

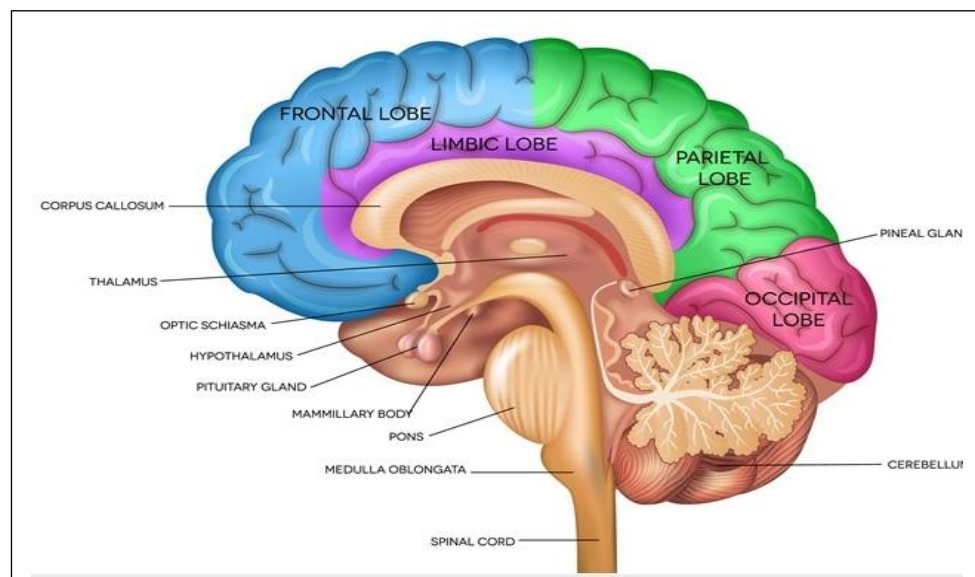


Rai Foundation Medical College

NEUROSCIENCES - I MODULE

SECOND YEAR MBBS, ACADEMIC SESSION 2025-26

**BLOCK: VI (NEUROSCIENCES – I &
INFLAMMATION MODULE)
Academic Year: 2025**



DISCLAIMER

- Developing a study guide is a dynamic process and undergoes iteration according to the needs and priorities.
 - This study guide is subjected to the change and modification over the whole academic year.
 - However, students are advised to use it as a guide for respective modules.
 - It is to declare that the learning objectives (general and specific) and the distribution of assessment tools (both theory and practical) are obtained from university of health sciences. These can be obtained from: <https://www.uhs.edu.pk/>
 - The time tables are for guiding purpose. It is to advise that final timetables are always displayed over the notice boards of each lecture hall.
 - Students are encouraged to provide feedback via module coordinator.
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Vision Statement

To be an institution of excellence in medical education, research, and patient care, fostering innovation, compassion, and a profound commitment to addressing healthcare challenges at local and global levels.

Mission Statement

We are dedicated to producing competent, ethical medical graduates who exemplify empathy, social accountability, and excellence in patient care. Through innovative education and critical thinking, they will advance clinical practice, scientific research, and lifelong learning to meet local and global healthcare needs.

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Module Committee

Sr.no	Name	Department	Role
1.		Principal	
2.		DME	Director
3.		DME	Assistant Director
4.		DME	Senior Demonstrator
Module Team			
5.		Professor & HOD Physiology	Block Coordinator
6.		Professor Anatomy	Module Coordinator
7.		Asst Professor DME	Module Developer
8.		Senior Demonstrator	Module Developer
9.		Professor & HOD Anatomy	Member
10.		Prof. & HOD Biochemistry	Member
11.		Professor & HOD Pharmacology	Member
12.		Assistant Professor Physiology	Member
13.		Assistant Professor Anatomy	Member
14.		Asst. Prof Pathology	Member
15.		Professor Surgery	Member
16.		Professor Medicine	Member
17.		Senior Lecturer Community Medicine	Member
18.		Asst. Prof. Psychiatry (Behavioral Science)	Member
19.		SR Surgery (In charge Skill Lab)	Member

Introduction to Study Guide

It is an aid to inform students how student learning program of the module has been organized, to help students organize and manage their studies throughout the module and guide students on assessment methods, rules and regulations.

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.

Module Outcomes:

- 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 on the student's overall performance.
- Includes information on the assessment methods that will be held to determine every student's performance.

Achievement of Objectives:

- Focuses on information pertaining to examination policy, rules and regulations.

Students will experience an integrated curriculum.

Integrated Curriculum:

An integrated curriculum is all about making connections, whether to real life or across the disciplines, about skills or about knowledge. An integrated curriculum fuses subject areas, experiences, and real-life knowledge together to make a more fulfilling and tangible learning environment for students. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn in relation to clinical examples. Case based discussions, computer-based assignments, early exposure to clinics, wards, and skills acquisition in skills lab are characteristics of integrated teaching program.

Marks Distribution

BLOCK VI Neurosciences – I & Inflammation Module					
Theory	Part I - MCQs	85 Marks	Practical	OSPE	56 Marks
	Part II- SEQs	35 Marks		OSCE	16 Marks
	Internal Assessment	30 Marks		OSVE	48 Marks
	Total	150 Marks		Internal Assessment	30 Marks
				Total	150 Marks

Table of Specification

Theme	Subject	MCQ (1 Mark)	SEQ (5 Mark each)	Marks	Oral / Practical / Clinical Exam			
					OSPE (08 Marks each)	OSCE (10 Marks each)	Structure d OSVE (16 Marks each)	Marks
Normal Structure	Anatomy & Applied / Clinical	24	3	39	3	-	1	40
Normal Function	Physiology & Applied / Clinical	26	3	41	3	-	1	40
	Biochemistry & Applied / Clinical	09	1	14	1	-	1	24
Disease Burden & Prevention	Community Medicine Public Health	04	-	04	-	-	-	-
	Behavioral Sciences	03	-	03	-	-	-	-
Pathophysiology & Pharmacotherapeutics	Pathology	12	-	12	-	-	-	-
	Pharmacology	07	-	07	-	-	-	-
CFRC	CFRC 1-1	-	-	-	-	1	-	08
PERLS	PERLS 1-1	-	-	-	-	1	-	08
		85	7×5 = 35	120	08×7 = 56	2×08 = 16	3 × 16= 48	120

Organization of Module

INTRODUCTION

The second year MBBS students will have a detailed understanding of the anatomy, physiology, and clinical aspects of the human brain and spinal cord. 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.

Teaching and learning strategies:

The following teaching / learning methods are used to promote better understanding:

1. Interactive Lectures
2. Hospital / Clinic visits
3. Small Group Discussion
4. Practical
5. Skills session in skill labs
6. Case-Based Learning (tutorials)
7. Directed Self-Learning

- **Interactive lectures:**

An interactive lecture is an easy way for instructors to intellectually engage and involve students as active participants in a lecture - based class of any size.

- **Hospital / Clinic visits:**

In small groups, students observe patients with signs and symptoms in hospital or clinical settings. This helps students to relate knowledge of basic and clinical sciences of the relevant module.

- **Small group discussion (SGD):**

Students learn from each other. Everyone gets more practice at expressing their ideas. A two-way discussion is almost always more creative than individual thoughts. Social skills are practiced in a 'safe' environment e.g. tolerance, cooperation.

- **Skills session:**

Skills relevant to respective module are observed and practiced where applicable in skills laboratory or Laboratories of various departments.

- **Case Based Learning (CBL):**

A small group discussion format where learning is focused on a series of questions based on a clinical scenario. Students discuss and answer the questions by applying relevant knowledge gained previously in clinical and basic health sciences during the module and construct new knowledge. The CBD will be provided by the concerned department. It is an active learning & teaching strategy which promotes application of foundational knowledge in

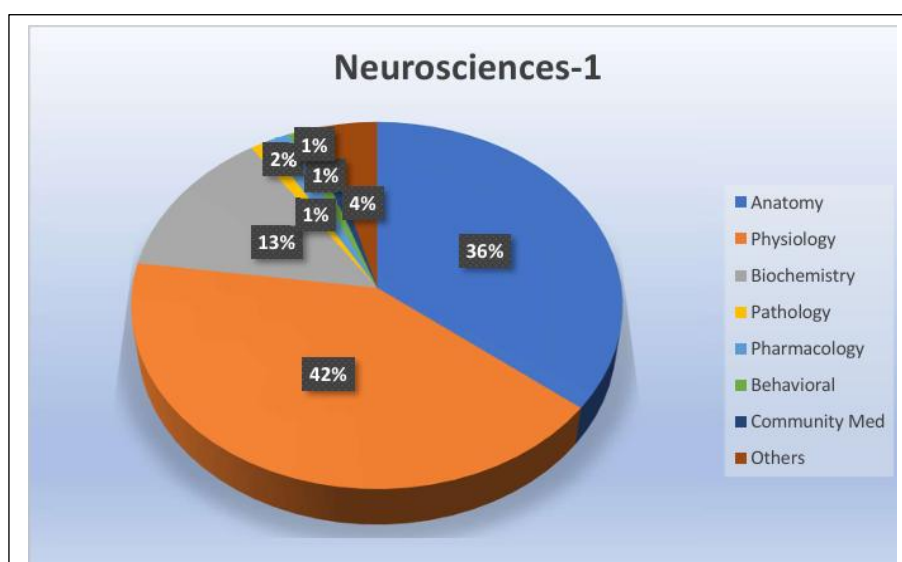
relevant clinical scenarios.

- **Directed Self-learning (DSL):**

Directed Self-learning, which involves studying with indirect supervision in a classroom/Library, is a valuable way to learn and is quickly growing in popularity among parents and students.

Students' assume responsibilities of their own learning through individual study, sharing and discussing with peers, seeking information from Learning Resource Centre, teachers and resource persons within and outside the college. Students can utilize the time within the college scheduled hours of self-study.

INTEGRATING DISCIPLINES OF NEUROSCIENCES- I MODULE



Module Outcomes

By the end of Neurosciences -1 module, students of 2nd year MBBS will be able to

- 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. Illustrate awareness of the impact on overall health and well-being, the importance of preventing and early detection of related disorders.
 - Develop the ability to communicate effectively with patients and their families, including explaining diagnosis and treatment options, and providing emotional support.
 - Practice the attitude to work in a multidisciplinary team, collaborating with other healthcare Professionals to provide comprehensive care for patients.
 - Equip themselves with the ability to appreciate the significance of lifelong learning and professional development to keep up with latest advances in the clinical field.
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Themes of Head & Neck, Special Senses- I Module

S. No	Theme	Duration
1.	Nerve fibers & receptors	1 week
2.	Spinal cord & tracts	1 week
3.	Brain Stem	1 week
4.	Cerebellum	1 week
5.	Cerebrum	1 week
6.	Diencephalon	1 week
7.	Autonomic Nervous System	1 week

Specific Learning Objectives

ANATOMY				
GROSS ANATOMY				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Nervous system	Describe the basic organization of nervous system	LGIS	C1	MCQs, SEQs, OSVE, OSPE
	Identify and describe the components of the Nervous system and their function		C1	
Spinal Nerves	Trace the origin, exit from vertebral canal, branches & distribution of typical spinal nerve.	SGD (Dissection Hall & Museum)	C2	
Spinal Cord & Clinical Correlates	Identify the location, extent, coverings and blood supply of spinal cord on model.	SGD (Dissection Hall & Museum)	C2 / P2	MCQs, SEQs, OSVE, OSPE
	Discuss in a tabulated form nuclear organization at different levels of spinal cord.		C2	
	Describe the transverse section of spinal cord at mid cervical level showing ascending & descending tracts.	LGIS	C2	
	Tabulate the sensory nerve endings, and anatomical sites of first, second, third order neurons of ascending tracts.		C2	
	Tabulate first, second, third order neurons of descending tracts.	LGIS	C2	
	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.	SGD	C2	
Brain Stem	Differentiate clearly between upper and lower motor neuron lesions.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe the external features of medulla, pons midbrain along with their location, relations and blood supply.		C2	
	Explain the cross-sectional details of white and grey matter of brain stem (mid brain, pons, medulla).		C2	
	Correlate clinically anatomical abnormalities in Medial and lateral medullary syndrome, Weber syndrome, Benedikt syndrome	LGIS	C3	
Cerebellum	Explain location, relations, functional classification & blood supply along with major connections of cerebellum. (cerebellar peduncles)	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe internal structure of cerebellum.		LGIS	
	Describe important clinical correlates.		C2	
	Clinically correlate features of cerebellar syndrome with anatomical locations.		C3	
Cerebrum	Identify the lobes, sulci & gyri, cortical	SGD	C2	MCQs, SEQs,

	areas of cerebrum.	(Dissection Hall & Museum)/ LGIS		OSVE, OSPE
	Describe Venous drainage and arterial supply of each lobe.			
	Describe functional areas of cerebrum.			
	Draw a labelled diagram of Homunculus.		C2	
	Define important clinical correlates of cerebrum.		C1	
	Describe internal structure of cerebral hemisphere; 1. White matter 2. Basal ganglia 3. Lateral ventricle		C2	
	Clinically correlate features of disorders of cerebrum with anatomical location.	LGIS	C3	
Limbic system, Reticular formation	Describe components & functions of limbic system.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe components & functions of reticular formation.		C2	
Cranial Nerves	Explain the origin, exit from the brain and intracranial course of cranial nerves.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Describe the functional components and specific functions of each cranial nerve.		C2	
Diencephalon	Identify the Location and sub division of Diencephalon on model.	SGD (Dissection Hall & Museum)	C2 /P2	MCQs, SEQs, OSVE, OSPE
Thalamus & hypothalamus	Discuss the location, relations, blood supply, nuclei and major connections of thalamus, hypothalamus, epithalamus, subthalamus, metathalamus.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Describe and illustrate the hypothalamic and pituitary gland nuclei with their functions, location afferents.		C2	
	Describe the hypothalamo-hypophyseal portal system.		C2	
	Describe the functions of hypothalamus.		C2	
	Justify the anatomical basis for the thalamic cauterization, thalamic pain, thalamic hand and hypothalamic disorders.		C3	
Intracranial Fossa	Explain the gross anatomy of Intracranial fossae with intracranial foramina.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
Meninges	Explain the attachments, blood supply and nerve supply of the meninges of the brain.		C2	
Dural Sinuses	Discuss the Origin, tributaries & area of drainage, termination of Dural venous sinuses.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
CSF	Explain the Formation, circulation and absorption into venous system of CSF (Cerebrospinal fluid).	LGIS	C2	
	Describe ventricular system, Lateral, 3rd & 4th ventricles.		C2	

Blood Supply	Discuss the origin, course, branches and distribution of internal carotid artery, vertebral artery formation, location, branches and area of supply of Circle of Willis.	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
Autonomic Nervous System (ANS)	Explain the major subdivision of ANS into sympathetic and parasympathetic nervous system with comparison of anatomical differences.	LGIS	C2	
Autonomic Ganglia	Describe the location, connections and functions of autonomic ganglion.	SGD (Dissection Hall & Museum)	C2	
Sympathetic Chain	Explain the origin, termination and branches of the sympathetic chain	SGD (Dissection Hall & Museum)	C2	MCQs, SEQs, OSVE, OSPE
	Localize spinal cord lesions on given clinical scenarios.		C3	
Clinical Anatomy	Discuss clinical correlates of cerebrum and cerebellum.			

EMBRYOLOGY & POST- NATAL DEVELOPMENT

Topic	Specific Learning objectives	Teaching strategy	Levels C/P/A	Assessment
Neural tube development	Explain the development of neural tube and brain vesicles.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Discuss related clinical anomalies.		C2	
Spinal cord development	Describe the development of the spinal cord and related clinical anomalies.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
Pituitary gland	Describe development of Pituitary gland.	LGIS	C2	

MICROSCOPIC ANATOMY (HISTOLOGY)

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Nervous Tissue	Describe the histological structure of Nervous tissue, Neuron, Nerve Fiber, Sensory & motor nerve endings, Neuroglia, Blood brain barrier, ganglia.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
Spinal Cord	Describe the histological structure of the spinal cord.	LGIS	C2	
Cerebrum	Describe the histological structure of Cerebrum.	LGIS	C2	
Cerebellum	Describe the histological structure of Cerebellum.	LGIS	C2	

MICROSCOPIC ANATOMY (HISTOLOGY) PRACTICAL

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
CNS	Identify light microscopic structure of Peripheral nerve sensory ganglia, autonomic ganglia.	Practical	C2 / P2	Integrated OSPE
	Draw a labelled diagram of light microscopic structure of Peripheral nerve sensory ganglia, autonomic ganglia.		C2	

Spinal Cord	Identify light microscopic structure of spinal cord.	Practical	C2 / P2	Integrated OSPE
	Draw a labelled diagram of light microscopic structure of spinal cord.		C2	
Cerebrum	Identify light microscopic structure of cerebrum.	Practical	C2 / P2	
	Draw a labelled diagram of light microscopic structure of cerebrum.		C2	
Cerebellum	Identify light microscopic structure of cerebellum.	Practical	C2/P2	
	Draw a labelled diagram of light microscopic structure of cerebellum.			

PHYSIOLOGY

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Organization of nervous system	Describe the general organization of nervous system.	LGIS / SGD	C1	MCQs, SEQs, OSVE, OSPE
	Classify synapses.		C1	
	Explain physiological anatomy of synapses.		C1	
	Describe the properties of synaptic transmission.		C2	
	Classify the substances that act as neurotransmitters.	LGIS	C2	
	Classify all sensory receptors in the body.		C2	
	Enumerate the properties of receptors.		C2	
	Explain the mechanism of adaptation of receptors.			
Neurons & synapses and nerve fibers	Enlist the rapid adapting mechanism of receptors.	SGD	C2	MCQs, SEQs, OSVE
	Explain the properties of receptors.		C2	
	Explain the general classification of nerve fibers.		C2	
	Explain the numerical classification of nerve fibers.	LGIS	C2	MCQs, SEQs, OSVE
	Explain Gasser classification of nerve fibers.		C2	
Sensory areas of brain	Explain summation and its types.	LGIS	C2	MCQs, SEQs, OSVE
	Describe the sensory areas of brain.		C1	
	Enlist Brodmann number of sensory areas.		C2	
	Describe the effects produced by damage to each sensory area of brain		C2	
	Describe the pathophysiology and features of personal neglect syndrome.		C2	
Somatic Sensations	Classify somatic sensations.		C2	
	Explain somatic sensations.		C2	

Ascending Tracts	Enumerate the ascending tracts / Pathways		C1	
	Name the sensations carried by dorsal column medial lemniscus system (DCMLS).		C2	
	Trace the pathway of DCMLS		C2	
Pain	Classify pain.	LGIS	C1	MCQs, SEQs, OSVE
	Differentiate between slow pain and fast pain.		C2	
	Describe the analgesia system in brain and spinal cord.		C2	
	Describe the cause and features of Brown Sequard Syndrome.		C1	
Spinal Cord	Describe the physiological anatomy of spinal cord	SGD	C2	
	Name the anterior motor neurons and their location.		C1	
Muscle spindle & stretch reflex	Explain the Renshaw cells feedback.	LGIS / SGD	C1	MCQs, SEQs, OSVE, OSPE
	Classify the spinal cord reflexes according to number of synapses.		C1	
	Describe the structure & functions of Muscle spindle.		C1	
	Trace the reflex arc of stretch reflex.		C2	
	Discuss the clinical significance of stretch reflex.		C2	
Tone	Define tone.		C1	
	Discuss how it is maintained		C2	
	Trace the reflex arc of golgi tendon organ, golgi tendon reflex		C2	
	Explain the importance of Golgi tendon reflex		C2	
Motor Areas of Brain	Name the motor areas of brain.	LGIS / SGD	C2	MCQs, SEQs, OSVE
	Enlist Brodmann number of motor areas of brain.		C2	
	Explain the features produced due to damage to the motor areas.			
	Name the motor areas of brain.		C1	
Brain Stem	Enlist the functions of brain stem		C1	
Descending Tracts	Enumerate the descending tracts		C1	
	Describe the functions of Pyramidal tract		C2	
	Describe the effect of lesions in motor cortex of brain or pyramidal tract	LGIS	C2	
Motor Neurons	Discuss the location of upper and lower motor neuron.		C1	
	Explain the features of upper motor neuron lesion.	LGIS	C2	
	Explain the features of lower motor neuron lesions.		C2	
Spinal Shock	Define spinal shock		C2	MCQs, SEQs,

	Enumerate and explain the stages of spinal shock		C1	OSVE, OSPE
	Describe the features of hemi section of spinal cord (at the level, above the level, below the level)		C2	
Cerebellum	Name the functional parts of cerebellum.	LGIS	C2	MCQs, SEQs, OSVE
	Explain the functions of spinocerebellum.		C2	
	Describe the functions of cerebro cerebellum.		C2	
	Discuss the functions of vestibule cerebellum.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Explain the clinical features of cerebellar disease.		C2	
Basal Ganglia	Name the components of Basal ganglia.		C2	
	Explain the putamen and caudate circuits.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Enlist the neurotransmitters in basal ganglia.		C1	
	Enlist the functions of basal ganglia.		C1	
	Explain the clinical abnormalities of putamen circuit.		C2	
	Explain the pathophysiology and		C2	
	Explain the types of rigidity.		C2	
	Differentiate spasticity and rigidity.		C2	
	Define decerebrate rigidity.		C1	
Vestibular Apparatus	Enumerate the components of vestibular apparatus.	LGIS	C1	MCQs, SEQs, OSVE, OSPE
	Name the sensory organs of vestibular apparatus.		C1	
	Describe the role of vestibular Apparatus in maintenance of linear and angular equilibrium.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
Limbic System	Enlist the components of limbic system.		C1	
	Describe the functions of amygdala.		C2	
	Explain the effects of bilateral ablation of the amygdala — The Klüver-Bucy Syndrome.		C2	
	Explain the functions of hippocampus	SGD	C2	MCQs, SEQs, OSVE, OSPE
	Explain the functions of Hypothalamus		C2	
	Explain Functions of Thalamus		C2	
	Discuss the Thalamic syndrome.		C2	
Reticular Formation	Define brain stem reticular formation (BRF).		C2	
	Name the neurotransmitters of BRF.		C1	
	Enlist functions of BRF.		C1	

	Differentiate between the functions of Pontine and medullary reticular Formation.		C1	
Epilepsy	Enumerate different types of epilepsy.	LGIS	C1	MCQs, SEQs, OSVE, OSPE
	Explain the features and physiological basis and EEG waves in different types of epilepsy.		C2	
Sleep	Explain the types of sleep.	SGD	C2	
	Discuss the stages of slow wave sleep.		C2	
	Explain the changes in EEG during sleep wake cycle.		C1	
	Enumerate the areas and ho		C1	
Memory	Define memory.	LGIS	C1	MCQs, SEQs, OSVE, OSPE
	Classify memory on the basis of duration and information stored.		C2	
	Explain the molecular mechanism of Intermediate memory.		C2	
	Enumerate the structural changes of long-term memory.		C1	
	Explain the higher intellectual functions of prefrontal association cortex.	LGIS	C2	
	Explain the mechanism of consolidation of memory.		C2	
	Explain retrograde and anterograde amnesia.		C2	
	Explain the physiological basis and features of Alzheimer’s disease.		C2	
Speech	Enlist the areas of speech.	LGIS / SGD	C2	MCQs, SEQs, OSVE, OSPE
	Explain the functions of motor and sensory areas of speech.		C2	
	Trace and explain the pathway of written and heard speech.		C2	
	Enlist the abnormalities of speech.	SGD	C1	
	Explain the features of motor aphasia.		C2	
	Elaborate the features of sensory aphasia.		C2	
	Define dyslexia, alexia, agraphia.		C1	
Autonomic Nervous System	Discuss Components of Autonomic nervous system.	LGIS	C2	MCQs, SEQs, OSVE, OSPE
	Explain the physiological anatomy of sympathetic and parasympathetic nervous system.		C2	
	Describe the types of adrenergic and cholinergic receptors.		C2	
	Explain the effects of sympat		C2	

PRACTICAL				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Sensory System Examination	Examine the sensory system.	Lab	C2 /P2	OSCE
Reflexes	Examine the superficial reflexes.		C2 /P2	
	Examine the deep reflexes.		C2 /P2	
Cerebellar Functions	Demonstrate cerebellar function test.		C2 /P2	
Cranial Nerves	Demonstrate the testing of Cranial Nerve (CN) VII.		C2 /P2	
	Demonstrate the testing of Cranial Nerves (CN) IX & X.		C2 /P2	
Motor System Examination	Examine the motor system.		C2 /P2	

BIOCHEMISTRY				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Digestion and Absorption of Lipids	Explain the digestion and absorption of lipids with enzymes involved in it.	LGIS	C2	MCQs, SEQs, OSVE
	Discuss role of bile acids and salts in lipid digestion and absorption		C2	
Lipid Transport	Explain the concept of lipid transport and storage.	LGIS	C2	
Sphingolipids	Discuss the reactions of beta-oxidation, alpha and omega oxidation of unsaturated and saturated fatty acids.	LGIS	C2	MCQs, SEQs, OSVE
	Calculate energy yield from palmitate in oxidation.		C2	
Carnitine Shuttle	Discuss role of carnitine shuttle.	LGIS	C2	
Citrate Shuttle	Discuss the role of citrate shuttle in fatty acid synthesis.	LGIS	C2	
Fatty Acid Synthesis	Explain the pathway of fatty acid synthesis and its regulation.	LGIS	C2	MCQs, SEQs, OSVE
	Explain the steps of the reactions of hepatic ketogenesis and regulation.		C2	
Metabolism of Sphingo & Phospholipids	Describe utilization of ketone bodies by extrahepatic tissue.	LGIS	C2	MCQs, SEQs, OSVE
	Describe the Synthesis and degradation of phospholipids and sphingolipids.		C2	
	Interpret the disorders related to enzyme deficiencies.		C3	
Glycolipid Metabolism	Discuss the metabolism of glycolipids interpret the disorders related to enzyme deficiencies.	LGIS	C2	MCQs, SEQs, OSVE
Fast feed cycle	Explain fast feed cycle with reference to pathways activated and suppressed in each tissue in starved and fed state.	LGIS	C2	MCQs, SEQs, OSVE
	Discuss integration of metabolism.		C3	

Neurotransmitters	Explain fast.	LGIS	C2	MCQs, SEQs, OSVE
	Discuss the structure, biochemical function and metabolism, dopamine, serotonin, histamine, GABA.		C2	
	Correlate the biochemical functions of these neurotransmitters with their deficiency diseases.	LGIS	C2	MCQs, SEQs, OSVE
Oncogenes	Explain proto-oncogene and oncogene concept.	LGIS	C2	MCQs, SEQs, OSVE
Tumor Markers	Discuss tumor markers and their significance.		C2	
Genetics	Explain the role of genetics in cancers especially breast, ovary, lung and colon.	LGIS	C2	MCQs, SEQs, OSVE
Xenobiotics	Discuss the concept of xenobiotics.	LGIS	C2	

PRACTICAL BIOCHEMISTRY

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Data Interpretation	Interpret the lysosomal storage diseases on given data Neiman pick disease, Gaucher's disease etc.	Lab	C4	OSPE
Triglyceride Estimation	Perform the estimation of triglycerides by kit method.		C2 / P	

COMMUNITY MEDICINE

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Community Based Interventions	Identify general approach to prevent mental illnesses at community level.	LGIS	C2	MCQs
Epidemiology	Describe the depth of problem in context of mental illnesses.	LGIS	C2	

BEHAVIORAL SCIENCE

Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Learning & Behavior	Explain the theoretical basis of classic conditioning, operant conditioning and observational learning with examples in medical practice	LGIS	C2	MCQs
	Discuss strategies to incorporate learning principles to help prepare people for medical interventions		C2	
Memory	Outline the structure of memory.	LGIS	C1	
	Explain the distinction between short- and long-term memory.		C2	
	Describe memory improvement techniques .		C2	

PHARMACOLOGY				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Learning & Opioids Agonists & Antagonists	Classify various opioid receptors.	LGIS	C2	MCQs
	Describe Mechanism of Action (MOA), pharmacological actions, clinical uses and adverse effects of opioid agonist, mixed agonist - antagonist and antagonist.		C2	
CNS Stimulants & Depressants	Classify various CNS stimulants and depressants.	LGIS	C2	
	Describe MOA, pharmacological actions, clinical uses and adverse effects of CNS stimulant and depressants.		C2	

MEDICINE				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
CVA	Identify various types of CVA (cerebrovascular accident).	LGIS	C2	MCQs
	Describe various symptoms and signs.		C2	
	Outline management strategies		C1	
Epilepsy	Define Epilepsy.	LGIS	C1	
	Enlist various types of epilepsy.		C1	
	Identify various symptoms and signs		C2	
	Outline management strategies		C1	
Meningitis	Enlist various types of meningitis.	LGIS	C1	MCQs
	Describe symptoms and signs.		C2	
	Outline management strategies		C1	
AGING (MEDICINE)				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Dementia	Define dementia.	LGIS	C1	MCQs
	Discuss various causes for dementia.		C2	
	Discuss various risks for dementia.		C2	
	Outline management strategies.		C1	
PEDIATRICS				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Cerebral Palsy	Describe the clinical features of Cerebral Palsy.	LGIS	C2	-

PATHOLOGY				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
CVA	Define cerebral vascular accident (CVA).	LGIS	C1	MCQs
	Discuss the etiology and morphological changes of Cerebrovascular accidents		C2	
Meningitis	Define Meningitis.	LGIS	C1	
	Classify types of meningitis.		C2	

NEUROSURGERY				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Surgical Management of Stroke	Discuss the role of surgery in stroke.	LGIS	C2	MCQs
Hematomas	Categorize the various types of hematomas.	LGIS	C2	
Trauma	Discuss triage in emergency room.	LGIS	C2	

PERLS (PROFESSIONALISM, ETHICS, RESEARCH, LEADERSHIP SKILLS)				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
Research	Write a literature review of about 2000 words on selected topic.	LGIS	C2	OSCE
Leadership (Self-directed Learner)	Differentiate between reflection and feedback.	LGIS	C2	OSCE
	Discuss techniques of receiving feedback.		C2	
	Write a reflection on any feedback received on any specific educational area.		C3	
Resilience	Written report on patient encounter highlighting important steps of communication.	LGIS	C3	OSCE
Communication	Demonstrate non-verbal, verbal communication skills with stable patients.	LGIS	C2/P2	OSCE

CLINICAL SKILLS (CSIM)				
Topic	Specific Learning Objectives	Teaching strategy	Levels C/P/A	Assessment
GCS	Assess Glasgow Coma Scale.	Skill Lab	C2 / P	OSCE
Radiology	Interpret normal CT brain		C2 /C3	

Time Tables:

The timetables for the module will be shared via WhatsApp groups and the notice boards in advance.

Assessment Tools

Theoretical knowledge is tested by a written examination system constituted by multiple choice questions (MCQ) and SEQs. The assessment of practical knowledge involves oral, spot, or objective structured practical examinations (OSPE).

Multiple Choice Questions (MCQ/SEQs):

Multiple choice questions (MCQ/SEQs) are a form of assessment for which students are asked to select the best choice from a list of answers.

MCQ/SEQ consists of a stem and a set of options. The stem is usually the first part of the assessment that presents the question as a problem to be solved; the question can be an incomplete statement which requires to be completed and can include a graph, a picture or any other relevant information. The options are the possible answers that the student can choose from, with the correct answer called the key and the incorrect answers called distractors.

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 the college.

The block exam will comprise of 85 MCQ/ 7 SEQs each of 5 marks and will be compiled according to the shared blueprint.

Short Essay Questions (SEQ)

Short Essay questions generally ask for brief, text-based responses. They can be used to assess students' understanding of and ability to think with subject matter content, discourage guessing of answers, in-depth knowledge of concepts, and formulation of an answer.

Objective Structured Practical or Clinical Examination (OSCE / OSPE)

- 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, interactive and rest stations.
- Observed and interactive stations will be assessed by internal or external examiners.
- Rest station is a station where there is no task given, and in this time student can organize his/her thoughts.
- The Block OSPE / OSCE will be comprise of 12 examined stations. The stations will be assigned according to the shared blueprint.

Internal Evaluation:

Internal evaluation is a process of quality review undertaken within an institution for its own ends. Internal evaluation criteria will be shared with faculty and 20 % on internal assessment will be observed in each module.

Attendance Requirement:

A minimum of 85% attendance is mandatory to sit for the examinations.

Professional Examination:

Criteria for appearing in Professional examination are according to rules and regulations shared by UHS which are available on their website. The criteria is;

- At least 85 % cumulative attendance in all blocks.
- An average 50 % minimum score in all blocks
- Certificate of good conduct from college
- Certificate of having appeared in all block exams conducted by the college

Learning Resources for Students

Anatomy

- Snell Clinical Anatomy 10th ed
- B.D Churasia
- Nelter Atlas
- Langman Embryology (12th Edi)
- Laiq Hassain Basic Histology (8th Ed)
- Difore Atlas Histology

Physiology

- Guyton and Hall physiology (14th Ed)
- Essentials of Medical Physiology by Mushtaq Ahmed

Biochemistry

- Harpers Illustrated Biochemistry (32nd Ed)
- Lippincott's Biochemistry
- Essentials of Medical Biochemistry vol 1&2 by Mushtaq Ahmed.

Community Medicine:

- Parks Textbook of Preventive and Social Medicine. K. Park (Editor)

Pathology:

- Vinary Kumar, Abdul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.

Pharmacology:

- Basic and Clinical Pharmacology by Katzung, McGraw-Hill.

Behavioral Sciences:

- Handbook of Behavioral Sciences by Prof. Mowaddat H.Rana, 3rd Edition

Apart from these resource learning, students can consult books available in library or recommended by the specialty experts.
