**  **OSPE**  **Observed**  **Physiology** |
| **↑** | **↓** |
| **Station # 3**  **OSPE**  **Observed**  **Biochemistry** | **Station # 10**  **OSPE**  **Observed**  **Anatomy** |
| **↑** | **↓** |
| **Station # 2**  **OSPE**  **Observed**  **Physiology** | **Station # 11**  **OSPE**  **Observed**  **Physiology** |
| **↑** | **↓** |
| **Station # 1 OSPE**  **Observed**  **Anatomy** | **START**  **&**  **END** | **Station # 14**  **Rest Station** | **←** | **Station # 13**  **Structured**  **OSVE**  **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, OSVE, OSCE & Practical:** Please consult the proposed plan

* It may comprise between 12- 25 stations.
* The content may assess application of knowledge, or practical skills.
* Student will complete task in defined 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 AND 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

**End of Module/ Block examination will be conducted on ---/---/ 2025/26**