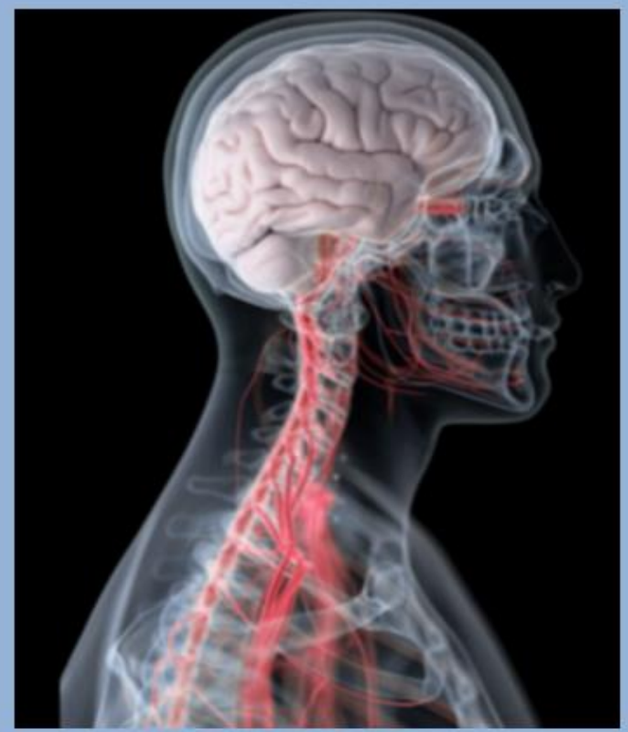
Department of Medical Education (DME)

CNS Module

Study Guide
Second Year MBBS 2022 - 2023



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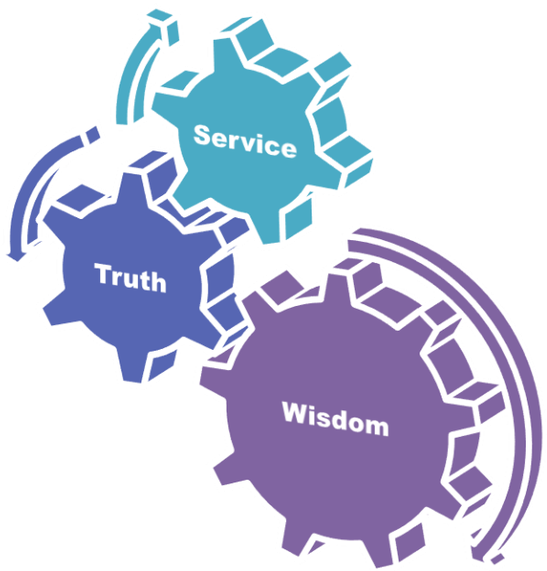
University Moto, Vision, Values & Goals

RMU Motto



Mission Statement

To impart evidence-based research-oriented health professional education in order to provide best possible patient care and inculcate the values of mutual respect, ethical practice of healthcare and social accountability.

Vision and Values

Highly recognized and accredited centre of excellence in Medical Education, using evidence-based training techniques for development of highly competent health professionals, who are lifelong experiential learner and are socially accountable.

Goals of the Undergraduate Integrated Modular Curriculum

The Undergraduate Integrated Learning Program is geared to provide you with quality medical education in an environment designed to:

- Provide thorough grounding in the basic theoretical concepts underpinning the practice of medicine.
- Develop and polish the skills required for providing medical services at all levels of the health care delivery system.
- Help you attain and maintain the highest possible levels of ethical and professional conduct in your future life.
- Kindle a spirit of inquiry and acquisition of knowledge to help you attain personal and professional growth & excellence.

Second Year MBBS 2023

Study Guide

CNS Module

Discipline Wise Details of Modular Contents

Subjects	Embryology	Histology	General & Gross Anatomy
• Anatomy	Embryology/Development • Early CNS Development • Spinal Cord • Hindbrain & Cerebellum • Midbrain • Forebrain • Peripheral Nervous System	Histology • Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• General Anatomy of Nervous System • General Anatomy of Autonomic Nervous System • Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS
• Biochemistry	• Fatty acid metabolism • Cholesterol Metabolism • Ketone bodies metabolism • Lipoproteins and Phospholipids		
• Physiology	• Organization of nervous system, Mechanism of synaptic transmission • Classification of sensory receptors, Properties of sensory receptors • Properties of synaptic transmission • Physiology of pain, Dual pathway for transmission of pain,Analgesia System and Thermal sensations • Sensory pathways for transmitting somatic signals • Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function • Somatosensory cortex & lesions of Somatosensory cortex • Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation • CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture • Concept of Association areas, • Concept of Dominant and non-dominant cerebral hemispheres • Limbic system, • Functions of hypothalamus		

	• Speech and aphasia • Learning and memory • Reticular activating system and sleep • EEG and epilepsy • Introduction to motor nervous system & Reflex action,Conditioned reflexes & Properties of reflex action,Control of spinal cord reflexes by higher centers • Introduction to cerebellum, Neuronal circuits of cerebellum, and its motor functions • Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity
• Research Club Activity	• Data entry and coding in SPSS File
• Bioethics & Professionalism	• Ethical dilemmas in healthcare practice involving breach in principle of autonomy • Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence • Ethical dilemmas practice involving breach in principle of justice
• Radiology & Artificial Intelligence	• Skull radiograph • CT Scan & MRI
• Family Medicine	• Approach to a patient with headache
• Behavioral Sciences	• Emotions • Memory
• Vertical components	• The Holy Quran Translation Component
• Vertical Integration	Clinically content relevant to CNS module • Introduction to CNS (pharmacology) • Patterns of injury in nervous system (Pathology) • Meningitis (Pathology) • Meningitis (Pediatrics) • Spinal injury and head injury (Surgery) • Management of hydrocephalus (Surgery) • Brain abscess (Surgery) • Polytrauma patient (Surgery) • Spinal cord and peripheral nervous system (Medicine) • Encephalitis (Medicine) • Cerebellar disorders (Medicine) • Epilepsy and other convulsive disorders (Medicine) • Stroke (Medicine) • Seizures during pregnancy (eclampsia/ epilepsy) (Gynecology &Obs) • Cerebral palsy, Polio (Pediatrics)

Table of Contents

CNS Module Team

Module Name	:	CNS Module
Duration of module	:	06 Weeks
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Co-coordinator	:	Dr. Gaiti Ara
Reviewed by	:	Module Committee

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Module IV – CNS Module

Rationale: The human nervous system is the most complex and versatile achievement of the process of evolution. The nervous system of all animals functions to detect changes in the external and internal environment and to bring about appropriate responses in the muscles, organs and glands.

The anatomical, physiological, biochemical and molecular foundation of some of these aspects of neural function are well understood, while others continue to occupy the professional lives of many thousands of researchers in both the basic and clinical sciences.

The nervous system is often damaged by inherited or developmental abnormalities by disease processes and by traumatic injury. The prevention, diagnosis and management of neurological disorders are therefore of immense socioeconomic importance.

This module is expected to build the student's basic knowledge about the normal structure, organization, functions and development of nervous system. This knowledge, skills and attitudes acquired will serve as a fabric on which the student will weave further knowledge about the etiology, pathology and pathogenesis of diseases of nervous system and the principles of their management.

Module Outcomes

By the end of the module, students will be able to:

Knowledge

- Describe the development, structure, functions and biochemical processes of the nervous system.
- Briefly describe the injuries and diseases of the nervous system such as Alzheimer's disease, Parkinson's Disease, etc.
- Classify the main drug groups actin on the nervous system.
- Identify the medical conditions related to nervous system such as stroke, cerebellar disorders, meningitis etc.
- Identify the surgical conditions related to the nervous system such as head injury brain tumors and abscesses.
- Identify obstetrical conditions related to nervous system such as preeclampsia.
- Identify pediatric conditions related to nervous system such as meningitis, cerebral palsy and polio.
- Identify parts of the CNS on radiographs CT scans and MRIs.
- Identify ENT and ophthalmological conditions such as acoustic neuroma, chalazion and strabismus.
- Describe aspects of behavioral sciences such as Emotions and Memory.

- Used technology based Medical Education including Artificial Intelligence.
- Appreciate concept and importance of Biomedical Ethics, & Research.

Skills

- Demonstrate dissection and identification of various parts of the nervous system.
- Identify, draw and label histological slides of the nervous system.
- Perform examination of sensory system, motor system, special senses and cranial nerves.
- Demonstrate effective skill for performing estimation of cholesterol, triglycerides and HDL.
- Demonstrate awareness of ethical, legal and social implication of issues related to bioethics

Attitude

- Demonstrate professional attitude, team building spirit and good communication specially in small group discussions.

This module will run in 6 weeks duration. Instructional strategies are given in the time table and learning objectives are given in the study guides. Study guides will be uploaded on the university website. Good luck!

SECTION - I

Terms & Abbreviations

Contents

Tables & Figures

Table1. Domains of Learning According to Blooms Taxonomy

Sr. #	Abbreviation	Domains of learning
1.	C	**Cognitive Domain:** knowledge and mental skills.
	• C1	Remembering
	• C2	Understanding
	• C3	Applying
	• C4	Analyzing
	• C5	Evaluating
	• C6	Creating
2.	P	**Psychomotor Domain:** motor skills.
	• P1	Imitation
	• P2	Manipulation
	• P3	Precision
	• P4	Articulation
	• P5	Naturalization
3.	A	**Affective Domain:** feelings, values, dispositions, attitudes, etc
	• A1	Receive
	• A2	Respond
	• A3	Value
	• A4	Organize
	• A5	Internalize

Teaching and Learning Methodologies / Strategies

Large Group Interactive Session (LGIS)

The large group interactive session is structured format of Prof Umar Model of Integrated lecture. It will the followed for delivery of all LGIS. The lecturer will introduce a topic or common clinical condition and explains the underlying phenomena through questions, pictures, videos of patients, interviews and exercises, etc. Students are actively involved in the learning process.

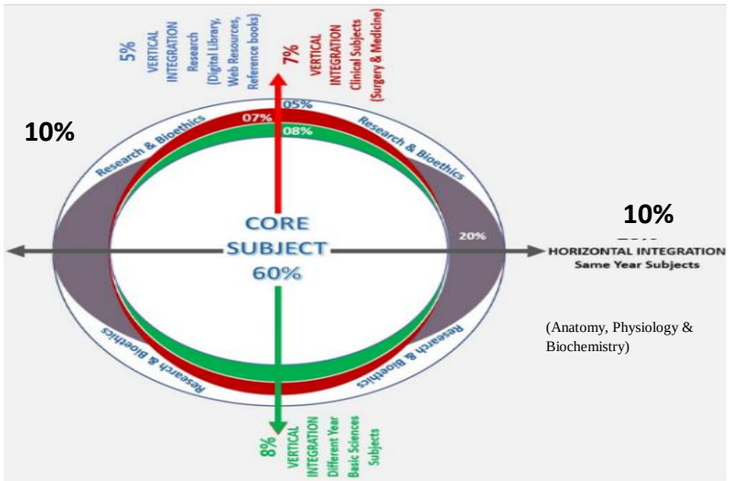


Figure 1. Prof Umar's Model of Integrated Lecture

Small Group Discussion (SGD)

This format helps students to clarify concepts acquire skills and attitudes. Sessions are structured with the help of specific exercises such as patient case, interviews or discussion topics or power point presentations. Students exchange opinions and apply knowledge gained from lectures, SGDs and self study. The facilitator role is to ask probing questions, summarize and help to clarify the concepts.

Table 2. Standardization of teaching content in Small Group Discussions

S. No	Topics	Approximate %
1	Title Of SGD	
2	Learning Objectives from Study Guides	
3	Horizontal Integration	5%+5%=10%
4	Core Concepts of the topic	60%
5	Vertical Integration	20%
6	Related Advance Research points	3%
7	Related Ethical points	2%

Table 3. Steps of Implementation of Small Group Discussions

Step 1	Sharing of Learning objectives by using students Study guides	First 5 minutes
Step 2	Asking students pre-planned questions from previous teaching session to develop co-relation (these questions will be standardized)	5minutes
Step 3	Students divided into groups of three and allocation of learning objectives	5minutes
Step 4	ACTIVITY: Students will discuss the learning objectives among themselves	15 minutes
Step 5	Each group of students will present its learning objectives	20 min
Step 6	Discussion of learning content in the main group	30min
Step 7	Clarification of concept by the facilitator by asking structured questions from learning content	15 min
Step 8	Questions on core concepts	
Step 9	Questions on horizontal integration	
Step 10	Questions on vertical integration	
Step 11	Questions on related research article	
Step 12	Questions on related ethics content	
Step 13	Students Assessment on online MS teams (5 MCQs)	5 min
Step 14	Summarization of main points by the facilitator	5 min
Step 15	Students feedback on the SGD and entry into log book	5 min
Step 16	Ending remarks	

Self-Directed Learning (SDL)

- Self- directed learning is a process where students take primary charge of planning, continuing, and evaluating their learning experiences.
- Time Home assignment
- Learning objectives will be defined
- Learning resources will be given to students = Textbook (page no), web site
- Assessment:

  i Will be online on LMS (Mid module/ end of Module)

  ii.OSPE station

Case Based Learning (CBL)

- It's a learner centered model which engages students in discussion of specific scenarios that typically resemble real world examples.
- Case scenario will be given to the students
- Will engage students in discussion of specific scenarios that resemble or typically are real-world examples.
- Learning objectives will be given to the students and will be based on
  i. To provide students with a relevant opportunity to see theory in practice
  ii. Require students to analyze data in order to reach a conclusion.
  iii. Develop analytic, communicative, and collaborative skills along with content knowledge.

Problem Based Learning (PBL)

- Problem-based learning (PBL) is a student-centered approach in which students learn about a subject by working in groups to solve an open-ended problem.
- This problem is what drives the motivation and the learning.

The 7- Jump-Format of PBL (Masstricht Medical School)	
Step 7	Synthesize & Report
Step 6	Collect Information from outside
Step 5	Generate learning Issues
Step 4	Discuss and Organize Ideas
Step 3	Brainstorming to Identify Explanations
Step 2	Define the Problem
Step 1	Clarify the Terms and Concepts of the Problem Scenario
Problem- Scenario	

Figure 2. PBL 7 Jumps Model

Practical Sessions/Skill Lab (SKL)

Practical Session/ Skill Lab (SKL)	
Demonstration/ power point presentation 4-5 slide	10-15 minutes
Practical work	25-30 minutes
Write/ draw and get it checked by teacher	20-25 minutes
05 mcqs at the end of the practical	10 minutes
At the end of module practical copy will be signed by head of department	
At the end of block the practical copy will be signed by Head of Department Dean Medical education department QEC	

SECTION – II

Learning Objectives, Teaching Strategies & Assessments

Contents

- Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)
- Large Group Interactive Session:
  - Anatomy (LGIS)
  - Physiology (LGIS)
  - Biochemistry (LGIS)
- Small Group Discussions
  - Anatomy (SGD)
  - Physiology (SGD)
  - Biochemistry (SGD)
- Self-Directed Topic, Learning Objectives & References
  - Anatomy (SDL)
  - Physiology (SDL)
  - Biochemistry (SDL)
- Skill Laboratory
  - Anatomy
  - Physiology
  - Biochemistry

Horizontally Integrated Basic Sciences (Anatomy, Physiology & Biochemistry)

Anatomy Large Group Interactive Session (LGIS)

Topic	At The End Of The Session Student Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
General Anatomy Nervous System	• Discuss the major divisions of nervous system	C2	LGIS	MCQs SEQs VIVA
	• Differentiate between neurons and neuroglia	C2		
	• List the neuroglia and their functions	C1		
	• Describe myelination of nerve fibers	C2		
	• Describe the structure of a peripheral nerve and reflex action	C2		
	• Describe degeneration and regeneration of nerves	C2		
Embryology Early development of Skull & Central Nervous System	• Describe the process of development of neurocranium and viscerocranium	C2	LGIS	MCQs SEQs VIVA
	• Describe formation of neural tube, neuropores and their closure	C2		
	• Describe histogenesis and Cytodifferentiation within the neural tube.	C2		
	• Describe the brain flexures and their derivatives	C2		
	• Describe role of neuroblasts forming efferent and afferent rows.	C2		
Embryology Development of spinal cord	• Describe the significance of ventricular, mantle and marginal layers of developing spinal cord.	C2	LGIS	MCQs SEQs VIVA
	• Enumerate derivatives of alar and basal plates in developing spinal cord.	C1		
	• Describe the process of myelination of nerve fibers.	C2		
	• Describe role of neural crest cells in development of spinal ganglia.	C2		
	• Explain positional changes of spinal cord.	C2		
	• Discuss congenital anomalies due to neural tube defects and abnormal histogenesis.	C3		
General Anatomy Autonomic Nervous System	• Enlist the components of peripheral and autonomic system.	C1	LGIS	MCQs SEQs VIVA
	• Tabulate differences between sympathetic and parasympathetic nervous systems	C2		
	• Describe effects of sympathetic and parasympathetic nervous systems on various parts of the body	C2		
	• Discuss the anatomical basis of autonomic injuries such as Horner's syndrome, Urinary bladder dysfunction, rectal distention, Erectile dysfunction are argyll Robertson pupil.	C3		

Histology Meninges, Choroid Plexus, Peripheral Nervous system and ganglia	• Describe the histological structure of meninges and choroid plexus	C2	LGIS	MCQs SEQs VIVA
	• Discuss the histological structure of Myelinated and unmyelinated nerve fibers	C2		
	• Discuss the histological structure of sensory and autonomic ganglia	C2		
	• Discuss the principles of neuroplasticity and regeneration	C2		
Embryology Development of Rhombencephalon	• Describe the development of Myelencephalon.	C2	LGIS	MCQs SEQs VIVA
	• Describe the arrangement of neuroblasts in metencephalon	C2		
	• Describe the development of metencephalon.	C2		
	• Describe the arrangement of neuroblasts in metencephalon	C2		
	• Describe the development of cerebellum	C2		
Histology Spinal Cord and Cerebellum	• Describe the histological structure of spinal cord	C2	LGIS	MCQs SEQs VIVA
	• Describe the histological structure of cerebellum	C2		
	• Discuss cells in each layer along with its histological morphology	C2		
Development Mesencephalon and Prosencephalon	• Describe the developed of mesencephalon	C2		
	• Describe the arrangements of neuroblasts in mesencephalon	C2		
	• Describe the developed of mesencephalon	C2		
	• Describe the arrangements of neuroblasts in mesencephalon	C2		
	• Describe the development of pituitary gland	C2		
	• Discuss the anatomical basis of pharyngeal hypophysis and craniopharyngiomas	C3		
	• Discuss the anatomical basis of birth defects such as encephalocele, microencephaly, microcephaly, Chiari malformation.	C3		
Histology Cerebrum	• Describe the histological structure of cerebrum	C2	LGIS	MCQs SEQs VIVA
Embryology Development of peripheral and autonomic nervous system	• Describe the development cranial nerves	C2	LGIS	MCQs SEQs VIVA
	• Describe the development of spinal nerves	C2		
	• Describe the development of sympathetic nervous system	C2		
	• Describe the development of parasympathetic nervous system	C2		

Physiology Large Group Interactive Session (LGIS)

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Objectives	Teaching Strategy	Assessment Tools
Organization of Nervous System Mechanism of synaptic transmission	• Describe the general organization of nervous system	C1	LGIS	MCQ SEQ VIVA
	• Describe major levels of CNS functions	C1		
	• Briefly explain nerve fiber structure, classification & properties	C2		
	• Describe labeled line principle	C1		
	• Define synapse	C1		
	• Enumerate & compare types of synapses	C2		
	• Describe process of synaptic transmission	C1		
	• Enumerate the important neurotransmitters of nervous system	C1		
Classification of sensory receptors Properties of sensory receptors	• Enumerate & explain different types of sensory receptors according to function	C1	LGIS	MCQ SEQ VIVA
	• Enumerate & explain different types of sensory receptors according to location	C2		
	• Enlist various properties of sensory receptors	C1		
	• Describe mechanism of signal transduction & generation of receptor potential	C1		
	• Describe mechanism of adaptation of different types of receptors	C1		
	• Describe the properties of sensory receptors	C1		
	• Describe the types and characteristics of tactile receptors	C1		
Properties of synaptic transmission	• Briefly explain the electrical events during neuronal excitation and inhibition	C2	LGIS	MCQ SEQ VIVA
	• Explain temporal and spatial summation	C1		
	• Enlist & explain various characteristics of synaptic transmission	C1		
Physiology of pain Dual pathway for transmission of pain Analgeia System	• Define pain	C1	LGIS	MCQ SEQ VIVA
	• Enumerate different types of pain	C2		
	• Tabulate the differences between two types of pain	C1		
	• Describe characteristics of pain receptors	C1		
	• Discuss the mechanism of stimulation of pain receptors	C2		
	• Compare and contrast neospinothalamic & paleo spinothalamic tract	C2		
	• Define referred pain	C1		

Thermal Sensations	• Explain the mechanism of referred pain	C2		
	• Give examples of referred pain	C1		
	• Describe visceral pain and its causes	C1		
	• Define headache	C1		
	• Enlist the types of headache & their causes	C1		
	• Explain the analgesia system	C2		
	• Describe thermal receptors	C1		
	• Explain mechanism of excitation of thermal receptors	C2		
	• Describe transmission of thermal signals in nervous system	C1		
Sensory pathways for transmitting somatic signals	• Classify somatic senses	C2	LGIS	MCQ SEQ VIVA
	• Describe the sensory pathways for transmission of somatic sensations to central nervous system	C1		
	• Enumerate sensations carried by dorsal column system and anterolateral system	C1		
	• Describe the characteristics of transmission in the dorsal column medial lemniscal system and anterolateral system	C1		
	• Compare and contrast dorsal column medial lemniscal system and anterolateral system	C2		
Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function	• Describe general organization of autonomic nervous system	C1	LGIS	MCQ SEQ VIVA
	• Enumerate the functions of autonomic nervous system	C1		
	• Describe sympathetic and parasympathetic nervous system	C1		
	• Enumerate & explain their receptors, neurotransmitters & physiological effects	C1		
	• Describe physiological anatomy & effects of adrenal medulla	C1		
Somatosensory cortex & lesions of somatosensory cortex	• Explain cortical mapping & association cortex	C2	LGIS	MCQ SEQ VIVA
	• Describe lesions of somatosensory areas	C1		
	• Summarize role of thalamus in somatic sensations	C1		
	• Interpret the importance of dermatomes	C3		
Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation	• Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response	C2	LGIS	MCQ SEQ VIVA
	• Draw a table showing autonomic effects on various body organs	C1		
	• Briefly describe the pharmacology of autonomic nervous system	C1		

CSF, Blood Brain Barrier, Blood CSF Barrier, Lumber Puncture	• Describe briefly the physiological anatomy of cerebral blood flow	C1	LGIS	MCQ SEQ VIVA
	• Explain cerebrospinal fluid system	C2		
	• Describe the CSF pressure, its measurement by lumbar puncture, & hydrocephalus	C1		
	• Explain blood CSF barrier & BBB	C2		
	• Describe brain edema	C1		
Concept of Association areas, dominant and non-dominant cerebral hemispheres	• Draw association areas of brain	C1	LGIS	MCQ SEQ VIVA
	• Describe association areas of brain regarding their physiological role	C1		
	• Explain briefly the clinical features, if the association areas become damaged	C2		
	• Describe concept of dominant hemisphere	C1		
	• Enlist role of parieto-occipito temporal cortex in non-dominant hemisphere	C1		
Limbic system Functions of hypothalamus	• Describe the concept of limbic system	C1	LGIS	MCQ SEQ VIVA
	• Describe physiological anatomy of limbic system	C1		
	• Enumerate and explain the roles of hippocampus, amygdala and limbic cortex	C1		
	• Describe physiological anatomy of hypothalamus	C1		
	• Enlist functions of hypothalamus	C1		
	• Explain role of hypothalamus in: o Vegetative function o Endocrine function Behavioral function o Reward and punishment function	C2		
Speech and aphasia	• Describe sensory and motor aspects of communication	C1	LGIS	MCQ SEQ VIVA
	• Define Wernicke‘s aphasia, Motor aphasia & Global aphasia	C1		
	• Explain Wernicke‘s aphasia, Motor aphasia & Global aphasia	C2		
	• Describe function of corpus callosum & anterior commissure in transferring information between two cerebral hemispheres	C1		
Learning and memory	• Define memory & classify its various types	C1	LGIS	MCQ SEQ VIVA
	• Describe role of synaptic inhibition and synaptic facilitation in memory	C1		
	• Explain mechanism of short term, intermediate and long-term memory	C2		
	• Describe mechanism of consolidation of memory	C1		
	• Enumerate specific parts of brain involved in memory	C2		
	• Explain the role of each part	C2		

Reticular activating system and sleep	• Describe activating driving system of the brain	C1	LGIS	MCQ SEQ VIVA
	• Explain the reticular activating system	C2		
	• Discuss the control of cerebral activity by signals from brain stem	C2		
	• Explain neurohormonal system of the brain	C2		
	• Define sleep and enumerate types of sleep	C1		
	• Compare and contrast between two types of sleep	C2		
	• Describe the basic theories of sleep in detail	C1		
	• Explain physiological effects of sleep	C2		
	• Describe sleep and wakefulness cycle	C1		
EEG and epilepsy	• Describe brain waves	C1	LGIS	MCQ SEQ VIVA
	• Enumerate different types of brain wave	C2		
	• Explain the origin of different brain waves	C2		
	• Describe EEG	C1		
	• Define epilepsy	C1		
	• Enumerate various types of epilepsy	C1		
	• Explain various types of epilepsy	C2		
	• Describe role of nor-epinephrine, serotonin and	C1		
	• dopamine in psychotic disorders	C1		
	• Describe the causes, symptoms & treatment of depression & bipolar disorder	C1		
	• Discuss causes, types, symptoms and treatment of schizophrenia	C2		
	• Define Alzheimer‘s disease. Mention its causes, clinical features, incidence and treatment	C1		
Introduction to motor nervous system & Reflex action Conditioned reflexes & properties Properties of reflex action Control of spinal cord reflexes by higher centers	• Outline brief introduction of motor nervous system	C1	LGIS	MCQ SEQ VIVA
	• Give concept of cortical & subcortical motor control	C1		
	• Briefly explain UMN, LMN, anterior motor neurons & interneurons	C2		
	• Define reflex action	C1		
	• Define and draw reflex arc	C1		
	• Enumerate components of reflex arc	C1		
	• Classify the reflexes	C2		
	• Define conditioned reflex	C1		
	• Enlist and describe properties of conditioned reflexes	C1		
	• Give examples of conditioned reflex	C1		

	• Enlist and Explain properties of reflex action	C1,C2		
	• Compare & contrast spinal animal with decerebrate animal	C2		
	• Describe organization of spinal cord for motor functions	C1		
	• Explain the concept of cortical & subcortical control. • Define UMN & LMN	C2		
Introduction to cerebellum Neuronal circuits of cerebellum Cerebellum and its motor functions	• Describe physiological anatomy of cerebellum	C1	LGIS	MCQ SEQ VIVA
	• Classify the functional parts of cerebellum & mention their functions	C2		
	• Describe neuronal circuits of cerebellum in detail	C1		
	• Enumerate the afferent and efferent pathways	C1		
	• Describe the functional unit of cerebellar cortex & deep cerebellar nuclei	C1		
	• Explain the role of purkinje cell, Deep nuclear cells and inhibitory cells of cerebellum in overall functions of cerebellum	C2		
	• Explain role of climbing fibers	C2		
	• Discuss the turn-on and turn-off mechanism	C2		
	• Enlist and explain motor functions of cerebellum	C1		
	• Explain the role of vestibulocerebellum, spinocerebellum & neocerebellum in overall motor control by cerebellum	C2		
Muscle spindle & Golgi tendon organ Role of muscle spindle and Golgi tendon organ in voluntary motor activity	• Describe muscle spindle & Golgi tendon organ in detail	C1	LGIS	MCQ SEQ VIVA
	• Explain the receptor function of the Muscle Spindle & Golgi tendon organ	C2		
	• Draw muscle spindle and Golgi tendon organ showing the sensory and motor innervation	C1		
	• Explain the dynamic and static response of muscle spindle & Golgi tendon organ	C2		
	• Briefly describe muscle stretch reflex	C1		
	• Draw the neuronal circuitry of the stretch reflex	C1		
	• Explain the static and dynamic components of stretch reflex	C2		
	• Discuss the clinical applications of stretch reflex	C2		
	• Explain negative stretch reflex	C2		
	• Explain lengthening reaction and its significance	C2		
	• Describe role of muscle spindle and Golgi tendon organ in voluntary muscle activity	C1		

	• Explain the role of alpha gamma co activation	C2		
Manifestations of cerebellar disease	• Enlist and explain clinical abnormalities of cerebellum	C2	LGIS	MCQ SEQ VIVA
Polysynaptic reflexes Transection of spinal cord Role of brain stem in controlling motor functions Lesions of motor system	• Enlist polysynaptic reflexes	C1	LGIS	MCQ SEQ VIVA
	• Describe the polysynaptic reflexes	C1		
	• Explain mechanism of reciprocal inhibition and reciprocal innervation	C2		
	• Enlist and describe reflexes of posture and locomotion	C1		
	• Explain scratch reflex	C2		
	• Enumerate the spinal cord reflexes that cause muscle spasm	C1		
	• Enlist autonomic reflexes in the spinal cord	C1		
	• Briefly describe transection of spinal cord	C1		
	• Explain stages of complete transection	C2		
	• Briefly explain stages of complications in complete transection of spinal cord	C2		
	• Describe hemi section of spinal cord	C1		
	• Explain brown-sequard syndrome	C1		
	• Enumerate and explain role of brainstem in controlling motor function	C1,C2		
	• Explain role of pontine & medullary reticular nuclei	C2		
	• Briefly write role of vestibular nuclei in antigravity muscle control	C1		
	• Summarize decerebrate rigidity	C1		
	• Enlist the effects of damage to specialized areas of motor cortex	C1		
	• Differentiate UMN Lesion and LMN Lesion	C2		
	• Explain decorticate rigidity	C2		
	• Briefly explain the pathophysiology of syringomyelia, tabs- dorsalis & poliomyelitis	C2		
Motor cortex & physiological importance of neocortex Corticospinal or pyramidal tract Extra pyramidal system Basal Ganglia & Lesions	• Briefly describe motor areas in cortex	C1	LGIS	MCQ SEQ VIVA
	• Draw motor & somatic association areas of motor cortex	C1		
	• Explain functions of motor & somatic association areas	C2		
	• Explain allocortex & neocortex	C2		
	• Describe medial and lateral descending pathways	C1		
	• Explain transmission of signals from motor cortex to muscle	C2	LGIS	MCQ SEQ VIVA
	• Draw course of pyramidal tract	C1		
	• Enlist the functions of pyramidal tract	C1		
	• Mention the effects of lesions in Corticospinal tract	C1		

	• Briefly describe extra pyramidal descending tracts	C1		
	• Describe rigidity and spasticity	C1		
	• Describe location and function of red nucleus	C1		
	• Describe physiological anatomy of basal ganglia	C1		
	• Draw neuronal circuits of basal ganglia	C1		
	• Explain the role of neuronal circuits in functioning of basal ganglia	C2		
	• Enlist and explain the physiological role of neurotransmitters in basal ganglia system	C1		
	• Enumerate the clinical abnormalities caused by damage to basal ganglia	C1		
	• Briefly explain Parkinson disease regarding its causes, signs and symptoms & treatment	C2		
	• Explain Huntington's Chorea regarding its causes, signs and symptoms	C2		

Biochemistry Large Group Interactive Session (LGIS)

Topic	At The End Of Lecture Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Triglyceride Metabolism, Fatty acid transport	• Describe synthesis & breakdown of TAGs and factors affecting it	C2	LGIS	MCQs SAQs Viva
	• Explain entry of fatty acid into mitochondria (carnitine shuttle)	C2		
Oxidation of fatty acid	• Describe steps, enzymes, energy calculations of β- oxidation of saturated fatty acid (Odd + Even)	C2	LGIS	MCQs SAQs Viva
Oxidation of fatty acid	• Discuss other types of oxidations and related disorders	C2	LGIS	MCQs SAQs Viva
Fatty acid synthesis	• Explain the steps, regulation and related diseases of fatty acid synthesis	C2	LGIS	MCQs SAQs Viva
Cholesterol Synthesis	• Describe the steps, regulation and related disorders of Cholesterol Synthesis	C2	LGIS	MCQs SAQs Viva

Plasma Cholesterol level	• Recall normal Plasma Cholesterol level and factors controlling it	C1	LGIS	MCQs SAQs Viva
Ketone bodies metabolism	• Explain the synthesis and breakdown of Ketone bodies with related diseases (ketoacidosis)	C2	LGIS	MCQs SAQs Viva
Biosynthesis of Glycerophospholipid	• Describe the steps of biosynthesis of Glycerophospholipids with its regulation and clinical significance	C2	LGIS	MCQs SAQs Viva
Biosynthesis of sphingophospholipids	• Explain the steps of biosynthesis of sphingophospholipids with its regulation and clinical significance	C2	LGIS	MCQs SAQs Viva
Introduction to Lipoproteins	• Discuss the functions and roll of Lipoproteins & apolipoprotein	C2	LGIS	MCQs SAQs Viva

LDL& HDL	• Explain the composition, functions and clinical significance of LDL& HDL	C2	LGIS	MCQs SAQs Viva
	• Illustrate the mechanism of reverse cholesterol transport	C3		
Disorders of lipoprotein metabolism	• Classify and explain the disorders of lipoprotein metabolism • (hyper & hypo lipoproteinemia)	C2	LGIS	MCQs SAQs Viva
Fatty liver & Adipose tissues	• Interpret conditions leading to Fatty liver	C3	LGIS	MCQs SAQs Viva
	• Describe metabolism of adipose tissue & Brown fat	C2		
Disorders of lipoprotein metabolism	• Classify and explain the disorders of lipoprotein metabolism • (hyper & hypo lipoproteinemia)	C2	LGIS	MCQs SAQs Viva

Anatomy Small Group Discussion (SGDs)

Topic	At The End Of Lecture Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Anterior & Middle cranial fossae	• Identify and describe the boundaries of anterior and middle cranial fossae	C2	Skills lab	OSPE VIVA
	• Discuss anatomical features present in anterior and middle cranial fossa	C2		
	• Locate foramina and describe the structures passing through them	C2		
Posterior cranial fossa	• Identify and describe the boundaries of posterior cranial fossa	C2	Skills lab	OSPE VIVA
	• Discuss anatomical features present in posterior cranial fossa	C2		
	• Locate foramina and describe the structures passing through them	C2		
Meninges, Dural venous sinuses, and intracranial hemorrhages	• Identify and describe meninges and their reflections on specimens and models	C2	Skills lab	OSPE VIVA
	• Describe the attachments and relations of dural venous sinuses of brain with the help of models and specimens	C2		
	• Discuss the clinical importance of facial vein connection with dural venous sinuses.	C3		
	• Differentiate between various types of intracranial hemorrhages	C3		
	• Differentiate between different types of headaches	C3	Skills lab	OSPE VIVA
Spinal cord	• Describe the internal and external structure of spinal cord	C2	Skills lab	OSPE VIVA
	• Compare the arrangement of white and gray matter in different regions of the spinal cord	C2		
	• Enumerate the major ascending and descending tracts of spinal cords	C1		
	• Illustrate the arrangements of ascending and descending tracts in the spinal cors	C2		
Ascending tracts and their clinicals	• List the ascending tracts of the spinal cord	C1	Skills lab	OSPE VIVA
	• Tabulate the sensation, receptor, first to third order neurons, pathways and destinations	C2		
	• Describe and illustrate the pathways of lateral spinothalamic tract, anterior spinothalamic tract, anterior spinocelebellar tract and posterior spinocerebellar tracts	C2		

	• Describe and illustrate the pathways of spinotectal tract, spinoreticular tract and spino-olivary tracts	C2		
	• Describe the anatomical basis of the signs and symptoms in lesions of the ascending tracts	C3		
Descending tracts and their clinicals	• List the descending tracts of the spinal cord	C1	Skills lab	OSPE VIVA
	• Tabulate the sensation, receptor, first to third order neurons, pathways and destinations of pyramidal and extrapyramidal tracts	C2		
	• Describe and illustrate the pathways of corticospinal tracts	C2		
	• Describe and illustrate the pathways of extrapyramidal tracts	C2		
	• Describe the anatomical basis of the signs and symptoms in lesions of upper and lower motor neuron lesions	C3		
Lesions of Spinal Cord	• Explain anatomical basis of signs and symptoms of anterior and posterior nerve root lesions	C3	Skills lab	OSPE VIVA
	• Explain anatomical basis of signs and symptoms of complete cord transection syndrome, central cord syndrome, syringomyelia, anterior cord syndrome, Brown-Sequard Syndrome, Poliomyelitis and amyotrophic lateral sclerosis	C3		
Medulla oblongata	• Identify and describe gross features of medulla and identify them on gross specimen/model.	C2	Skills lab	OSPE VIVA
	• Identify and describe internal structure of medulla on cross sectional diagrams.	C2		
	• Describe the anatomical basis and clinical features of raised pressure in posterior cranial fossa, Arnold Chiari malformation, lateral and medial medullary syndrome.	C2		
Pons & the Fourth ventricle	• Identify and describe the gross features of Pons on a given specimen/model	C2	Skills lab	OSPE VIVA
	• Identify and describe internal structure of pons on cross sectional diagrams.	C2		
	• Describe the boundaries and relations of 4th ventricle	C2		
	• Describe the anatomical basis of clinical features of tumors, hemorrhage and infarctions of pons	C3		
Midbrain & Cerebral aqueduct	• Identify and describe the gross features of Pons on a given specimen/model	C2	Skills lab	OSPE VIVA
	• Identify and describe internal structure of pons on cross sectional diagrams.	C2		
	• Describe the boundaries and relations of 4th ventricle	C2		
	• Describe the anatomical basis of trauma, cerebral aqueduct stenosis and vascular lesions of midbrain.	C3		
Cerebellum	• Identify and describe the gross features of cerebellum	C1		OSPE
	• Describe internal structure of gray and white matter of cerebellar cortex	C2		

	• Describe the cerebellar cortical mechanisms	C1	Skills lab	VIVA
	• Describe afferent and efferent fibers of cerebellum	C2		
	• Discuss the functions of cerebellum	C2		
	• Describe the anatomical basis of signs and symptoms of cerebellar diseases such as hypotonia, gait alteration, ataxia, dysdiadochokinesia, disturbances in reflexes, disturbances in ocular movement, disorders of speech	C3		
	• Describe the anatomical basis of signs and symptoms of cerebellar syndromes such as vermis syndrome and cerebellar hemisphere syndrome	C3		
Thalamus, Epithalamus & Subthalamus	• Identify and describe the gross structure of thalamus, epithalamus and subthalamus	C2	Skills lab	OSPE VIVA
	• Enlist nuclei of thalamus, epithalamus & subthalamus and describe their functions	C1		
	• Describe the anatomical basis for the lesions of thalamus, epithalamus and subthalamus such as thalamic pain and thalamic hand	C3		
Hypothalamus and 3rd Ventricle	• Enlist nuclei of thalamus, epithalamus & subthalamus and describe their functions	C1	Skills lab	OSPE VIVA
	• Identify and describe the functions of tuber cinereum and mamillary bodies	C2		
	• Describe the various afferent and efferent connections of hypothalamic nuclei	C2		
	• Describe the anatomical basis for the lesions of hypothalamus and hypothalamic syndromes	C3		
	• Describe the boundaries and relations of the 3rd ventricle	C2		
Cortical areas, Layers and Lesions of Cerebrum	• Identify and describe the gross features of cerebrum	C2	Skills lab	OSPE VIVA
	• Identify the describe the lobes and subdivisions of cerebrum	C2		
	• Identify the sulci and gyri of cerebral cortex and describe their functions	C2		
	• Identify and describe the commissural, association and projection fibers present in the white matter of the brain.	C2		
	• Discuss the anatomical basis of lesions of internal capsule and alzheimer's disease	C3		
	• Discuss the anatomical basis of cerebral cortical lesions of the motor cortex, frontal eye field, motor & sensory speech areas, prefrontal cortex, sensory cortex and visual areas	C3		
	• Discuss the anatomical basis of schizophrenia and frontal lobectomy	C3		

	• Discuss the basis cerebral dominance, consciousness, persistent vegetative state, sleep and epilepsy.	C3		
Lateral Ventricle &CSF	• Describe the relations and boundaries of lateral ventricle	C2	Skills lab	OSPE VIVA
	• Describe the formation of choroid plexus in ventricles	C2		
	• Explain the function, production, circulation, and absorption of cerebrospinal fluid	C2		
	• Explain the causes of overproduction and blockage of CSF	C2		
	• Discuss the anatomical basis of various types of hydrocephalus and papilledema.	C3		
	• Discuss the formation and clinical significance of blood brain barrier, blood CSF barrier and CSF Brain interface.	C3		
Cranial nerves I,II,II,IV,VI	• Identify the nuclei and connections of CN I,II,II,IV,VI	C2	Skills lab	OSPE VIVA
	• Trace the pathway and perform reflexes associated with of CN I,II,II,IV,VI	C2		
	• Describe the anatomical basis of lesions of visual pathway and ophthalmoplegias	C3		
Cranial nerves V,VII	• Identify the nuclei and connections of CN V,VII	C2	Skills lab	OSPE VIVA
	• Trace the pathway and perform reflexes associated with of CN V,VII	C2		
	• Describe the anatomical basis of upper and lower motor neuron lesion of CN V and trigeminal neuralgia	C3		
Cranial nerves VIII-XII	• Identify the nuclei and connections of CN VIII-XII	C2	Skills lab	OSPE VIVA
	• Trace the pathway and perform reflexes associated with of CN VIII-XII	C2		
	• Discuss the anatomical basis of vertigo, nystagmus, deafness, tinnitus, taste and gag reflex	C3		
	• Discuss the anatomical basis of paralysis of muscles supplied by accessory and hypoglossal nerves	C3		
Basal ganglia	• Enlist components of basal ganglia	C1	Skills lab	OSPE VIVA
	• Discuss functions of basal ganglia	C2		
	• Describe the connections of basal ganglia	C2		
	• Discuss the anatomical basis of hypo and hyperkinetic disorders such as chorea, hemiballismus, Parkinson’s disease and athetosis.	C3		
	• Enlist components and connections of limbic system	C1		
	• Discuss functions of limbic system	C2		

Limbic system & Reticular formation	• Describe the connections of limbic system	C2	Skills lab	OSPE VIVA
	• Enlist components of reticular system	C1		
	• Discuss functions of reticular system	C2		
	• Describe the connections of reticular system	C1		
	• Discuss the anatomical basis of loss of consciousness, schizophrenia, Kluver-Bucy syndrome and temporal lobe dysfunction	C3		
Blood Supply of Brain and clinicals	• Describe the arterial supply of brain and spinal cord from internal carotid artery and vertebrobasilar systems	C2	Skills lab	OSPE VIVA
	• Describe the circle of Willis along with its clinical significance	C2		
	• Describe the venous drainage of brain and spinal cord	C2		
	• Discuss the anatomical basis of signs and symptoms of cerebral vessel occlusions and spinal cord ischemias.	C3		
Radiological Imaging of CNS	• Identify and describe the appearance of different parts of brain in ○ Normal radiographs ○ MRI ○ CT scan	C2	Skills lab	OSPE VIVA

Physiology Small Group Discussion (SGDs)

Topic	At The End Of Tutorial Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Triglycerides & F.A. oxidation	• Explain the functions & uses of triglycerides and steps of oxidation of Fatty acids	C2	SGD	MCQs SAQs Viva
Fatty acid synthesis & cholesterol metabolism	• Describe the steps of fatty acid synthesis, cholesterol, their functions& clinical significance	C2	SGD	MCQs SAQs Viva
Ketone bodies & Phospholipids	• Describe the synthesis & breakdown of ketone bodies and factors affecting them.	C2	SGD	MCQs SAQs Viva
	• Describe the phospholipids synthesis & their functions	C2		
Lipoprotein (HDL)	• Explain HDL synthesis, its functions & clinical significance	C2	SGD	MCQs SAQs

				Viva
Lipoprotein (VLDL, LDL)	• Explain synthesis, functions & clinical significance of VLDL, LDL	C2	SGD	MCQs SAQs Viva

Biochemistry Small Group Discussion (SGDs)

Topic	At The End Of Tutorial Students Should Be Able To	C/P/A	Teaching Strategy	Assessment Tool
Triglycerides & F.A. oxidation	• Explain the functions & uses of triglycerides and steps of oxidation of Fatty acids	C2	SGD	MCQs SAQs Viva
Fatty acid synthesis & cholesterol metabolism	• Describe the steps of fatty acid synthesis, cholesterol, their functions& clinical significance	C2	SGD	MCQs SAQs Viva
Ketone bodies & Phospholipids	• Describe the synthesis & breakdown of ketone bodies and factors affecting them.	C2	SGD	MCQs SAQs Viva
	• Describe the phospholipids synthesis & their functions	C2		
Lipoprotein (HDL)	• Explain HDL synthesis, its functions & clinical significance	C2	SGD	MCQs SAQs Viva
Lipoprotein (VLDL, LDL)	• Explain synthesis, functions & clinical significance of VLDL, LDL	C2	SGD	MCQs SAQs Viva

Anatomy Self-Directed Learning (SDL)

Topics	Learning objectives	Learning Resources
Anterior And middle Cranial Fossa	• Identify and describe the boundaries of anterior and middle cranial fossae • Discuss anatomical features present in anterior and middle cranial fossa • Locate foramina and describe the structures passing through them	• Clinically Oriented Anatomy, 9th Edition, pg no. 840-861 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/article/10.1007/s00701-013-1937-0
Posterior cranial fossa Dural venous sinuses and intracranial hemorrhages	• Identify and describe meninges and their reflections on specimens and models • Describe the attachments and relations of dural venous sinuses of brain with the help of models and specimens • Discuss the clinical importance of facial vein connection with dural venous sinuses. • Differentiate between various types of intracranial hemorrhages • Differentiate between different types of headaches	• Clinically Oriented Anatomy, 9th Edition, pg no. 840-861, 884-885, 895 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://www.tandfonline.com/doi/abs/10.3109/02688699308995089
Meninges & Spinal cord	• Describe the internal and external structure of spinal cord • Compare the arrangement of white and gray matter in different regions of the spinal cord • Enumerate the major ascending and descending tracts of spinal cords • Illustrate the arrangements of ascending and descending tracts in the spinal cord	• Clinically Oriented Anatomy, 9th Edition, pg no. 132-139, 883, 890-891 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/chapter/10.1007/978-981-15-7771-0_3
	• List the ascending tracts of the spinal cord	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 131-182

Ascending tracts & Descending tracts	• Tabulate the sensation, receptor, first to third order neurons, pathways and destinations • Describe and illustrate the pathways of lateral spinothalamic tract, anterior spinothalamic tract, anterior spinocelebellar tract and posterior spinocerebellar tracts • Describe and illustrate the pathways of spinotectal tract, spinoreticular tract and spino-olivary tracts • Describe the anatomical basis of the signs and symptoms in lesions of the ascending tracts	• https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z https://link.springer.com/chapter/10.1007/978-1-4684-7688-0_7
Medulla Oblongata, Pons& Cerebellum	• Identify and describe gross features of medulla and identify them on gross specimen/model. • Identify and describe internal structure of medulla on cross sectional diagrams. • Identify and describe the gross features of Pons on a given specimen/model • Identify and describe internal structure of pons on cross sectional diagrams. • Identify and describe the gross features of cerebellum • Describe internal structure of gray and white matter of cerebellar cortex • Describe the cerebellar cortical mechanisms	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 185-247 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z https://link.springer.com/chapter/10.1007/978-1-61779-779-8_13
Midbrain and Diencephalon	• Identify and describe the gross features of Pons on a given specimen/model • Identify and describe internal structure of pons on cross sectional diagrams. • Describe the boundaries and relations of 4th ventricle • Describe the anatomical basis of trauma, cerebral aqueduct stenosis and vascular lesions of midbrain.	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 209, 363-372 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z https://link.springer.com/chapter/10.1007/978-3-319-60187-8_8
Cerebrum & Ventricular system	• Identify and describe the gross structure of thalamus, epithalamus and subthalamus • Enlist nuclei of thalamus, epithalamus & subthalamus and describe their functions • Identify and describe the functions of tuber cinereum and mamillary bodies • Describe the relations and boundaries of ventricles • Describe the formation of choroid plexus in ventricles	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 249-277, 436-462 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/article/10.1007/BF00344224 • https://www.tandfonline.com/doi/full/10.1080/10255840701492118

	• Explain the function, production, circulation, and absorption of cerebrospinal fluid • Explain the causes of overproduction and blockage of CSF	
Canial Nerves 1-7	• Identify the nuclei and connections of CN 1,2,3,4,& 6 • Trace the pathway and perform reflexes associated with of CN 1,2,3,4,& 6 • Describe the anatomical basis of lesions of visual pathway and ophthalmoplegias • Identify the nuclei and connections of CN 5 & 7 • Trace the pathway and perform reflexes associated with of CN 5 & 7 • Describe the anatomical basis of upper and lower motor neuron lesion of CN 5 and trigeminal neuralgia	• Snell's Clinical Neuroanatomy 8th Edition, pg no. 323-361 • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/referenceworkentry/10.1007/978-3-540-29678-2_1315
Cranial Nerves 8-12, Basal Ganglia, Limbic system and Reticular Formation	• Identify the nuclei and connections of CN 8-12 • Trace the pathway and perform reflexes associated with of CN 8-12 • Discuss the anatomical basis of vertigo, nystagmus, deafness, tinnitus, taste and gag reflex • Discuss the anatomical basis of paralysis of muscles supplied by accessory and hypoglossal nerves • Enlist components and connections of limbic system • Discuss functions of limbic system • Describe the connections of limbic system • Enlist components of reticular system • Discuss functions of reticular system • Describe the connections of reticular system • Discuss the anatomical basis of loss of consciousness, schizophrenia, Kluver-Bucy syndrome and temporal lobe dysfunction	• Clinically Oriented Anatomy 9th Edition, pg no. 299-308, 310- 321, 323-361. • https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z • https://link.springer.com/referenceworkentry/10.1007/978-3-540-29678-2_1315 • https://link.springer.com/book/10.1007/978-1-4615-1235-6

Physiology Self-Directed Learning (SDL)

Topics	Learning objectives	Learning Resources
	• Classify somatic senses • Describe the sensory pathways for transmission of somatic sensations to central nervous system.	• Ganong's Review of Medical Physiology.25TH Edition. Central and Peripheral Neurophysiology Section 02 (Chapter 08, Page 168)

Pathways for transmitting somatic signals	• Enumerate sensations carried by dorsal column system and anterolateral system • Describe the characteristics of transmission in the dorsal column medial lemniscal system and anterolateral system • Compare and contrast dorsal column medial lemniscal system and anterolateral system	• Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 82) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 48, Page 601,609) • https://youtu.be/432AD7JZnKE • https://www.osmosis.org/learn/Somatosensory_pathways
Somatosensory cortex & lesions of Somatosensory cortex	• Explain cortical mapping & association cortex • Describe lesions of somatosensory areas • Summarize role of thalamus in somatic sensations • Interpret the importance of dermatomes	• Textbook of Medical Physiology by Guyton & Hall.14th Edition.(Chapter 48,Page 603) • https://nba.uth.tmc.edu/neuroscience/m/s2/chapter04.html • https://teachmeanatomy.info/neuroanatomy/pathways/ascending-tracts-sensory/
Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function	• Describe general organization of autonomic nervous system • Enumerate the functions of autonomic nervous system • Describe sympathetic and parasympathetic nervous system • Enumerate & explain their receptors, neurotransmitters & physiological effects • Describe physiological anatomy & effects of adrenal medulla	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 255,259) • Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous System(Chapter 02. Page 47,59) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 11 Page 392) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 61, Page 763,765) • . https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system • https://youtu.be/j9pUItHAAhs 7 https://youtu.be/7pGKa-1tSJw https://youtu.be/gBOAYgMxq-Q
Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation	• Briefly explain physiological actions of ANS, vasomotor tone, vagal tone & sympathetic stress response • Draw a table showing autonomic effects on various body organs • Briefly describe the pharmacology of autonomic nervous system	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 13, Page 264) • Physiology by Linda S. Costanzo 6th Edition. Autonomic Nervous • System(Chapter 02. Page 55) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 11 Page 397)

		• Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 61, Page 768) • https://youtu.be/7pGKa-1tSJw • https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system • https://www.diffen.com/difference/Parasympathetic_nervous_system_vs_Sympathetic_nervous_system
, Blood brain barrier, Blood CSF Barrier, Lumber puncture	• Describe briefly the physiological anatomy of cerebral blood flow • Explain cerebrospinal fluid system • Describe the CSF pressure, its • measurement by lumbar puncture, & hydrocephalus • Explain blood CSF barrier • & BBB • Describe brain edema	• Physiology by Linda S. Costanzo 6th Edition. Neurophysiology (Chapter 03. Page 113) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 62, Page 777-784) • https://youtu.be/f9xi1Rf5m9w • https://www.sciencedirect.com/topics/neuroscience/blood-cerebrospinal-fluid-barrier
Limbic system, Functions of hypothalamus	• Describe the concept of limbic system	• Textbook of Medical Physiology by Guyton & Hall.14th Edition • https://youtu.be/h3K9RfGw8sI • https://www.endocrineweb.com/endocrinology/overview-hypothalamus
Learning and memory	• Define memory & classify its various types • Describe role of synaptic inhibition and synaptic facilitation in memory Explain mechanism of short term, intermediate and long-term memory Describe mechanism of consolidation of memory Enumerate specific parts of brain involved in memory • Explain the role of each part	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 15, Page 283) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 112) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition.The Central Nervous System (Chapter 09 Page 332) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 58, Page 735) • https://youtu.be/EqdsQDM5Fys • https://www.sciencedirect.com/topics/psychology/learning-and-memory
Concept of Association areas,	• Draw association areas of brain • Describe association areas of brain regarding their physiological role • Explain briefly the clinical features, if • the association areas become damaged	• Textbook of Medical Physiology by Guyton & Hall.14th Edition. • Section 09.(Chapter 58, Page 727) • https://my.clevelandclinic.org/health/articles/23073-

Concept of Dominant and non-dominant cerebral hemispheres	• Describe concept of dominant hemisphere • Enlist role of parietooccipito temporal cortex in non-dominant hemisphere	cerebral-cortex https://youtu.be/2Z425-CHY1c
Speech and aphasia	• Describe sensory and motor aspects of communication Define Wernicke's aphasia, Motor aphasia & Global aphasia • Explain Wernicke's aphasia, Motor aphasia & Global • aphasia • Describe function of corpus callosum & anterior commissure in transferring information between two cerebral hemispheres	• Ganong's Review of Medical Physiology.25TH Edition. (Chapter 15, Page 290,293) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 1211) • https://www.sciencedirect.com/science/article/abs/pii/S0021992422000892 • https://www.stroke.org.uk/what-is-aphasia/types-of-aphasia
EEG and epilepsy	• Describe brain waves • Enumerate different types of brain wave • Explain the origin of different brain waves • Describe EEG • Define epilepsy • Enumerate various types of epilepsy • Explain various types of epilepsy • Describe role of norepinephrine, serotonin and • dopamine in psychotic disorders • Describe the causes, symptoms & treatment of depression & bipolar disorder • Discuss causes, types, symptoms and treatment of • Schizophrenia • Define Alzheimer's disease. Mention its causes, clinical features, incidence and treatment	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 275) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 42) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 1209) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 756) • https://www.webmd.com/epilepsy/guide/types-epilepsy https://youtu.be/T7MKlPYiL48
Reticular activating system and sleep	• Describe activating driving system of the brain Explain the reticular activating system Discuss the control of cerebral activity by signals from brain stem Explain neurohormonal system of the brain • Define sleep and enumerate types of sleep • Compare and contrast between two types of sleep Describe the basic theories of sleep in detail • Explain physiological effects • of sleep • Describe sleep and wakefulness cycle	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 14, Page 269,272,278) • Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. Sensory Physiology (Chapter 10 Page 344) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 70, Page 12031208) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 60, Page 753) • https://youtu.be/TdGQvWAZ0Cs

		• https://www.physio-pedia.com/Reticular Formation
Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity	• Describe muscle spindle & • Golgi tendon organ in detail • Explain the receptor function of the Muscle Spindle & Golgi tendon organ • Draw muscle spindle and Golgi tendon organ showing the sensory and motor innervation • Explain the dynamic and static response of muscle spindle & Golgi tendon organ • Briefly describe muscle stretch reflex • Draw the neuronal circuitry of the stretch reflex • Explain the static and dynamic components of stretch reflex • Discuss the clinical applications of stretch reflex • Explain negative stretch reflex • Explain lengthening reaction and its significance • Describe role of muscle spindle and Golgi tendon organ in voluntary muscle • activity • Explain the role of alpha gamma co activation	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 12, Page 229,234) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 68, Page 476) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 55, Page 686,691) • https://www.osmosis.org/learn/Muscle_spindles_and_golgi_tendon_organs https://youtu.be/CzeAcc39Cyo
Motor cortex & physiological importance of neocortex, Corticospinal or pyramidal tract, Extra pyramidal system	• Briefly describe motor areas in cortex • Draw motor & somatic association areas of motor cortex • Explain functions of motor & somatic association areas • Explain allocortex & neocortex • Describe medial and lateral descending pathways • Explain transmission of signals from motor cortex to muscle • Draw course of pyramidal tract • Enlist the functions of pyramidal tract • Mention the effects of lesions in Corticospinal tract • Briefly describe extra pyramidal descending tracts • Describe rigidity and • spasticity • Describe location and function of red nucleus	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 • (Chapter 12, Page 237,240) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. • Section 09.(Chapter 56, Page 697) • https://www.physio-pedia.com/Extrapyramidal_and_Pyramidal_Tracts https://youtu.be/B88BNYWVkWE

Basal Ganglia & Lesions	• Describe physiological anatomy of basal ganglia • Draw neuronal circuits of basal ganglia • Explain the role of neuronal circuits in functioning of basal ganglia • Enlist and explain the physiological role of neurotransmitters in basal ganglia system • Enumerate the clinical abnormalities caused by damage to basal ganglia • Briefly explain Parkinson disease • regarding its causes, signs and symptoms & treatment • Explain Huntington's Chorea regarding its causes, signs and symptoms	• Ganong's Review of Medical Physiology.25TH Edition. Section 02 (Chapter 12, Page 243) • Physiology by Linda S. Costanzo 6th Edition.(Chapter 03. Page 110) • Physiological Basis of Medical Practice by Best & Taylor's.13th Edition. (Chapter 69, Page 1194) • Textbook of Medical Physiology by Guyton & Hall.14th Edition. Section 09.(Chapter 57, Page 720) • https://youtu.be/hxvep2Y8ShI • https://www.sciencedirect.com/science/article/pii/S2214751923000026 https://teachmeanatomy.info/neuroanatomy/structures/basal-ganglia/

Biochemistry Self-Directed Learning (SDL)

Topics	Learning objectives	Learning Resources
Chylomicron metabolism	• Describe synthesis of chylomicron, its breakdown and factors affecting it	• Lippincott Biochemistry Chapter. 18 page 253 https://www.ncbi.nlm.nih.gov/books/NBK305896/
HDL & LDL metabolism	• Explain composition functions and clinical significance of LDL & HDL • Illustrate mechanism of revise cholesterol synthesis	• Lippincott Biochemistry Chapter. 18 page 253 • https://www.alilamedicalmedia.com/-/g...
Fatty acid oxidation	• Describe steps enzymes energy calculation of Beta oxidation of saturated fatty acid	• Lippincott Biochemistry Chapter. 16 page 213 • https://ninjanerd.org

Synthesis &Interconversion of Ketone Bodies, Regulation of Ketogenesis, Ketolysis	• Explain synthesis and breakdown of ketone bodies and related disorders	• Lippincott Biochemistry Chapter. 27 page 411 • https://youtu.be/GuSqOsm3QV8
Synthesis of Cholesterol and its regulation	• Describe steps regulation and related disorders of cholesterol synthesis	• Lippincott Biochemistry Chapter. 18 page 244 • https://youtu.be/y9zsDFdMvZY

Histology Practicals Skill Laboratory (SKL)

Practical	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Ganglia	• Identify the microscopic features of ganglia	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of ganglia	C2		
	• List two points of identification	C1		
Peripheral nerve	• Identify the microscopic features of peripheral nerve on given histological slide	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of peripheral nerve	C2		
	• List two points of identification	C1		
Spinal cord	• Identify histological slide of spinal cord	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of spinal cord	C2		
	• List two points of identification	C1		
Cerebellum	• Identify the microscopic features of cerebellum	P	Skills lab	OSPE VIVA
	• Illustrate histological picture of cerebellum	C2		
	• List two points of identification	C1		

Physiology Practicals Skill Laboratory (SKL)

Practical	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Examination of sensory nervous system	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A, P		
	• Precautions	P		
	• Recall sensations transmitted by sensory pathways	C1		
	• Recall the effects of lesions of these pathways	C1		
	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		

Examination of motor nervous system	• Procedure	A,P		
	• Precautions	P		
	• Recall descending pathways & their functions	C1		
	• Recall effects of lesions of these pathways	C1		
Examination of cerebellar System	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A,P		
	• Precautions	P		
	• Recall functions of cerebellum & effects of lesions of cerebellum/	C3		
Ophthalmoscopy	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A,P		
	• Precautions	P		
	• Clinical Correlation	C1		
Determination of Eye field	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A,P		
	• Precautions	P		
	• Clinical Correlation	C3		
Recording of body temperature	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A,P		
	• Precautions	P		
	• Record oral, axillary & rectal temperature	C1		
	• Recall abnormalities of body temperature	C1		
Examination of superficial & deep reflexes	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A,P		
	• Precautions	P		
	• Recall reflex arc	C1		

	• Recall effects of UMNL & LMNL on reflexes	C1		
Examination of 3rd, 4th & 6th cranial nerves	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A,P		
	• Precautions	P		
	• Recall functions & pathways of various cranial nerves	C1		
	• Recall effects of lesions of cranial nerves	C1		
Examination of 5th, & 7th cranial nerves / Examination of 8th , 9th, 10, 11th, 12th cranial nerves	• Apparatus identification	C1	Skill lab	OSPE
	• Principle	C1		
	• Procedure	A,P		
	• Precautions	P		
	• Recall functions & pathways of various cranial nerves	C1		
	• Recall effects of lesions of cranial nerves	C1		

Biochemistry Practicals Skill Laboratory (SKL)

Topic	At The End Of Practical Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Estimation of cholesterol	Perform cholesterol estimation	P	Skill Lab	OSPE
Estimation of Triglyceride	Perform triglyceride estimation	P	Skill Lab	OSPE
Estimation of HDL	Perform HDL estimation	P	Skill Lab	OSPE

SECTION - III

Basic and Clinical Sciences (Vertical Integration)

Content

- **CBLs**
- **Vertical Integration LGIS**
- **Longitudinal Themes**
    - **Biomedical Ethics & Professionalism**
    - **Family Medicine**
    - **Artificial Intelligence (Innovation)**
    - **Integrated Undergraduate Research Curriculum (IUGRC)**

Case Based Learning Objectives (CBL)

Subject	Topic	At the End Of Lecture Students Should Be Able To	Learning Domain
Anatomy	• Cystic Astrocytoma of cerebellum	Apply basic knowledge of subject to study clinical case.	C3
	• Stroke	Apply basic knowledge of subject to study clinical case.	C3
Physiology	• CVA	Apply basic knowledge of subject to study clinical case.	C3
	• Gullain Barr syndrome	Apply basic knowledge of subject to study clinical case.	C3
Biochemistry	• IHD	Apply basic knowledge of subject to study clinical case.	C3
	• Respiratory Distress Syndrome	Apply basic knowledge of subject to study clinical case.	C3

Vertical Integration LGIS

Pathology

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
Patterns of injury in nervous system	• Describe edema ,herniation and hydrocephalous	C2	LGIS	MCQ'S
	• Classify cerebrovascular diseases	C2		
	• Explain CNS trauma	C2		
	• Identify Congenital malformation	C1		
Diseases of myelin and neurodegenerative diseases	Students should be able to • describe the pathophysiology and histomorphology of Alzheimer's disease, Parkinson's Disease, Huntington's disease and Multiple sclerosis	C2	LGIS	MCQ'S
Meningitis	• Classify types of meningitis	C2	LGIS	MCQ'S
	• Enlist causes of meningitis	C1		
	• Describe lab diagnosis of meningitis	C2		
	• Enlist complication of meningitis	C2		

Pharmacology

Topic	At the end of this LGIS students of should be able to:	Learning Domain	Teaching Strategy	Assessment Tool
Introduction to CNS Pharmacology	• List the major neurotransmitters in the CNS	C1	LGIS	MCQ
	• List the major classes of receptors for each of the primary neurotransmitters and their associated relevant disorders	C1		
	• Identify the special considerations associated with CNS drug delivery	C1		
	• Cite main drug groups acting on the CNS	C1		

Medicine

Topic	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Stroke	• Discuss pathophysiology, Blood supply of brain (Anterior and posterior Circulation), which part of brain supplied by various arteries, Physiology of brain pathways (Corticospinal and Corticobulbar pathways), Types of Stroke, clinical features, management	C1 C2	LGIS	MCQs
Spinal Cord and Peripheral Nervous system	• Various types of pathways and cells, Peripheral Nerves and neuromuscular junction, difference between upper and lower motor neurons, various types of Plegias (Paraplegia, Hemiplegia, Quadriplegia), Various types of neuropathies and myasthenia Gravis and discuss pathophysiology	C1 C2	LGIS	MCQs
Cerebellar Disorders	• Brain parts involved in Movement and Co-ordination, how movements are brought about, possible lesions and discuss pathophysiology, types of disorders, clinical features, management	C1 C2	LGIS	MCQs
Meningitis	• Define and discuss pathophysiology and discuss symptoms and signs	C1	LGIS	MCQs
	• Discuss the causes	C2		
	• Describe the management	C2		
Epilepsy and other convulsive disorders	• Define and discuss pathophysiology	C1	LGIS	MCQs
	• Discuss the causes	C2		

	• Describe the management	C2		
Encephalitis	• Define and discuss and discuss pathophysiology, symptoms and signs	C1	LGIS	MCQs
	• Discuss the causes	C2		
	• Describe the management	C2		

Surgery

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
Brain tumors	• Classify Brain Tumors	C1	LGIS	MCQ
	• Outline clinical features of brain tumors. • Approach towards a SOL brain	C1		
Brain abscess	• Define Brain Abscess	C1	LGIS	MCQ
	• Outline clinical features of brain abscess	C1		
Head injury	• Define head injury	C1	LGIS	MCQ
	• Mechanism of Head injury	C1		
	• Clinical features of head injury	C1		
	• Glassgow coma Scale	C1		
Poly trauma Patient	• Define polytrauma	C1	LGIS	MCQ
	• Describe triage	C1		
	• ATLS Protocol	C1		

Obstetrics & Gynecology

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Seizures during pregnancy(eclampsia/epilepsy)	• Enumerate common neurological disorders during pregnancy (eclampsia, epilepsy)	C1	LGIS	MCQs
	• Understand neurological changes leading to eclampsia and epilepsy	C1		
	• Understand the effects of epilepsy and anti-epileptic drugs on mother and fetus	C1		
	• Comprehend the principles of management of epilepsy during pregnancy	C1		

Pediatrics

Topic	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Meningitis	Scenario of a patient with fever & fits		LGIS	MCQs
	• Define meningitis.	C1		
	• Discuss Epidemiology &Pathophysiology	C1		
	• Discuss Etiological organisms at different ages	C1		
	• Discuss Clinical features	C1		
	• Discuss Diagnosis & Management	C1		
	• Discuss Complications & prognosis	C1		
	• Discuss Prevention of meningitis	C1		
Cerebral Palsy	• Scenario of a Cerebral Palsy patient		LGIS	MCQs
	• Student will be able to know			
	• Discus Brief anatomy of brain	C2		
	• Definition of cerebral palsy	C1		
	• Discuss Epidemiology	C2		
	• Discuss Etiology	C2		
	• Discuss Pathophysiology	C2		
	• Discuss Clinical presentation & anatomic classification of Cerebral Palsy	C2		

	• Discuss Associated problems	C2		
	• Discuss Management & Prevention	C2		
Polio	• Scenario of a patient with acute flaccid paralysis	C1	LGIS	MCQs
	• Student will be able to know	C1		
	• AFP definition	C1		
	• Discuss Etiology & Epidemiology of Polio	C2		
	• Discuss Pathogenesis	C2		
	• Discuss Clinical features	C2		
	• Discuss Management	C2		
	• Discuss Complications & sequel	C2		
	• Prevention – vaccination	C1		

Radiology

Practical	At The End Of This Skill Lab, Should Be Able To Illustrate:	Learning Domain	Teaching Strategy	Assessment Tools
Skull radio graph	• Interprat Normal Skull Radioghraph	C1	LGIS	MCQs
	• Discuss fractures and other diseases with their clinical significance	C2		
CT- scan brain	• Interpret normal anatomical structures	C2	LGIS	MCQs
MRI & CT Scan	• List some indications for contrast enhanced MRI and CT	C1	LGIS	MCQs
CT scan	• Discriminate between a subdural and epidural hematoma at CT (4) Describe imaging signs of a subarachnoid hemorrhage	C2	LGIS	MCQs

ENT

Topic	At The End Of This LGIS, Second Year MBBS Students Should Be Able To:	Learning Domain	Teaching Strategy	Assessment Tools
Acoustic neuroma	• Recognize signs and symptoms of acoustic neuroma	C1	LGIS	MCQs

Ophthalmology

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Chalazion	• Discuss in detail the clinical features and management	C2	LGIS	MCQs
Strabismus	• Discuss in detail the clinical features and management	C2	LGIS	MCQs

Behavioral sciences

Topic	At The End Of Lecture Students Should Be Able To	Learning Domain	Teaching Strategy	Assessment Tool
Emotions	• To be able to define emotions.	C1	LGIS	MCQs
	• To understand the neuroanatomy and neurochemistry of emotion way to deal with emotion	C2		
Memory	• To be able to outline the types of memory.	C2	LGIS	MCQs
	• To be able to explain the areas in brain responsible for memory storage and Retrieval	C2		

Longitudinal Themes

Biomedical Ethics

Topics	At the end of session students should be able to:	Learning Domains	Teaching Strategy	Assessment Tools
Ethical dilemmas in healthcare practice involving breach in principle of autonomy	• Analyze ethical dilemmas in healthcare practice involving breach in principle of autonomy. • Explain what procedures adopted to maintain patient autonomy. • Identify situations in which doctor may have to take decisions in the best interest of the patients	C3 C2 C1	Short video demonstration on violation of Ethical principle of autonomy from suit CBEC Video resources	• Assignment based assessment involving real life case scenarios under aggregate Marks. (Internal Assessment) • Assignment to be uploaded on LMS
Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence	• Analyze ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence • Explain what procedures adopted to maintain the principle of beneficence and non-maleficence in challenging situations • Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of beneficence and non-maleficence	C3 C2 C1	Short video demonstration on violation of Ethical principle of beneficence and non-maleficence from suit CBEC Video resources Students deliberations and reflections Reflective writing	• Assignment based assessment involving real life case scenarios under aggregate Marks (Internal Assessment) • Assignment to be uploaded on LMS
Ethical dilemmas practice involving breach in principle of justice	• Analyze ethical dilemmas in healthcare practice involving breach in principle of justice • Explain what procedures adopted to maintain the principle of justice in challenging situations • Identify situations in which a doctor may have to take decisions in the best interests of the patient considering the principle of justice	C3 C2 C1	Short video demonstration on violation of Ethical principle of beneficence and non-maleficence from suit CBEC Video resources Students deliberations and reflections Reflective writing	• Assignment based assessment involving real life case scenarios under aggregate Marks (Internal Assessment) • Assignment to be uploaded on LMS

Integrated Undergraduate Research Curriculum (IUGRC)

Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Data entry and coding in SPSS File	• How to generate a research question according to FINER Criteria	C3	LGIS-1	MCQs
	• Formulate the research question according to PICOT format – problem/population, intervention, comparison, outcome and time frame			
	• To understand how a properly formulated research question is related to an efficient literature review			
	• Development of research protocol including research objectives			

Family Medicine

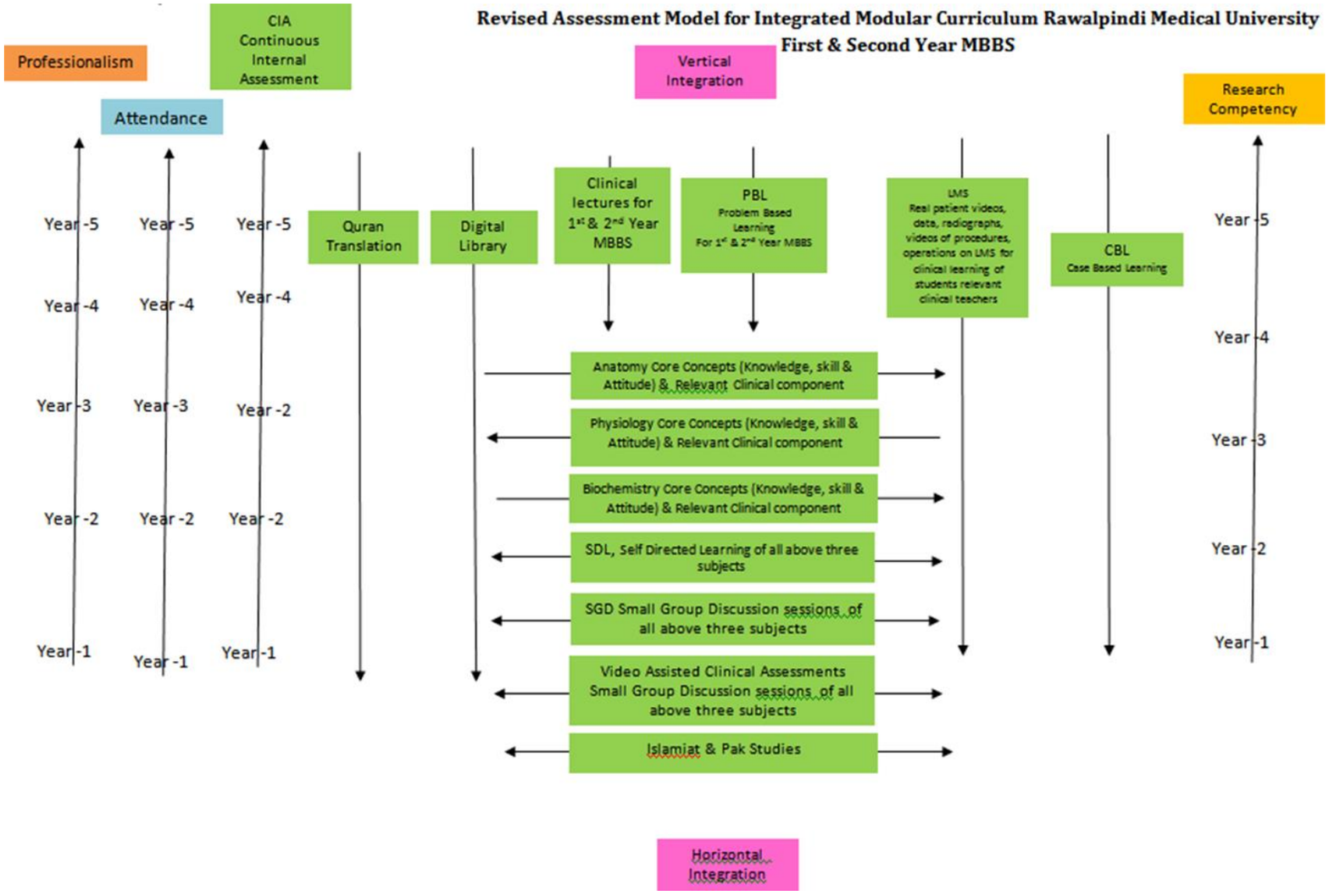
Topic	Learning Objectives At the end of the lecture the student should be able to	Learning Domain	Teaching Strategy	Assessment Tool
Approach to a patient with headache	• Describe presenting complains of patients with Headache	C3	LGIS-1	MCQs
	• Discuss complications of Headache			
	• Describe initial treatment of patients with Headache			
	• Know when to refer patient to consultant/ Hospital			

SECTION - IV

Assessment Policies

Contents

- **Assessment plan**
- **Types of Assessment:**
- **Modular Examinations**
- **Block Examination**
- **Table 4: Assessment Frequency & Time in CNS Module**



Gauge for Continuous Internal Assessment (CIA)

Red Zone	High Alert	Yellow Zone	Green Zone	Excellent	Extra Ordinary
0 - 25%	26 - *50%	51 - 60%	61 – 70%	71 – 80%	81 - 100%

*50% and above is Passing Marks.

Gauge for attendance percentage

Red Zone	High Alert	Yellow Zone-1	Yellow Zone-2	Green Zone	Excellent
0 - 25%	26 - 50%	51 - 60%	61 – 74%	*75 – 80%	81 - 100%

90% is eligibility criteria for appearing in professional examination.

Assessment plan

University has followed the guidelines of Pakistan Medical and Dental Council for assessment. Assessment is conducted at the mid modular,modular and block levels.

Types of Assessment:

The assessment is formative and summative.

Formative Assessment	Summative Assessment
Formative assessment is taken at modular (2/3rd of the module is complete) level through MS Teams. Tool for this assessment is best choice questions and all subjects are given theshare according to their hour percentage.	Summative assessment is taken at the mid modular (LMS Based),modular and block levels.

Modular Assessment

Theory Paper	Viva Voce
There is a module examination at the end of first module of each block. The content of the whole teaching of the module are tested in this examination. It consists of paper with objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module. (Annexure I attached)	Structured table viva voce is conducted including the practical content of the module.

Block Assessment

On completion of a block which consists of two modules, there is a block examination which consists of one theory paper and a structured viva with OSPE.

Theory Paper	Block OSPE
There is one written paper for each subject. The paper consists of objective type questions and structured essay questions. The distribution of the questions is based on the Table of Specifications of the module.	This covers the practical content of the whole block.

Table 4-Assessment Frequency & Time in CNS Module

Block	Sr #	Module CNS Module Components	Type of Assessments	Total Assessments Time			No. of Assessments	
				Assessment Time	Summative Assessment Time	Formative Assessment Time		
Block-I	1	Mid Module Examinations LMS based (Anatomy,Physiology & Biochemistry)	Summative	30 Minutes	3 Hour 15 Minutes	45 Minutes	2 Formative	6 Summative
	2	Topics of SDL Examination on MS Team	Formative	30 Minutes				
	3	End Module Examinations (SEQ & MCQs Based)	Summative	2 Hours				
	4	Anatomy Structured and Clinically Oriented Viva	Summative	10 Minutes				
	5	Physiology Structured & Clinically oriented Viva voce	Summative	10 Minutes				
	6	Assessment of Clinical Lectures	Formative	15 Minutes				
	7	Assessment of Bioethics Lectures	Summative	2 Minutes				
	8	Assessment of IUGRC Lectures	Summative	10 Minutes				

Learning Resources

Subject	Resources
Anatomy	**A. Neuroanatomy** **1.** Snell's Clinical Neuroanatomy by Rayan Splittgerber 9th Edition. **B. Gross Anatomy** 2. Gray's Anatomy By Prof. Susan Standring 42th Edition, Elsevier. 3. Clinical Anatomy For Medical Students By Richard S.Snell 10th Edition. 4. Clinically Oriented Anatomy By Keith Moore 9th Edition. 5. Cunningham's Manual Of Practical Anatomy By G.J. Romanes, 16th Edition, Vol-I, Ii And Iii **C. Histology** 1. B. Young J. W. Health Wheather's Functional Histology 6th Edition. 2. Medical Histology By Prof. Laiq Hussain 7th Edition. **D. Embryology** 1. Keith L. Moore. The Developing Human 11th Edition. 2. Langman's Medical Embryology 14th Edition. **E. YouTube Links** 6. https://www.youtube.com/watch?v=auogbJFitmI&pp=ygUSY25zIGFuYXRvbXkgdmlkZW9z 7. https://www.youtube.com/watch?v=Z3fLmpepJfg&list=PLmzZnYRTmRK8BTd1iJtzry0WhOYkpca0g 8. https://www.youtube.com/watch?v=q8NtmDrb_qo&pp=ygULY25zIGFuYXRvbXk%3D 9. https://www.youtube.com/watch?v=ADAOsuaOSCk&list=PLTF9h-T1TcJgx3OFachdjHPMX6VE4VDS1 **F. HEC Digital Library Links** 10. https://link.springer.com/chapter/10.1007/978-981-15-7771-0_3 11. https://link.springer.com/chapter/10.1007/978-1-4684-7688-0_7 12. https://link.springer.com/chapter/10.1007/978-1-61779-779-8_13 13. https://link.springer.com/chapter/10.1007/978-3-319-60187-8_8 14. https://link.springer.com/article/10.1007/s00701-013-1937-0 15. https://link.springer.com/article/10.1007/BF00344224 **G. Journal Links** 1. https://www.tandfonline.com/doi/abs/10.3109/02688699308995089 2. https://www.tandfonline.com/doi/full/10.1080/10255840701492118 3. https://link.springer.com/referenceworkentry/10.1007/978-3-540-29678-2_1315 1. https://link.springer.com/book/10.1007/978-1-4615-1235-6

Physiology	**A. Textbooks** 1. Textbook Of Medical Physiology by Guyton And Hall.14th edition 2. Ganong's Review of Medical Physiology.25TH Edition **B. Reference books** 1. Human Physiology by Lauralee Sherwood 10th edition. 2. Human Physiology by Dee Unglaub Silver thorn. 8TH Edition. 3. Best & Taylor Physiological Basis of Medical Practice 13th edition. 4. Berne & Levy Physiology 7th edition. **C. Internet References** 1. https://www.ncbi.nlm.nih.gov/books/NBK539861/ 2. https://teachmephysiology.com/nervous-system/sensory-system/pain-pathways/ 3. https://www.osmosis.org/learn/Somatosensory_pathways 4. https://www.kenhub.com/en/library/anatomy/autonomic-nervous-system 5. https://www.diffen.com/difference/Parasympathetic_nervous_system_vs_Sympathetic_nervous_system **D. HEC Library** 1. https://www.sciencedirect.com/topics/neuroscience/synaptic-transmission 2. https://nba.uth.tmc.edu/neuroscience/m/s2/chapter04.html 3. https://www.sciencedirect.com/topics/neuroscience/blood-cerebrospinal-fluid-barrier 4. https://www.sciencedirect.com/science/article/abs/pii/S0021992422000892 **E. Youtube links** 1. https://youtu.be/AG7Ev2hJGFk 2. https://youtu.be/cZwb8zqAPXc 3. https://youtu.be/5c8maFAhqIc 4. https://youtu.be/432AD7JZnKE 5. https://youtu.be/j9pUItHAAhs 6. https://youtu.be/7pGKa-1tSJw 7. https://youtu.be/gBOAYgMxq-Q 8. https://youtu.be/DPHoTIcFfLs **F. Journal of Physiology** 1. https://www.sciencedirect.com/science/article/abs/pii/S0021992422000892 2. https://www.sciencedirect.com/topics/psychology/learning-and-memory 3. https://www.physio-pedia.com/Reticular_Formation 4. https://www.sciencedirect.com/science/article/pii/S2214751923000026

Biochemistry	**A. Textbooks** **1.** Harper's Illustrated Biochemistry 32th edition. 2. Lehninger Principle of Biochemistry 8th edition. 3. Biochemistry by Devlin 7th edition. **B. Website** 1. https://www.alilamedicalmedia.com/-/g... 2. https://ninjanerd.org **C. Youtube** • https://youtu.be/GuSqOsm3QV8 • https://youtu.be/y9zsDFdMvZY **D. HEC Library and Journals** https://www.ncbi.nlm.nih.gov/books/NBK305896/

SECTION - V

Time Table

Clinically Oriented Integrated Modular Curriculum for Second Year MBBS

CNS Time Table

Second Year MBBS

Session 2021 - 2022

Batch- 49

CNS Module Team

Module Name	:	CNS Module
Duration of module	:	06 Weeks
Coordinator	:	Dr. Arsalan Manzoor Mughal
Co-coordinator	:	Dr. Gaiti Ara
Reviewed by	:	Module Committee

Module Committee		
1.	Vice Chancellor RMU	Prof. Dr. Muhammad Umar
2.	Director DME	Prof. Dr. Rai Muhammad Asghar
3.	Convener Curriculum	Prof. Dr. Naeem Akhter
4.	Chairperson Anatomy & Dean Basic Sciences	Prof. Dr. Ayesha Yousaf
5.	Additional Director DME	Prof. Dr. Ifra Saeed
6.	Chairperson Physiology	Prof. Dr. Samia Sarwar
7.	Chairperson Biochemistry	Dr. Aneela Jamil
8.	Focal Person Anatomy Second Year MBBS	Prof. Dr. Ifra Saeed
9.	Focal Person Physiology	Dr. Sidra Hamid
10	Focal Person Biochemistry	Dr. Aneela Jamil
11	Focal Person Pharmacology	Dr. Zunera Hakim
12	Focal Person Pathology	Dr. Asiya Niazi
13	Focal Person Behavioral Sciences	Dr. Saadia Yasir
14	Focal Person Community Medicine	Dr. Afifa Kulsoom
15	Focal Person Quran Translation Lectures	Dr. Fahad Anwar

Module Task Force Team		
1.	Coordinator	Dr. Arsalan Manzoor Mughal
2.	DME Focal Person	Dr. Sidra Hamid (Assistant Professor of Physiology)
3.	Co-coordinator	Dr. Gaiti Ara (APWMO)
4.	Co-Coordinator	Dr. Shazia Nosheen (Senior Demonstrator of Physiology)
5.	Co-coordinator	Dr. Rahat Afzal (Senior Demonstrator of Biochemistry)

DME Implementation Team		
1.	Director DME	Prof. Dr. Rai Muhammad Asghar
2.	Implementation Incharge 1st & 2nd Year MBBS & Add. Director DME	Prof. Dr. Ifra Saeed
3.	Deputy Director DME	Dr Shazia Zaib
4.	Module planner & Implementation coordinator	Dr. Sidra Hamid
5.	Editor	Muhammad Arslan Aslam

Discipline wise Details of Modular Contents

Subjects	Embryology	Histology	General & Gross Anatomy
• Anatomy	Embryology/Development • Early CNS Development • Spinal Cord • Hindbrain & Cerebellum • Midbrain • Forebrain • Peripheral Nervous System	Histology • Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• General Anatomy of Nervous System • General Anatomy of Autonomic Nervous System • Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS
• Biochemistry	• Fatty acid metabolism • Cholesterol Metabolism • Ketone bodies metabolism • Lipoproteins and Phospholipids		
• Physiology	• Organization of nervous system, Mechanism of synaptic transmission • Classification of sensory receptors, Properties of sensory receptors • Properties of synaptic transmission • Physiology of pain, Dual pathway for transmission of pain,Analgesia System and Thermal sensations • Sensory pathways for transmitting somatic signals • Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function • Somatosensory cortex & lesions of Somatosensory cortex • Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation • CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture • Concept of Association areas, • Concept of Dominant and non-dominant cerebral hemispheres • Limbic system, • Functions of hypothalamus		

	• Speech and aphasia • Learning and memory • Reticular activating system and sleep • EEG and epilepsy • Introduction to motor nervous system & Reflex action,Conditioned reflexes & Properties of reflex action,Control of spinal cord reflexes by higher centers • Introduction to cerebellum, Neuronal circuits of cerebellum, and its motor functions • Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity
• Research Club Activity	• Data entry and coding in SPSS File
• Bioethics & Professionalism	• Ethical dilemmas in healthcare practice involving breach in principle of autonomy • Ethical dilemmas in healthcare practice involving breach in principle of beneficence and non-maleficence • Ethical dilemmas practice involving breach in principle of justice
• Radiology & Artificial Intelligence	• Skull radiograph • CT Scan & MRI
• Family Medicine	• Approach to a patient with headache
• Behavioral Sciences	• Emotions • Memory
• Vertical components	• The Holy Quran Translation Component
• Vertical Integration	Clinically content relevant to CNS module • Introduction to CNS (pharmacology) • Patterns of injury in nervous system (Pathology) • Meningitis (Pathology) • Meningitis (Pediatrics) • Spinal injury and head injury (Surgery) • Management of hydrocephalus (Surgery) • Brain abscess (Surgery) • Polytrauma patient (Surgery) • Spinal cord and peripheral nervous system (Medicine) • Encephalitis (Medicine) • Cerebellar disorders (Medicine) • Epilepsy and other convulsive disorders (Medicine) • Stroke (Medicine) • Seizures during pregnancy (eclampsia/ epilepsy) (Gynecology &Obs) • Cerebral palsy, Polio (Pediatrics)

Categorization of Modular Contents

Anatomy

Category A*	Category B**	Category C***			
Special Embryology	**Special Histology**	**Demonstrations / SGD**	**CBL**	**Practical's**	**Self-Directed Learning (SDL)**
• Early CNS Development • Spinal Cord • Hindbrain & Cerebellum • Midbrain • Forebrain • Perepheral Nervous System	• Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• General Anatomy of Nervous System • General Anatomy of Autonomic Nervous System • Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS	• Cystic Astrocytoma of cerebellum • Stroke	• Ganglia • Peripheral Nerves • Spinal Cord • Cerebellum • Cerebrum	• Anterior, Middle & Posterior cranial fossae • Meninges, Dural venous sinuses, and intracranial hemorrhages • Spinal cord & Tracts • Brain stem (Medulla oblongata, Pons, cerebellum & Midbrain) • Diencephalon • Cerebrum • CSF and Ventricular System • Cranial nerves • Basal ganglia • Limbic system & Reticular formation • Blood Supply of Brain • Radiological Imaging of CNS

Category A*: By Professors

Category B:** By Associate & Assistant Professors

Category C*:** By Senior Demonstrators & Demonstrators

Teaching Staff / Human Resource of Department of Anatomy

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1.	Professor of Anatomy department	01
2.	Assistant professor of Anatomy department (AP)	03
3.	Demonstrators of Anatomy department	04

Contact Hours (Faculty)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	9*2 = 18 hours
2.	Small Group Discussions (SGD)	22*1= 22 hours
3.	Practical / Skill Lab	1*5= 5 hours

Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LGIS)	1*9 = 9 hours
2.	Small Group Discussions (SGD)	2*22= 44 hours
3.	Practical / Skill Lab	1.5 *5 = 75 hours
4.	Self-Directed Learning (SDL)	2*10s = 20 hours

Physiology

Category A & B*	Category C***				
LGIS	**PBL**	**CBL**	**Practical's**	**SGD**	**SDL**
• Organization of nervous system, Mechanism of synaptic transmission • Classification of sensory receptors, Properties of sensory receptors • Properties of synaptic transmission • Physiology of pain, Dual pathway for transmission of pain,Analgesia System and Thermal sensations • Sensory pathways for transmitting somatic signals • Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function • Somatosensory cortex & lesions of Somatosensory cortex • Excitatory & inhibitory effects of sympathetic & parasympathetic stimulation • CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture • Concept of Association areas, • Concept of Dominant and non-dominant cerebral hemispheres • Limbic system, • Functions of hypothalamus • Speech and aphasia • Learning and memory • Reticular activating system and sleep • EEG and epilepsy • Introduction to motor nervous system & Reflex action,Conditioned reflexes & Properties of		1. CVA 2. Gullain Barr syndrome	**1.** Examination of sensory nervous system **2.** Examination of Motor System **3.** Examination of **4.** Cerebellar System **5.** Opthalmoscopy **6.** Determination of field of vision	1. Synapse & sensory Receptors 2. Autonomic Nervous System 3. Motor nervous system , muscle spindle and Golgi tendon organ 4. Motor Nervous System 5. Basal Ganglia & limbic system 6. Analgesia system 7. Cerebellum	**On Campus:** **1.** Sensory pathways for transmitting somatic signals **2.** Somatosensory cortex & lesions of Somatosensory cortex **3.** Introduction to autonomic nervous system Basic Characteristics of sympathetic & parasympathetic function **4.** Excitatory & inhibitory effects of sympathetic & parasympathetic **5.** stimulation **6.** CSF, Blood brain barrier, Blood CSF Barrier, Lumber puncture **7.** Limbic system, **8.** Functions of hypothalamus **9.** Learning and memory **10.** Concept of Association areas, Concept of Dominant and nondominant cerebral hemispheres **11.** Speech and aphasia **12.** EEG and epilepsy **13.** **14.** Reticular activating system and sleep **15.** Muscle spindle & Golgi tendon organ, Role of muscle spindle and **16.** Golgi tendon organ in voluntary motor activity **17.** Motor cortex & physiological importance of neocortex, **18.** Corticospinal or pyramidal tract,

reflex action,Control of spinal cord reflexes by higher centers • Introduction to cerebellum, Neuronal circuits of cerebellum, • and its motor functions • Muscle spindle & Golgi tendon organ, Role of muscle spindle and Golgi tendon organ in voluntary motor activity • Manifestations of cerebellar disease • Polysynaptic reflexes & Transection of spinal cord, • Role of brain stem in controlling motor functions & Lesions of motor system • Motor cortex & physiological importance of neocortex, Corticospinal or pyramidal tract, Extra pyramidal system • Basal Ganglia & Lesions					Extra pyramidal system 19. Basal Ganglia & Lesions **Off Campus:** 1. Organization of nervous system 2. Classification of sensory receptors 3. Sensory pathways for transmitting somatic signals 4. Physiology of pain, Dual 5. pathway for 6. transmission of pain, 7. CSF, Blood brain barrier, Blood CSF Barrier, 8. Lumber puncture 9. Muscle spindle & 10. Golgi tendon organ, 11. Hypothalamus 12. Properties of reflex 13. action,Control of spinal cord 14. reflexes by higher centers 15. Reticular activating system 16. and sleep, EEG and epilepsy 17. Introduction to cerebellum, 18. Neuronal circuits of cerebellum 19. Basal Ganglia & Lesions

Category A*: By Professors

Category B:** By Associate & Assistant Professors

Category C*:** By Senior Demonstrators & Demonstrators

Teaching Staff / Human Resource of Department of Physiology

Sr. #	Designation Of Teaching Staff / HumanResource	Total number ofteaching staff
1.	Professor of physiology department	01
2.	Associate professor of physiology department	01
3.	Assistant professor of physiology department (AP)	01
4.	Demonstrators of physiology department	07
5.	Residents of physiology department (PGTs)	08

Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours
1.	Large Group Interactive Session (LECTURES)	1 x 22= 22 x 1 hour = 22 hours
2.	Small Group Discussions (SGD)/CBL	25 x 1.5 hour = 37.5+2= 39.5 hours
3.	Problem Based Learning (PBL)	---
4.	Practical / Skill Lab	25 x 1.5 hour = 37.5 hours
5.	Self-Directed Learning (SDL)	oncampus14 x 1 hour = 14 hours off campus 11x1 = 11 hours

Biochemistry

Category A & B	Category C***			
LGIS	**PBL**	**CBL**	**Practical's**	**SGD**
• Triglyceride Metabolism, Fatty acid transport • Oxidation of fatty acid • Oxidation of fatty acid • Fatty acid synthesis • Cholesterol Synthesis • Plasma Cholesterol level • Ketone bodies metabolism • Biosynthesis of Glycerophospholipid • Biosynthesis of sphingophospholipids • Introduction to Lipoproteins • LDL& HDL • Disorders of lipoprotein metabolism • Fatty liver & Adipose tissues • Disorders of lipoprotein metabolism		• IHD • Respiratory Distress Syndrome	• Estimation of cholesterol • Estimation of Triglyceride • Estimation of HDL	• Triglycerides & F.A. oxidation • Fatty acid synthesis & cholesterol metabolism • Ketone bodies & Phospholipids • Lipoprotein (HDL) • Lipoprotein (VLDL, LDL)

Category A*: By HOD and Assistant Professor

Category B:** By All (HOD, Assistant Professors, Senior Demonstrators)

Category C*:** (By All Demonstrators)

Teaching Staff / Human Resource of Department of Biochemistry

Sr. #	Designation Of Teaching Staff / Human Resource	Total number of teaching staff
1	Assistant professor of biochemistry department (AP)	01
2	Demonstrators of biochemistry department	06

Contact Hours (Faculty) & Contact Hours (Students)

Sr. #	Hours Calculation for Various Type of Teaching Strategies	Total Hours (Faculty)	Total Hours (student)
1.	Large Group Interactive Session (LECTURES)	2 * 5 = 10 hours	05
2.	Small Group Discussions (SGD)	2.5 * 3 = 7.5 hours	7.5
3.	Problem Based Learning (PBL)	2*1= 2 hours	2
4.	Practical / Skill Lab	2.5 * 3 = 7.5 hours	7.5
5.	Self-Directed Learning (SDL)	--------	04

CNS Module (First Week)
(05-06-2023 To 10-06-2023)

Date/Days	8:00am-9:30am	9:30am – 10:20am		10:20am-11:10am		11:10am-12:00pm		12:00pm-12:20pm	12:00pm – 2:00pm	Home Assignments(2HRS)
05-06-2023 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Anatomy (LGIS)**		**Pharmacology**		**B r e a k**	**SGD / Dissection**	SDL Physiology Organization of nervous system, Mechanism of synaptic transmission
		Organization of nervous system, Mechanism of synaptic transmission	Classification of sensory receptors &Properties of sensory receptors	General Anatomy Nervoussystem	Embryology Early development of CNS	Introduction to CNS pharmacology			Anterior and Middle Cranial Fossa	
		Dr. Shmyla (Even)	Prof..Dr. Samia / Dr. Kamil(Odd)	Prof. Dr. Ifra Saeed(Even)	Asst. Prof. Dr. Arsalan Manzoor(Odd)	Dr. Omaima Asif (even)	Dr Arsheen (odd)			
06-06-2023 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Anatomy (LGIS)**		**Pathology**			**SGD / Dissection**	SDL Physiology Classification of sensory receptors
		Classification of sensory receptors &Properties of sensory receptors	Organization of nervous system, Mechanism of synaptic transmission	Embryology Early development of CNS	General anatomy Nervous system	Patterns of injury in nervous system			Posterior cranial fossa	
		Prof. Dr. Sami Sarwar/ Dr. Kamil (Even)	Dr. Shmyla (Odd)	Asst. Prof.Dr. Arsalan Manzoor(Even)	Prof. Dr. Ifra Saeed (Odd)	Dr. Nida Fatima (even)	DrKiran Ahmad (odd)			
07-06-2023 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Behavioral Sciences**		**Anatomy (LGIS)**		**Biochemistry (LGIS)**			**SGD / Dissection**	SDL Biochemistry Chylomicron Metabolism
		Metacognition		Embryology Development of Spinal Cord	General Anatomy Autonomic Nervous System	Triglyceride Metabolism Transport	Introduction to Lipoproteins, chylomicrons, VLDL Metabolism		Meninges , Dural venous sinuses and intracranial hemorrhages	
		Dr. Zarnain Umar(even)	Dr. SadiaYasir(odd)	Asst. Prof .Dr. Arsalan Manzoor(Even)	Prof. Dr. Ifra Saeed (Odd)	Dr. Aneela (Even)	Dr. Isma (Odd)			
08-06-2023 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Anatomy (LGIS)**		**Biochemistry (LGIS)**			**SGD / Dissection**	SDL Anatomy Posterior cranial fossa Dural venous sinuses and intracranial hemorrhages
		Properties of synaptic transmission	Physiology of Pain, dual Pathway for Transmission of pain, Analgesia system and thermal sensation	General anatomy Autonomic Nervous system	Embryology Development of Spinal Cord	Introduction to Lipoproteins, chylomicrons, VLDL Metabolism	Triglyceride Metabolism Transport		Spinal Cord	
		DrShmyla (Even)	Prof..Dr. Samia / Dr. Kamil (Odd)	Prof. Dr. Ifra Saeed (Even)	Asst. Prof. Dr. Arsalan Manzoor(Odd)	Dr. Isma (Even)	Dr. Aneela (Odd)			
09-06-2023 Friday	**8:00am-900am**	**9:00am-10:00am**		**10:00am-11:00am**		**11:00am-12:00pm**				
	Pediatrics	**Physiology (LGIS)**		**Quran Translation**		**Quran Translation**				
	Meningitis	Physiology of Pain, dual Pathway for Transmission of pain, Analgesia system and thermal sensation	Properties of synaptic transmission	Imaniyaat-5		Imaniyaat-6				
	Dr. Mamoona Qudrat(Even) / Dr. Tanzeela Rani(Odd)	Prof..Dr. Samia / Dr. Kamil (Even)	Dr.Shmyla (Odd)	Mufti Naeem Sherazi		Mufti NaeemSherazi(Even)				
10-06-2023 Saturday	**8:00am-9:30am**	**9:30am – 10:20am**		**10:20am-11:10am**		**11:10am-12:00pm**		**12:00pm-12:20pm**	**12:00pm – 2:00pm**	
	Practical & CBL/SGD Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Pathology**		**Physiology SDL No. 1**		**Break**	**SGD / Dissection**	SDL Amatomy Anterior And middle Cranial Fossa
		Sensory Pathways for transmitting Somatic Signals	Introduction to ANS ,Basic Characteristics of Sympathetic & Parasympathetic System	Meningitis		Sensory Pathways for Transmitting somatic Signals			Ascending Tracts and their clinicals	
		Dr.Fahd (Even)	Dr.Uzma (Odd)	Dr. Nida Fatima (even)	Dr. Kiran Ahmad (odd)	Dr. Fahd (Even)	Dr. Usman (Odd)			

Topics For Practical with Venue
• Peripheral Nerve (Anatomy Histology Practical) Venue-Histology laboratory • Color test for Sterols (Biochemistry practical) • (Physiology Practical) Examination of sensory nervous system Venue – Physiology Lab

Topics For Small Group Discussion& CBLs With Venue
• Physiology SGD: Synapse & sensory Receptors (Venue: Lecture Hall No 5) • Biochemistry SGD: Triglyceride Metabolism (Venue: Lecture Hall No 2)

Schedule For Practical / Small Group Discussion

Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD
Monday	**C**	**B**	**E**	**A**	**D**
Tuesday	**D**	**C**	**A**	**B**	**E**
Wednesday	**E**	**D**	**B**	**C**	**A**
Thursday	**B**	**A**	**D**	**E**	**C**

Venue For Second Year Batches for Anatomy Dissection / Small Group Discussion

Batches	Roll No	Anatomy Teacher	Venue
A	01-90	Dr. Gaiti Ara	Lecture Hall No. 04 Anatomy Lecture Hall
B	91-180	Dr. Maryam Sohail	New Lecture Hall Complex Lecture Theater # 01
C	181- 270	Dr. Sajjad Hussain	New Lecture Hall Complex Lecture Theater # 04
D	271 onwards	Dr. Sadia Baqir	Lecture Hall No.03 Anatomy Lecture Hall

Venue For Second Year Batches For PBL & SGD Team-II

Batches	Roll No	Venue	
Batch-A1	(01-35)	New Lecture Hall complex no.01	Dr. Aneela Yasmeen
Batch-A2	(36-70)	New Lecture Hall complex no.04	Dr. Shazia Nosheen
Batch-B1	(71-105)	Demo Room (Basement)	Dr. Kamil
Batch-B2	(106-140)	Demo Room (Basement)	Dr. Iqra Ayub (PGT Physiology)
Batch-C1	(141-175)	Demo Room (Basement)	Dr. Nayab (PGT Physiology)
Batch-C2	(176-210)	Demo Room (Basement)	Dr. Maryam (PGT Physiology)
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)	Dr. Ali Raza (PBL) Dr. Ismail (SGD)
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)	Dr. Almas (PBL) Dr. Najam-us-Sehar (SGD)
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)	Dr. Muhammad Usman
Batch-E2	(315 onwards)	Lecture Hall no.05 Physiology	Dr. Rahat (PBL) Dr. Fareed Ullah (SGD)

Topic Details Of SDL Biochemistry
• Triglyceride Metabolism, Fatty acid Transport
• Fatty Acid Oxidation I

Sr. No	Batch	Roll no	Names of Teachers	
			Biochemistry	Physiology
1.	Batch – A	01-70	Dr. Nayab Ramzan	Dr. Aneela / Dr. Najam-us-Sehar
2.	Batch –B	71-140	Dr. Uzma Zafar	Dr. Shazia Nosheen
3.	Batch – C	141-210	Dr. Romessa	Dr. Nayab / Dr. Usman
4.	Batch –D	211-280	Dr. Rahat Afzal	Dr. Izzah Raashid & Dr. Iqra Ayub
5.	Batch -E	281- onwards	Dr. Almas Ijaz	Dr. Kamil Tahir

Venues for Large Group Interactive Session (LGIS) and SDL

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

CNS Module (Second Week)
(12-06-2023 To 17-06-2023)

Date/Day	8:00am-9:30am	9:30am – 10:20am		10:20am-11:10am		11:10am-12:00pm		12:009m - 12:20pm	12:00pm – 2:00pm	Home Assignments(2HRS)
12-06-2023 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Biochemistry (LGIS)**		**Physiology SDL No. 2**		**Break**	**SGD / Dissection**	SDL Physiology Sensory pathways for transmitting somatic signals-II
		Introduction to ANS ,Basic Characteristics of Sympathetic & Parasympathetic	Sensory Pathways for transmitting Somatic Signals	LDL, HDL metabolism	Fatty Acid Oxidation I	Somato Sensory Cortex & its Lesiouns			Descending Tracts and their clinicals	
		Dr. Uzma (Even)	Dr. Fahd (Odd)	Dr.Isma (Even)	Dr. Aneela (Odd)	Dr. Fahd (Even)	Dr. Ali Zain (Odd)			
13-06-2023 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Anatomy (LGIS)**		**Biochemistry (LGIS)**			**SGD / Dissection**	SDL Physiology Physiology of pain Dual pathway for transmission of pain
		Somatosensory cortex and lesions of somatosensory cortex	Excitatory and inhibitory effects of sympathetic and parasympathetic stimulation	Histology Of spinal cord and peripheral nerve	Embryology Development of Rhombencephalon	Fatty acid oxidation I	LDL, HDL metabolism		**Lesions of Spinal Cord**	
		Dr. Fahd (Even)	Dr. Uzma (Odd)	Asst. Prof. Dr. Maria Tasleem (Even)	Asst. Prof. Dr.Arsalan Manzoo(Odd)	Dr. Aneela (Even)	Dr. Isma (Odd)			
14-06-2023 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Anatomy (LGIS)**		**Surgery**			**SGD / Dissection**	SDL Biochemistry HDL & LDL Metabolism
		Excitatory and inhibitory effects of sympathetic and parasympathetic stimulation	Somatosensory cortex and lesions of somatosensory cortex	Embryology Development of Rhombencephalon	Histology Of spinal cord and peripheral nerve	Spinal injury and Head injury			Medulla Oblongata	
		Dr. Uzma (Even)	Dr. Fahd (Odd)	Asst. Prof. Dr. Arsalan Manzoor (Even)	Asst. Prof. Dr. Maria Tasleem (Odd)	Dr. Soban Sarwar Gondal(Even)	Dr. Usman Malik (Odd)			
15-06-2023 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Research Club Activity**		**Biochemistry (LGIS)**			**SGD / Dissection**	SDL Anatomy Meninges, Spinal ,cord
		Concept of Association areas, Concept of Dominant and non-dominant cerebral hemispheres	CSF, Blood Brain Barrier Blood CSF Barrier, Lumbar puncher			Hyperlipidemia And Fatty Liver	Fatty acid oxidation II		Pons & the Fourth Ventricle	
		Dr. Shazia (Even)	Dr. Maryam (odd)	Reseach team 2		Dr. Isma (Even)	Dr. Aneela (Odd)			
16-06-2023 Friday	**8:00am-900am**	**9:00am-10:00am**		**10:00am-11:00am**		**11:00am-12:00pm**				
	Medicine	**Physiology (LGIS)**		**Radiology**		**SGD/DISSECTION**				
	Spinal cord and peripheral nervous system	CSF, Blood Brain Barrier Blood CSF Barrier, Lumbar puncher	Concept of Association areas, Concept of Dominant and non-dominant cerebral hemispheres	Skull Radiograph		Midbrain				
	Dr Javeria Malik(Even) / Dr Riffat (even)	Dr .Maryam (Even)	Dr. Shazia (odd)	Dr Riffat (even)	Dr Saba (Odd)					

Date/Day	8:00am-9:30am	9:30am – 10:20am		10:20am-11:10am		11:10am-12:00pm		12:009m - 12:20pm	12:00pm – 2:00pm				
17-06-2023 Saturday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (SGD)**		**Anatomy (LGIS)**		**Obs & Gynae**		**Break**	**Pakstudies/Isl**				SDL Anatomy Ascending tracts & Descending tracts
		Analgesia system		Histology of cerebellum	Embryology Development of Mesencephalon & Prosencephalon	Seizures during pregnancy(eclampsia/epilepsy)			musawat	Tehreek-e-Pakistan (1940-1947)	Tehreek-e-Pakistan (1940-1947)	musawat	
		PBL Team - 2											
				Asst. Prof. Dr. Maria Tasleem (Even)	Asst. Prof. Dr. Arsalan Manzoor (Odd)	Dr Ismat Batool (Even)	Dr Sadia Waheed (Odd)		Mufti Naem (Odd	QariAmanUllah (Odd)	QariAman Ullah (Even)	Mufti Naem (Odd)	

Topics For Practical with Venue
• (Anatomy Histology Practical) Peripheral Nerve Venue-Histology laboratory • (Biochemistry Practical) Detection of Cholesterol Crystals • (Physiology Practical) Examination of Motor System Venue – Physiology Lab

Topics For Small Group Discussion& CBLs With Venue
• Physiology SGD: Autonomic Nervous System (Venue: Lecture Hall No 5) • Biochemistry SGD: Fatty Acid Oxidation (Venue: Lecture Hall No 2)

Schedule For Practical / Small Group Discussion

Day	Histology Practical	Biochemistry Practical	Physiology Practical	Physiology SGD	Biochemistry SGD
Monday	**C**	**B**	**E**	**A**	**D**
Tuesday	**D**	**C**	**A**	**B**	**E**
Wednesday	**E**	**D**	**B**	**C**	**A**
Thursday	**B**	**A**	**D**	**E**	**C**

Venue For Second Year Batches For Anatomy Dissection / Small Group Discussion

Batches	Roll No	Anatomy Teacher	Venue
Batch – A	01-70	Dr. Gaiti Ara	Lecture Hall No. 04 Anatomy Lecture Hall
Batch –B	71-140	Dr. Maryam Sohail	New Lecture Hall Complex Lecture Theater # 01
Batch – C	141-210	Dr. Sajjad Hussain	New Lecture Hall Complex Lecture Theater # 04
Batch –D	211-280	Dr. Sadia Baqir	Lecture Hall No.03 Anatomy Lecture Hall

Venue For Second Year Batches For PBL & SGD Team-II

Batches	Roll No	Venue	
Batch-A1	(01-35)	New Lecture Hall complex no.01	Dr. Aneela Yasmeen
Batch-A2	(36-70)	New Lecture Hall complex no.04	Dr. Shazia Nosheen
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)	Dr. Kamil
Batch-B2	(106-140)	Conference room (Basement)	Dr. Iqra Ayub (PGT Physiology)
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)	Dr. Nayab (PGT Physiology)
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)	Dr. Maryam (PGT Physiology)
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)	Dr. Ali Raza (PBL) Dr. Ismail (SGD)
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)	Dr. Almas (PBL) Dr. Najam-us-Sehar (SGD)
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)	Dr. Muhammad Usman
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology	Dr. Rahat (PBL) Dr. Fareed Ullah (SGD)

Topic Details Of SDL Biochemistry
• Hyperlipidemia And Fatty Liver

Sr. No	Batch	Roll no	Names of Teachers	
			Biochemistry	Physiology
1.	Batch – A	01-70	Dr. Nayab Ramzan	Dr. Aneela / Dr. Najam-us-Sehar
2.	Batch – B	71-140	Dr. Uzma Zafar	Dr. Shazia Nosheen
3.	Batch – C	141-210	Dr. Romessa	Dr. Nayab / Dr. Usman
4.	Batch – D	211-280	Dr. Rahat Afzal	Dr. Izzah Raashid & Dr. Iqra Ayub
5.	Batch -E	281-onwards	Dr. Almas Ijaz	Dr. Kamil Tahir

Venues for Large Group Interactive Session (LGIS) and SDL	
Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

CNS Module (Third Week)
(19-06-2023 TO 24-06-2023)

Date/Day	8:00am-9:30am	9:30am – 10:20am		10:20am-11:10am		11:10am-12:00pm		12:00pm – 12:20pm	12:00pm – 2:00pm	Home Assignments(2HRS)
19-06-2023 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Anatomy (LGIS)**		**Physiology SDL No. 3**		**Break**	**SGD / Dissection**	SDL Physiology CSF, BBB, Blood CSF Barrier, LP
		Speech and aphasia	Limbic system, Functions of hypothalamus	Embryology Development of Mesencephalon & Prosencephalon	Histology of cerebellum	CSF, BBB, Blood CSF Barrier, Lumbar puncher			Cerebellum	
		Dr. Shazia (Even)	Dr. Maryam (Odd)	Asst. Prof. Dr. Arsalan Manzoor (Even)	Asst. Prof. Dr. Maria Tasleem (Odd)	Dr. Maryam (Even)	Dr. Iqra (odd)			
20-06-2023 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Biochemistry (LGIS)**		**Physiology SDL No. 4**			**SGD / Dissection**	SDL Physiology Muscle spindle & Golgi tendon organ
		Limbic system, Functionsof hypothalamus	Speech and aphasia	Hyperlipidemia & Fatty Liver	Fatty acid Oxidation-II	Introduction to ANS			Thalamus, Epithalamus, Subthalamus	
		Dr. Maryam (Even)	Dr. Shazia (Odd)	Dr. Isma (Even)	Dr. Aneela (Odd)	Dr. Uzma (Even)	Dr. Najam us Sehar (Odd)			
21-06-2023 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Biochemistry (LGIS)**		**Physiology SDL No. 5**			**SGD / Dissection**	SDL Biochemistry Fatty acid oxidation
		Learning & Memory	Reticular Activating System & Sleep	Fatty acid synthesis	Cholesterol synthesis and regulation, hypercholesterolemia	Limbic System & function of Hypothalamus			Hypothalamus	
		Dr. Maryam (Even)	Dr. Fahd (Odd)	Dr Aneela (Even)	Dr. Isma (Odd)	Dr. Maryam (Even)	Dr. Iqra (Odd)			
22-06-2023 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Biochemistry (LGIS)**		**Medicine (LGIS)**			**SGD / Dissection**	SDL Anatomy Medulla Oblongata & Pons & Cerebellum
		Reticular Activating System & Sleep	Learning & Memory	Cholesterol synthesis and regulation, hypercholesterolemia	Fatty acid synthesis	Cerebellar disorders			Cortical areas, Layers and Lesions of Cerebrum	
		Dr. Fahd (Even)	Dr. Maryam (Odd)	Dr. Aneela (Even)	Dr Isma (Odd)	Dr Javeria Malik(Even)	Dr Faran Maqbool(Odd)			
23-06-2023 Friday	**8:00 AM – 9:00 AM**	**9:00 AM – 10:00 AM**		**10:00– 11:00AM**	**11:00AM – 12:00PM**					
	Biochemistry (LGIS)	**Physiology (LGIS)**		**SGD / Dissection**						
	Metabolism of Glycerophospholipids and siphonophore lipid	Ketone body metabolism	EEG & Epilepsy	Introduction to Moto Nervous System & reflex action, Conditional Reflexes & Its Properties, Control of Spinal cord Reflexes by Higher Centers	Dissection					
	Dr. Isma (Even)	Dr. Aneela (Odd)	Dr. Maryam (Even)	Dr Sidra (Odd)						

Date/Day	8:00am-9:30am	9:30am – 10:20am	10:20am-11:10am		11:10am - 12:00pm	12:00pm – 12:20pm		
24-06-2023 Saturday	**Practical & CBL/SGD**	**Physiology (LGIS)**	**Surgery**	**Medicine**	**Break**	**Isl & Pakst**	**Isl & Pakst**	SDLAnatomy Diencephalon

	Topics & Venue Mentioned at the end											*Online SDL Evaluation
		EEG & Epilepsy	Introduction to Moto Nervous System & reflex action, Conditional Reflexes & Its Properties, Control of Spinal cord Reflexes by Higher Centers	Management of hydrocephalus		Epilepsy and other convulsive disorders			Khwateen k hakook	Qayam e Pakistan, ibtidaimushkilaat	Qayam e Pakistan, ibtidaimushkilaat	Khwateen k hakook
		Dr Sidra (Even)	Dr. Maryam (Odd)	Dr. Fraz Mehmood (Even)	Dr. Ammad ul Haq (Odd)	Dr Javeria Malik (Even)	Dr Faran Maqbool (Odd)		Mufti NaemSherai (Even)	QariAmanUllah (Odd)	QariAmanUllah(Even)	Mufti NaemSherai (Odd)

Topics For Practical with Venue
• (Anatomy Histology Practical) Spinal Cord Venue-Histology laboratory • (Biochemistry Practical) Estimation of serum TAGS • (Physiology Practical) Examination of Cerebellar System Venue – Physiology Lab

Topics For Small Group Discussion& CBLs With Venue
• Physiology SGDs: Motor nervous system, muscle spindle and Golgi tendon organ (Venue: Lecture Hall No 5) • Biochemistry CBL: Respiratory Distress syndrome (Venue: Lecture Hall No 2)

Schedule For Practical / Small Group Discussion					
Day	**Histology Practical**	**Biochemistry Practical**	**Physiology Practical**	**Physiology SGD**	**Biochemistry SGD**
Monday	**C**	**B**	**E**	**A**	**D**
Tuesday	**D**	**C**	**A**	**B**	**E**
Wednesday	**E**	**D**	**B**	**C**	**A**
Thursday	**B**	**A**	**D**	**E**	**C**

Venue For Second Year Batches For Anatomy Dissection / Small Group Discussion			
Batches	**Roll No**	**Anatomy Teacher**	**Venue**
Batch – A	01-70	Dr. Gaiti Ara	Lecture Hall No. 04 Anatomy Lecture Hall
Batch –B	71-140	Dr. Maryam Sohail	New Lecture Hall Complex Lecture Theater # 01
Batch – C	141-210	Dr. Sajjad Hussain	New Lecture Hall Complex Lecture Theater # 04
Batch –D	211-280	Dr. Sadia Baqir	Lecture Hall No.03 Anatomy Lecture Hall

Venue For Second Year Batches For PBL & SGD Team-II			
Batches	Roll No	Venue	
Batch-A1	(01-35)	New Lecture Hall complex no.01	Dr. Aneela Yasmeen
Batch-A2	(36-70)	New Lecture Hall complex no.04	Dr. Shazia Nosheen
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)	Dr. Kamil
Batch-B2	(106-140)	Conference room (Basement)	Dr. Iqra Ayub (PGT Physiology)
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)	Dr. Nayab (PGT Physiology)
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)	Dr. Maryam (PGT Physiology)
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)	Dr. Ali Raza (PBL) Dr. Ismail (SGD)
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)	Dr. Almas (PBL) Dr. Najam-us-Sehar (SGD)
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)	Dr. Muhammad Usman
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology	Dr. Rahat (PBL) Dr. Fareed Ullah (SGD)

Sr. No	Batch	Roll no	Names of Teachers	
			Biochemistry	Physiology
1.	Batch – A	01-70	Dr. Nayab Ramzan	Dr. Aneela / Dr. Najam-us-Sehar
2.	Batch –B	71-140	Dr. Uzma Zafar	Dr. Shazia Nosheen
3.	Batch – C	141-210	Dr. Romessa	Dr. Nayab / Dr. Usman
4.	Batch –D	211-280	Dr. Rahat Afzal	Dr. Izzah Raashid & Dr. Iqra Ayub
5.	Batch -E	281-onwards	Dr. Almas Ijaz	Dr. Kamil Tahir

Topic Details Of SDL Biochemistry
• Fatty acid synthesis
• Ketone body metabolism

Venues for Large Group Interactive Session (LGIS) and SDL	
Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

26th June,2023 To 22nd July, 2023	Summer Vacations & Eid Ul Azha Holidays

CNS Module (Fourth Week)
(24-07-2023 To 29-07-2023)

Date/Day	8:00am-9:30am	9:30am – 10:20am	10:20am-11:10am	11:10am-12:00pm	12:00pm – 12:20pm	12:00pm – 2:00pm	Home Assignments(2HRS)
24-07-2023 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology SDL No. 6** EEG & Epilepsy Dr Maryam (Even) / Dr. Iqra (Odd)	**Anatomy (LGIS)** Histology of Cerebrum / Embryology Development of Peripheral and Autonomic Nervous System Asst. Prof. Dr.Maria Tasleem (Even) / Asst. Prof. Dr.Arsalan Manzoor (Odd)	**PBL Session-II** PBL Team	**Break**	**SGD / Dissection** Lateral ventricle, Ventricular system, CSF and Blood Brain Barrier	SDL Physiology Hypothalamus
25-07-2023 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology SDL No 7** Reticular Activating System & Sleep Dr Fahd (Even) / Dr. Ali Zain (Odd)	**Anatomy (LGIS)** Embryology Development of Peripheral and Autonomic Nervous System / Histology of Cerebrum Asst. Prof. Dr. Arsalan Manzoor(Even) / Asst. Prof. Dr. Maria Tasleem(Odd)	**Medicine** Encephalistis Dr Javeria Malik (Even) / Dr Faran Maqbool(Odd)		**SGD / Dissection** Cranial nerves-I,II,II,IV,VI	SDL Physiology Properties of reflex action, Control of spinal cord reflexes by higher centers
26-07-2023 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology SDL No 8** Motor Cortex & Physiological Importance of Neocortex, Cortico Spinal or pyramidal Tract Extra Pyramidal System Dr Maryam (Even) / Dr Iqra (Odd)	Biochemistry SDL Glycerophospholipids & Sphingolipids	**Radiology** CT Scan and MRI (Brain and Spinal Cord) Dr Anum Zahoor (even) / Dr Faisal (odd)		**SGD / Dissection** Cranial nerves-V,VII	SDL Biochemistry Synthesis &Interconversion of Ketone Bodies (diagrammatically) Regulation of Ketogenesis Ketolysis
27-07-2023 THURSDAY	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Practical & CBL/SGD** Topics & Venue Mentioned at the end. Thursday Schedule	**SGD / Dissection** Cranial Nerves VIII-XII		**Break**	**Physiology SDL No.9** Learning & Memory Dr Nayab (Even) / Dr. Iqra (Odd)	SDL anatomy Cranial Nerves 1-7
28-07-2023 FRIDAY	Ashura Holidays						
29-07-2023 SATURDAY							

Topics For Practical with Venue
• (Anatomy Histology Practical) Cerebellum Venue-Histology laboratory • (Biochemistry Practical) Estimation of Serum HDL • (Physiology Practical) Ophthalmoscopy Venue – Physiology Lab

Topics For Small Group Discussion& CBLs With Venue
• Physiology SGD: Motor Nervous System (Venue: Lecture Hall No 5) • Biochemistry CBL: Ischemic Heart disease (Venue :Lecture Hall No 2)

Schedule For Practical / Small Group Discussion

Day	**Histology Practical**	**Biochemistry Practical**	**Physiology Practical**	**Physiology SGD**	**Biochemistry SGD**
Monday	**C**	**B**	**E**	**A**	**D**
Tuesday	**D**	**C**	**A**	**B**	**E**
Wednesday	**E**	**D**	**B**	**C**	**A**
Thursday	**B**	**A**	**D**	**E**	**C**

Venue For Second Year Batches For Anatomy Dissection / Small Group Discussion

Batches	**Roll No**	**Anatomy Teacher**	**Venue**
Batch – A	01-70	Dr. Gaiti Ara	Lecture Hall No. 04 Anatomy Lecture Hall
Batch –B	71-140	Dr. Maryam Sohail	New Lecture Hall Complex Lecture Theater # 01
Batch – C	141-210	Dr. Sajjad Hussain	New Lecture Hall Complex Lecture Theater # 04
Batch –D	211-280	Dr. Sadia Baqir	Lecture Hall No.03 Anatomy Lecture Hall

Venue For Second Year Batches For PBL & SGD Team-II

Batches	Roll No	Venue	
Batch-A1	(01-35)	New Lecture Hall complex no.01	Dr. Aneela Yasmeen
Batch-A2	(36-70)	New Lecture Hall complex no.04	Dr. Shazia Nosheen
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)	Dr. Kamil
Batch-B2	(106-140)	Conference room (Basement)	Dr. Iqra Ayub (PGT Physiology)
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)	Dr. Nayab (PGT Physiology)
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)	Dr. Maryam (PGT Physiology)
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)	Dr. Ali Raza (PBL) Dr. Ismail (SGD)
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)	Dr. Almas (PBL) Dr. Najam-us-Sehar (SGD)
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)	Dr. Muhammad Usman
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology	Dr. Rahat (PBL) Dr. Fareed Ullah (SGD)

Sr. No	Batch	Roll no	Names of Teachers	
			Biochemistry	Physiology
1.	Batch – A	01-70	Dr. Nayab Ramzan	Dr. Aneela / Dr. Najam-us-Sehar
2.	Batch –B	71-140	Dr. Uzma Zafar	Dr. Shazia Nosheen
3.	Batch – C	141-210	Dr. Romessa	Dr. Nayab / Dr. Usman
4.	Batch –D	211-280	Dr. Rahat Afzal	Dr. Izzah Raashid & Dr. Iqra Ayub
5.	Batch -E	281-onwards	Dr. Almas Ijaz	Dr. Kamil Tahir

Venues for Large Group Interactive Session (LGIS) and SDL

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

Topic Details Of SDL Biochemistry

- Synthesis &Interconversion of Ketone Bodies (diagrammatically)
- Synthesis of Cholesterol (diagrammatically)
- Regulation of Ketogenesis
- Ketolases
- Regulation of Cholesterol Synthesis
- Regulation of HMGCOA

CNS Module (Fifth Week)
(31-07-2023 TO 05-08-2023)

DATE/DAY	8:00am-9:30am	9:30am – 10:20am		10:20am-11:10am		11:10am-12:00pm		12:00pm – 12:20pm	12:00pm – 2:00pm	Home Assignments(2HRS)
31-07-2023 Monday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Medicine**		**Family Medicine**		**Break**	**SGD / Dissection**	SDL Physiology Introduction to cerebellum Neuronal circuits of cerebellum
		EEG & Epilepsy	Introduction to Moto Nervous System & reflex action, Conditional Reflexes & Its Properties, Control of Spinal cord Reflexes by Higher Centers	Stroke		Approach to a patient with neuronal disease			Basal Ganglia	
		Dr Sidra (Even)	Dr. Maryam (Odd)	Dr Javeria Malik(Even)	Dr Faran Maqbool (Odd)	Dr. Sadia				
01-08-2023 Tuesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Physiology (LGIS)**		**Behavioral Sciences**			**SGD / Dissection**	SDL Physiology Basal Ganglia & Lesions
		Introduction to Cerebellum, Neuronal Circuits of Cerebellum & Its Motor functions	Muscle Spindle & Golgi Tendon organ, role of muscle spindle & Golgi tendon organ in voluntary motor activity	Muscle Spindle & Golgi Tendon organ, role of muscle spindle & Golgi tendon organ in voluntary motor activity	Introduction to Cerebellum, Neuronal Circuits of Cerebellum & Its Motor functions	Memory & Emotions			Limbic system and Reticular Formation	
		Dr. Shmyla (Even)	Dr. Sidra (Odd)	Dr. Sidra (Even)	Dr. Shmyla (Odd)	Dr. M. Azeem Rao (Even))	Dr. Zarnain Umar (Odd)			
02-08-2023 Wednesday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Physiology (LGIS)**		**Surgery**			**SGD / Dissection**	SDL Biochemistry Synthesis of Cholesterol and its regulation Online Clinical Evaluation
		Manifestations of Cerebellar Disease	Poly synaptic reflexes & transaction of spinal cord, role of brain stem in controlling motor function & lesions of motor system	Poly synaptic reflexes & transaction of spinal cord, role of brain stem in controlling motor function & lesions	Manifestations of Cerebellar Disease	Poly trauma patient			Blood supply of Brain and Clinicals	
		Dr Shymla (Even)	Dr. Sidra (Odd)	Dr. Sidra (Even)	Dr Shymla (Odd)	Dr. Fraz Mehmood (Even)	Dr. Ali Tasaddaq (Odd)			
03-08-2023 Thursday	**Practical & CBL/SGD** Topics & Venue Mentioned at the end	**Physiology (LGIS)**		**Biochemistry (LGIS)**		**Physiology (LGIS)**			**SGD / Dissection**	SDL Anatomy Cranial nerves 8-12, Basal Ganglia, Limbic system and Reticular Formation
		Basal Ganglia & Lesions	Motor Cortex & Physiological importance of Neocortex, Cortico Spinal or Pyramidal tracked, Extra pyramidal Systems	Metabolism of Glycerophospholipids and sphingophospholipid		Motor Cortex & Physiological importance of Neocortex, Cortico Spinal or Pyramidal tracked, Extra pyramidal Systems	Basal Ganglia & Lesions		Radiological Imaging of CNS	
		Dr. Uzma (Even)	Dr Maryam (Odd)	Dr. Isma (Even)	Dr. Aneela (Odd)	Dr Maryam (Even)	Dr. Uzma (Odd)			
04-08-2023 Friday	**8:00 AM – 9:00 AM**	**9:00 AM – 10:00 AM**		**10:00 – 11:00AM**		**11:00AM – 12:00PM**				
	Practical & CBL/SGD Topics & Venue Mentioned at the end	**SGD/ Dissection**		**Quran Translation IV**		**Quran Translation V**				
		Dissection		Momalat-I		Momalat-II				
				Mufti Naeem Sherazi		Mufti Naeem Sherazi				
05-08-2023 Saturday	SDL									

Topics For Practical with Venue
• (Anatomy Histology Practical) Cerebrum. Venue-Histology laboratory • (Biochemistry Practical) Lipid Solubility & Acrolein test • (Physiology Practical) Determination of field of vision Venue – Physiology Lab

Topics For Small Group Discussion& CBLs With Venue
• Physiology SGD: Basal Ganglia & limbic system (Venue: Lecture Hall No 5) • Biochemistry SGD: Ketone body metabolism (Venue :Lecture Hall No 2)

Schedule For Practical / Small Group Discussion

Day	**Histology Practical**	**Biochemistry Practical**	**Physiology Practical**	**Physiology SGD**	**Biochemistry SGD**
Monday	**C**	**B**	**E**	**A**	**D**
Tuesday	**D**	**C**	**A**	**B**	**E**
Wednesday	**E**	**D**	**B**	**C**	**A**
Thursday	**B**	**A**	**D**	**E**	**C**

Venue For Second Year Batches For Anatomy Dissection / Small Group Discussion

Batches	**Roll No**	**Anatomy Teacher**	**Venue**
Batch – A	01-70	Dr. Gaiti Ara	Lecture Hall No. 04 Anatomy Lecture Hall
Batch –B	71-140	Dr. Maryam Sohail	New Lecture Hall Complex Lecture Theater # 01
Batch – C	141-210	Dr. Sajjad Hussain	New Lecture Hall Complex Lecture Theater # 04
Batch –D	211-280	Dr. Sadia Baqir	Lecture Hall No.03 Anatomy Lecture Hall

Venue For Second Year Batches For PBL & SGD Team-II

Batches	Roll No	Venue	
Batch-A1	(01-35)	New Lecture Hall complex no.01	Dr. Aneela Yasmeen
Batch-A2	(36-70)	New Lecture Hall complex no.04	Dr. Shazia Nosheen
Batch-B1	(71-105)	Lecture Hall no.02 (Basement)	Dr. Kamil
Batch-B2	(106-140)	Conference room (Basement)	Dr. Iqra Ayub (PGT Physiology)
Batch-C1	(141-175)	Lecture Hall no.04 (Basement)	Dr. Nayab (PGT Physiology)
Batch-C2	(176-210)	Lecture Hall no.05 (Basement)	Dr. Maryam (PGT Physiology)
Batch-D1	(210-245)	Lecture Hall no.03 (First Floor)	Dr. Ali Raza (PBL) Dr. Ismail (SGD)
Batch-D2	(246-280)	Anatomy Museum (First Floor Anatomy)	Dr. Almas (PBL) Dr. Najam-us-Sehar (SGD)
Batch-E1	(281-315)	Lecture Hall no.04 (First Floor Anatomy)	Dr. Muhammad Usman
Batch-E2	(315 onwards)	Lecture Hall no.05Physiology	Dr. Rahat (PBL) Dr. Fareed Ullah (SGD)

Sr. No	Batch	Roll no	Names of Teachers	
			Biochemistry	Physiology
1.	Batch – A	01-70	Dr. Nayab Ramzan	Dr. Aneela / Dr. Najam-us-Sehar
2.	Batch –B	71-140	Dr. Uzma Zafar	Dr. Shazia Nosheen
3.	Batch – C	141-210	Dr. Romessa	Dr. Nayab / Dr. Usman
4.	Batch –D	211-280	Dr. Rahat Afzal	Dr. Izzah Raashid & Dr. Iqra Ayub
5.	Batch -E	281-onwards	Dr. Almas Ijaz	Dr. Kamil Tahir

Venues for Large Group Interactive Session (LGIS) and SDL

Odd Roll Numbers	New Lecture Hall Complex Lecture Theater # 01
Even Roll Number	New Lecture Hall Complex Lecture Theater # 04

Next week will be assessment week. The detail of assessment week will be shared once finalized.

CNS Module (Sixth Week)
(07-08-2023 to 12-08-2023)

Date / Day	8:00 AM – 9:00 AM	12:00-02:00pm
07-08-2023 Monday	Anatomy Regional Assessment (Roll No 1-180) Physiology Viva Voce (Roll No 181-onwards) (08:00am To 02:00pm)	
08-08-2023 Tuesday	Physiology Viva Voce (Roll No 1-180) Anatomy Regional Assessment (Roll No 181-onwards) (08:00am To 02:00pm)	
9-08-2023 Wednesday	Anatomy Theory/ Gross OSPE	
10-08-2023 Thursday	Physiology Theory/ Video Assisted Quiz	
11-08-2023 Friday	Biochemistry Written- Clinical & Quran Translation	
12-08-2023 Saturday	Integrated OSPE	

Note: Detailed notice regarding content, time and venue will be issued accordingly

Note: Timetable Subject to change according to the current circumstances.

SECTION-VI

Table of Specification (TOS) For CNS Module Examination

Sr. #	Discipline	No. of MCQs (%)	No. of MCQs according to cognitive domain			No. of SEQs (%)		No. of SEQs according to cognitive domain			Viva voce	Integrated OSPE	Total Marks
			C1	C2	C3	No. of items	Marks	C1	C2	C3			
1.	Anatomy	25	15	5	5	5	25	1	2	2	50	15(Integrated) + 30(Gross)	145
2.	Physiology	40	24	12	4	4	20	1	2	1	50	18	128
3.	Biochemistry	12	6	5	1	2	15	0.5	1.5	-	-	06	28
4.	Bioethics Professionalism	3	-	2	1	-	-	-	-	-	-		3
5.	Research, Artificial Intelligence & Innovation	2	-	1	1	-	-	-	-	-	-		2
6.	Pathology	2	-	1	1	-	-	-	-	-	-		2
7.	Medicine	2	-	1	1	-	-	-	-	-	-		2
8.	Surgery	2	-	1	1	-	-	-	-	-	-		2
9.	Obs & Gynecology	3	-	1	2	-	-	-	-	-	-		3
10.	Community Medicine	2	-	1	1	-	-	-	-	-	-		2
11.	Pediatrics	2		1	1								2
12.	Family Medicine	1		1									1
Grand Total													320

Table of Specification for Integrated OSPE

Anatomy					
Sr. #	**Topics**	**Knowledge**	**Skill**	**Attitude**	**Marks**
Block II – Reproduction & CNS					
1	Development of Reproductive System	30%	50%	20%	3
2	Development of Nervous System				3
3	Microscopic anatomy of Reproductive System				3
5	Microscopic anatomy of Nervous System				3
Physiology					
1	Examination of sensory system	30%	50%	20%	3
2	Examination of motor system				3
3	Examination of cerebellar functions				3
4	Examination of cranial nerves				3
5	Performance of pregnancy test				3
6	Practical note book / sketch copy				3
Biochemistry					
1	Quantitative estimation of Serum Uric Acid	100%			2
2	Quantitative estimation of Serum Cholesterol				
3	Quantitative estimation of Serum HDL Cholesterol	100%	90%	10%	2
4	Quantitative estimation of Serum LDL Cholesterol				
5	Quantitative estimation of Serum Triglycerides (TAG)	100%	80%	20%	2
6	Practical notebook				

Table of Specification for Gross Anatomy OSPE

Sr. #	Topics	Knowledge	Skill	Attitude	Marks
Block II- Pelvis and CNS					
1	Bones of pelvis	30%	50%	20%	3
2	Structures of Male pelvis				3
3	Structures of Female pelvis				3
4	External genitalia				3
5	Radiology of Pelvis				3
6	Meninges				3
7	Brain Stem and cerebellum				3
8	Diencephalon and telencephalon				3
9	Cranial fossae				3
10	Radiology of Skull (cranial fossae)				3

Annexure I

(Sample MCQ, SEQ & OSPE Papers)

RAWALPINDI MEDICAL UNIVERSITY, RWP
ANATOMY DEPARTMENT
2nd Year MBBS Module Exam (CNS)

1. A patient was unable to maintain his balance with feet & heel close together. He was also unable to detect sensations of vibration when vibrating tuning fork was placed on joints of lower limb. Which of the following spinal cord tract is likely to be effected?
    a. Rubrospinal
    b. Corticospinal
    c. Fasciculus gracilis
    d. Fasciculus cuneatus
    e. Lateral spinothalamic

2. A diagnosed case of hypertension presented with weakness of left lower limb and difficulty in movements. On examination he also had impaired sensations of two point discrimination and vibration. On protrusion of the tongue it deviated to right side. Depending on the knowledge of Neuroanatomy which part is affected?
    a. Midbrain
    b. Pons
    c. Medulla oblongata
    d. Cerebellum
    e. Hypothalamus

3. A 75-year-old female suffered a stroke that produced loss of pain and temperature sensations from the left side of her face (along her forehead, cheek, and jaw). She had no other sensory or motor losses. Her physician advised MRI of brain to rule out the cause. Which structure is most likely to be suffered?
    a. Left medial lemniscus
    b. Right spinal trigeminal nucleus
    c. Left spinothalamic tract
    d. Right spinothalamic tract
    e. Left spinal trigeminal nucleus

4. Computed tomography (CT) scan showed an area of hemorrhage in the region of the calcarine fissure. To determine the most likely neurologic deficit produced by this hematoma, which test should be performed?
    a. Rapid independent finger movements
    b. Visual fields
    c. Cognitive functions in word definition
    d. Tongue movements
    e. Muscle tone and coordination

5. Internal capsule is a white matter structure situated in each cerebral hemisphere. Which one of the following passes through the sublentiform part of internal capsule?
    a. Optic Radiation
    b. Auditory Radiation
    c. Temporopontine fibres
    d. Anterior Thalamic radiation
    e. Corticonuclear fibres

RAWALPINDI MEDICAL UNIVERSITY
CNS MODULE EXAM 2ND YEAR MBBS
ANATOMY SEQS

Note: Attempt all questions. All questions carry equal marks. Draw diagram where necessary

1. a. A 45-year-old man was brought to OPD. His family explained that he had been experiencing progressive weakness and difficulty in walking. They also mentioned that he had a respiratory infection a few weeks ago. After examination and tests he was diagnosed as a case of Guillain Barre Syndrome affecting peripheral nervous system. Draw the histological section of structure affected in this condition. (3)

   b. Enlist the cells present in different layers of cerebrum. (2)

2. a. Tabulate the adult derivatives from walls and cavities of primary and secondary brain vesicles. (2.5)

   b. A 25-year-old male, presented with intractable headache, dizziness, and coordination difficulties. MRI confirmed cerebellar tonsillar herniation due to congenital malformation. Describe its embryological basis? What complication can arise in this case? (2.5)

RAWALPINDI MEDICAL UNIVERSITY
CNS MODULE 2ND YEAR MBBS
PHYSIOLOGY MCQS

1. Neurotransmitter concerned with slow chronic pain is:
    a. glutamate
    b. acetyl choline
    c. GABA
    d. substance P
    e. calcitonin gene-related peptide

2. The movement that is integrated at spinal cord level is:
    a. Turning of head
    b. Turning of eyes
    c. Walking
    d. Writing
    e. Jumping

3. A 62-year-old male is evaluated by a neurologist after a stroke. The doctor observed defect in sequencing & coordination of motor activities. The organ damaged is:
    a. Cerebellum
    b. Medulla
    c. Cortical motor strip
    d. Pons
    e. Eighth cranial nerve

4. When the awake person's attention is directed to some specific type of mental activity, the alpha waves in EEG are replaced by:
    a. Theta waves
    b. Delta waves
    c. Beta waves
    d. Gamma waves
    e. Epsilon waves

5. When the awake person's attention is directed to some specific type of mental activity, the alpha waves in EEG are replaced by:
    a. Theta waves
    b. Delta waves
    c. Beta waves
    d. Gamma waves
    e. Epsilon waves

RAWALPINDI MEDICAL UNIVERSITY
CNS MODULE 2ND YEAR MBBS
PHYSIOLOGY SEQS

Q.1 a) Compare dorsal column medial leminiscal system and antrolateral system for transmission of sensory nervous system? **(3)**

b) Describe the role of golgi tendon organ in inverse stretch reflex. **(2)**

Q.2 . a) Give the physiological basis of sleep. **(2)**

b) What is turn on and turn off phenomenon. Why knee jerk becomes pendular in lesion of cerebellum. **(3)**

RAWALPINDI MEDICAL UNIVERSITY DEPARTMENT OF BIOCHEMISTRY
2ND YEAR MBBS
CNS MODULE

1. Oxidation of fatty acid decrease in:

a. Starvation
b. Diabetes mellitus
c. Decreased intake of carbohydrate in diet
d. Well fed state
e. Excessive carnitine

3.Inherited defect in enzymes of β oxidation cause:

a. Hyperglycemia
b. Ketoacidosis
c. Hypoglycemia
d. Fatty liver
e. Methylmalonic aciduria

2. 3- hydroxybutyrate:

a. Synthesis is increased after high carbohydrate diet
b. Synthesis is dependent on NADPH
c. Is increased in ketoacidosis
d. Is mainly excreted from lungs during respiration
e. Is directly converted to acetone.

4. The committed step in the biosynthesis of cholesterol from acetyl CoA is:

a. Formation of acetoacetyl CoA from acetyl CoA
b. Formation of mevalonate from HMG – CoA
c. Formation of HMG-CoA from acetyl – CoA and acetoacetyl – CoA
d. Formation of squalene by squalene synthase
e. Formation of lanosterol by cyclization of squalene

SEQ

Q. a. Describe the metabolism of chylomicrons. 03

b. Discuss causes of carnitine deficiency. 02

1. ----Includes rules of conduct that may be used to regulate our activities concerning the biological world.

a. Bio-piracy
b. Biosafety
c. Bioethics
d. Bio-patents
e. Bio-logistic

2. The right of patients having self-decision is called.

a. Justice
b. Autonomy
c. Beneficence
d. Veracity
e. Fidelity

3. Following is not code of ethics.

a. Integrity
b. Objectivity
c. Confidentiality
d. Behaviour
e. Autonomy

4. -------in the context of medical ethics, if it's fair and balanced

a. Justice
b. Autonomy
c. Beneficence
d. Veracity
e. Fidelity

5. ------Principle requiring that physicians provide, positive benefits

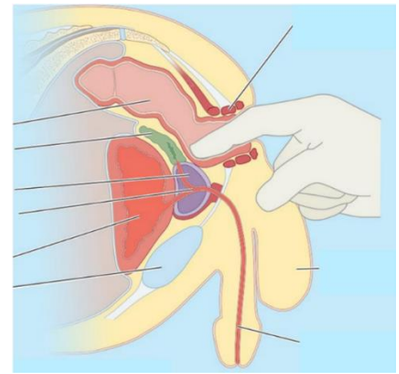
a. Justice
b. Autonomy
c. Beneficence
d. Veracity
e. Fidelity

RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI
DEPARTMENT OF ANATOMY
2nd Year MBBS OSPE Block-II

Station No. 1 Time Allowed: 2 Min

Histology sketch copy will be assessed for

a. Complete index (1)
b. Complete and signed diagrams (1)
c. 2 ID points mentioned with each diagram (1)
d. Punctuality (1)
e. Neatness (1)



Station No. 2 Time Allowed: 2 Min

a. Identify Red (1)
b. Identify Yellow (1)
c. Identify Green (1)
d. Look at the picture given below and answer the following questions

IV a. What is this examination called? (1)
b. Which structure is examined by this technique? (1)

RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI
DEPARTMENT OF PHYSIOLOGY
2nd Year MBBS OSPE Block-II

Station No. Time Allowed: 2 Minutes

MRI of a patient suggests thrombosis of superior cerebellar artery,

a. Enlist some signs & symptoms exhibited. (2)

b. Will he experience any motor deficit? (0.5)

c. Grade his reflexes (0.5)

Station No. Time Allowed: 2 Minutes

a. Which cranial nerve assessed with the given instrument. (0.5)

b. Give afferent & efferent of gag reflex. (0.5)

c. How will you assess XII nerve? (2)

RAWALPINDI MEDICAL UNIVERSITY, RAWALPINDI
DEPARTMENT OF BIOCHEMISTRY
2nd Year MBBS OSPE Block-II

Station No. 1 Time Allowed: 2 Mins

Observed Station

Pipette out 100 microliters from given solution 03

Station No. 2 Time Allowed: 2 Mins

Observed Station

Observe the slide under the microscope. Give one identifying feature. 03