

Study Guide
2nd Year MBBS
Neurosciences &
Inflammation
For
Block 6



Contents

Vision & Mission.....	3
List of Abbreviations.....	4
Introduction to study guide	7
Curriculum framework.....	9
Modular Commiittee	11
Faculty	12
MODULE NO 10.....	14
NEUROSCIENCES-I.....	14
Module rationale.....	14
Module outcome	14
Syllabus of Neurosciences -I Module	15
Distribution and duration of teaching hours amongst disciplines	27
MODULE 11:.....	28
INFLAMMATION.....	28
Module rationale.....	28
Module outcome	28
Distribution and duration of teaching hours amongst disciplines	33
Modes of Information Transfer	34
Assessment Strategies.....	36
BLOCK-6	37
PERLS	37
Reading Resources.....	39

Vision & Mission

Vision & Mission of UHS

Vision statement

UHS is a leading university aiming to keep its graduates apt with the ever-emerging global health challenges evolving educational methodologies and emerging technological advancements to maintain its distinguishable positions as a Medical University.

Mission statement

UHS shall continue to strive for producing a human resource par and excellence to cater for the health needs of the people of Punjab and Pakistan.

Vision & Mission of SMDC

To be recognized for the provision of a safe and functional environment conducive to collaborative teaching & learning, comfortable working atmosphere and conducting world class research through professionalism and excellence.

'Veritas et Devotio'

Mission

Sharif Medical & Dental College is dedicated to best serving the nation through preservation and dissemination of advanced knowledge and educating the students by latest trends in learning and research reaching levels par excellence.

The Institution is committed to provide standardized quality medical education to its students by inculcating professional knowledge, skills, and responsibilities in them with the aim of:

- Preparing them as modern physicians having initiative to act as future leaders in their respective fields and becoming lifelong learners.
- Encouraging the spirit of critical thinking through research and publication.
- Building up an understanding of the ethical values compatible with our religion, culture, and social norms.
- Developing a sense of being responsible citizens of society possessing professional competence and instilling in them the values of hard work and dedication thus preparing them to be accountable to the stakeholders and the state.

The Institution is devoted to keep abreast its faculty with the latest trends in Medical Education encompassing teaching/learning methodologies, assessment tools, research opportunities and professionalism to facilitate their professional development, competencies, and commitment towards continues learning.

Our patient-centered mission is achieved by outstanding medical care & services in professional practice with due emphasis and focus on our local health needs.

Our mission further elaborates upon establishing academic and research facilities in areas of local demand under global gold standards and leading advancement in research, education & patient care.

List of Abbreviations

Abbreviations	Subjects
A	Anatomy
ABG	arterial blood gas
Ag	Aging
AKI	acute kidney injury
ALT	alanine transaminase
AMP	Adenosine monophosphate
ANS	Autonomic Nervous System
AST	aspartate aminotransferase
AV	Atrioventricular
B	Biochemistry
BhS	Behavioral Sciences
C	Civics
CBC	Complete Blood Count
C-FRC	Clinical-Foundation Rotation Clerkship
CK	Creatine kinase
CM	Community Medicine
CNS	Central Nervous System
CO	Carbon monoxide
CO ₂	Carbon dioxide
COPD	Chronic obstructive pulmonary disease
COX	cyclooxygenase
CPR	Cardio pulmonary Resuscitation
CT	Computed tomography
CV	Cardiovascular
CVA	cerebral vascular accident
DALY	Disability-Adjusted Life Year
DCMLS	Dorsal column medial lemniscus system
DLC	differential Leukocyte Count
DNA	Deoxy Ribonucleic Acid
ECF	Extra Cellular Fluid
ECG	Electrocardiography
ECP	Emergency contraceptive pills
EEG	Electroencephalogram
EnR	Endocrinology & Reproduction
ENT	Ear Nose Throat
ER	Emergency Room
F	Foundation
FEV ₁	Forced Expiratory Volume 1
FM	Forensic Medicine
FVC	Forced Vital Capacity

GFR	Glomerular Filtration Rate
GIT	Gastrointestinal tract
GMP	guanosine monophosphate
GO	Gynecology and Obstetrics
GTO	Golgi Tendon Organ
HCL	Hydrochloric acid
H & E	Hematoxylin and eosin
HL	Hematopoietic & Lymphatic
HMP	Hexose Monophosphate
HNSS	Head & Neck and Special Senses
ICF	Intra Cellular Fluid
IL	Interleukin
IN	Inflammation
INR	International Normalized Ratio
IUD	Intrauterine device
IUGR	Intra Uterine Growth Restriction
JVP	Jugular Venous Pulse
LDH	Lactate Dehydrogenase
M	Medicine
MALT	Mucosa Associated Lymphoid Tissue
MCH	Mean Corpuscular Volume
MCV	Mean Corpuscular Volume
MRI	Magnetic resonance imaging
MS	Musculoskeletal
MSD	Musculoskeletal disorders
NEAA	non-essential amino acids
NMJ	Neuro Muscular Junction
NS	Neurosciences
O	Ophthalmology
Or	Orientation
P	Physiology
Pa	Pathology
PAF	Platelet activating factor
PBL	Problem Based Learning
PCR	Polymerase Chain Reaction
PDGF	Platelet derived growth factor

Pe	Pediatrics
PEM	Protein Energy Malnutrition
PERLs	Professionalism, Ethics, Research, Leadership
Ph	Pharmacology
PNS	Peripheral Nervous System
Psy	Psychiatry
PVC	Premature Ventricular Contraction
QALY	Quality-Adjusted Life Year
QI	Quran and Islamiyat
R	Renal
Ra	Radiology
RBCs	Red Blood cells
RDA	Recommended Dietary Allowance
Re	Respiratory
RFLP	Restriction Fragment Length Polymorphism
RMP	Resting Membrane Potential
RNA	Ribonucleic Acid
S	Surgery
SA	Sinoatrial
TCA	Tricarboxylic acid cycle
TNF	Tumor Necrotic Factor
USG	Ultrasonography
UTI	Urinary Tract Infections
WBCs	White Blood Cells

Introduction to study guide

Welcome to the second year of medical school! This phase of your medical education typically marks a significant transition from the foundational knowledge gained in your first year to more clinical applications and deeper understanding of medical concepts. This study guide will help you to know about the syllabus of the first block of second year is BLOCK 6. Here's an introduction to what you can expect in your second year:

Clinical Clerkships: Second year Block-6 often involves starting clinical clerkships, where you'll rotate through various specialties. These clerkships provide hands-on experience in different medical settings and specialties, allowing you to apply your knowledge in real-life scenarios and interact with patients under supervision.

Continued Basic Sciences: While the emphasis shifts towards clinical experiences, you'll still engage with basic science courses, albeit at a little more advanced level. These courses may include topics like pharmacology, pathology, microbiology, and physiology, which provide the foundation for more understanding of diseases and their treatment.

Integration of Clinical Skills: You will continue to develop clinical skills such as history-taking, physical examination, communication with patients, and medical decision-making. These skills are essential for becoming a competent physician and will be honed through practice, feedback, and guidance from clinical instructors.

Research and Extracurricular Activities: Dear students conducting research, volunteering, or joining student activities, can enhance your medical college experience and help you grow as a future physician.

Maintaining Balance: Balancing the demands of coursework, clinical skills learning, exam preparation, and personal life can be challenging during your second year.

Overall, the second year of medical school is an exciting and challenging time as you continue to build upon your foundation of medical knowledge, gain clinical experience, and prepare for the next stages of your medical career. Embrace the opportunities for growth, stay focused on your goals, and remember to enjoy the journey.

Block 6

It consists of two modules

- Neurosciences 1
- Inflammation

We will study in detail the components in module of neurosciences and module of inflammation. We will study their functional, embryological and histological anatomy, physiological and biochemical aspects of its functioning. Students will also be introduced to clinical and pathological aspects, pharmacological interventions and preventive measures for common diseases related to the system.

Key Areas of Focus

Anatomy: Understanding the structure of the human body is essential for any aspiring physician. Spend ample time in the cadaver lab and utilize anatomical atlases to reinforce your learning.

Physiology: Gain a deep understanding of how the body's systems function in health and disease. Focus on concepts such as homeostasis, cellular physiology, and organ systems.

Biochemistry: Explore the molecular mechanisms underlying physiological processes. Pay particular attention to biochemical pathways, enzyme kinetics, and metabolic regulation.

Histology: Study the microscopic structure of tissues and organs to comprehend their functions and pathology. Use microscopy slides and digital resources to aid in your understanding.

PERLs: Affective training has been formally inculcated in the curricular framework. The model of PERLs has been introduced so that the yield of doctors has a strong, resilient, ethically driven character. PERLs stands for Professionalism, Ethics, Research and Leadership skills. PERLs rounds up professional development for the effective application of the knowledge and skills base achieved.

C-FRC-1: In block-6 of Clinical Skills- in this block which will represent clinical orientation. The clinical orientation will be conducted in wards, skills lab and simulation centers (depending on the available resources). The clinical orientation along with the applied/clinical component of the knowledge base will channelize the learner for the practical and professional aspect of learning.

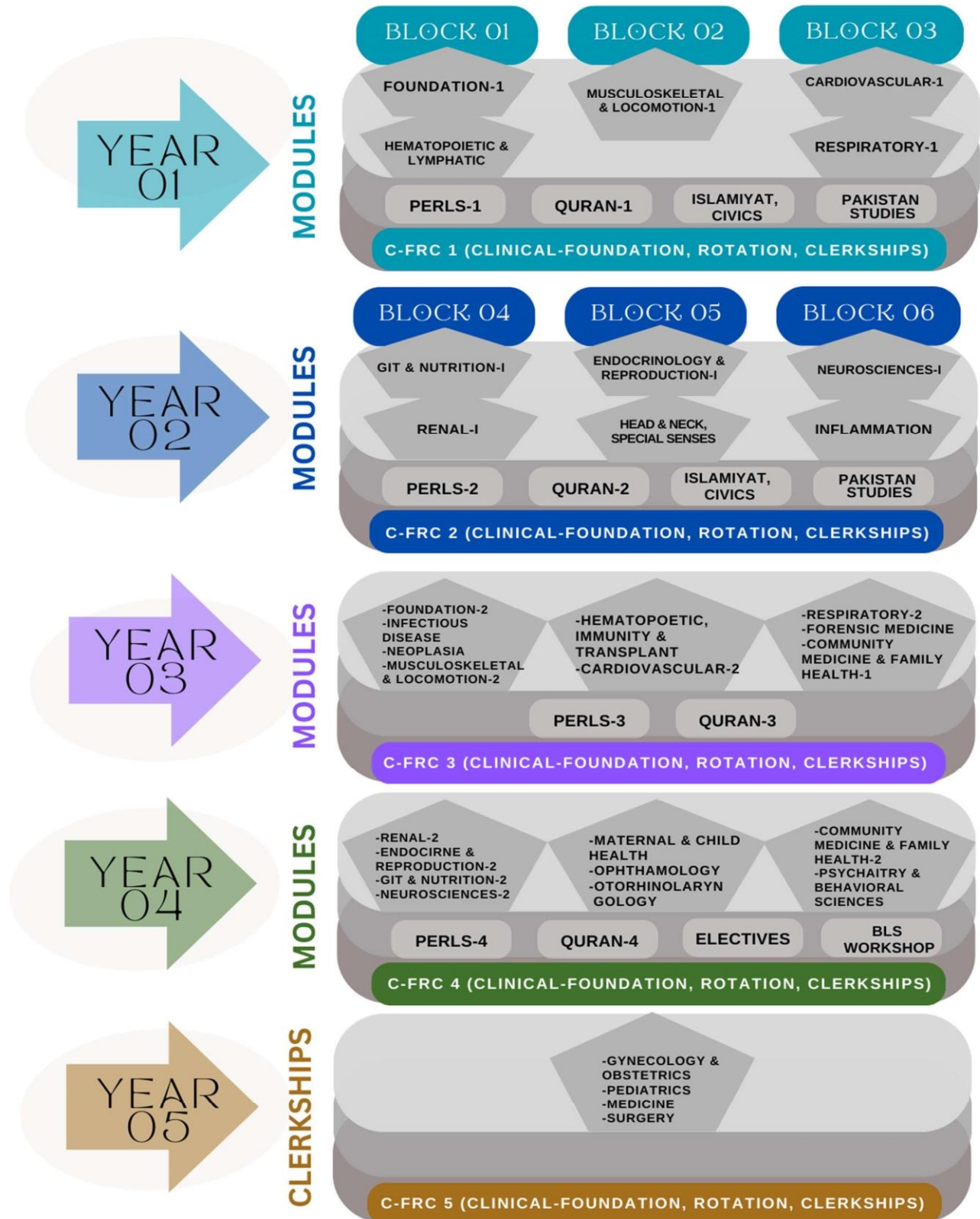
Islamiyat and Pak studies

Both subjects are important in the curriculum as they help students understand their religious and national identity, as well as the values and principles upon which the nation was founded. They provide a foundation for students to develop a sense of citizenship, cultural awareness, and a deeper understanding of their heritage.

CURRICULUM FRAMEWORK

Curriculum 2K23 *version 2.0*

CURRICULUM FRAMEWORK



MODULAR COMMITTEE

Sr No.	Foundation Module Calendar	Faculty Members
1.	Neurosciences	• Prof. Uzma Ahsan, Head Dept. of Dermatology • Prof. Maria Aslam, Head Dept. of Pathology • Prof. Samra hafeez, Dept. of Biochemistry • Prof. Sana Qanber, Dept. of Physiology • Dr. Sabeen Arjumand, Assoc. Prof. Dept. of Pharmacology • Dr. Amna Iqbal Butt, Assoc. Prof. Dept. of Community Medicine • Dr. Uzma Shahid, Head Dept. of Medical Education • Dr. Nadia Ahmed, Assoc. Prof. Dept. of Anatomy • Dr. Arslan, Associate Professor Dept. of Anatomy • Dr. Madiha Ehsan ul haq, Assist, Prof. Dept. of Pathology • Dr. Shahid Iqbal, SR, Dept. of Peadritics • Dr. Komal Khan, SR, Dept. of Medicine • Dr. Rida Fatima, PGR, Dept. of Surgery • Dr. Sajawal, MO, Dept. of Neurosurgery • Miss Sarah Shirazi, Dept. of Psychiatry
2.	Inflammation	• Prof. Uzma Ahsan, Head, Dept. of Dermatology • Prof. Maria Aslam, Head, Dept. of Pathology • Dr. Uzma Shahid, Head, Dept. of Medical Education • Dr. Amna Iqbal Butt, Dept. of Community Medicine • Dr. Sabeen Arjumand, Assist, Prof. Dept. of Pharmacology • Dr. Remisha Zahid, Assist, Prof. Dept. of Pathology • Dr. Anum Jamil, Assist, Prof. Dept. of Biochemistry • Dr. Ammara Anwar, Demonstrator Dept. of Anatomy

FACULTY

NAME	DEPARTMENT	DESIGNATION	E-MAIL
		ANATOMY	
Prof. Nausheen Raza	Anatomy	Professor	nausheen410@gmail.com
Dr. Ammara Ghafoor	Anatomy	Associate Professor	nabeeha.shahid1507@gmail.com
Dr. Nadia Ahmad	Anatomy	Associate Professor	diaejaz_74@hotmail.com
Dr. M. Abu Usama	Anatomy	Demonstrator	monausman25@gmail.com
Dr. Kalsoom Ayesha Rehman	Anatomy	Demonstrator	<u>kalsoom_aisha@yahoo.com</u>
Dr. Saman Altaf	Anatomy	Demonstrator	samanaltaf47@gmail.com
BIOCHEMISTRY			
Dr. Gul-e-Raana	Biochemistry	HOD & Professor	guleraana60@gmail.com
Dr. Samra Hafeez	Biochemistry	Professor	dr.samraisrar1993@gmail.com
Dr. Hassan Jamil	Biochemistry	Associate Professor	biohassan86@gmail.com
Dr. Anam Rehman	Biochemistry	Assistant Professor	anamrana492@gmail.com
Dr. Haseeb Afzal	Biochemistry	Demonstrator	haseebafzal1533@gmail.com
Dr. Sana Fatima	Biochemistry	Demonstrator	sannazainn@gmail.com
Dr. Abdul Rehman	Biochemistry	Demonstrator	abzain7225355@gmail.com
PHYSIOLOGY			
Dr. Ghazal Mansoor	Physiology	Professor	<u>ghazalmajeed100@gmail.com</u>
Dr. Sana QanberAbbasi	Physiology	Professor	<u>sanaqanberabbasi01@gmail.com</u>
Dr. Qurat-ul-ain	Physiology	Associate Professor	<u>quratkundi@gmail.com</u>
Dr. Sana Javaid	Physiology	Assistant Professor	<u>sana5120@hotmail.com</u>
Dr. Nazish Jamil	Physiology	Assistant Professor	<u>nazishjamil875@gmail.com</u>
Dr. Wajih Malik	Physiology	Demonstrator	<u>drwajihmalik@gmail.com</u>
Dr. Asma Siddiqi	Physiology	Demonstrator	<u>asmasiddiqi214@gmail.com</u>
Dr. AniquaShafique	Physiology	Demonstrator	<u>aniquasfq225@gmail.com</u>
Dr. MahaAshfaq	Physiology	Demonstrator	<u>maha.ashfaq44.ma@gmail.com</u>
Dr. Mahnoor	Physiology	Demonstrator	<u>mahnoormahmood8@gmai.com</u>

PATHOLOGY			
Prof. Maria Aslam	Pathology	Professor & HOD	mariaaslam77@outlook.com
Prof. M. Tahir Saeed	Pathology	Professor	drtahirsaeed@yahoo.com
Prof. Saima Inam	Pathology	Professor	saimainam@ymail.com
PHARMACOLOGY AND THERAPEUTICS			
Prof. Salman Bakhtiar	Pharmacology	Prof & HOD	salman_bakhtiar@hotmail.com
Dr. Sabeen Arjumand	Pharmacology	Associate Prof	sabeen_jabbar@hotmail.com
COMMUNITY MEDICINE AND PUBLIC HEALTH			
Dr. Samina Khalid	Community Medicine	Associate Professor	saminakhalid83@yahoo.com
Dr. Amna Iqbal Butt	Community Medicine	Assistant Professor	dr_amnawaqas@hotmail.com
IMPACT (EPIDEMIOLOGY, SOCIOLOGY/SOCIETY, PUBLIC HEALTH)			
Dr. Ayaz M. Khan	Behavioral Sciences	Assistant Professor	dr.ayazmkhan@gmail.com
Miss. Sarah Shirazi	Behavioral Sciences	Sr. Clinical Psychologist	shirazi1255@gmail.com
PERLS (PROFESSIONALISM, ETHICS, RESEARCH, LEADERSHIP)			
Dr. Uzma Shahid	Medical Education	Head of Department	uzmashahid112@gmail.com
HOLY QURAN AND ISLAMIYAT / CIVICS OTHER THAN MUSLIM STUDENTS			
Ms. Oniba Siddique	Islamiyat/Pak Studies	Lecturer	onibasiddique@gmail.com

MODULE NO 10

NEUROSCIENCES-I

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. 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.

Module outcome

- 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.

Theme

- 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

SYLLABUS OF NEUROSCIENCES -I MODULE

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

	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			LGIS
NS-A-005	Location, Relations, Functional classification & Blood supply along with major connections of Cerebellum (Cerebellar Peduncles) Define important clinical correlates	Human Anatomy	Cerebellum	LGIS
NS-A-006	Identify the Lobes, Sulci & Gyri, Cortical areas. Describe Venous drainage and arterial supply of each lobe	Human Anatomy	Cerebrum	LGIS
	Describe Functional areas of cerebrum. Draw and Label Homunculus. Define important clinical correlates			LGIS
	Describe internal structure of cerebral hemisphere; 1. white matter 2. Basal ganglia 3. Lateral ventricle			LGIS
NS-A-007	Describe components & functions of Limbic system & Reticular formation		Limbic system. Reticular formation	LGIS
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	LGIS
NS-A-009	Identify the Location and sub division of Diencephalon.	Human Anatomy	Diencephalon	LGIS
NS-A-010	Discuss the Location, Relations, Blood supply, nuclei and major connections of Thalamus, Hypothalamus, Epithalamus, Subthalamus, Metathalamus	Human Anatomy	Thalamus and hypothalamus	LGIS

	Describe and Illustrate the Hypothalamic and pituitary gland Nuclei with their functions, location afferents. Describe the HypothalamoHypophyseal Portal System Describe the functions of Hypothalamus Explain the anatomical basis for the Thalamic Cauterization, Thalamic Pain, Thalamic Hand and Hypothalamic Disorders			LGIS
NS-A-011	Explain the Gross anatomy of Intracranial fossae with intracranial foramina	Human Anatomy	Intracranial fossa	LGIS
NS-A-012	Explain the attachments, blood supply and nerve supply of the meninges of the brain	Human Anatomy	Meninges	LGIS
NS-A-013	Discuss the Origin, tributaries & area of drainage, termination of Dural venous sinuses	Human Anatomy	Dural venous sinuses	LGIS
NS-A-014	Explain the Formation, circulation and absorption into venous system of CSF (Cerebrospinal fluid) Describe ventricular system, Lateral, 3 rd & 4 th ventricles	Human Anatomy	CSF	LGIS
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	LGIS
NS-A-016	Explain the Major subdivision of ANS into Sympathetic and parasympathetic nervous system with comparison of anatomical differences.	Human Anatomy	ANS	LGIS
NS-A-017	Describe the Location, connections and functions of autonomic ganglion	Human Anatomy	Autonomic ganglia	LGIS
NS-A-018	Explain the origin, termination and branches of the sympathetic chain Localize spinal cord lesions	Human Anatomy	Sympathetic chain	LGIS
CODE	EMBRYOLOGY & POST-NATAL DEVELOPMENT	TOTAL HOURS = 03		
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	MIT
NS-A-019	Explain the Development of Neural tube and Brain vesicles. Discuss related clinical anomalies	Embryology	Neural tube development	LGIS

NS-A-020	Describe the development of the spinal cord and related clinical anomalies	Embryology	Spinal cord development	LGIS
NS-A-021	Describe development of Pituitary gland	Embryology	Pituitary gland	LGIS
CODE	MICROSCOPIC ANATOMY (HISTOLOGY & PATHOLOGY)	TOTAL HOURS = 05		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
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	LGIS
NS-A-023	Describe the histological structure of the spinal cord	Histology	Spinal cord	LGIS
NS-A-024	Describe the histological structure of Cerebrum, Cerebellum	Histology	Cerebrum, Cerebellum	LGIS
Practical				
CODE	HISTOLOGY	TOTAL HOURS = 07		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
NS-A-025	Identify draw & label light microscopic structure of Peripheral nerve sensory ganglia, autonomic ganglia	Histology	CNS	Laboratory Practical
NS-A-026	Identify Draw & label the light microscopic structure of the spinal cord	Histology	Cerebrum	Laboratory Practical
NS-A-027	Identify Draw & label the light microscopic structure of the Cerebrum	Histology	Cerebellum	Laboratory Practical
NS-A-028	Identify Draw & label the light m structure of the Cerebellum	Histology	Spinal Cord	Laboratory Practical

NORMAL FUNCTION				
THEORY				
CODE	MEDICAL PHYSIOLOGY	TOTAL HOURS = 60		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
NS-P-001	Describe the general organization of nervous system	Medical Physiology	Organization of Nervous System, Neurons and Synapses	LGIS
	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	LGIS
	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	LGIS
	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	LGIS
NS-P-005	Enumerate the ascending tracts/Pathways		Ascending Tracts/ pathways	LGIS
NS-P-006	Name the sensations carried by Dorsal column	Medical	Anterolateral	LGIS
	medial lemniscus system DCMLS	Physiology	system	LGIS

	Trace the pathway of DCMLS			
NS-P-007	Classify pain		Pain	LGIS
	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			
NS-P-008	Describe the Physiological anatomy of spinal cord	Medical Physiology	Spinal cord	LGIS
	Name the anterior motor neurons and their location			
	Explain the Renshaw cells feedback			
	Classify the spinal cord reflexes according to number of synapses			
NS-P-009	Describe the structure & functions of Muscle spindle		Muscle Spindle and stretch reflex	LGIS
	Trace the reflex arc of stretch reflex			LGIS
	Discuss the clinical significance of stretch reflex			LGIS
NS-P-110	Define tone and how it is maintained		Tone	LGIS
NS-P-011	Trace the reflex arc of Golgi Tendon Organ GTO, Golgi tendon reflex Explain the importance of Golgi tendon reflex		GTO	LGIS
NS-P-012	Name the motor areas of brain		Motor areas of the brain	LGIS
	Enlist Brodmann number of motor areas of brain Explain the features produced due to damage to the motor areas			LGIS
NS-P-013	Enlist the functions of brain stem	Medical Physiology	Brainstem	LGIS
NS-P-014	Enumerate the descending tracts		Descending tracts	LGIS
	Describe the functions of Pyramidal tract			
	Describe the effect of lesions in motor cortex of brain or pyramidal tract			
NS-P-015	Discuss the location of upper and lower motor neuron		Location of motor neurons	LGIS
	Explain the features of upper motor neuron lesion			LGIS

	Explain the features of lower motor neuron lesions			
NS-P-016	Define spinal shock	Medical Physiology	Spinal shock and hemi section	LGIS
	Enumerate and explain the stages of spinal shock			LGIS
	Describe the features of hemi section of spinal cord (at the level, above the level, below the level)			LGIS
NS-P-017	Name the functional parts of cerebellum		Cerebellum	LGIS
	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-018	Name the components of Basal ganglia		Basal Ganglia	LGIS LGIS
	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 Huntington's disease			
	Explain the types of rigidity			
	Differentiate spasticity and rigidity			
	Define decerebrate rigidity			
NS-P-019	Enumerate the components of vestibular Apparatus	Medical Physiology	Vestibular apparatus	LGIS
	Name the sensory organs of vestibular apparatus			LGIS
	Describe the role of vestibular Apparatus in maintenance of linear and angular equilibrium			LGIS
NS-P-020	Enlist the components of limbic system		Limbic system	LGIS
	Describe the functions of amygdala			LGIS
	Explain the effects of bilateral ablation of the amygdala—The Klüver-Bucy Syndrome			LGIS
	Explain the functions of hippocampus			LGIS
	Explain the functions of Hypothalamus			

	Explain Functions of Thalamus			LGIS
	Discuss the Thalamic syndrome			LGIS
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	Brain stem reticular formation	LGIS
NS-P-022	Enumerate and discuss the physiological basis of Electroencephalogram EEG waves	Medical Physiology	EEG	LGIS
NS-P-023	Explain the types of sleep		Sleep	LGIS
	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-024	Enumerate different types of epilepsy	Medical Physiology	Epilepsy	LGIS
	Explain the features and physiological basis and EEG waves in different types of epilepsy			LGIS
NS-P-025	Define memory		Memory	LGIS
	Classify memory on the basis of duration and information stored			LGIS
	Explain the Molecular Mechanism of Intermediate Memory			LGIS
	Enumerate the structural changes of long-term memory			LGIS
	Explain the higher intellectual functions of prefrontal			LGIS
	association cortex	Medical Physiology		LGIS
	Explain the mechanism of consolidation of memory			LGIS
	Explain retrograde and anterograde amnesia			LGIS
	Explain the physiological basis and features of Alzheimer's disease			LGIS
NS-P-026	Enlist the areas of speech		Speech	LGIS
	Explain the functions of motor and sensory areas of speech			LGIS

	Trace and explain the pathway of written and heard speech			LGIS
	Enlist the abnormalities of speech			LGIS
	Explain the features of motor aphasia			LGIS
	Elaborate the features of sensory aphasia			LGIS
	Define dyslexia, alexia, agraphia			LGIS
NS-P-027	Discuss Components of Autonomic nervous system	Medical Physiology	ANS	LGIS
	Explain the physiological anatomy of sympathetic and parasympathetic nervous system			LGIS
	Describe the types of adrenergic and cholinergic receptors			LGIS
	Explain the effects of sympathetic parasympathetic on various organs/ system of body			LGIS
CODE	MEDICAL BIOCHEMISTRY	TOTAL HOURS = 20		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
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	LGIS
NS-B-002	Explain the concept of lipid transport and storage		Lipid transport and storage	LGIS
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	Sphingolipidos is	LGIS
NS-B-004	Discuss role of carnitine shuttle		Carnitine shuttle	LGIS
NS-B-005	Discuss the role of citrate shuttle in fatty acid synthesis		Citrate shuttle	LGIS
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	LGIS

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	LGIS
NS-B-008	Discuss the metabolism of glycolipids interpret the disorders related to enzyme deficiencies.		Glycolipid metabolism	LGIS
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		Fast feed cycle	LGIS
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	Medical Biochemistry	Neurotransmitters	LGIS
NS-B-011	Explain proto-oncogene and oncogene concept.		Oncogene	LGIS
NS-B-012	Discuss tumor markers and their significance.		Tumor markers	LGIS
NS-B-013	Explain the role of genetics in cancers especially breast, ovary, lung and colon.		Cancer	LGIS
NS-B-014	Discuss the concept of xenobiotics.		Xenobiotics	LGIS

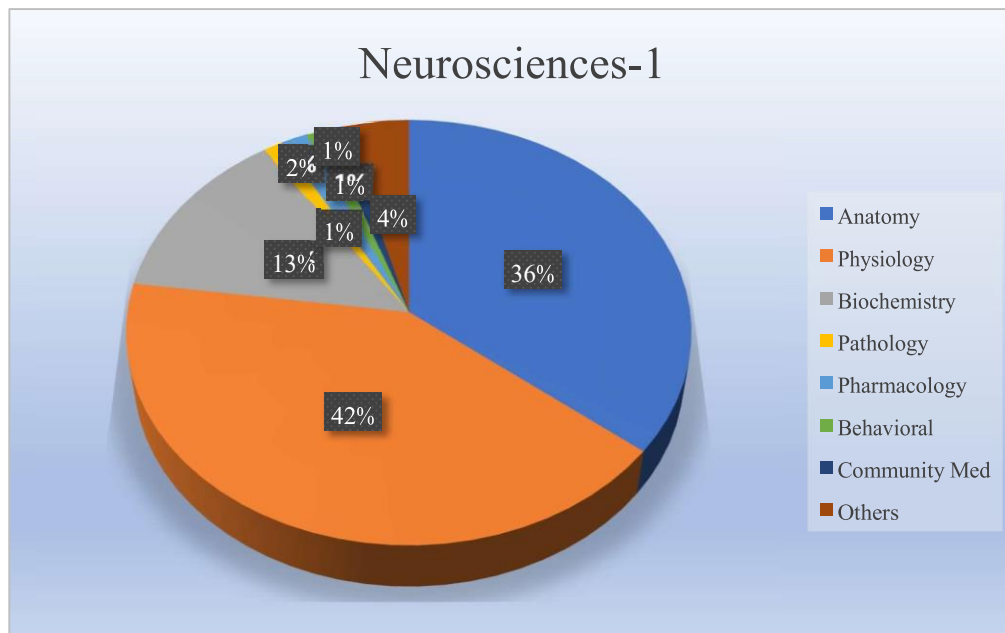
PRACTICAL

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 14		
		DISCIPLINE	TOPIC	LGIS
NS-B-015	Interpret the lysosomal storage diseases on given data Neiman pick disease, Gaucher's disease etc.	Biochemistry Practical	Data Interpret	LGIS
NS-B-016	Perform the estimation of triglycerides by kit method		Triglycerides estimation	LGIS
NS-P-028	Examine the Sensory System	Physiology Practical	Sensory system	LGIS
NS-P-029	Examine the Superficial Reflexes		Superficial Reflexes	LGIS
NS-P-030	Examine the Deep Reflexes		Deep Reflexes	LGIS
NS-P-031	Demonstrate Cerebellar Function Test		Cerebellar Tests	LGIS

NS-P-032	Demonstrate the testing of Cranial Nerve (CN) VII		CN VII	LGIS
NS-P-033	Demonstrate the Testing of Cranial Nerves (XI, XII)		CN X, XI, XII	LGIS
NS-P-034	Examine the Motor system		Motor system	LGIS
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS				
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 05		LGIS
		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	LGIS
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	LGIS
NS-Pa-001	Define cerebral vascular accident (CVA). Discuss the etiology and morphological changes of Cerebrovascular accidents	Pathology	CVA	LGIS
NS-Pa-002	Define Meningitis Identify types of meningitis		Meningitis	LGIS
DISEASE PREVENTION AND IMPACT				
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 10		
		DISCIPLINE	TOPIC	MIT
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	LGIS
NS-CM-002	Able to learn the general approach to prevent mental illnesses at community level		Community based interventions for Mental Illnesses	LGIS
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	LGIS

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	LGIS
NS-M-001	Identify various types of CVA (cerebrovascular accident) Describe various symptoms and signs Outline management strategies	Medicine	Stroke/CVA	LGIS
NS-S-001	Discuss the role of surgery in stroke	Surgery	Stroke/CVA	LGIS
NS-M-002	Define Epilepsy Enlist various types of epilepsy Identify various symptoms and signs Outline management strategies	Medicine	Epilepsy	LGIS
NS-M-003	Enlist various types of meningitis Describe symptoms and signs Outline management strategies	Medicine/ Neurology	Meningitis	LGIS
NS-S-002	Describe triage in ER Emergency Room	Surgery	Head injury	LGIS
NS-S-003	Identify the various types of hematomas	Neurosurgery	Hematoma/ CVA	LGIS
NS-Pe-001	Describe the clinical features of Cerebral Palsy	Pediatrics	Cerebral Palsy	LGIS
	AGING			
CODE	THEORY	TOTAL HOURS = 01		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
NS-Ag-001	Define dementia	Medicine	Dementia	LGIS
	Discuss various causes for dementia			LGIS
	Discuss various risks for dementia			LGIS
	Outline management strategies			LGIS

Distribution and duration of teaching hours amongst disciplines



Module Weeks	Recommended Minimum Hours
07	171

MODULE 11:

INFLAMMATION

Module rationale

The objective of teaching inflammation to undergraduate students is to impart knowledge about cellular and molecular mechanisms of cell injury, inflammation, and repair. This understanding serves as the foundation for comprehending most disease processes within the body. It equips students to apply this knowledge in the clinical field when working with real-life patients.

Module outcome

- 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 inflammation

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 ory response.
- Discuss the pharmacological aspects of steroidal and non-steroidal anti- inflammatory drugs
- Discuss the clinical aspects of inflammation.

Clinical relavence

- Inflammation, in medical terminology, refers to a collection of classical signs and symptoms, such as edema, erythema, increased warmth, pain, and loss of function.
- It represents a complex and dynamic series of responses to tissue injury, primarily triggered by toxic chemicals, environmental factors, trauma, overuse, or infection.

NORMAL STRUCTURE				
THEORY				
CODE	EMBRYOLOGY & POST-NATAL DEVELOPMENT	TOTAL HOURS = 03		
	SPECIFIC LEARNING OUTCOMES	DISCIPLINE	TOPIC	MIT
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	LGIS
CODE	MICROSHOPIC STRUCTURE	TOTAL HOURS = 02		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
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	LGIS
PRACTICAL				
CODE	HISTOLOGY	TOTAL HOURS = 02		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
IN-A-003	Draw and identify microscopic structure of integumentary system	Histology	Integumentary System	Laboratory Practical
CODE	MEDICAL BIOCHEMISTRY	TOTAL HOURS = 01		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
IN-B-001	Explain the biochemical and therapeutic roles of eicosanoids (prostaglandins, leukotrienes, thromboxane and prostacyclin	Medical Biochemistry	Eicosanoids	Laboratory Practical
PATHOPHYSIOLOGY AND PHARMACOTHERAPEUTICS				
CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 06+12		
		DISCIPLINE	TOPIC	MIT
IN-Ph-001	Enumerate prostaglandin analogues Discuss the clinical use and adverse effect of prostaglandin analogues		Prostaglandin analogues	LGIS

IN-Ph-002	Enlist anti-inflammatory drugs Differentiate between steroidal and non-steroidal antiinflammatory drugs	Pharmacology & Therapeutics	Anti-Inflammatory drugs	LGIS
IN-Ph-003	Discuss mechanism of action, clinical usage, and adverse effects of steroidal anti-inflammatory drugs		Steroidal anti-Inflammatory drugs	LGIS
IN-Ph-004	Discuss mechanism of action, pharmacological effects, clinical usage, and adverse effects of non-steroidal antiinflammatory drugs		Non-steroidal anti-Inflammatory drugs (NSAIDs)	LGIS
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	LGIS
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	LGIS
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		Process of acute inflammation	LGIS
	mediators and their role in clinical practice Discuss the role of different chemical mediators in acute inflammation Describe the different morphological patterns and outcomes of acute inflammation			

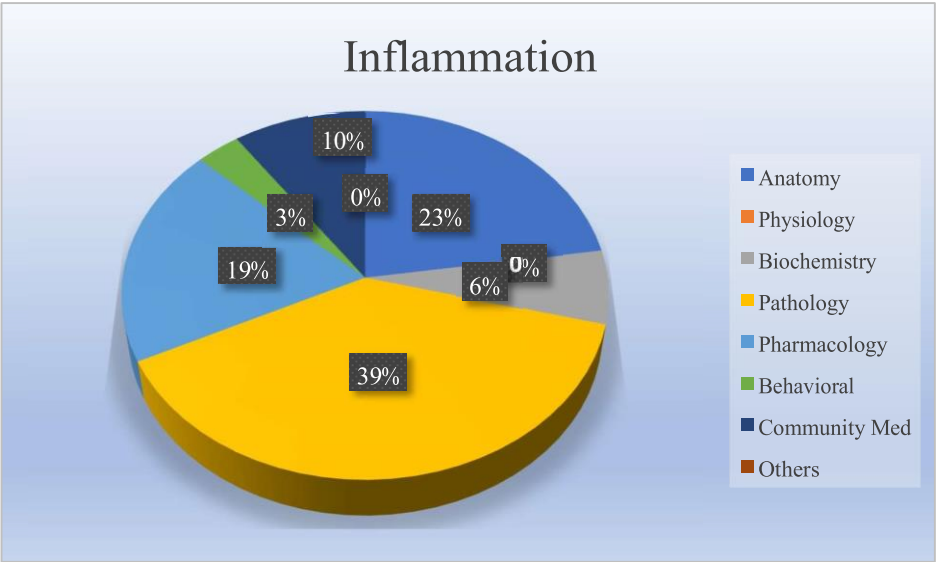
IN-Pa-003	Define chronic inflammation Discuss the role of chronic inflammatory cells and mediators in chronic inflammation Discuss the causes, pathophysiology and morphology of granulomatous inflammation Classify mycobacteria Explain the pathogenesis, clinical manifestations and lab diagnosis of typical mycobacteria Explain the pathogenesis, clinical manifestations and lab diagnosis of atypical mycobacteria		Chronic Inflammation	LGIS
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		Cell Repair	LGIS

DISEASE PREVENTION AND IMPACT

CODE	SPECIFIC LEARNING OBJECTIVES	TOTAL HOURS = 03+01		
		DISCIPLINE	TOPIC	MIT
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	Community Medicine and Public Health	Communicable Diseases	LGIS
	acute and chronic diseases Discuss the role of immunoprophylaxis and chemoprophylaxis in prevention of communicable diseases			LGIS
IN-BhS-001	Understand the correlation between psychological stress and inflammation	Behavioral Sciences	Role of Psychological stress in Inflammation	LGIS

AGING				
CODE	THEORY	TOTAL HOURS = 01		
	SPECIFIC LEARNING OBJECTIVES	DISCIPLINE	TOPIC	MIT
IN-Ag-001	Explain inflammatory changes and role of leukotriene and cytokines in old age	Biochemistry	Inflammatory changes & signaling molecules in Aging	LGIS

Distribution and duration of teaching hours amongst disciplines



Module Weeks	Recommended Minimum Hours
01	31

Modes of Information Transfer

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 • Respect for colleagues views
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 • Helps students acquire insight full information. • Stay a breast with novel advancements in health care
Small Group Discussion (SGD) SGD 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 view for discussion. Students point of allowing time and including self-directed, reflective learning skills Significance of its usage Develop and assess the extent of back ground 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.
Reflective Writing It is a meta-cognitive 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
Skills Laboratories

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 learner stomach critical decisions.

Laboratory Practical

Lab practical involves things like identifying a structure, a type of stain through a microscope, a problem with preparation, reading biochemical test results and answering safety questions. These simulation 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 team workabilities.

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 very systematic manner.

Significance of its usage

- Promotes learning and correlates theory with practice.
- Sharpens observation skills.
- Sustain interests in learning environment.
- Helps teacher to evaluate students response

Case Presentation

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.
- Judgment and Decision making
- Facilitate creative problem solving.
- Allow students to develop realistic solutions to complex problems

Assessment Strategies

Assessment tools for Theory

- Multiple Choice Questions (MCQ)
- Structured Essay Questions (SEQ)
- Reflective paper
- Assignment Presentation

Assessment tools for Practical, Clinical and Human (soft) skills

- Objective Structured
- Practical Examination
- Objective Structured Clinical Examination Structured Viva
- Short CaseLong Case
- Logbook Portfolio
- Feedback (simple and/or 360 degree)

BLOCK-6

PERLS

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 nonverbal, verbal communication skills with stable patients	Communication skills with the patients Appropriate verbal communication and appropriate nonverbal 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 feedback active 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-	Research	Writer &	Write a literature	Structuring of a	Literature review

21		Presenter	review	literature review Academic writing essentials Plagiarism and its types	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

READING RESOURCES

Anatomy

- Moore K.L. Clinically Oriented Anatomy. Baltimore, U.S.A. Williams, and Wilkins:
- The Developing Human by K.L. Moore.
- Snell's Clinical Neuroanatomy.
- Laiq H.S. Medical Histology. Paramount Books.

Physiology

- Guyton AC and Hall JE. Textbook of Medical Physiology. W. B. Saunders & Co., Philadelphia.

Biochemistry

- Champe, P.C. & Harvey, E.A. Biochemistry (Lippincott's Illustrated
- Robert K. Murray, Daryl K. Granner, Peter A. Mayes, Victor W. Rodwell. Harper's Biochemistry. McGraw-Hill.
- ABC of Clinical genetics by H.M. Kingston.

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.

Pharmacology

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

Behavioral Sciences

- Hand book of Behavioral Sciences by Prof. Mowadat H.Rana, 3rd Edition
- Integrating Behavioral Sciences in Healthcare by Asma Humayun & Michael Herbert.

Community medicine

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

Islamiyat/Pakistan studies Books

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