GANDHARA UNIVERSITY
KABIR MEDICAL COLLEGE



2ND YEAR MBBS 2026-27
BLOCK – IV (Module VII & VIII)

DEPARTMENT OF MEDICAL EDUCATION
GANDHARA UNIVERSITY PESHAWAR

MESSAGE FROM THE VICE CHANCELLOR

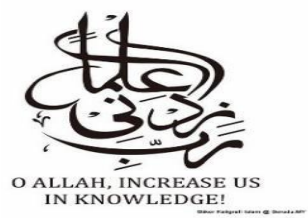


Welcome to Gandhara University. Our aim is to help you grow from learners into confident health professionals who are motivated to serve humanity. The University and its colleges are fully recognized by national and international bodies, ensuring your education meets the highest standards.

With experienced faculty, modern facilities, and a strong IT system to support both classroom and online learning, we are committed to providing you with the best environment for academic and personal growth.

We believe our students are our greatest strength. Along with professional skills, we focus on leadership and character development so you can contribute positively to society.

I warmly welcome you to Gandhara University and wish you success in your journey ahead.



Prof. Dr. Ejaz Hassan Khan,
MBBS, M. Phil , PhD, FCPS,
FRCP, FCPP, MHPE
Vice Chancellor,
Gandhara University,
Peshawar.

FROM THE DESK OF PRINCIPAL



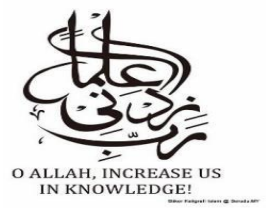
Kabir Medical College has evolved, since its inception, as an exceptionally outstanding facility to provide quality education to the students.

I must appreciate the hard work of our well experienced and dedicated faculty members and staff in maintaining high standards of medical education and the efforts they have put into making Kabir Medical College a distinguished center of excellence.

By the grace of Almighty Allah, we are following the integrated curriculum for 2nd year MBBS. We meet international standards of professional education by installing the system of integrated curriculum and system-based teaching of basic medical sciences. We advocate interactive sessions to improve comprehension of students as well as training them with skills of communication and self- expression

Since the establishment of Kabir Medical College, we have been working constantly to upgrade services and facilities at the campus and the attached Naseer Teaching Hospital for our students and patients.

We would like our graduates to excel as confident, responsible and self-learning medical practitioners. With a state-of-the-art campus, experienced faculty, an up-to-date digital library, I assure you that your decision to study at Kabir Medical College will surely be a wise one, your experience here will be profoundly enriching, and you will become a valuable asset to the nation and international community health care professionals.



Brig Ahmad Hussain Mashwani (R)
MBBS, FCPS (SURGERY) OJT (VASCULAR SURGERY), CHPE, MHPE (KMU)
Principal Kabir Medical College,
Gandhara University Peshawar

Welcome

On behalf of the module team, I would like to welcome you to Block IV which covers Neurosciences & Special Senses modules. As a part of the system-based curriculum, this module is an integrated presentation comprises system-based modules which links basic science knowledge to clinical problems. Integrated teaching means that subjects are presented as a meaningful whole. Students will be able to have better understanding of basic sciences when they repeatedly learn it in relation to clinical examples. Small group discussions, early exposure to clinics, wards, and skills acquisition in skills lab are characteristics of integrated teaching program.

Our mission is to provide all educational opportunities to our students. Therefore, on completion of the MBBS program, graduates will possess an appropriate foundation of knowledge, skills and attitudes to be well prepared to practice safely and effectively. This study guide includes the course contents of the module, the learning objectives, practical, topics of the small group discussions. It also includes the assessment plan for the block exam.

As director of the Medical Education Department, I will be meeting with the facilitators to receive feedback and will try to resolve any difficulties or problems faced during the module. Please do not hesitate to contact the DME for any academic help. I wish you an enjoyable and learning experience with block IV.

Director DME: Dr. Marina Khan



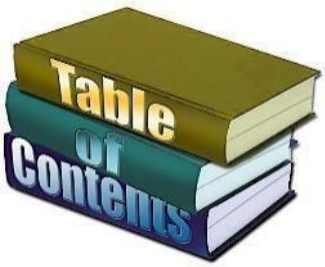


Table of Contents

MESSAGE FROM THE VICE CHANCELLOR.....

FROM THE DESK OF PRINCIPAL .....

BLOCK TEAM .....

LIST OF ABBREVIATIONS .....

ORGANIZATION OF MODULAR CURRICULUM.....

INTRODUCTION TO BLOCK-IV.....

MODULE–VII.....

MODULE–VIII.....

ASSESSMENT METHODS FOR BLOCK EXAM: .....

SECOND YEAR MBBS BLOCK THEORY FORMAT .....

SECOND YEAR MBBS END OF SESSION THEORY FORMAT .....

SECOND YEAR MBBS BLOCK PRACTICAL FORMAT .....

SECOND YEAR MBBS END OF SESSION PRACTICAL FORMAT .....

SECOND YEAR MBBS FINAL PROF FORMAT (700 MARKS) .....

LEARNING RESOURCES.....

LIST OF ABBREVIATIONS

DME	Department of Medical Education
CI	Curriculum integration
NEURO	Neurosciences
ANAT	Anatomy
PHYSIO	Physiology
BIO	Biochemistry
HISTO	Histology
EMB	Embryology
PATHO	Pathology
PHARMA	Pharmacology
NEURO	Neurosurgery
RADIO	Radiology
COM	Community medicine
LGIS	Large Group Interactive Session
SGD	Small Group Discussion
SDL	Self-Directed Learning
MCQ	Multiple Choice Question
SAQ	Short Answer Question
OSPE	Objective Structured Practical Exam

STUDY GUIDE

This study guidebook was designed by combining the efforts of all topics throughout the year to give medical students at Gandhara University a resource material that highlights significant components of the curriculum. By providing students with control over their learning, the study guide aims to promote self-regulated lifelong learning.

Regarding the course content, the study guide provides an overview of the anticipated course outcomes and objectives. The assessment approach is also customized to the institutional strategy.

A successful curriculum has a significant impact on the final product, as well as on society. This study guide was carefully designed with the PMDC curriculum and rules in mind, and Gandhara University stakeholders and faculty members worked hard to personalize it to the needs of students. They are further working to build, implement, and exercise a well-built curriculum considering changing demographic needs and disease prevalence in our society. Throughout the construction of the study guide, students' feedback was received and included. Curriculum is a living, dynamic entity that is constantly changing. With each passing day, we hope to improve it.

Each module in this block has been created to cater the gap between basic and clinical subjects through pre-clinical learning. The block is divided into two modules in which the students are exposed to a variety of basic and clinical subjects. The integrated curriculum is enforced through interactive lectures, small group discussion, and community outreach programs along with rotations at preclinical laboratories. There will be formative as well as summative assessment of the block throughout the modules.

AIMS OF THE STUDY GUIDE



It is an aid to:

- Inform students how student learning program of the BLOCK-wise module has been organized
- Help students organize and manage their studies throughout the module
- Guide students on assessment methods, rules, and regulations
- Communicates information on organization and management of the module. This will help the student to contact the right person in case of difficulty.
- Defines the objectives which are expected to be achieved at the end of the module.
- Identifies the learning strategies such as lectures, small group teachings, clinical skills and demonstration, tutorial that will be implemented to achieve the module objectives.
- Provides a list of learning resources such as books, computer assisted learning programs, web-links, and journals, for students to consult to maximize their learning.
- Highlights information on the contribution of continuous and block examinations on the students' overall performance.
- Includes information on the assessment methods that will be held to determine every student's achievement of objectives.
- Focus on information pertaining to examination policy, rules, and regulations.

ORGANIZATION OF MODULAR CURRICULUM

2nd YEAR MBBS

Block-04		Exam Block 04	Block-05		Exam Block 05	Block-06		Exam Block 06	PROF Exam
Module 7 Neurosciences -I	**Module 8** Special Senses		**Module 9** GIT & Liver - I	**Module 10** Renal & excretion - I		**Module 11** Endocrinology -I	**Module 12** Reproduction-I		

INTRODUCTION TO BLOCK-IV

Block-IV of the MBBS curriculum for Second Year consists of two modules - Module VII (Neurosciences) and Module VIII (Special Senses).

This block has been carefully designed to provide students with an integrated understanding of the structure and function of the nervous system and the organs of special senses, along with their related biochemical, pathological, and pharmacological aspects. It aims to bridge the gap between foundational and clinical sciences by developing the student's ability to apply basic concepts to clinical scenarios involving neurological and sensory disorders.

In Module VII (Neurosciences), students will learn about the central and peripheral nervous systems, covering topics such as the organization of neurons, neurophysiology, neurotransmission, reflexes, and higher cortical functions. The module also emphasizes the pathophysiology of neurological diseases, integrating the principles of pharmacological management and clinical neurology. It provides the essential framework for understanding how disturbances in neural mechanisms lead to motor, sensory, and cognitive dysfunctions - forming the foundation for future clinical learning in neurology, psychiatry, and neurosurgery.

Module VIII (Special Senses) focuses on the anatomy, physiology, and pathology of the organs of vision, hearing, taste, smell, and balance. Students will explore how these sensory systems detect, process, and interpret stimuli, and how disorders of these systems are present clinically. The module highlights the interdisciplinary connections between anatomy, physiology, biochemistry, pathology, and pharmacology, emphasizing the clinical relevance of sensory impairments and their management in specialties such as ophthalmology and otorhinolaryngology (ENT).

As a part of the system-based, integrated curriculum, this block combines basic sciences with clinical insight to encourage critical thinking and application of knowledge to real-life medical problems. The teaching and learning strategies remain similar to previous blocks, including Large Group Interactive Sessions (LGIS), Small Group Discussions (SGDs), Self-Directed Learning (SDL), and Directed Self-Learning (DSL).

Assessment will be conducted at the end of the block through MCQs, SAQs, and OSPEs, alongside periodic class tests or quizzes. Students are strongly encouraged to actively participate in skill lab sessions to strengthen their understanding of clinical correlations and enhance practical competence.

LEARNING METHODOLOGIES

The following teaching methods are used to promote better understanding:

- Large Group Interactive Lectures
- Small Group Discussion
- Practical
- Skills session
- E-Learning
- Self-Directed Learning

LARGE GROUP INTERACTIVE LECTURES (LGIS)



In large group, the lecturer introduces a topic or common clinical conditions and explains the underlying phenomena through questions, pictures, videos of patients'

SMALL GROUP DISCUSSIONS (SGDs):

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

to ask probing questions, summarize, or rephrase to help clarify concepts



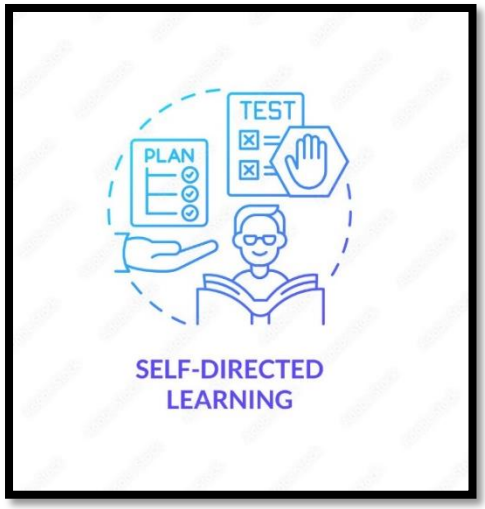
PRACTICAL

Basic science practical related to anatomy, biochemistry physiology and oral biology are scheduled for student learning.



SELF- DIRECTED LEARNING SDL:

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



E-LEARNING:

E-Learning is a strategy by which learning occurs through the utilization of electronic media, typically the Internet. The basic aspects of medical professionalism and ethics will be addressed through an e-learning course.



A) Hands on Training

1) Histology, Physiology and Biochemistry lab sessions:

Histology and biochemistry practical will demonstrate your skills and help in clarifying your concepts practically.

2) Clinical skill lab sessions Hands on

Practice of clinical examination on simulated patients.

3) Museum Sessions:

Three-dimensional models of anatomy enhance the learning process. Our museum is equipped with models and specimens to help you understand the concepts more clearly.

RULES AND REGULATIONS

We will be making the journey through BLOCK-IV in 14 weeks. Therefore, this course includes an intensive coursework load. Class attendance and participation are extremely important to your learning and are considered in the evaluation of your course grade. If there is anything that the module team can do to assist you during the course, please feel free to contact them. Attendance will be monitored during the different teaching activities. If your attendance is less than 75%, you will not be allowed to sit for both block and annual examination.



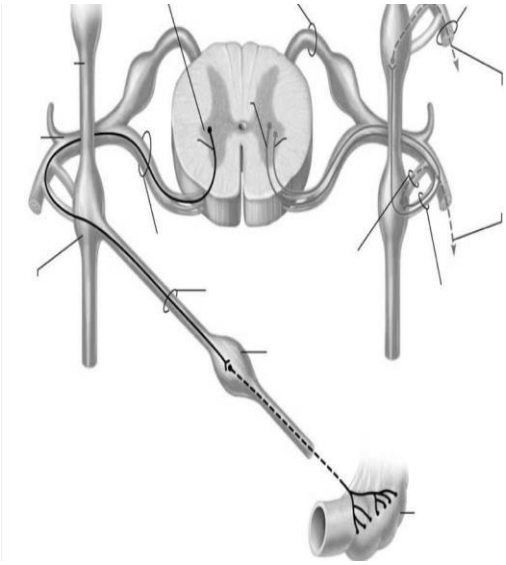
All examinations must be taken on the date scheduled. No student will be allowed to enter the examination hall after the examination starts. There will be a block exam at the end of each block, and each block will cover two modules. There will be a total of 3 block examination, and the 20% weightage of this block exam will be added to the 80 % of the annual professional exam as an internal assessment.

.



MODULE – VII

NEUROSCIENCES







GENERAL OUTCOMES:

By the end of block IV, the students would be able to:

KNOWLEDGE



At the end of this module, the 2nd year MBBS students will be able to:

1. Explain the gross and microscopic structural and functional features of peripheral nerves, spinal cord and brain.
2. Describe the development of forebrain, midbrain and hindbrain
3. Describe the basic functions of synapses, neurotransmitters and mechanisms of electrical events during neuronal excitation
4. Explain the structure and functions of different receptors during neuronal excitation
5. Describe the mechanisms and pathways of sensory inputs in the nervous system
6. Explain the organization, structure, functions, and neurotransmitters of autonomic nervous system
7. Describe the blood supply and venous drainage of brain and spinal cord
8. Describe the organization, structure and functions of motor system of the brain and spinal cord
9. Explain the organization, structure and functions of cerebellum and basal ganglia
10. Explain the structure, formation and drainage of cerebrospinal fluid in the brain and spinal cord
11. Describe the functions of limbic system and reticular activating system
12. Describe the pathophysiology and prevention of common diseases like stroke, epilepsy, hydrocephalus and brain injuries
13. Identify the microscopic structure of spinal cord, cerebral and cerebellar cortex
14. Examine nervous system of a standardized patient (sensations, motor functions, and higher cortical functions and tendon reflexes

PSYCHOMOTOR DOMAIN:

By the end of Neurosciences module, the students of 2nd year MBBS will be able to perform the following skills:

1. Identify the histological features of brain and spinal cord.
2. Elicit superficial reflexes
3. Elicit deep tendon reflexes
4. Examine cranial nerves
5. Examine motor system and assess the power, tone, appearance and reflexes.
6. Examine sensory system
7. Detect glucose and creatinine in urine.
8. History taking in neurological patients
9. Perform CNS examination
10. Identify fast criteria to rule out stroke

ATTITUDE:

By the end of module VII, the students of 2nd year MBBS will be able to:



1. Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues, peers and other health professionals.
2. Organize & distribute the tasks.
3. Exchange opinion & knowledge.
4. Develop communication skills and etiquette with sense of responsibility.
5. To equip themselves for teamwork.
6. Regularly attend the classes.
7. Demonstrate good laboratory practices.
8. Carry out practical work as instructed in an organized and safe man
9. Make and record observations accurately.
10. Develop the ability to give and receive feedback

LEARNING OBJECTIVES & COURSE CONTENTS

At the end of the teaching session the student of 2nd year MBBS will be able to achieve the following objectives

GROSS ANATOMY LECTURES		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1.	Scalp	• Enumerate the layers of the scalp. • Describe the extent, attachments, and clinical importance of each layer. • Discuss the nerve and blood supply of the scalp.
2.	Posterior Triangles of the neck	• Enumerate triangles of the neck • Describe boundaries of triangles of the neck • Describe contents of triangles of the neck
3.	Lateral view of skull, temporal fossa	• Discuss lateral view of skull.
4.	Infra temporal fossa	• Describe the boundaries and communications of the infratemporal fossa. • Enumerate and describe the contents of the infratemporal fossa. • Explain the clinical relevance of the infratemporal fossa, including related infections and surgical approaches.
5.	Mandible, / Temporomandibular joint	• Describe the anatomy of TMJ. Discuss the functions of TMJ. • Describe the relations of TMJ.
6.	Pterygopalatine fossa	• Describe the location, boundaries, and communications of the pterygopalatine fossa. • Enumerate and describe the contents of the pterygopalatine fossa. • Explain the importance of the fossa in the distribution of maxillary nerve and arterial branches.
7.	Blood supply of the face & Scalp	• Enumerate layers of the scalp Describe layers of the scalp • Describe the blood supply of face
8.	Blood supply of the head and neck	• Enumerate arterial supply to the head and neck Describe common carotid artery • Describe external carotid artery and its branches
9.	Muscles of facial expression and mastication	• Describe origin, insertion, action and supply to muscles of facial expression and mastication
10.	Autonomic Nervous System	• Differentiate between sympathetic and parasympathetic divisions of the autonomic nervous system. • Describe the anatomical organization and pathways of autonomic fibers in the head and neck. • Explain the functional and clinical significance of autonomic control in salivary glands, eyes, and vascular structures.

NEUROANATOMY LECTURE

S.NO	TOPICS	LEARNING OBJECTIVES
1	Overview to nervous system	• Describe division of nervous system Describe synapse, neurotransmitters, myelinated and non-myelinated fibers
2	Spinal cord (External Features)	• Describe gross features of spinal cord
3	Spinal Cord Grey matter	• Describe the general organization and anatomical features of the grey matter of the spinal cord. • Identify the anterior, posterior, and lateral grey columns and their distribution at different levels of the spinal cord. • Explain the functional significance of the anterior, posterior, and lateral horns.
4	Ascending Tracts	• Discuss ascending tracts & descending tracts
5	Medulla Oblongata (external features)	• Describe the internal and external structure of the medulla oblongata Describe the fourth ventricle
6	Medulla Oblongata (Internal Features)	• Describe the internal and external structure of the medulla oblongata Describe the fourth ventricle
7	Pons	• Describe the external and internal structure of the pons
8	Mid Brain	• Describe the brain stem and mid brain in detail
9	Cerebral sulci and gyri/basal nuclei	• Describe the cerebral sulci, cerebral gyri and basal nuclei
10	Functional areas of the brain	• Identify and describe the major functional cortical areas (motor, sensory, visual, auditory, etc.). • Explain the localization of brain functions in different lobes. • Correlate the effects of lesions in specific cortical areas with clinical outcomes.
11	White matter of brain	• Discuss white matter of brain
12	Blood supply of the brain & spinal cord	• Describe the blood supply and venous drainage to the cerebral hemisphere Describe the venous sinuses of the brain.
13	Dural venous sinuses	• Define dural venous sinuses and describe their general anatomical features. • Identify the major dural venous sinuses, including the superior sagittal, inferior sagittal, straight, transverse, sigmoid, cavernous, and occipital sinuses. • Explain the formation and drainage of the confluence of sinuses and its communication with the internal jugular veins.
14	Diencephalon	• Define the diencephalon and describe its anatomical location and relationship with surrounding structures.

		• Identify the major components of the diencephalon, including the thalamus, hypothalamus, epithalamus, and subthalamus. • Describe the gross anatomy and major subdivisions of the thalamus. • Explain the major functions of the thalamus in sensory processing, motor control, arousal, and cortical activity.
15	Descending tracts	• Discuss ascending tracts & descending tracts
16	Cerebellum	• Describe the cerebellum describe the subdivisions of cerebellum • Discuss internal structure and features of the cerebellum • Discuss the external features of the cerebellum
17	Basal Nuclei	• Define the basal nuclei and describe their location within the cerebral hemispheres. • Identify the major components of the basal nuclei, including the caudate nucleus, putamen, and globus pallidus, and their functional associations with the substantia nigra and subthalamic nucleus. • Describe the anatomical relationships of the basal nuclei with the internal capsule, thalamus, and surrounding cerebral structures. • Explain the major connections of the basal nuclei with the cerebral cortex, thalamus, and brainstem.
18	Ventricles of brain	• Enumerate the ventricles of the brain • Describe the structure of the ventricles of the brain
19	Limbic system	• Describe limbic system and its components Enumerate functions of the limbic system • Describe the fornix, origin, course, and distribution of its fibers
20	CSF	• Describe the formation, circulation, and absorption of cerebrospinal fluid. • Enumerate the sites of CSF production and reabsorption. • Discuss the composition and functions of CSF. • Explain the clinical significance of CSF abnormalities and lumbar puncture.

HISTOLOGY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Neurons	• Define neurons and describe their role as the structural and functional units of the nervous system. • Classify neurons according to their structure, function, and number of processes. • Describe the structure of a neuron, including the cell body, dendrites, axon, axon hillock, and synaptic terminals. • Explain the functions of the major cellular components of neurons.
2	Neuroglia	• Define the histological features of neuroglia and ependymal cell
3	Spinal cord	• Describe the histological features of transverse section of the spinal cord. • Describe white column, horns, different commissures of the spinal cord. • Describe differences at different levels in spinal cord.
4	Muscles of the neck and Hyoid bone	• Identify and describe the histological structure of skeletal muscle associated with the neck region. • Explain the microscopic features of muscle fibers, connective tissue coverings, and neuromuscular junctions. • Describe the histological features of the hyoid bone and associated structures. • Correlate the structure with function and clinical significance.
5	Cerebral cortex	• Define the histological terms related to cerebral cortex. • Enumerate and explain different types of cells. Enumerate different layers of cerebral cortex. • Explain different layers of cerebral cortex.
6	Histology of cerebellum & connections	• Define histological features of cerebellar cortex. • Enumerate different layers of cerebellar cortex. • Explain different layers of cerebellar cortex. • Describe afferent fibers of the cerebellum.

EMBRYOLOGY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Development of pharyngeal arches	• Describe the formation and organization of the pharyngeal (branchial) arches. • Enumerate the components of each arch (cartilage, muscle, nerve, and artery). • Explain the derivatives of each pharyngeal arch. • Correlate developmental anomalies of pharyngeal arches with their clinical implications (e.g., first arch syndrome).
2	Development of pharyngeal pouches	• Describe the formation and structure of the pharyngeal pouches. • Enumerate the derivatives of each pharyngeal pouch. • Explain the relationship of pouches to branchial clefts and arches. • Discuss congenital anomalies associated with the pharyngeal apparatus (e.g., branchial cysts, fistulas).
3	Development of skull	• Describe the developmental process of the skull bones from mesenchyme and neural crest cells. • Differentiate between membranous and cartilaginous neurocranium and viscerocranium. • Explain the sequence of ossification and fontanelle formation. • Discuss congenital malformations of the skull (e.g., craniosynostosis).
4	Development of face	• Describe the formation of the face from the facial prominences. • Explain the contribution of maxillary, mandibular, and frontonasal processes in facial development. • Describe the formation of the nasal cavity, lips, and palate. • Discuss common congenital anomalies (e.g., cleft lip, cleft palate)..
5	Development of pharyngeal arches	• Describe the embryological development and general organization of the pharyngeal arches. • Identify the components of each pharyngeal arch, including its cartilage, muscular component, cranial nerve, and arterial arch. • Describe the derivatives of the first pharyngeal arch, including its skeletal, muscular, and neural components. • Explain the development and derivatives of the second pharyngeal arch.
6	Development of Brain-I	• Describe the formation of the neural tube and its differentiation into primary brain vesicles (forebrain, midbrain, hindbrain). • Explain the process of neural tube closure and its importance. • Discuss early morphogenetic changes in the developing brain. • Describe congenital malformations resulting from neural tube defects.
7	Development of Brain-II	• Describe the subdivision of primary brain vesicles into secondary vesicles. • Explain the development of major brain regions —

		cerebrum, cerebellum, midbrain, pons, and medulla. • Discuss the formation of ventricles and cerebrospinal fluid pathways. • Explain common developmental anomalies of the brain (e.g., microcephaly, hydrocephalus, holoprosencephaly).

HISTOLOGY PRACTICALS		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Neurons	• Identify and describe the microscopic structure of neuron under a microscope.
2	Cerebral cortex	• Identify and describe the microscopic structure of cerebral cortex under a microscope.
3	Cerebellar cortex	• Identify and describe the microscopic structure of cerebellum under a microscope.
4	Spinal cord	• Identify and describe the microscopic structure of spinal cords under a microscope.
5	Spinal cord transverse section at different levels	• Identify and describe the microscopic structure of transverse section of spinal cord at different levels under a microscope.

ANATOMY SGDs		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Skull (norma verticalis and norma occipitalis, cervical vertebrae)	• Describe bones of the skull • Describe and identify vault of the skull. • Discuss different gross features of the skull.
2	Maxilla, Mandible muscles attach to it	• Describe the gross features of adult maxilla &mandible. • Describe the bony features of maxilla & mandible • Name the joints formed by maxilla & mandible • Name the attachment of muscles and ligaments on maxilla & mandible
3	lateral view of the skull, temporal fossa, infra temporal fossa and pterygopalatine fossa (skull model)	• Describe lateral view of the skull.
4	Sagittal section on model/ ascending tracks (Neuroanatomy)	• Describe the sagittal section on model/ascending tracks

5	Sagittal section on model/ descending tracks (Neuroanatomy)	• Describe sagittal section of the brain. • Describe transverse section of the spinal cord. • Discuss gross features of mid brain • Discuss the foramens of the skull & structures passing through it
6	Brain model /foramen of the skull and structures passing through it	• Describe parts of the brain. Enumerate 12th cranial nerves. • Describe relations of different parts of the brain. • Describe foramens of the skull and structure passing through it.

PHYSIOLOGY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Organization of nervous system	• Describe general design of the nervous system Describe various divisions of the nervous system. • Describe structural and functional units of CNS. • Describe Functional components of Neuron. Describe Functional and Structure of Neurons • Describe major levels of central nervous system function
2	Sensory Receptors	• Define and classify receptors. • Classify receptors according to their location in the body. • Describe specific functions of receptors. • Receptor or Generator Potential and the mechanism of action of sensory transduction
3	Organization of spinal cord for motor function (Muscle spindle)	• Describe organization of the spinal cord for motor functions • Give an overview of the components of nervous system involved in motor control • Describe muscle spindles & muscle tone • Differentiate between muscle spindles and Golgi tendons organ
4	Synapse	• Define and classify synapses • Explain physiological structure of synapse • Describe mechanism by which a potential causes transmitter release from the presynaptic terminals • Describe transmission and explain properties of synaptic transmission. • Describe mechanism of action of neurotransmitter on the post synaptic membrane • Describe second messenger system in the post synaptic neuron
5	Neurotransmitter	• Define the characteristics of a neurotransmitter • Enumerate the neurotransmitters involved in central nervous system. • Classify neurotransmitters and describe the actions of some common neurotransmitters in central nervous system.
6	Nerve and nerve fiber	• Define a nerve fiber, its structure and function • Define and describe a motor fiber sensory fiber • Define and describe nerve, its coverings and types

7	Ascending pathway	• Describe the organization of major ascending sensory pathways. • Explain the functions of dorsal column, spinothalamic, and spinocerebellar tracts. • Correlate lesions of ascending tracts with corresponding sensory deficits.
8	Sensory Cortex	• Describe sensory cortex • Enumerate sub areas of sensory cortex
9	Pain and types	• Define pain and classify its types (acute, chronic, visceral, referred, etc.). • Describe the physiological pathways and mechanisms of pain transmission. • Explain the modulation and perception of pain in the nervous system. • Discuss clinical correlations such as referred pain and neuropathic pain.
10	Analgesia system	• Describe the components and organization of the endogenous analgesia system. • Explain the mechanism of pain suppression and modulation. • Discuss the role of neurotransmitters (endorphins, enkephalins, serotonin) in pain inhibition.
11	Stretch reflex and golgi tendon reflex	• Describe Stretch Reflex • Differentiate between Static (Tonic) and Dynamic (Phasic) stretch reflex • Describe Golgi Tendon Reflex
12	Reflex and its types	• Define classify and enumerate reflexes • Describe reflex action • Discuss physiological significance of these reflexes.
13	Motor cortex	• Describe motor cortex • Enumerate subareas of motor cortex
14	Corticospinal tract and lesions	• Define muscle tone and describe its significance. • Explain the sequence of events during development of muscle tone.
15	Extra pyramidal tracts	• Define extrapyramidal tracts and differentiate them from the pyramidal motor pathways. • Identify the major extrapyramidal tracts, including the rubrospinal, vestibulospinal, reticulospinal, and tectospinal tracts. • Describe the origin, course, decussation, termination, and functions of the major extrapyramidal tracts. • Explain the role of the rubrospinal tract in the regulation of limb movements and muscle tone.
16	Cerebellum	• Describe the structure and functional organization of the cerebellum. • Explain the role of the cerebellum in coordination, balance, and motor learning. • Discuss the manifestations and types of cerebellar disorders.

17	Control of motor function by the brain stem	• Enumerate parts of the brain stem • Explain its mechanism • Describe functions of the motor system by the brain stem
18	Basal Ganglia	• Enlist the nuclei • Enlist circuits and their functions • Describe neurotransmitters involved
19	Vestibular apparatus	• Describe the physiologic anatomy of vestibular apparatus • Describe function of the utricle and saccule in the maintenance of static equilibrium • Describe function of semicircular ducts • Describe Neuronal Connections of the Vestibular Apparatus • Describe Vestibular mechanism for stabilizing the eyes
20	Functions of specific cortical area	• Enlist the functions of specific cortical area
21	Autonomic nervous system	• Define the autonomic nervous system. • Describe the organization, divisions, and general functions of the sympathetic and parasympathetic systems. • Explain the physiological control of visceral organs by the ANS.
22	Epilepsy	• Define epilepsy and describe its physiological basis. • Explain the mechanisms leading to abnormal neuronal discharges. • Discuss the classification and physiological effects of epileptic seizures.
23	Physiology of memory	• Enumerate the types of memory (short-term, long-term, procedural, declarative). • Describe the physiological and neural mechanisms underlying memory formation and retrieval. • Explain the role of the hippocampus and related structures in memory processes.
24	Physiology of sleep/EEG	• Enumerate and describe the types of EEG waves and their physiological significance. • Explain the stages and types of sleep (REM and non-REM). • Discuss the physiological regulation and functions of sleep. • Correlate EEG patterns with sleep stages and brain activity.
25	Physiology of speech	• Enumerate the cortical speech centers and describe their locations. • Explain the functions of Broca's and Wernicke's areas. • Discuss the mechanisms of speech production and comprehension. • Describe the effects of lesions in speech areas (aphasias).
26	Cerebrospinal fluid	• Describe composition/ formation/regulation and functions of cerebrospinal fluid
27	Hypothalamus and limbic system	• Identify the major structures forming the hypothalamus and limbic system. • Describe their physiological roles in homeostasis, behavior, and emotion. • Discuss the neuroendocrine and autonomic functions of the hypothalamus.

PHYSIOLOGY SGDs

S.NO	TOPICS	LEARNING OBJECTIVES
1	Paraplegia	• Define paraplegia and differentiate it from quadriplegia and hemiplegia. • Classify paraplegia according to its causes, clinical presentation, and involvement of upper or lower motor neurons. • Describe the common causes of paraplegia, including spinal cord injury, compression, infection, inflammation, and vascular disorders. • Explain the pathophysiological mechanisms underlying paraplegia due to lesions of the spinal cord and motor pathways.
2	Disorders of sensory nervous system	• Enlist the disorders of sensory nervous system • Discuss the disorders of sensory nervous system
3	Referred pain	• Define referred pain and differentiate it from local and radiating pain. • Explain the physiological mechanisms underlying referred pain, particularly the convergence of visceral and somatic sensory afferents on common spinal cord neurons.
4	UMN/LMN Lesion-features and localization Spinal shock	• Define UMN and LMN Lesions • Differentiate between UMN and LMN Lesions • Localize UMN and LMN Lesions • Describe UMN and LMN Lesions
5	cerebellar disorders	• Define cerebellar disorders and describe the role of the cerebellum in the coordination of movement, posture, balance, and muscle tone. • Classify cerebellar disorders according to their causes, including congenital, hereditary, degenerative, vascular, infectious, and traumatic conditions. • Explain the pathophysiological mechanisms underlying cerebellar dysfunction.
6	Parkinsonism and Huntington Chorea	• Define each parkinsonism & other lesions of basal ganglia • Differentiate parkinsonism & other lesions of basal ganglia • Describe parkinsonism & other lesions of basal ganglia • Define & discuss Huntington chorea
7	Function and diseases of Thalamus	• Discuss functions and diseases of thalamus

PHYSIOLOGY PRACTICALS

S.NO	TOPICS	LEARNING OBJECTIVES
1	Temperature regulation	• Perform temperature regulation at high centers and how it is measured through different methods
2	Cranial Nerves (1-3)	• Perform clinical examination of cranial nerves 1-3 on a standardize patient
3	Cranial Nerves (4-6)	• Perform clinical examination of cranial nerves 4-6 on a standardize patient
4	Cranial Nerves 7-8-9	• Perform clinical examination of cranial nerves 7-8 on a standardize patient
5	Cranial Nerves 10-11-12	• Perform clinical examination of cranial nerves 9-10 on a standardize patient
6	Triple Response	• Define the triple response of Lewis and describe its significance in cutaneous physiology. • Identify the three components of the triple response: red reaction, flare, and wheal. • Explain the physiological mechanisms responsible for each component of the triple response.
7	Superficial reflexes	• Define superficial reflexes and describe their physiological significance in neurological examination. • Classify superficial reflexes, including the abdominal, cremasteric, plantar, corneal, and anal reflexes. • Describe the components of the reflex arc, including sensory receptors, afferent pathways, central connections, efferent pathways, and effector muscles.

BIOCHEMISTRY LECTURES		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Bioenergetics& Biological Oxidation I	• Define the biological oxidation • Describe the high energy phosphate compounds and their biochemical importance
2	Bioenergetics & Biological Oxidation II	• Describe the Electron Transport Chain • Describe oxidative phosphorylation, components of respiratory chain, electron carriers
3.	Bioenergetics & Biological Oxidation III	• Describe the ATP-synthase, their relation to proton pump, PMF, and active transport
4.	Metabolism of Nucleotide (Purine)	• Enumerate purine and Pyrimidine bases • Enlist the steps of de novo synthesis of the parent purine nucleotide • Discuss the conversion of IMP to AMP & GMP • Describe the regulation of purine synthesis • Describe the salvage pathway of purine synthesis with its regulation • Describe Lesch- Nyhan syndrome with its cardinal clinical features • Discuss the synthesis of deoxy ribonucleotides • Describe the degradation of purine nucleotides • Discuss the diseases associated with purine degradation
5.	Metabolism of Nucleotide (Pyrimidine)	• Discuss the steps of de novo Pyrimidine synthesis • Discuss the synthesis of thymidine mono phosphate from deoxy uridine mono phosphate with its inhibition • Describe the salvage pathway of pyrimidines • Describe the degradation of Pyrimidine nucleotides • Discuss the abnormalities of Pyrimidine metabolism • Discuss the regulation of Pyrimidine metabolism

BIOCHEMISTRY PRACTICALS		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Determination of creatinine in urine	• Perform the determination of creatinine in urine
2	Determination of glucose in urine	• Perform the determination of glucose in urine
3.	Preparation of Protein free filtrate	• Perform the preparation of protein free filtrate
4.	Determination of total plasma protein	• Perform the Determination of total plasma protein

BIOCHEMISTRY SGDs

S.NO	TOPICS	LEARNING OBJECTIVES
1	Uncouplers and inhibitors of oxidative phosphorylation	• Difference and Role of Uncouplers and inhibitors of oxidative phosphorylation.
2	Types of Nucleic Acid	• Discuss types of nucleic acid
3	Chromosomes Structure	• Discuss structure of chromosomes

GENERAL MEDICINE LECTURES

S.NO	TOPICS	LEARNING OBJECTIVE
1	Paraplegia	• Define paraplegia • Enumerate clinical features, investigations, and treatment of paraplegia
2	Acute bacterial meningitis	• Describe the clinical features and management of acute bacterial meningitis
3	Stroke	• Enumerate types of strokes • Differentiate between hemorrhagic and ischemic stroke • Describe the etiology, clinical features, investigations and prevention of hemorrhagic and ischemic stroke
4	Increased intracranial pressure	• Describe the etiology, clinical features, investigations and treatment of increased intracranial pressure

BEHAVIORAL SCEINCE LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Sensation and perception	• Define sensation. • Define perception. • Discuss the connection between sensation and perception
2	Attention and concentration	• Define attention, concentration and differentiate between these their two cognitive functions. • Describe the types of attention, including selective, sustained, divided, and alternating attention. • Explain the physiological basis of attention and concentration and the roles of the cerebral cortex, reticular activating system, and neurotransmitters.
3	Pain & sleep	• Define pain and describe its psychological and physiological components. • Explain the psychological factors that influence pain perception and response. • Describe the role of cognitive and emotional factors in pain management. • Define sleep and describe its stages and physiological functions.

RADIOLOGY LECTURES		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	CT and MRI of the Skull	• Identifying important landmarks • Describe morphologic relationships and discuss their significance

PEDIATRICS LECTURES		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Developmental milestones	• Discuss developmental milestones with specific signs/reflexes according to age
2	Normal childhood development	• Define growth, development, and developmental milestones in childhood. • Describe the principles and patterns of normal physical, cognitive, and psychosocial development in children. • Identify the major developmental milestones in gross motor, fine motor, language, and social domains from birth to early childhood.
3	Hydrocephalus	• Enumerate causes of increase in intracranial pressure • Explain the management of intracranial pressure • Discuss hydrocephalus

ENT LECTURES		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Neck triangles/ lymph node level	• Enumerate and describe the anatomical triangles of the neck (anterior and posterior triangles). • Describe the boundaries and contents of each triangle. • Explain the classification of cervical lymph nodes and their levels. • Discuss the clinical significance of neck triangles in surgical approaches and lymph node evaluation.
2	Neck masses and triangles	• Describe common causes of neck masses in children and adults. • Explain the relationship of neck masses to anatomical triangles. • Discuss the clinical approach to evaluation, including history, examination, and imaging. • Outline management strategies for various neck masses (congenital, inflammatory, neoplastic).

GENERAL SURGERY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Spine trauma	• Discuss the signs and symptoms of spine trauma. • Describe management of spine trauma
2	Spinal tumors	• Classify spinal tumors • Discuss the most common spinal tumor • Discuss management of patient with spinal tumor
3	Head trauma	• Discuss the signs and symptoms of head trauma • Discuss how to assess GCS. Discuss BLS. • Describe management of head and spine trauma
4	Stroke	• Enlist different types of stroke • Enlist the causes and management of sroke
5	Hydrocephalus	• Define hydrocephalus. • Describe the types of hydrocephalus. • Discuss the causes of hydrocephalus. • Discuss its management.

COMMUNITY MEDICINE LECTURES

S.NO	TOPICS	LEARNING OBJECTIVE
1	Meningitis A Public health problem	• Discuss epidemiology and prevention of meningitis and common organisms associated with it.

RIPPLE LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Variables	• Define a variable and explain its importance in medical research. • Classify variables into qualitative and quantitative types with relevant examples from medical sciences. • Differentiate between nominal, ordinal, discrete, and continuous variables. • Explain the differences between independent, dependent, and confounding variables in research studies.
2	Hypothesis, Objectives	• Define a research hypothesis and research objectives and explain their importance in medical research. • Differentiate between a research hypothesis, research question, aim, and objectives. • Describe the characteristics of a good research hypothesis and well-formulated research objectives.
3	Study Designs	• Define a study design and explain its importance in medical research.

		• Classify study designs into observational and experimental studies. • Differentiate between descriptive and analytical observational study designs.
4	Search Engines & Boolean Operators	• Define search engines and explain their importance in accessing medical and scientific information. • Identify commonly used search engines and medical databases, including Google, PubMed, Google Scholar, and the Cochrane Library. • Differentiate between general search engines and specialized medical literature databases. • Explain the functions of Boolean operators, including AND, OR, and NOT, in literature searching.

EYE LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Cranial Nerve Palsy	• Define cranial nerve palsy and classify it according to the affected cranial nerve. • Describe the common causes of cranial nerve palsies. • Identify the clinical features associated with palsies of cranial nerves III, IV, and VI. • Explain the clinical manifestations of facial nerve (VII) and hypoglossal nerve (XII) palsies.

PATHOLOGY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Brain Tumor	• Define brain tumors and classify them according to their origin and biological behavior. • Differentiate between primary and secondary brain tumors. • Identify common types of brain tumors, including gliomas, meningiomas, pituitary adenomas, and metastatic tumors. • Describe the common risk factors and etiological factors associated with brain tumors. • Explain the clinical manifestations of brain tumors, including headache, seizures, focal neurological deficits, and raised intracranial pressure.

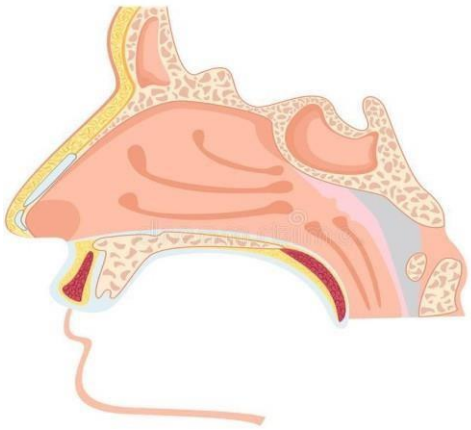
SKILL LAB

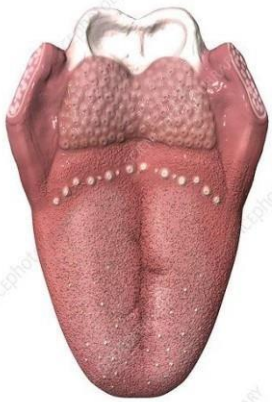
S.NO	TOPICS	LEARNING OBJECTIVES
1	History taking of neurological patient	• Demonstrate the basics of steps of history taking. • Demonstrate the common signs and symptoms of nervous system and how they are written in history.
2	CNS Examination	• Demonstration of nervous system and neurological exam. Demonstrate the indications of neurological exam • Demonstrate the mental status exam. • Demonstrate the assessed level of conscious ness.
3	FAST criteria to rule out stroke	• Demonstrate the diagnosis of stroke. • Perform the examination on a patient for the signs and symptoms of stroke. • Perform the Assessment risk of stroke in future. • Perform the FAST criteria to rule out stroke.
4.	Glasgow coma scale	• Demonstrate the three components of GCS. • Perform GCS. • Demonstrate the application GCS scoring on patients.

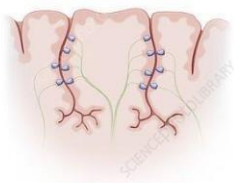
MODULE – VIII

SPECIAL SENSES

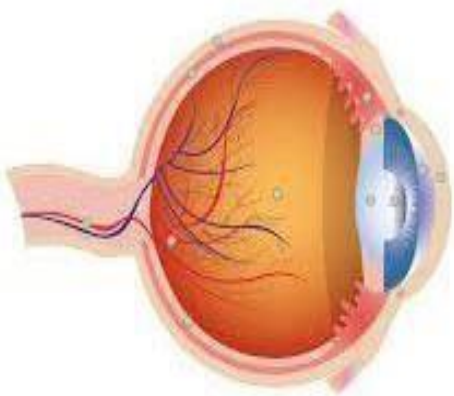












GENERAL OUTCOMES:

By the end of Module VIII, the students of 2nd year would be able to:

KNOWLEDGE:



1. Describe the gross anatomy of the head and neck in detail.
2. Describe the origin, course, and relations of arteries, veins, and nerves of the head and neck.
3. Describe the development of important structures of the head and neck.
4. Describe the gross anatomy of the nose, eye, and ear, along with their boundaries, nerve supply, and blood supply.
5. Explain the basic physiology of the eye along with the physical principles of optics.
6. Discuss the visual pathway and its lesions, eye movements and their control, visual acuity, and errors of refraction.
7. Explain the mechanism of taste perception and its transmission into the central nervous system.
8. Explain the physiology of hearing, including the function of the tympanic membrane, ossicular system, and organ of Corti.
9. Explain the auditory pathway and associated abnormalities and discuss the role of the cerebral cortex in hearing.
10. Explain the biochemistry of proteins and amino acids.
11. Enumerate common diseases of the ear, nose, throat, and eye, and explain their signs and symptoms.
12. Describe the effect of motivation and sleep on human behavior.
13. Describe corneal ulcers, optic nerves, orbits, conjunctivitis, ocular trauma, and refractive errors.
14. Describe anesthesia, its types, and preoperative and postoperative management.
15. Describe rhinorrhea, carcinoma of the tongue, and vertigo.
16. Describe allergic rhinitis, applied anatomy of the nose and ear, tonsillitis, deviated nasal septum (DNS), and larynx.

PSYCHOMOTOR DOMAIN:

By the end of Special senses module, the students of 2nd year MBBS will be able to perform the following skills:



- Perform and interpret visual acuity using Snellen‘s chart in a subject provided.
- Perform perimetry and technique of plotting visual field
- Demonstrate the performance of Rinne‘s, Weber‘s and ABC test.
- Examine the sense of smell and taste in a subject provided.
- Identify the histological features of eye, ear, lip, tongue and olfactory epithelium

- Determine the level of urea and creatinine in serum.
- Perform the history taking in special senses
- Perform eye examination with ophthalmoscope
- Perform ear examination with otoscope

ATTITUDE:

By the end of Module VIII, the students of 2nd year MBBS will be able to:



- Develop respect for the individuality and values of others - (including having respect for oneself) patients, colleagues and other health professionals.
- Organize & distribute the tasks.
- Exchange opinion & knowledge.
- Develop communication skills and etiquette with sense of responsibility.
- To equip themselves for teamwork.
- Regularly attend the classes.
- Demonstrate good laboratory practices.
- Carry out practical work as instructed in an organized and safe man
- Make and record observations accurately.
- Develop the ability to give and receive feedback
- Respect for self and peers.

LEARNING OBJECTIVES & COURSE CONTENTS

At the end of the teaching session the student of 2nd year MBBS will be able to achieve the following objectives:

GROSS ANATOMY LECTURE		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Introduction to module An overview of special senses	• Describe the anatomy, physiology and biochemistry of special senses
2	Layers of eye	• Enumerate the layers of an eye • Describe the gross features of layers of an eye.
3	Content of eye	• Enumerate content of an eye • Enlist the gross features of contents of an eye in detail
4	Bony orbit /Muscles of the eye	• Enumerate the bones of the orbit • Enumerate the muscle of the eye • Enumerate the walls of the orbit and bones present in it • Describe the openings in the bony orbit and structures pass through it
5	Nasal cavity	• Describe parts of nasal cavity • Describe and enlist the bones of the nasal cavity • Describe and enlist the cartilages of the nasal cavity • Enlist the muscles of the nasal cavity
6	Lateral and medial wall of the nose	• Enlist the gross features of the lateral wall of the nose • Describe the openings of the lateral wall of the nose • Describe the medial wall of the nose
7	Paranasal sinuses	• Enumerate the paranasal sinuses • Enlist the boundaries of the paranasal sinuses • Explain the blood supply, nerve supply and venous drainage of the paranasal sinus
8	Cranial nerve 4-7	• Identify the nuclei, anatomical course, and functional components of cranial nerves IV, V, VI, and VII. • Describe the origin, intracranial course, foramina, and major branches of cranial nerves IV–VII. • Explain the motor and sensory functions of the trigeminal nerve (CN V).
9	Tongue/taste buds	• Enlist gross features of the tongue • Describe nerve supply and blood supply to the tongue • Describe taste buds of the tongue
10	External ear	• Enlist gross features of external acoustic meatus • Enlist gross features of external ear
11	Middle ear	• Describe gross features of the middle ear
12	Internal ear	• Describe gross anatomy of the internal ear
13	Larynx	• Enumerate cartilages of the larynx

EMBRYOLOGY LECTURE		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Development of eye	• Define lens placode and formation of retina. • Describe the development of ciliary body, iris, lens and choroid. • Discuss the formation of sclera, cornea, sphincter and dilator pupillae • Discuss the development of virtreous body and optic nerve • Describe developmental anomalies of eye
2	Development of nose	• Describe the development of nasal cavities and paranasal air sinuses. • Describe the development of nasolacrimal groove, duct, and sac Enlist developmental defects of nose
3	Development of palate	• Describe the development of primary and secondary palate. • Discuss the developmental defects of lip and primary, secondary palate
4	Development of tongue/taste buds	• Describe the development of anterior 2/3 of the tongue • Discuss the role of the third pharyngeal arch in tongue development. • Discuss the innervation, blood vessels, and muscles of tongue. • Describe the development of papillae, taste buds and salivary glands. • Describe the developmental anomalies of tongue.
5	Development of ear	• Describe the development of external and middle ear • Explain the origin of internal ear along the relationship of saccule, utricle, semicircular canals • Describe the development of cochlear duct and organ of corti Enlist the developmental anomalies of external middle and internal ear

NEUROANATOMY LECTURE		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Blood supply & nerve supply of eye	• Explain the structures supplied by nerves of orbital cavities. • Describe the blood vessels of orbit.
2	Cranial nerve I-3	• Describe intracranial course of nerves

HISTOLOGY LECTURE

S.NO	TOPICS	LEARNING OBJECTIVES
1	OPH Cornea	• Describe the microscopic structure of the cornea • Explain the layers of the cornea and their functions • Discuss the clinical relevance of corneal histology
2	Retina	• Define the retina and describe its anatomical extent and relationship with other structures of the eye. • Describe the layers of the retina and identify their major cellular components. • Explain the functions of rods, cones, bipolar cells, and ganglion cells in retinal processing.
3	Olfactory Epithelium	• Enumerate cells of the olfactory mucosa Describe microscopic structure of olfactory epithelium
4	Lip /cheek/Oral cavity	• Describe microscopic structure of lip and cheek
5	Tongue, Oral cavity and teeth	• Describe the histological structure of the tongue • Explain the types of papillae and taste buds • Describe the microscopic structure of teeth including enamel, dentin, and pulp
6	Ear	• Describe microscopic structure of the ear

HISTOLOGY PRACTICAL		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Cornea	• Identify and describe the microscopic structure of cornea under a microscope
2	Retina	• Identify and describe the microscopic structure of retina under a microscope
3	Olfactory epithelium	• Identify and describe the microscopic structure of olfactory epithelium under a microscope
4	Tongue/Lip/oral cavity	• Identify and describe the microscopic structure of tongue/lip/oral cavity under a microscope
5	Ear	• Identify and describe the microscopic structure of ear under a microscope

ANATOMY SGDs		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Eye bony cavity / lacrimal glands (model)	• Discuss bones of the orbit • Discuss muscle of the eye • Discuss the walls of the orbit and bones present in it • Discuss the openings in the bony orbit and structure pass through it • Discuss the origin, insertion, action and supply of muscles • Describe fluid system of eye
2	Contents of eyeball (model)	• Discuss the layers, gross features of layers, content of eye in detail
3	Lateral medial wall of nose / paranasal sinuses on dry skull	• Describe the bony framework of the lateral and medial walls of the nasal cavity • Discuss the paranasal sinuses, their location, and clinical relevance
4	Middle & inner Ear	• Describe gross features of external acoustic meatus, middle ear, tympanic membrane and internal ear
5	Larynx (model)	• Describe the cartilages of the larynx and their articulations • Discuss the muscles, ligaments, and nerve supply of the larynx • Explain the anatomical basis of phonation and airway protection

PHYSIOLOGY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Fluid system of eye	• Discuss fluid system of the eye s
2	Physical principles of optics	• Describe physical principles of the optics
3	Mechanism of accommodation	• Explain accommodation reflex. • Explain presbyopia • Describe how the depth of focus of the lens system increases with decreasing pupillary diameter • Define the visual acuity. • Explain the determination of distance of an object from the eye.
4	Errors of refraction	• Define error of refraction • Describe the errors of refraction (Myopia, hyperopia, astigmatism and their correction by using different lens systems
5	Structural elements of retina	• Describe structural elements of retina Describe function of retina
6	Photochemistry of rods & cones	• Describe photochemistry of rods • Enlist the Difference between rods and cones • Describe photochemistry of cones • Enlist the Difference between rods and cones
7	Visual pathways & its abnormalities	• Describe the neural circuitry of the Retina • Describe the physiology of visual pathway • Enumerate the optic lesion associated with visual pathway
8	Visual acuity	• Define visual acuity • Describe the errors of refraction (Myopia, hyperopia, astigmatism and their correction by using different lens systems)
9	Organization and function of visual cortex	• Describe the Organization and function of visual cortex
10	Eye movement and their control	• Describe the muscular control of eye movement • Describe the fixation movements of an eye • Define and describe accommodation reflex and pupillary light reflex
11	Sense of smell	• Enumerate the primary sensation of smell • Describe the stimulation of olfactory cells and its transmission into central nervous system
12	Sense of taste	• Enumerate the primary sensation of taste • Describe the mechanism of taste perception and its transmission
13	External & Middle Ear Content & Their Functions	• Define the external and middle ear and describe their anatomical boundaries. • Identify the components of the external ear, including the auricle, external acoustic meatus, and tympanic membrane. • Describe the anatomical features and functions of the auricle and external acoustic meatus.

		• Explain the structure and functions of the tympanic membrane.
14	Organ of corti	• Describe the structure of the organ of Corti • Explain its role in converting sound waves into neural signals
15	Transmission of sound waves in Cochlea	• Describe the process of sound wave transmission through cochlea • Explain the mechanical and neural transduction of sound
16	Auditory Nervous pathway	• Describe the neural pathway for auditory signals from cochlea to auditory cortex • Explain the role of cochlear nuclei, superior olivary complex, lateral lemniscus, and inferior colliculus
17	Deafness & its types	• Describe types of deafness including conductive, sensorineural, and mixed • Explain causes, clinical features, and basic management of each type

PHYSIOLOGY SGDs		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Intraocular pressure & Glaucoma	• Define intraocular pressure • Define glaucoma • Describe the causes of intraocular pressure & Glaucoma
2	Light and dark adaptation in eye	• Describe the process of light and dark adaptation • Explain the role of photoreceptors and retinal circuitry in adaptatio • Discuss physiological significance and time course of adaptation
3	Abnormalities of visual pathways	• Describe the common lesions of visual pathways • Explain the clinical manifestations such as visual field defects • Correlate anatomical site of lesion with specific visual deficits
4	Diseases of taste and smell	• Describe the disorders affecting taste and smell • Explain causes, mechanisms, and clinical consequences of anosmia, ageusia, and dysgeusia
5	Hearing abnormalities	• Describe common hearing disorders • Differentiate between conductive and sensorineural hearing loss • Explain the physiological basis and clinical assessment of hearing abnormalities

PHYSIOLOGY PRACTICALS		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Reflexes of eye	• Examine and demonstrate eye reflexes including pupillary light reflex and accommodation reflex • Interpret normal and abnormal reflex responses
2	Visual Acuity + Color Vision	• Assess visual acuity using standard charts • Evaluate color vision and identify color vision deficiencies
3	Perimetry	• Examine a standardized patient for visual field function
4	Sense of smell and taste	• Examine and test sense of smell and taste in a standardized patient • Identify abnormalities and discuss possible clinical causes
5	Tuning fork test for hearing	• Examine a standardized patient for hearing loss with tuning fork (Weber and Rinne`s test)

BIOCHEMISTRY LECTURES		
S.NO	**TOPICS**	**LEARNING OBJECTIVES**
1	Biochemical Genetics – I	• Define replication and its importance • Discuss semi conservative and conservative replication • Enlist the names and functions of various enzymes and proteins participating in replication • Enumerate the steps of replication • Differentiation of prokaryotic and eukaryotic DNA replication
2	Biochemical Genetics – II	• Define transcription • Discuss RNA polymerase and its role in transcription • Enlist the steps of transcription
3	Biochemical Genetics – III	• Discuss the materials required for protein synthesis • Enlist the steps of translation • Define Mutation • Describe types of mutations
4	Biochemical Genetics – IV	• Define biochemical genetics and explain its relevance to inherited metabolic disorders. • Describe the relationship between genes, enzymes, metabolic pathways, and biochemical phenotypes. • Explain the molecular basis of genetic mutations and their effects on protein and enzyme function.
5	Metabolism of Proteins & Amino Acids - I	• Discuss the chemical processes responsible for dissimilation of proteins: transamination, deamination and trans deamination • State Clinical importance of transaminases
6	Metabolism of Proteins & Amino Acids – II	• Discuss how ammonia is formed in various tissues and transported to liver
7	Metabolism of Proteins & Amino Acids – III	• Describe the Urea Cycle, clinical significance of various enzymes involved in urea formation

8	Metabolism of Proteins & Amino Acids – IV	• Discuss biosynthesis, fate, metabolic functions and related inherited disorders of aromatic amino acids
9	Metabolism of Proteins & Amino Acids – V	• Discuss biosynthesis, fate, metabolic functions and related inherited disorders of sulphur containing amino acids
10	Metabolism of Proteins & Amino Acids – VI	• Discuss biosynthesis, fate, metabolic functions and related inherited disorders of Glycine, serine, and alanine
11	Metabolism of Proteins & Amino Acids – VII	• Discuss biosynthesis, fate, metabolic functions and related inherited disorders
12	Metabolism of Proteins & Amino Acids – VIII	• Discuss biosynthesis, fate, metabolic functions and related inherited disorders of branched chain amino acids

BIOCHEMISTRY PRACTICALS

S.NO	TOPICS	LEARNING OBJECTIVES
1	Determination of Blood Urea	• Perform the determination of blood urea
2	Determination of Serum Creatinine	• Perform the determination of serum creatinine
3.	Determination of serum aspartate aminotransferase	• Perform the determination of serum aspartate aminotransferase
4.	Determination of serum alanine amino transferase	• Perform the determination of serum alanine amino transferase

BIOCHEMISTRY SGDs

S.NO	TOPICS	LEARNING OBJECTIVES
1	Cell cycle + Genetic code	• Describe the stages of the cell cycle • Explain the regulation of the cell cycle • Describe the structure and function of the genetic cod • Explain mechanisms of DNA replication and protein synthesis
2	Chaperones & Post-Translational modification	• Discuss the role of chaperones • Describe post-translational modification
3	Transaminase of clinical importance	• Explain the Clinical Importance of Transaminases
4	Ammonia toxicity in brain	• Enlist the Effects of ammonia toxicity in brain

COMMUNITY MEDICINE LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Prevention of Blindness	• Define blindness and visual impairment • Describe the epidemiology and major causes of blindness • Discuss preventive strategies and public health measures to reduce blindness
2	Prevention of Deafness	• Define deafness and classify hearing loss according to its type, severity, and etiology. • Identify the common causes of congenital and acquired hearing loss. • Explain the importance of antenatal, perinatal, and postnatal care in preventing hearing impairment.

GENERAL SURGERY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Carcinoma tongue	• Describe the epidemiology and risk factors of carcinoma of the tongue • Explain the clinical presentation and staging • Discuss diagnostic methods, including biopsy and imaging • Outline management options including surgical, radiotherapy, and chemotherapy approaches

OPTHALMOLOGY LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Glaucoma	• Define glaucoma and classify its major types. • Describe the anatomy of the anterior chamber, aqueous humor production, drainage, and regulation of intraocular pressure. • Explain the pathophysiology of optic nerve damage in glaucoma.
2	Eyelids	• Describe the classification of diseases related to eyelids • Define stye and chalazion • Describe signs, symptoms, investigations, and management of patients with stye and chalazion
3	Corneal ulcer	• Discuss the etiology of corneal ulcer • Describe signs, symptoms, investigations, and management of patients with corneal ulcer • Enlist complications of corneal ulcer
4	Refractive error (myopia, astigmatism hypermetropia)	• Enumerate different types of refractive errors • Describe signs, symptoms, investigations, and management of patients with myopia, astigmatism, and hypermetropia
5	Conjunctivitis	• Enlist the causes of red eyes • Describe signs, symptoms, investigations and management of patient with conjunctivitis

6	Optic Neuritis / Retinal detachment	• Define optic neuritis • Enlist causes of optic neuritis • Describe signs, symptoms, investigations, and management of patients with optic neuritis and retinal detachment
7	Lacrimal apparatus (naso lacrimal duct obstruction)	• Describe the classification of diseases related to lacrimal apparatus • Define naso-lacrimal duct obstruction • Describe sign, symptoms investigations and management of patient with nasolacrimal duct obstruction
8	Lens (cataract)	• Enumerate causes of cataract • Describe sign, symptoms, investigations and management of patient with cataract

ENT LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Allergic Rhinitis	• Define allergic rhinitis and describe its etiology and pathophysiology. • Discuss the clinical features and diagnostic criteria of allergic rhinitis. • Outline the management, including pharmacological and preventive measures.
2	Applied Anatomy of Nose	• Describe the detailed anatomy of the external and internal nose. • Explain the blood supply, nerve supply, and lymphatic drainage of the nasal cavity. • Correlate anatomical structures with common nasal pathologies and surgical approaches.
3	Sinusitis	• Define sinusitis and classify it according to duration and anatomical involvement. • Identify the paranasal sinuses and describe their anatomical location and drainage pathways. • Explain the etiology and pathophysiology of acute and chronic sinusitis.
4	Applied Anatomy – Tonsillitis	• Describe the anatomy of palatine tonsils and their relations. • Explain the pathophysiology and clinical presentation of acute and chronic tonsillitis. • Discuss the complications and management, including indications for tonsillectomy.
5	Otitis media	• Define otitis media and classify it into acute otitis media, otitis media with effusion, and chronic otitis media. • Describe the anatomy of the middle ear and the role of the pharyngotympanic tube in the development of otitis media. • Explain the etiology and pathophysiology of acute and chronic otitis media.
6	Larynx	• Describe the anatomy and functional divisions of the larynx. • Explain the mechanism of phonation and protection of the airway. • Discuss common laryngeal pathologies and their clinical correlations.

BEHAVIORAL SCIENCES LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Motivation	• Describe concept of motivation • Differentiate among different types of Motivation • Differentiate between biological and psychological and social motives • Describe steps of psychological mechanism of motivation. • Describe different staged of Abraham Maslow‘s hierarchy of needs. • Describe clinical application of motivation

ANESTHESIA LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Introduction & Types of Anesthesia	• Define anesthesia • Describe content of anesthesia
2	Postoperative management of patients for anesthesia	• Describe post-operative management of patients for anesthesia.

GENERAL MEDICINE LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Ocular nerve Palsy	• Define ocular nerve palsy and identify the cranial nerves responsible for extraocular muscle movements. • Describe the anatomical course and functions of cranial nerves III (oculomotor), IV (trochlear), and VI (abducens). • Explain the role of the extraocular muscles in eye movements and maintenance of binocular vision. • Identify the common causes of ocular nerve palsy, including diabetes mellitus, vascular lesions, trauma, aneurysms, and intracranial tumors.

PAEDS LECTURES

S.NO	TOPICS	LEARNING OBJECTIVES
1	Cleft palate	• Define cleft palate and classify its major types. • Describe the embryological development of the palate. • Explain the embryological basis of cleft palate, including failure of palatal shelf elevation, fusion, or related developmental processes.

SKILL LAB

S.NO	TOPICS	LEARNING OBJECTIVES
1	History taking in special senses + Eye examination	• Discuss how to take history from patients. • Describe the importance of consent. • Discuss the steps of history taking. • Discuss the common signs and symptoms related to special senses. • Perform examination of eye.
2	Abnormalities of sense of smell	• Identify and describe abnormalities of smell • Explain methods for testing olfactory function
3	Diseases related to taste & tongue	• Demonstrate diseases related to taste & tongue



ASSESSMENT METHODS FOR BLOCK EXAM:

Evaluation is a continuous process comprising of block examination and annual university examination. Students will be evaluated throughout the year. The internal assessment will contribute towards the final examination scores.

Multiple examination methods including MCQs, SAQs, OSPE, and viva will be used.

There will be a block exam at the end of each block.

Theory (knowledge):

MCQs (Multiple Choice Questions) and SAQs (Short Answer Questions) are used to assess the theory part for the block exam.

MCQ:

A MCQ has a statement or clinical scenario followed by five options (likely answers).

After reading the statement/scenario student select ONE, the most appropriate answer/response from the given list of options.

Correct answers carry one mark, and incorrect ‘zero mark’. There is NO negative marking.

SAQ:

SAQ are short open-ended questions that require students to create an answer. They are commonly used in examinations to access the basic knowledge and understanding of a topic.

OSPE:

OBSERVED AND INTERACTIVE STATIONS:

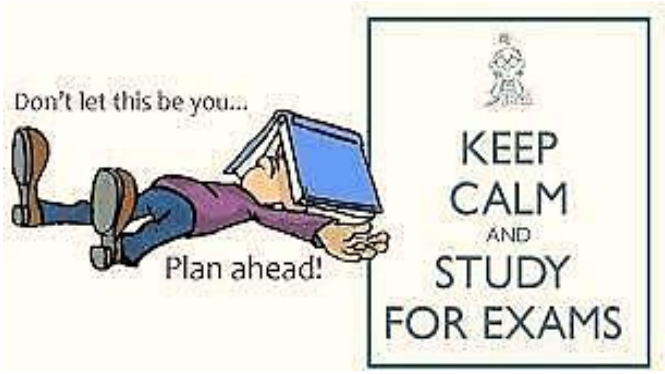
They will be assessed by internal or external examiners through the task or viva.

UNOBSERVED STATION:

It will be static station in which students will have to answer questions related to the given pictures, models or specimens on the provided response sheet.

REST STATION:

It is a station where no task is given, and during this time student can organize his/her thoughts.



BLOCK D (04) · BLOCK EXAMINATION

D

Neurosciences –I & Special Senses

Classes distribution

#	Subject	Module-7 Neurosciences	Module-8 Special Senses	Total
1	**Anatomy**	52	25	**77**
2	**Physiology**	31	17	**48**
3	**Biochemistry**	5	12	**17**
4	Surgery	5		**5**
5	Medicine	4	1	**5**
6	Paediatrics	3		**3**
7	Behavioral Sciences	3	1	**4**
8	ENT	2	5	**7**
9	Eye	1	7	**8**
10	Ripple	3		**3**
11	Anaesthesia		2	**2**
12	Pathology	1		**1**
13	Community Medicine		1	**1**
	Total	**105**	**71**	**181**

MCQ distribution

#	Subject	Module-7 Neurosciences	Module-8 Special Senses	Total
1	**Anatomy**	32	16	**48**
2	**Physiology**	18	12	**30**
3	**Biochemistry**	3	9	**12**
4	Surgery	3		**3**
5	Medicine	2	1	**3**
6	Paediatrics	2		**2**
7	Behavioral Sciences	1	1	**2**
8	ENT	1	3	**4**
9	Eye	1	4	5
10	Ripple	2		**2**
11	Anaesthesia		1	1
12	Pathology	1		1
13	Community Medicine		1	1
	Total	**66**	**48**	**114**

250	150	100	114	36
TOTAL	THEORY	PRACTICAL	MCQ	SAQ

BLOCK D (04) · BLOCK EXAMINATION

D

Neurosciences –I & Special Senses

OSPE, viva and log books

#	Subject	OSPE stations	OSPE marks	Viva	SGD + practical log book	Total
1	**Anatomy**	5 stations (5 marks each)	25	1 station (5 marks)	5	**35**
2	**Physiology**	5 stations (5 marks each)	25	1 station (5 marks)	5	**35**
3	**Biochemistry**	4 stations (5 marks each)	20	1 station (5 marks)	5	**30**
	Total practical		**70**	**15**	**15**	**100**

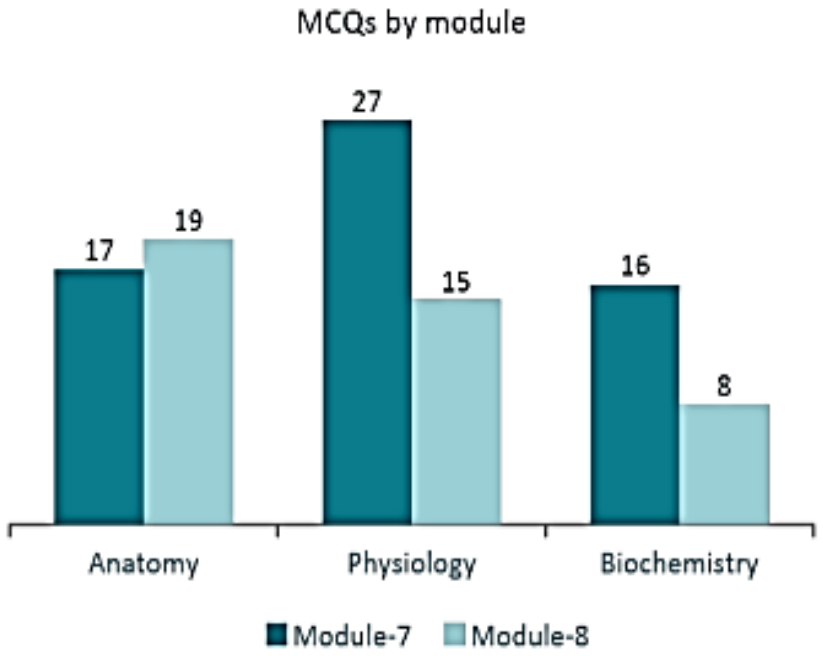
BLOCK D (04) · PROFESSIONAL EXAMINATION

D

Neurosciences –I & Special Senses

MCQ allocation across the core subjects

#	Subject	Module-7 Neurosciences	Module-8 Special Senses	Total
1	Anatomy	35	19	54
2	Physiology	22	13	35
3	Biochemistry	4	9	13
	Total	61	41	102



150	102	36	12
TOTAL MARKS	MCQ	SAQ	INTERNAL ASSESSMENT

BLOCK D (04) · PROFESSIONAL EXAMINATION

Neurosciences –I & Special Senses

D

OSPE — station-wise distribution

ANATOMY	Marks
Station 1 · External examiner	5
Station 2 · Internal examiner	5
Station 3	5
Station 4	5
Station 5	5
Station 6	5
Total	**30**

PHYSIOLOGY	Marks
Station 1 · External examiner	5
Station 2 · Internal examiner	5
Station 3	5
Station 4	5
Station 5	5
Station 6	5
Total	**30**

BIOCHEMISTRY	Marks
Station 1 · External examiner	8
Station 2 · Internal examiner	8
Station 3	4
Station 4	4
Station 5	4
Total	**28**

88
OSPE (STATIONS)

12
INTERNAL ASSESSMENT

100
OSPE TOTAL MARKS

OTHER LEARNING RESOURCES	
Hands-on Activities/ Practical	Students will be involved in Practical sessions and hands-on activities that link with the foundation module to enhance the learning.
Labs	Utilize the lab to relate the knowledge to the specimens and models available.
Skill Labs	A skills lab provides the simulators to learn the basic skills and procedures. This helps build the confidence to approach the patients.
Videos	Video familiarize the student with the procedures and protocols to assist patients.
Computer Lab/CDs/DVDs /Internet Resources	To increase the knowledge students should utilize the available internet resources and CDs/DVDs. This will be an additional advantage to increase learning.
SDL	SDL is scheduled to search for information to solve cases, read through different resources and discuss among the peers and with the faculty to clarify the concepts.



Gandhara Uuniversity, Canal Road, University Town, Peshawar - Pakistan
Tel: (091) 5844429-32, Fax: (091) 5844428
Info@gandhara.edu.pk, www.gandhara.edu.pk