STUDY GUIDE

2nd YEAR MBBS
NEUROSCIENCES-I & INFLAMMATION MODULE

LAHORE MEDICAL AND DENTAL COLLEGE

MISSION OF LMDC

The Lahore Medical and Dental College is committed in its pursuit of excellence to providing the best academic facilities and atmosphere to its students.

Our mission is to: “Train future leaders of medicine who set new standards in knowledge, care and compassion”.

The well qualified and committed faculty of LMDC provides combination of nurturing support and challenge to the students to reach their maximum potential.

FACULTY

Department Of Physiology
Prof. Dr. Anser Asrar (HOD/Professor)
Prof. Dr. Zaima Ali (Professor)
Prof. Dr. Sadia Nazir (Professor)
Prof. Dr. Attiqa Khalid (Professor)
Dr. Asma Akram (Assistant Professor)

Department Of Anatomy
Prof. Dr. Iffat Badar (HOD/Professor)
Prof. Dr. Aruna Bashir (Professor)
Dr. Anis Fatima (Associate Professor)
Dr. Shumaila Ijaz (Assistant Professor)

Department Of Biochemistry
Prof. Dr. Rubina Bashir (HOD/Professor)
Prof. Dr. Sobia Imtiaz (Professor)
Dr. Mahwish Shahzad (Assistant Professor)

Department Of Pharmacology
Prof. Dr. Ajaz Fatima (HOD/Professor)
Prof. Dr. Shazia Asim (Professor)
Dr. Asia Firdous (Assistant Professor)

Department Of Pathology
Prof. Dr. Shazia Nilofar Ibne Rasa (HOD/Professor Histopathology)
Prof. Dr. Saadia Chaudhary (Professor Microbiology)
Prof. Dr. Fauzia Sadiq (Professor Chemical Pathology)
Prof. Dr. Muhammad Shahbaz Amin (Professor Histopathology)
Dr. Nazia Ahmad (Associate Professor Haematology)
Dr. Sonia Tahir (Assistant Professor Microbiology)
Dr. Muhammad Rizwan (Assistant Professor Histopathology)
Dr. Maimoona Aslam (Assistant Professor Histopathology)

Department Of Community Medicine
Prof. Dr. Seema Daud (HOD/Professor)
Dr. Humayun Mirza (Associate Professor)
Dr. Umbreen Navied (Assistant Professor)
Dr. Saadia Maqbool (Assistant Professor)

Department Of Medical Education
Dr. Nighat Nadeem (HOD/Associate Professor)

Department Of Medicine

Prof. Dr. Waseem Amir (HOD/Professor)
Prof. Dr. Asad Ullah Ijaz (Professor OPS)
Prof. Dr. Sarah Shoaib (Professor OPS)

Department Of Surgery

Prof. Dr. Saquib Zahoor (HOD/Professor)
Dr. Sidra Shoaib (Professor)

Department Of Behavioural Sciences
Prof. Dr. Maj. ^{R}. Maqbool Ahmad (HOD/Professor)

Department Of Radiology
Prof. Dr. Khalid Farooq (HOD/Professor)

Department Of Pediatrics
Prof. Rizwan Waseem (HOD/Professor)

INTRODUCTION

Medical education is a life-long process and MBBS curriculum is a part of the continuum of education from pre-medical education, MBBS proceeding to house job, and post-graduation. PMDC and UHS outlines the guiding principles for undergraduate medical curriculum and has defined the generic competencies and desired outcomes for a medical graduate to provide optimal health care, leading to better health outcomes for patients and societies.

Level of Student: 2nd Year MBBS
Duration of Block: October 2025 – December 2025

MODULE NO. 10:
NEUROSCIENCES-1 MODULE

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

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
- Cerebrum
- Spinal cord and tracks
- Cerebellum and brainstem, basal ganglia
- ANS
- Peripheral arterial diseases

LEARNING OBJECTIVES AND COURSE CONTENT OF INDIVIDUAL SUBJECTS

NORMAL STRUCTURE			
THEORY			
CODE	GROSS ANATOMY	TOTAL HOURS = 46	
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC
NS-A-001	Describe the basic organization of nervous system	Human 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 the Location, Extent, Coverings and Blood supply of 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.	Human Anatomy	Spinal cord Clinical correlates (Spinal cord)
NS-A-004	Differentiate clearly between upper and lower motor neuron lesions	Human Anatomy	Brainstem
	Location, Relations, Blood supply and external features of medulla, pons midbrain.	Human Anatomy	

	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		Limbic system. 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.	Human 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	Human Anatomy	Thalamus and hypothalamus

	Describe the functions of Hypothalamus Explain the anatomical basis for the Thalamic Cauterization, Thalamic Pain, Thalamic Hand and Hypothalamic Disorders		
NS-A-011	Explain the Gross anatomy of Intracranial fossae with intracranial foramina	Human Anatomy	Intracranial 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 of brain & spinal cord
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
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 03**	
	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

CODE	MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)	TOTAL HOURS = 05	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
NS-A-021	Describe the histological structure of Nervous tissue, Neuron, Nerve fiber, Sensory & motor nerve endings, Neuroglia, Blood brain barrier, ganglia	Histology	Nervous tissue
NS-A-022	Describe the histological structure of the spinal cord	Histology	Spinal cord
NS-A-023	Describe the histological structure of Cerebrum, Cerebellum	Histology	Cerebrum, Cerebellum

PRACTICAL

CODE	HISTOLOGY	TOTAL HOURS = 07	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
NS-A-024	Identify draw & label light microscopic structure of Peripheral nerve sensory ganglia, autonomic ganglia	Histology	CNS
NS-A-025	Identify Draw & label the light microscopic structure of the spinal cord	Histology	Cerebrum
NS-A-026	Identify Draw & label the light microscopic structure of the Cerebrum	Histology	Cerebellum
NS-A-027	Identify Draw & label the light m structure of the Cerebellum	Histology	Spinal Cord

NORMAL FUNCTION			
THEORY			
CODE	MEDICAL PHYSIOLOGY	TOTAL HOURS = 60	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
NS-P-001	Describe the general organization of nervous system	Medical Physiology	Organization of Nervous System, Neurons and Synapses
	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		
NS-P-002	Explain the properties of receptors		Nerve fibers
	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		
NS-P-003	Describe the sensory areas of brain		Sensory areas of the 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		
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	Medical Physiology	Anterolateral system
	Trace the pathway of DCMLS		

NS-P-007	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 Define & explain the mechanism of referred pain Explain visceral and parietal pain		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	Medical 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 and stretch reflex
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	Define and explain flexor reflex and cross extensor reflex. Discuss the reflexes of posture and locomotion Describe the spinal cord reflexes for scratch, muscle spasm and autonomic reflexes		Spinal cord reflexes
NS-P-013	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-014	Enlist the functions of brain stem	Medical Physiology	Brainstem
NS-P-015	Enumerate the descending tracts Describe the functions of Pyramidal tract		Descending tracts

	Describe the effect of lesions in motor cortex of brain or pyramidal tract		
NS-P-016	Discuss the location of upper and lower motor neuron		Location of motor neurons
	Explain the features of upper motor neuron lesion		
	Explain the features of lower motor neuron lesions		
NS-P-017	Define spinal shock	Medical Physiology	Spinal shock and hemi section
	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)		
NS-P-018	Name the functional parts of cerebellum		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		
NS-P-019	Name the components of Basal ganglia		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		
NS-P-020	Enumerate the components of vestibular Apparatus	Medical Physiology	Vestibular apparatus
	Name the sensory organs of vestibular apparatus		
	Describe the role of vestibular Apparatus in maintenance of linear and angular equilibrium		
NS-P-021	Enlist the components of limbic system		Limbic system
	Describe the functions of amygdala		

	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		
NS-P-022	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	Brain stem reticular formation
NS-P-023	Enumerate and discuss the physiological basis of Electroencephalogram EEG waves	Medical Physiology	EEG
NS-P-024	Explain the types of sleep		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)		
NS-P-025	Enumerate different types of epilepsy		Epilepsy
	Explain the features and physiological basis and EEG waves in different types of epilepsy		
NS-P-026	Define memory		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	Medical Physiology	
	Explain the mechanism of consolidation of memory		

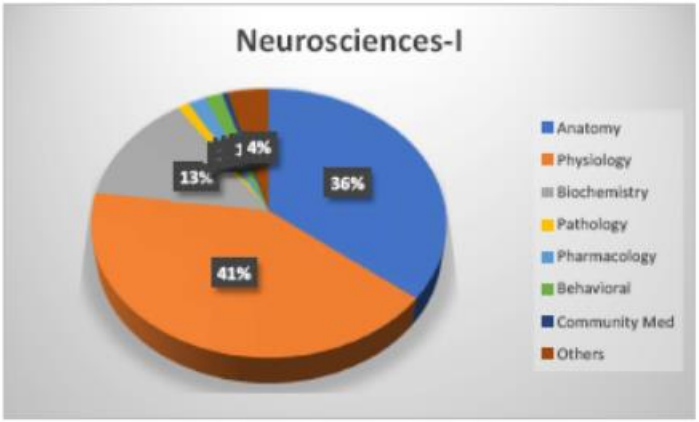
	Explain retrograde and anterograde amnesia		
	Explain the physiological basis and features of Alzheimer's disease		
NS-P-027	Enlist the areas of speech		Speech
	Explain the functions of motor and sensory areas of speech		
	Trace and explain the pathway of written and heard speech		
	Enlist the abnormalities of speech		
	Explain the features of motor aphasia		
	Elaborate the features of sensory aphasia		
	Define dyslexia, alexia, agraphia		
NS-P-028	Discuss the sites of CSF secretion, flow of CSF, and abnormalities of CSF production	Medical Physiology	CSF (Cerebrospinal Fluid)
	Discuss the formation, flow and absorption of CSF		
	Explain the functions of CSF		
	Explain the composition and flow of CSF and pathophysiology of hydrocephalus.		
	Explain the regulation of CSF pressure, increase in CSF pressure in pathological conditions of the brain, and measurement of CSF pressure.		
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 20**	
	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 of lipids
NS-B-002	Explain the concept of lipid transport and storage. Discuss the metabolism of cholesterol along with its regulations and associated disorders		Lipid transport and storage and cholesterol metabolism

	Explain retrograde and anterograde amnesia		
	Explain the physiological basis and features of Alzheimer's disease		
NS-P-027	Enlist the areas of speech		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		
NS-P-028	Discuss the sites of CSF secretion, flow of CSF, and abnormalities of CSF production	Medical Physiology	CSF (Cerebrospinal Fluid)
	Discuss the formation, flow and absorption of CSF		
	Explain the functions of CSF		
	Explain the composition and flow of CSF and pathophysiology of hydrocephalus.		
	Explain the regulation of CSF pressure, increase in CSF pressure in pathological conditions of the brain, and measurement of CSF pressure.		
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 20**	
	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 of lipids
NS-B-002	Explain the concept of lipid transport and storage. Discuss the metabolism of cholesterol along with its regulations and associated disorders		Lipid transport and storage and cholesterol metabolism

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		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.		Metabolism of phosphor and sphingolipids
NS-B-008	Discuss the metabolism of glycolipids interpret the disorders related to enzyme deficiencies.		Glycolipid 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, Acetylcholine Correlate the biochemical functions of these neurotransmitters with their deficiency diseases		Neurotransmitters
NS-B-011	Explain proto-oncogene, oncogene and tumor suppressor genes concept.		Oncogene
NS-B-012	Discuss tumor markers and their significance.		Tumor markers
NS-B-013	Explain the role of genetics in cancers especially breast, ovary, lung and colon.		Cancer

NS-Pa-002	Define Meningitis Identify types of meningitis	Microbiology	Meningitis
DISEASE PREVENTION AND IMPACT			
CODE	**SPECIFIC LEARNING OBJECTIVES**	**TOTAL HOURS = 10**	
		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 Mental Illnesses
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	**THEORY**	**TOTAL HOURS = 01**	
	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		



Module Weeks	Recommended Minimum Hours
07	174

MODULE NO. 11:
INFLAMMATION MODULE

MODULE OUTCOME

At the end of this module the students will be able to:

- Define inflammation and describe its fundamental characteristics.
- Explain the cellular and molecular mechanisms that underlie the inflammatory response.
- Differentiate between acute and chronic inflammation
- Discuss the physiological role of inflammation in tissue repair and host defense.
- Identify how dysregulated inflammation contributes to the pathogenesis of various diseases.
- Describe the key inflammatory mediators, including cytokines, chemokines, and prostaglandins.
- Illustrate the signaling pathways involved in the initiation and resolution of inflammation.
- Recognize the roles of different immune cells (e.g., neutrophils, macrophages, lymphocytes) in the inflammatory response.
- Discuss the pharmacological aspects of steroidal and non-steroidal anti- inflammatory drugs
- Discuss the clinical aspects of inflammation.

MODULE THEMES

- Role of inflammation in embryology
- Inflammatory response and role of leukocytes
- Eicosanoids
- Acute inflammation
- Chronic inflammation
- Cell repair
- Prostaglandin analogues
- Anti-inflammatory drugs
- Steroidal anti-inflammatory drugs
- Non-steroidal anti-inflammatory drugs
- COX- inhibitors
- Histamines and antihistamines
- Communicable diseases and their prevention
- Psychological stress and inflammation
- Aging

CLINICAL RELEVANCE

1. Acute Respiratory Distress Syndrome
2. Bronchial Asthma
3. Tuberculosis
4. Pneumonia

LEARNING OBJECTIVES AND COURSE CONTENT OF INDIVIDUAL SUBJECTS

NORMAL STRUCTURE			
THEORY			
CODE	**EMBRYOLOGY & POST-NATAL DEVELOPMENT**	**TOTAL HOURS = 03**	
	SPECIFIC LEARNING OUTCOMES	**DISCIPLINE**	**TOPIC**
IN-A-001	Identify role of inflammation in implantation Development of cells involved in acute & chronic inflammation Development of integumentary system	Embryology	Role of inflammation in Implantation & Development of Integumentary System
CODE	**MICROSHOPIC STRUCTURE**	**TOTAL HOURS = 02**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
IN-A-002	Discuss the microscopic structure of components involved in inflammation (cells, capillaries) Discuss the histology of integumentary system	Histology	Integumentary system & Inflammatory Response at Cellular Level
PRACTICAL			
CODE	**HISTOLOGY**	**TOTAL HOURS = 02**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
IN-A-003	Draw and identify microscopic structure of integumentary system	Histology	Integumentary System
CODE	**MEDICAL BIOCHEMISTRY**	**TOTAL HOURS = 01**	
	SPECIFIC LEARNING OBJECTIVES	**DISCIPLINE**	**TOPIC**
IN-B-001	Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane and prostacyclin	Medical Biochemistry	Eicosanoids

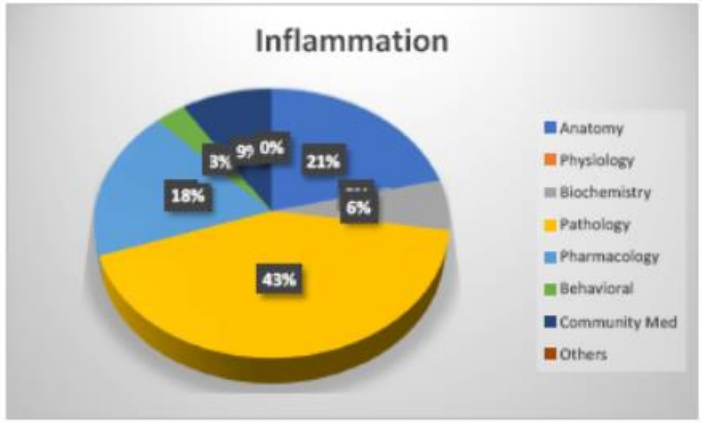
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 06+12	
		DISCIPLINE	TOPIC
IN-Ph-001	Enumerate prostaglandin analogues Discuss the clinical use and adverse effect of prostaglandin analogues	Pharmacology & Therapeutics	Prostaglandin analogues
IN-Ph-002	Enlist anti-inflammatory drugs Differentiate between steroidal and non-steroidal anti-inflammatory drugs		Anti-Inflammatory drugs
IN-Ph-003	Discuss mechanism of action, clinical usage, and adverse effects of steroidal anti-inflammatory drugs		Steroidal anti-Inflammatory drugs
IN-Ph-004	Discuss mechanism of action, pharmacological effects, clinical usage, and adverse effects of non-steroidal anti-inflammatory drugs		Non-steroidal anti-Inflammatory drugs (NSAIDs)
IN- Ph-005	Differentiate between selective and non-selective cyclooxygenase (COX) inhibitors Differentiate between Aspirin and paracetamol Classify antihistamines Discuss the role of histamines and antihistamines in inflammation and allergies, adverse effects and drug interactions		COX inhibitors
IN-Pa-001	Define acute inflammation Enlist stimuli for Acute Inflammation Recognize microbes, necrotic cells, and foreign substances causing acute inflammation Identify different components of inflammation Define necrosis and explain its type with example	Pathology	Acute inflammation
IN-Pa-002	Discuss the role of vascular and cellular events in acute inflammation Differentiate between transudate and exudate Classify chemical mediators Describe the different pathways of synthesis of chemical mediators and their role in clinical practice	Pathology	Process of acute inflammation

	Discuss the role of different chemical mediators in acute inflammation Describe the different morphological patterns and outcomes of acute inflammation		
IN-Pa-003	Define chronic inflammation Discuss the role of chronic inflammatory cells and mediators in chronic inflammation Discuss the causes, pathophysiology and morphology of granulomatous inflammation	Pathology	Chronic Inflammation
	Classify mycobacteria Explain the pathogenesis and lab diagnosis of mycobacterium tuberculosis Discuss the Runyon classification of atypical mycobacteria Discuss pathogeneses and lab diagnosis of leprosy	Microbiology	
IN-Pa-004	Discuss the concept of Cell Proliferation, the Cell Cycle and Stem Cells in tissue repair Discuss the role of Growth Factors, receptors, signal transduction and extracellular matrix Involved in Regeneration and Repair Explain the types of healing along with the steps in scar formation Identify the factors that influence the tissue repair Discuss the complication of wound healing -keloid, Hypertrophy, Scarring	Pathology	Cell Repair

PRACTICAL

CODE	PATHOLOGY	TOTAL HOURS = 02	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
IN-Pa-005	Identify the pathological features of acute inflammation	Pathology	Inflammation
	Identify the pathological features of chronic inflammation & granulomatous inflammation		

DISEASE PREVENTION AND IMPACT			
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 03+01	
		DISCIPLINE	TOPIC
IN-CM-001	Discuss the mode of transmission of communicable diseases Explain the general concept of prevention of communicable diseases Discuss the primary, secondary and tertiary prevention of acute and chronic diseases Discuss the role of immunoprophylaxis and chemoprophylaxis in prevention of communicable diseases	Community Medicine and Public Health	Communicable Diseases
IN-BhS-001	Understand the correlation between psychological stress and inflammation	Behavioral Sciences	Role of Psychological stress in Inflammation
AGING			
CODE	THEORY	TOTAL HOURS = 01	
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC
IN-Ag-001	Explain inflammatory changes and role of leukotriene and cytokines in old age	Biochemistry	Inflammatory changes & signaling molecules in Aging



Module Weeks	Recommended Minimum Hours
01	33

CURRICULUM
OF
The Holy Quran

Quran: Year-2

SECTION THREE: SPECIFIC QURANIC COMMANDMENTS
LEARNING OUTCOMES
a. Importance of the protection of Human life i. Concept of the sanctity of human life in Quran and Sunnah ii. Importance and significance of a single human being even during war iii. Concept of punishment in regard to the killing of a human being, voluntarily or involuntarily
b. Jihad i. Concept of Jihad and its significance (hikmat) ii. Different forms of Jihad and their importance iii. Principles and preparation of Jihad iv. Devine reward of Jihad
c. Heirship/Inheritence (Virasat) i. Heirship and division of wealth in accordance with divine teachings ii. Heirs and their shares iii. Legal aspect of virasat (Hud-e-Illahi)
d. Amar-bil-maroof-wa-Nahi-anil-munkar i. Differentiation between Maroof and Munkar ii. Importance and significance (effects of avoiding this principle) iii. Necessary conditions of both amar-bil-maroof and nahi-anil-munkar iv. The different stages and the necessary prerequisites
e. Hadood-e Illahee and taazeerat i. Meaning and various types of hadood-e-Illahee ii. Authority for fixation of limit (hudd) iii. Criteria and permissible relaxation in fixing the limits iv. Difference between 'Hadood', 'Qisas' and 'Tazeerat'. Punishments which are left to the court of law v. **Benefits for the good of community**

f. Justice (Adal-o-insaf)

i. Justice of Allah subhan wa taala
ii. Importance of justice for the survival of community
iii. Need of justice to be prevailed irrespective of religion
iv. Devine reward for fair justice

g. Business (Bay-o-tijarat)

i. Importance of fair business and its necessary constituents
ii. Permissible and impermissible conditions of businesses
iii. Concept of loan in businesses

h. Interest (Riba or Sudi karobar)

i. Meaning of Riba or interest and its different forms
ii. Impact of Riba on a society in general
iii. Devine declaration and its punishment both in this world and Hereafter

i.Nikah-o-talaq

i. Basic rulings regarding marriage and divorce
ii. Importance of Nikah and its constituents
iii. Conditions of Nikah and various forms of prohibited/impermissible nikah
iv. Misconception of dowry
v. Talaq and its various forms
vi. Meaning of Khula and its conditions

CONTENTS

8. Interest (Riba or Sudi karobar)
9. Nikah-o-talaq

CURRICULUM
OF
Islamiyat & Pakistan Studies

ISLAMIYAT

A short course on Islamic Studies will be completed in First and Second year with an exam at the end of second year.

Course Content:

- Understand the basic principles of Islam.
- Explain the concept of the Islamic state.
- Explain the Quran as a guide for modern society and scientific development.
- Describe the life of the Holy Prophet Peace be upon him as an example to follow.
- Explain ethics in the Islamic prospective.
- Describe the rights of the individual in Islam.
- Describe the rights of women and children in Islam.
- Explain the contribution of Islamic scholars to science and medicine.
- Understand Islam in terms of modern scientific development.
- Explain the concept of Rizk-e-Hilal.
- Explain the concept of Hukook-ul-Ibad.

PAKISTAN STUDIES

A short course on Pakistan Studies will be completed in First and Second year with an exam at the end of second year.

Course Content:

- Describe brief the salient features of the Pakistan movement.
- Explain the basis for the creation of Pakistan.
- Give a brief account of the history of Pakistan.
- Explain the ethnic and cultural distribution of the population of Pakistan.
- Describe the Provinces and resources available in Pakistan.
- Explain current problems faced by Pakistan.
- Describe the social, economic and health problems of the rural population of Pakistan

ISLAMIYAT AND PAKISTAN STUDIES BOOKS

- Standard Islamiyat (Compulsory) for B.A, B.Sc., M.A, M.Sc., MBBS by Prof. M.Sharif
- Islahi Ilmi Islamiyat (Compulsory) for B.A. B.Sc., & equivalent.
- Pakistan studies (Compulsory) for B.A. B.Sc., B.Com., Medical/Engineering by Prof. Shah Jahan Kahlun
- Pakistan studies (Compulsory) for B.A, B.Sc., B.Com., B.Ed., Medical/Engineering by Prof. Shah Jahan Kahlun

CURRICULUM

OF

Civics

LEARNING OUTCOMES	TOPICS
i. Define civics ii. Describe how civics can improve the citizenship iii. Illustrate the scope of civics iv. Discuss the nature of civics v. Give examples how civics can help in the national development	Civics-Meaning & Nature
i. Examine the significance of civics ii. Explain how civics is important to know the problems of daily life iii. Discuss how civics can help to bring improvements in the civics life of citizens iv. Evaluate how civics can improve the sense of love and respect for human relationship v. Discuss that studying civics can develop a sense of gratitude vi. Give examples how civics is important to develop the global unity	Significance and Utility
i. Compare civics with political science, history, economics, sociology and ethics	Relationship with Social Sciences
i. Describe the term harmonic relationship ii. Explain the harmonic relationship among different members of society. (Women, children and senior citizens) iii. Explain how harmonic relationship develop for respect of religion	Harmonic Relationship
i. Define the term individual in relation to civics ii. Define the term state iii. Explain the relation between an individual and a state iv. Describe the importance of an individual in a state v. Enlist the responsibilities of an individual in a state	Individual and state
i. Identify the basic unit of social institution Discuss and characterize the different types of family ii. Give the importance of basic unit of social institution in the development of a state Enlist the responsibilities of family in	Family

general iii. Analyze your role for the betterment of the family Compare and contrast the impact of the deterioration of family in the western society and give examples	
i. Define community ii. Explain the nature and significance of community iii. Discuss the role of a family in community iv. Analyze the role of an individual for the betterment of the community	Community
i. Define society ii. Elaborate the relation between an individual and society and society and state iii. Analyze the role of an individual for the betterment of society	Society
i. Define the term nation, nationality and ummah differentiate between nation and nationality distinguish between nation and ummah analyze the value, behavior and the pattern of society based on religions ii. Evaluate the characteristics of society developed by religions	Nation, Nationality
i. Trace the origin of state with reference to the theories of Divine Origin, Force and Social ii. Contract (Hobbs, Lock, Rousseau) iii. Describe the elements of a state (sovereignty, population, territory, Government) iv. Compare and distinguish the role of state, society and government	Origin and elements of State
i. Describe the functions of state ii. Describe the factors which are necessary for proper functioning of state iii. Analyze the situation when a state does not function properly iv. Describe the characteristics of a welfare state Analyze how a welfare state guarantees the equity and justice on the issues of gender, religion, and social classes	Functions of state. (Defense, law and order, welfare etc.)
i. Define the concept of sovereignty in west ii. Discuss different kinds of sovereignty iii. Explain Austin's concept of sovereignty iv. Analyze critically Austin's concept of sovereignty	Sovereignty

PERLs

PROFESSIONALISM, ETHICS
RESEARCH, LEADERSHIP SKILLS

BLOCK-6

Code	Domain	Attribute	Specific Learning Outcome	Topic	Portfolio Entry
PERLs- 2-16	Professionalism	Self-Aware	Build a rapport with a stable patient	Rapport building Basics of Negotiation	Written report on patient encounter
PERLs- 2-17		Communicator	Demonstrate non-verbal, verbal communication skills with stable patients	Communication skills with the patients Appropriate verbal communication and appropriate non-verbal communication grounded in culture and context	Communication skills checklist filled by the observer
PERLs- 2-18	Leadership	Resilient & Adaptable	Demonstrate patience and tolerance with patients' relatives	Explaining decisions to relatives in terms that they understand Cultural and language sensitivity Art and science of listening	Reflection on encounter with patient attendants in a ward setting
PERLs- 2-19		Self-Directed Learner	Seek active feedback from peers and teachers	Difference between reflection and Feedback Techniques of receiving feedback	Feedback request generated by the student in specific areas and the reflection on the response received
PERLs- 2-20			Seek membership in one of the student clubs or societies within or outside the institution.	Medical Societies and clubs that provide membership to the student Bylaws, formation and registration of societies and clubs	Membership proof of any one club or society
PERLs- 2-21	Research	Writer & Presenter	Write a literature review	Structuring of a literature review Academic writing essentials Plagiarism and its types	Literature review of at least 2000 words
PERLs- 2-22			Make a poster of the literature review	Anatomy of an academic poster Presenting a poster in academia	Poster

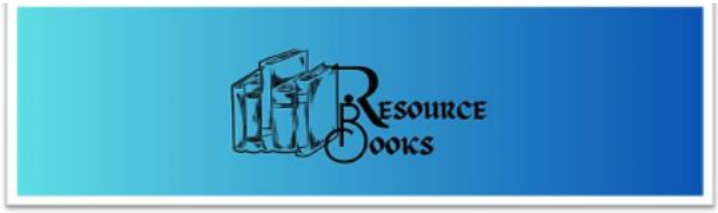
C-FRC-2
(YEAR-2)

NEUROSCIENCES-1 MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Assess Glasgow Coma Scale	GCS	Shows
Interpretation of Normal CT brain	CT scan interpretation	Knows how

INFLAMMATION MODULE		
Objectives	**Skill**	**Miller's Pyramid Level Reflected**
Learn how to do history taking	History Taking	Shows

TEACHING AND LEARNING METHODOLOGIES

- Large Group Interactive Session
- Problem Based Learning (PBL)
- Tutorials
- Skill Laboratories
- Laboratory Practical
- Demonstrations
- Self-Directed Learning



Anatomy

- Snell's Clinical Anatomy 10th ed.
- Langman's Medical Embryology 12th ed
- Medical Histology by Laiq Hussain Siddiqui 8th ed.
- General Anatomy by Laiq Hussain Siddiqui 8th ed.

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology. W. B. Sunders & Co., Philadelphia 14th Edition.
- Essentials of Medical Physiology by Mushtaq Ahmed

Biochemistry

- Harpers illustrated Biochemistry 32nd edition. Rodwell.V.W MCGrawHill publishers.
- Lippincott illustrated Review 8th edition Kluwer.W.
- Essentials of Medical Biochemistry vol 1&2 by Mushtaq Ahmed.

Pathology

- Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and Cotran, Pathologic basis of disease. WB Saunders.
- Richard Mitchall, Vinary Kumar, Abul K. Abbas and Nelson Fausto Robbins and
- Cotran, Pocket Companion to Pathologic basis of diseases. Saunder Harcourt.
- Walter and Israel. General Pathology.
- Churchill Livingstone.

Medicine

- Davidson's Principles and Practice of Medicine

Pharmacology

- Basic and Clinical Pharmacology by Katzung, McGraw-Hill.
- Pharmacology by Champe and Harvey, Lippincott Williams & Wilkins

Behavioural Sciences

- **Handbook of Behavioural Sciences by Prof. Mowadat H.Rana, 3rd Edition**
- **Medical and Psychosocial aspects of chronic illness and disability SIXTH EDITION by Donna R.Falvo, PhD Beverely E.Holland, PhD, RN**

Community medicine

- Parks Textbook of Preventive and Social Medicine. K. Park (Editor)
- Public Health and Community Medicine
- **Ilyas, Ansari (Editors)**

Surgery

- **Bailey and Love's short practice of surgery**

Islamiyat

- **Standard Islamiyat (compulsory) for B.A, BSc, MA, MSc, MBBS by Prof M Sharif Islahi.**
- **Ilmi Islamiyat(compulsory) for BA, BSc & equivalent.**

ASSESSMENT METHODOLOGY

FORMATIVE:

Theory: Single best multiple choice questions and short essay tests will be conducted according to the schedule given:

2ND YEAR MBBS BLOCK 6 TEST SCHEDULE:

DATE	TEST
03/11/25	Anatomy, Physiology, Biochemistry
01/12/25	Anatomy, Physiology, Biochemistry, Allied
12/12/25	Block Examination (Written)
15-18/12/25	Block Examination (OSPE/OSVE/OSCE)

SUMMATIVE

(To be held at the end of 2ND Year MBBS)

TABLE OF SPECIFICATIONS

MBBS 2nd Professional

Block-6

Theme	Subject	Written Exam			Oral/Practical/Clinical Exam			
		MCQ (1 mark)	SEQ (5 mark each)	Marks	OSPE (8 marks each observed)	OSCE (5 marks each observed)	OSVE (14 marks each observed)	Marks
Normal Structure	Anatomy applied/clinical	24	03	39	03	-	01	38
Normal Function	Physiology applied/clinical	27	04	47	04	-	01	46
	Biochemistry applied/clinical	12	02	22	01	-	01	22
Disease Burden & Prevention	Community Medicine & Public Health	04	-	04	-	-	-	-
	Behavioral Sciences	03	-	03	-	-	-	-
Pathophysiology & pharmacotherapeutics	Pathology	12	01	17	02	-	-	16
	Pharmacology	08	-	08	01	-	-	08
CFRC	CF-II	-	-	-	-	01	-	05
PERLs	PERLs-II	-	-	-	-	01	-	05
Total		**90**	**10x5=50**	**140**	**11 stations x 08 = 88**	**02 stations x 05 = 10**	**03 stations x 14=42**	**140**

TIME TABLE/ PLANNER
NEUROSCIENCE-1 MODULE
INFLAMMATION MODULE

Lahore Medical & Dental College
Canal Bank North, Tulspura, Lahore
Phone No. 0346-4418891-98

2ND YEAR M.B.B.S TIMETABLE SESSION 2023-2024 w.e.f. 13.10.2025 till 05.12.2025

DAY & TIME	08:00 a.m. to 09:30 a.m.	09:30 a.m. to 10:15 a.m.	10:15 a.m. to 11:00 a.m.	11:00 a.m. to 11:45 a.m.	11:45 a.m. to 12:15 p.m.	12:15 p.m. to 01:00 p.m.	01:00 p.m. to 03:00 p.m.	
MONDAY	Anatomy Dissection Dissection Hall	Pharmacology Lecture Theater No. 10	Biochemistry Lecture Theater No. 10	Pathology Lecture Theater No. 10	**BREAK**	Physiology Lecture Theater No. 2	[1] Biochemistry Practical/ Histology Practical **A+B+C+D** [2] Physio. Practical/ CSF **E+F+G** Physio. Tutorial **H+I+J**	
TUESDAY	Anatomy Dissection Dissection Hall	Anatomy Lecture Theater No. 10	Biochemistry Lecture Theater No. 10	Physiology Lecture Theater No. 2		Physiology Lecture Theater No. 2	[1] Biochemistry Practical/ Histology Practical **A+B+C+D** [2] Physio. Practical/ CSF **E+F+G** Physio. Tutorial **H+I+J**	
WEDNESDAY	Anatomy Dissection Dissection Hall	Disease Prevention & Impact Lecture Theater No. 2	Biochemistry Lecture Theater No. 10	Physiology Lecture Theater No. 2		Physiology Lecture Theater No. 2	[1] Biochemistry Practical/ Histology Practical **A+B+C+D** [2] Physio. Practical/ CSF **E+F+G** Physio. Tutorial **H+I+J**	
THURSDAY	Anatomy Dissection Dissection Hall	Pathology Lecture Theater No. 10	Biochemistry Lecture Theater No. 10	Physiology Lecture Theater No. 2		Physiology Lecture Theater No. 2	**01:00 p.m. to 02:00 p.m.** [3] Pharmacology Lecture Theater No. 2	**02:00 p.m. to 03:00 p.m.** SDL Lecture Theater No. 2
FRIDAY	**08:00 a.m. to 08:45 a.m.** Physiology Lecture Theater No. 2	**08:45 a.m. to 09:30 a.m.** Anatomy Lecture Theater No. 10	**09:30 a.m. to 10:15 a.m.** [5] Biochemistry/ Aging Lecture Theater No. 10	**10:15 a.m. to 11:00 a.m.** Physiology Lecture Theater No. 10	**11:00 a.m. to 11:30 a.m.** **BREAK**	**11:30 a.m. to 12:15 p.m.** Islamiyat (Quran) & Pakistan Studies Lecture Theater No. 2	**12:15 p.m. to 01:00p.m.** PERL/Disease Prevention & Impact Lecture Theater No. 2	