WAH MEDICAL COLLEGE

2024-2028

Department of Medical Education

STUDY GUIDE
2nd YEAR MBBBS
INTEGRATED
Y2BV

2024-2028

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VISION

National University of Medical Sciences envisions a world with a better quality of life for all by enhancing our contribution to healthcare, education, innovation, and research.

MISSION

To produce competent medical professional graduates equipped with sound knowledge & research capabilities based on scientific principles, imbued with ethics and moral values, primed to serve the community through the profession and pursue research & advanced training in any branch of medicine.

1. Outcomes of WMC MBBS Program:

At the end of our five-year MBBS program, the graduates should be able to:
1. Independently manage common, non-critical clinical problems.
2. Assist in the management of critically ill patients & demonstrate competency in life saving procedures.
3. Exhibit the attributes of an ethical professional.
4. Conduct research which brings relevance to health care practices.
5. Act as an efficient community health promoter.
6. Exhibit scientific knowledge in all professional activities.
7. Demonstrate clear and efficient written & verbal communication skills.
8. Exhibit the habits of a lifelong learner.

2. Introduction to the Study Guide:

i. Objectives of the Study Guide

Dear Students,

We, at the Department of Medical Education, Wah Medical College, have developed this study guide especially for you. This study guide aims to:

- Inform you about the organization of learning programs in this block which will help you to contact the right person in case of any difficulty.
- Help you in organizing and managing your studies throughout the block
- Guide you on assessment methods, rules, and regulations.
- Define the outcomes which are expected to be achieved at the end of the block.
- Identify the learning strategies that will be implemented to achieve the block outcomes such as lectures, small group discussions, clinical skills, demonstration, tutorial, and case-based learning
- Provide a list of learning resources such as books, and journals for students to consult to maximize their learning.

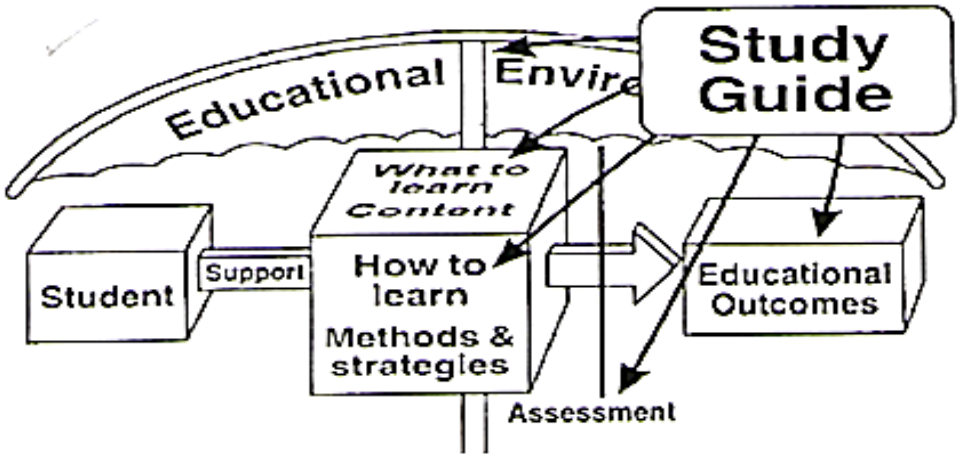


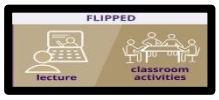
Figure1: Objectives of the study Guide(HARDEN, J.M. LAIDLAW, E.A. HESKETH, 1999)

ii. Commonly used abbreviations & Logos in the study guide

Learning Outcomes:

Learning outcomes are statements that define the expected goal of your course, lesson, or activity in terms of demonstrable skills or knowledge that will be acquired by you as a result of instruction. In simple words, these are the things that you must be able to tell or do with the required attitude after learning a particular topic.

1. **Educational Strategies:** These are the methodologies through which you will be taught by your instructors. These include:

Abbreviation	Logos
LGIS: Large Group interactive session/Lecture	
Flipped Classroom	
CBL: Case-based learning.	
Practicals	
Demonstrations	
SGD: Small group discussions	
BST: Bedside Teaching	
Skill Lab	
Clinical Teaching (OPD/ OT/ IPD	
Gamification	

Large Group Interactive Sessions

In a large group, the lecturer introduces a topic or common clinical condition and explains the underlying phenomena through questions, pictures, videos of patients' interviews, exercises, etc. Students are actively involved in the learning process.

Flipped classroom

A pedagogical approach in which the conventional notion of classroom-based learning is inverted: students are introduced to the learning material before class with classroom time then being used to deepen understanding through discussion with peers and problem-solving activities facilitated by teachers.

Small Group Discussion

This format helps students to clarify concepts, acquired 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's role is to ask probing questions, summarize, or rephrase to help clarify concepts.

Case-Based Learning

This is a small group discussion format where learning is focused around a series of questions based on a clinical scenario. Specifically, designed case scenarios and the learning outcomes to be achieved are shared with the student before the session. Students prepare for the CBL and during class they discuss and answer the questions applying relevant knowledge gained in clinical and basic health sciences during the block. Faculty members are present as a guide and an assessor.

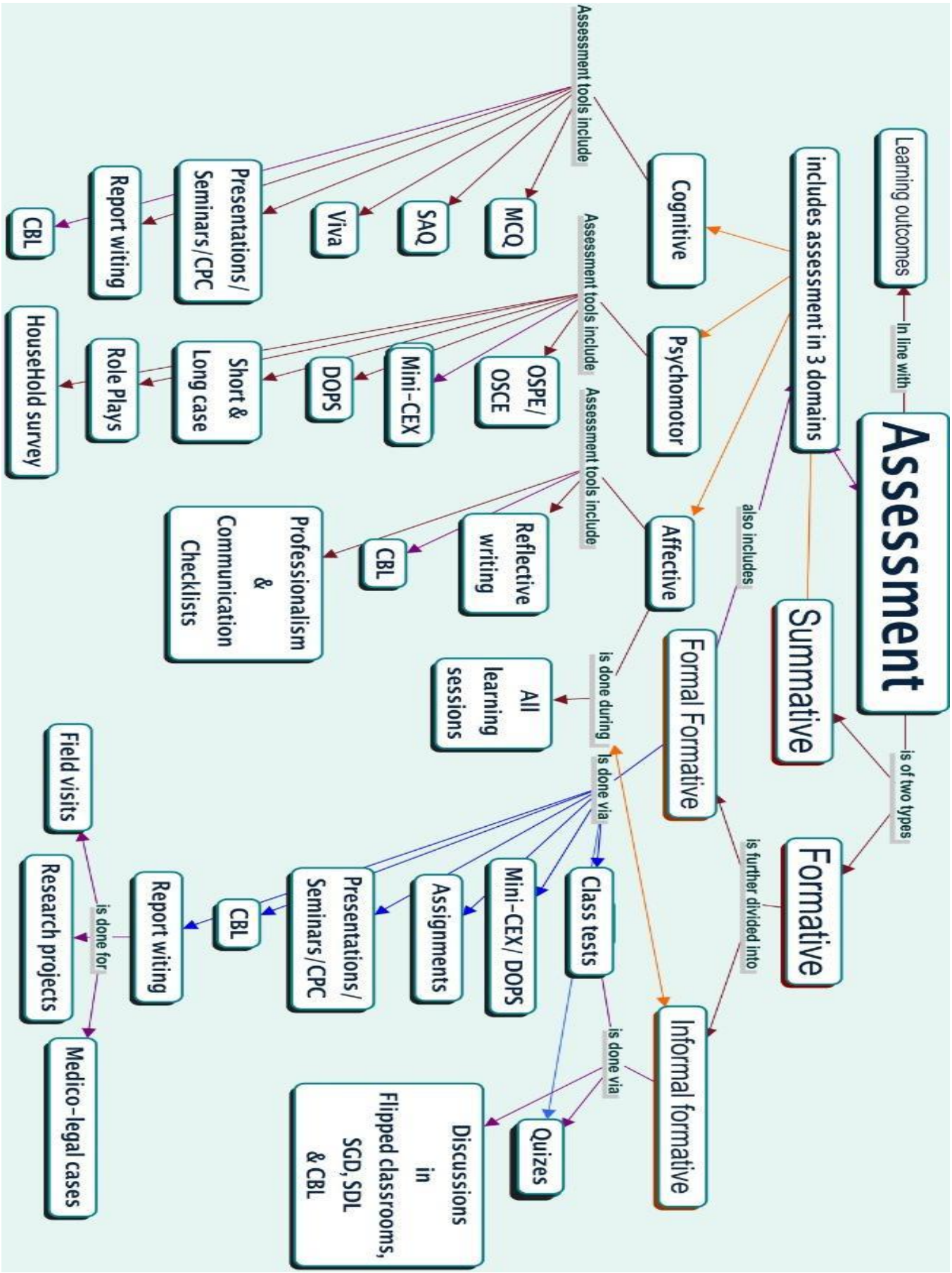
Self-Directed Study

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

Gamification:

The educators apply game design elements to an educational setting. The goal is usually to make learning more engaging.

3. Assessment Map, Policies & Strategies:



4. Assessment Strategies:

During the block, you shall be continually formatively assessed in all three learning domains i.e., Cognitive, Psychomotor & Affective.

- The weighting of internal assessment shall be 20% in 1st professional MBBS Examination.
- There shall be three EBE and one pre-annual examination. To be eligible to sit in the Pre-annual exam a student must pass at least 50% of all the formal formative & summative assessments conducted during the year. The final decision of eligibility to sit in the pre-annual exam for the students failing to meet the requirements will be taken by the respective HODs & the dBOS. This decision will be on a case to case basis depending upon the student's performance in all 3 learning domains throughout the year.
- The scores of class tests, each EBE & pre-annual examination shall be used for calculation of the internal assessment according to NUMS curriculum.

Internal Assessment Structure for theory	
Weighting 20%	
Component	Weightings
1. Attendance in theory learning sessions a. >90%=10 b. 80-89% = 7 c. 75-79% = 5	10%
EBE/ ECE (Theory)	45%
Continuous formal formative assessments- Average score in all the class tests or quizzes during the academic year	20%
Pre-Annual Exam	25%
Total	100%
Internal Assessment Structure for Practical	
Weighting 20%	
Component	Weighting
1. Attendance in practical learning sessions a. >90%=10 b. 80-89% = 7 c. 75-79% = 5	10%
2. OSPE/ OSCE conducted in EBE/ ECE	45%
3. Continuous formal formative assessments- Average score in all the skill tests during the academic year	20%
Pre-Annual Exam	25%
Total	100%

End Block and Pre-Annual Examination:

- There will be three EBEs, one at the end of each block & one pre-annual examination at the end of the academic year.
- The structure of the paper for all the end block examinations and pre-annual examinations will be the same as that for the annual examination, though the syllabus will be different.
- The syllabus for EBE will be announced by the department at least 02 weeks before the examination.
- Pre-annual examination will cover the whole syllabus.
- The date sheet for EBE and pre-annual examinations will be prepared by coordinators of 1st & 2nd year, while the examinations will be conducted by the respective departments.
- The result will be utilized for the calculation of the internal assessment, which will be submitted to the NUMS examination branch at least two weeks before the annual exam.

Annual Professional Examination:

- The university shall take the 1st professional Examination as per PMC guidelines at the end of the academic year.
- Annual theory and practical examinations shall be of 200 marks each in Anatomy, Physiology, and Biochemistry.
- The pass score shall be 50% in theory and practical separately.

5. Block Development Committee

Chairperson	Prof. Dr. Sumaira Gul	
Block In-charge	Dr. Hina Umair	
Members/ Resource persons	Anatomy Physiology Biochemistry Medicine Surgery Behavioral Sciences EBM & RM P-CMILE/ Generic Competencies	Dr. Kaukab Anjum Dr. Hina Umair Dr. Zahid Mahmood Dr. Ayesha Rani Dr. Sadia Farhan Ms. Zunaira Naveed Dr. Khola Waheed Khan Ms. Zunaira Naveed
Study guide developed by	Department of Medical Education Wah Medical College under the supervision of **Prof. Dr. Mussarat Ramzan**	
Resource person for Study Guide	**Brig (R) Dr. Abdul Waheed Khan**	

6. Structured Summary of Y2BV- MX

Block Code	Y2BV- MX Genetics & Neuroscience I
Prerequisite	Passing the first professional MBBS examination.
Duration	09 weeks
Rationale	This module of the block aims to form the basis of knowledge and skills related to the Anatomy, Physiology, and Biochemical aspects of genetics and neurosciences. This module of 9 weeks duration focuses on histo-morphological, embryological, and gross features as well as physiological and biochemical functioning of neurosciences. It is part of the second-year integrated curriculum at WMC.
Anatomy	• Gross anatomy of brain and spinal cord, Development of CNS, Histology of nervous tissue
Physiology	• Central nervous system, including sensory, motor and autonomic nervous system
Biochemistry	• Chemistry & Metabolism of Nucleotides, Molecular Genetics, Neurotransmitters
Surgery & Radiology	• Neurological assessment of patients with brainstem and spinal cord lesions, CNS.
Medicine	• Motor system examination, Upper and Lower motor neuron lesions, Epilepsy, Parkinson's disease.
Behavioral sciences	• Communication, professionalism, Ethics, Patient and doctor, Psycho-social Aspects, Clinical Practice

Block V Module X
Neurosciences I & Genetics

1. Foundations of Neurosciences

Learning Outcomes	Teaching & Learning Strategies	Proposed Assessment Strategies:
• Apply the basic anatomical and physiological principles of neurological processes by correlating the structures forming the nervous system with their functions. • Interpret the physiological mechanisms controlling the neuronal signals transmitted through the synapse • Interpret the physiological mechanisms controlling the functions of the sensory system	SGD, LGIS	MCQs, SEQs/ SAQs, OSPE, Structured Viva

Anatomy:

- List the major divisions and components of the central nervous system.
- Summarize the histological features of neurons and neuroglia.
- Classify neurons according to their morphology with one example of each.
- Explain the characteristic histological features of encapsulated and non-encapsulated sensory nerve endings.
- Explain the histomorphological composition of the peripheral nerve.
- Differentiate between sensory and autonomic ganglia in tabulated form.
- Describe the development of the neural tube concerning neurulation, vesicles, brain flexures, and ventricles.
- Demonstrate the structure of the brain and spinal cord on prosected specimens and models.
- Identify the structure of the brain and spinal cord in the images of CT scan & MRI

Physiology

- Describe the functions of different types of neurons and neuroglial cells. Differentiate between various types of synapses.
- Elucidate the electrical events during neuronal excitation and inhibition (EPSPs & IPSPs)
- Summarize the transmission and processing of signals in neuronal pools (summation, facilitation, convergence, divergence, after discharge, synaptic delay, and fatigue)
- Classify the various types of sensory receptors based on their structure and function

• Explain the sensory stimuli and differential sensitivity of receptors • Explain the sensory transduction into nerve impulses and the adaptation of receptors • Classify the nerve fibers that transmit different types of signals on a physiological basis. • Relate neuropeptides and neurotransmitters with their functions • Differentiate between the sympathetic and parasympathetic nervous systems based on structure, receptors, neurotransmitters, and functions		
Medical biochemistry • Discuss synthesis, stimulus, mechanism of action, and biochemical role of neurotransmitters		
Clinical Relevance: • Analyze the pathophysiology of demyelinating disorders like Multiple sclerosis. • Differentiate between tetanization, tetany, tetanus, and the treppe phenomenon • Enumerate ventricles and coverings of the brain and spinal cord with special emphasis on intracranial hemorrhages. • Justify the importance of nucleotides, their derivatives, and nucleic acids in diagnosing and treating genetic disorders, cancers, and developing anti-viral drugs and advanced gene therapy. • Justify and correlate the role of different neurotransmitters in various Neurological & Immunological disorders		
1. CRANIAL CAVITY		
• Relate the developmental and anatomical features of the cranial cavity to its clinical significance	LGIS, SGD	MCQs SAQs/ SEQs, OSPE, Structured Viva
Anatomy: • Describe the development of the skull • Describe the importance of the fontanelle of the skull in newborns regarding: - Changes in intracranial pressure. - Closure of different fontanelles • Explain the embryological basis of cranioschisis and various types of craniosynostosis • Demonstrate the anatomical position of the skull with special emphasis on the planes of anatomical position. • Describe and demonstrate the boundaries and gross features of cranial fossae. • List and demonstrate foramina along with structures passing through them in the anterior, middle, and posterior cranial fossae. • Recognize the important sutures, fontanelles, and impressions on the interior of the cranial vault		
Physiology: • Examine the cranial nerves on the SP • Explain the pathophysiological basis of the clinical manifestations of different	Lab Skills CBL, TBL	MCQs SEQs, SAQs, OSPE, Structured Viva

cranial nerves		
Clinical Relevance: • Correlate the congenital anomalies of the skull with their embryological basis • Identify important landmarks on the skull • Explain the clinical presentations relevant to fractures of various bones of the skull	SGD	MCQs, SAQs, SEQs, OSPE, Structured Viva
2. Meninges and Dural Venous Sinuses		
• Correlate the anatomical structures of meninges and Dural venous sinuses to their clinical significance	LGIS, SGD	MCQs, SAQs, SEQs, OSPE, Structured Viva
Anatomy: • Explain the meninges of the brain and spinal cord, along with the reflections of the dura mater in the brain. • Liat paired and unpaired Dural venous sinuses along with their attachments • Describe the location, important relations, and communications of the cavernous sinus and enumerate structures passing through it.		
Clinical Relevance: • Describe the clinical presentation of the following clinical disorders associated with meninges and Dural venous sinuses: o Meningitis o Epidural hemorrhage o Subdural hemorrhage o Subarachnoid hemorrhage o Intracranial hemorrhage		
3. Spinal Cord & Neural Pathways		
• Explain the dorsal column medial leminiscal system and anterolateral pathways • Correlate the pathophysiological basis of pain pathways to their clinical significance	LGIS, SGD	MCQs, SEQs/SAQs OSPE, Structured Viva
Anatomy: • Describe the histological features of the white and grey matter of the spinal cord. • Describe the development and positional changes of the spinal cord. • Describe the formation and developmental changes in alar and basal plates. • Explain the gross appearance and the nerve cell groups in the anterior, posterior, and lateral gray columns of the spinal cord • Enumerate and illustrate the arrangements of ascending and descending tracts (white matter) in the spinal cord at various levels.		

- Explain the given clinical conditions related to the ascending and descending tracts of the spinal cord.

Physiology:

- Compare and contrast the dorsal column medial leminiscal system and anterolateral pathways
- Differentiate between different sensory tracts
- List different types of sensations carried by their relevant sensory tract
- Explain the various thermal sensations, thermal receptors, and their excitation and transmission of thermal signals in the nervous system
- Classify the different types of pain.
- Compare the perception and transmission of the different types of pain.
- Explain the pain suppression system in the brain and spinal cord.
- Describe the brain's opiate system, endorphins, and enkephalins
- Explain the role of proprioceptors (muscle spindles and Golgi tendon organs) in motor movements
- Explain dynamic and static stretch reflex
- Describe the flexor reflex and the crossed extensor reflex.
- Explain the reciprocal inhibition and reciprocal innervation.
- Identify the reflexes of posture and locomotion in the spinal cord.
- Explain the role of the primary motor cortex, premotor area, and supplementary motor area in the control of voluntary motor movements.
- Identify the various pathways for the transmission of signals for voluntary motor control from the motor cortex to the muscles.
- Explain the significance of anterior motor neurons as the lower motor neurons.
- Identify the role of the brain stem in controlling motor function and its role in the posture of the body against gravity.
- Explain the role of the pyramidal and extrapyramidal tracts in voluntary motor movements

Clinical Relevance:

- Explain the embryological basis of various types of Spina Bifida.
- Describe the clinical abnormalities of pain and other somatic sensations
- Determine the anatomical and pathophysiological relevance of the following clinical conditions:
  - Upper motor neuron lesions, lower motor neuron lesions
  - Hemiplegia, paraplegia and Quadriplegia
  - Spinal shock syndrome
  - Complete cord transection syndrome
  - Anterior cord syndrome
  - Central cord syndrome
  - Brown-Sequard syndrome
  - Syringomyelia
  - Poliomyelitis
  - Multiple sclerosis

○ Amyotrophic lateral sclerosis		
4. Brainstem		
• Relate the anatomical structures, physiological functions of **the** brainstem to its clinical significance	LGIS, SGD	MCQs, SAQs/ SEQs, OSPE, Structured Viva
Anatomy: • Enumerate the derivatives of rhombencephalon and mesencephalon, • Summarize the characteristic developmental events of the following: ○ Medulla oblongata ○ Midbrain ○ Pons • Describe the gross appearance and internal structure of the medulla oblongata. • Illustrate the cross sections of the medulla oblongata at different levels. • Explain the effects of raised pressure in the posterior cranial fossa on the structures contained within it. • Describe the gross features and internal structure of the pons. • Illustrate a cross-section of the pons at different levels, showing major structures at each level. • Describe the gross appearance and internal structure of the midbrain. • Illustrate cross sections at the level of the superior colliculus and the inferior colliculus, showing major structures at each level.		
Physiology: • Discuss the functions of the brainstem in regulation of various vital functions in body.		
Clinical Relevance: • Explain the anatomical features with relevant physiological significance of the following clinical conditions: ○ Arnold-chiari malformation ○ Medial medullary syndrome ○ Lateral medullary syndrome of Wallenberg. • Analyze the anatomical basis/relevance of clinical presentation in case of tumors of the pons, Pontine hemorrhage, and Infarction of the pons. • Describe trauma and vascular lesions of the midbrain • Justify the clinical presentation of blockage of the cerebral aqueduct with an anatomical and physiological basis.		
5. **Cerebellum**		
• Relate the macro and microscopic structure and physiological functions of the cerebellum to its clinical significance	SGD, LGIS	MCQs, SAQs/ SEQs, OSPE, StructuredViva
Anatomy: • Enumerate and illustrate the histological layers of cerebellar cortices and the different cell types of these layers.		

- Summarize the characteristic developmental events of the Cerebellum
- Describe the gross features of the cerebellum.
- List intracerebellar nuclei and types of fibers constituting the white matter of the cerebellum and explain their routes of entry and exit.
- Explain the pathways carrying afferent and efferent fibers to and from the cerebellum.

Physiology:

- Explain the functional divisions and neuronal circuitry of the cerebellum.
- Differentiate between the vestibulo and spinocerebellum based on their functions

Clinical Relevance:

- Describe the pathophysiological basis of the clinical abnormalities of the cerebellum
- Correlate the clinical presentations of cerebellar disorders with the anatomical and physiological basis

6. Cerebrum

• Relate the anatomical structures and physiological functions of the cerebrum to its clinical significance	LGIS, SGD	MCQs, SAQs, SEQs OSPE, Structured Viva

Anatomy:

- Explain the histological features of the cerebral cortex
- Summarize the characteristic developmental events of the Cerebrum.
- Identify the major sulci and gyri of the cerebral hemispheres and describe the extent of each of them.
- Explain the divisions of cerebral lobes on the superolateral, medial, and inferior surfaces of cerebral hemispheres.
- Name the fibers making up the white matter of the cerebral hemispheres and describe each of them
- Identify different components of the cerebrum on the prosected specimen
- Describe the cortical functional areas in different lobes of the cerebral hemispheres.

Physiology:

- Describe the various functional areas of the cerebral cortex
- Relate the functions of specific cortical areas and association areas in the physiology of speech.
- Discuss the higher intellectual functions of the prefrontal areas and the various cortical association areas.
- Describe the functions of the corpus callosum.
- Identify the different types of brain waves and their origin
- Explain the effect of varying levels of cerebral activity on the frequency of the EEG.

Clinical Relevance:

- Differentiate between Grand mal, petit mal epilepsy, and focal epilepsy

- Correlate the clinical presentations of lesions of the internal capsule and motor cortex with motor and speech disorders
- Explain the pathophysiological disorders related to speech.
- Explain the pathophysiology, signs, symptoms, microscopic changes, diagnosis, and treatment of Alzheimer's disease
- Assess higher mental functions on SP

7. Diencephalon

• Relate the anatomical structures and physiological functions of the Diencephalon to its clinical significance	SGD, LGIS	MCQs, SAQs/ SEQs OSPE, Structured Viva

Anatomy:

- Describe the topographic anatomy of the diencephalon and demonstrate its gross features on a given model.
- Describe the general arrangement, functions, and projections of the reticular formation.
- Illustrate components of the limbic system on the model
- Describe the development of the Diencephalon
- List the divisions, nuclei, and connections of the thalamus.
- List the nuclei of the hypothalamus.
- Describe the hypothalamic-hypophyseal portal system and tract

Physiology:

- Describe the functions of the thalamus.
- Explain the mechanisms of heat production and heat loss.
- Describe the regulation of body temperature and the role of the hypothalamus
- Differentiate between slow-wave sleep and REM Sleep.
- Describe the basic theories of sleep and the physiological effects of sleep. Explain the changes in EEG at different stages of wakefulness and sleep.
- Explain the functions of various components of the limbic system and the role of the hippocampus in memory.
- Classify memories based on type of sensory experience, time of retention, synaptic facilitation, and habituation
- Explain the process of consolidation of memory through chemical and anatomical changes occurring at the synapse.

Clinical Relevance:

- Describe the pathophysiology and clinical presentation of various disorders of the thalamus, hypothalamus, and limbic system
- Interpret the various abnormalities of body temperature regulation with special focus on fever.
- Discuss the pathophysiology of various sleep disorders
- Explain the effects of destruction of the amygdaloid complex on behavior and memory
- Compare various types of amnesia, including retrograde, anterograde

amnesia, Alzheimer's and dementia.		
8. Reticular formation and limbic system		
• Relate the anatomical structures and functions of the limbic system and reticular formation to their clinical significance	LGIS	MCQs, SEQs, OSPE, Viva-Voce
• Describe the general arrangement, functions, and projections of the reticular formation. • Illustrate the components of the limbic system on the model **Clinical Relevance:** • Determine the anatomical relevance of the following clinical conditions: • Schizophrenia • Epilepsy (Temporal Lobe Epilepsy) • Klüver-Bucy Syndrome • Coma & Altered States of Consciousness		
9. Basal Nuclei		
• Relate the anatomical structures and physiological functions of the basal ganglia to its clinical significance	LGIS, SGD	MCQs, SAQs/ SEQs OSPE, Structured Viva
Anatomy: • Explain the gross features of the basal nuclei. • Describe connections and functions of different nuclei constituting basal ganglia		
Physiology: • Relate the role of basal nuclei in cognitive control of sequences of motor patterns. • Explain the direct and indirect circuits of the basal ganglia • Explain the role of various specific neurotransmitter substances in the basal ganglia and the pathophysiological disorders related to their deficiency**.**		
Clinical Relevance: • List hyperkinetic disorders related to various basal nuclei like chorea, hemiballismus, and athetosis, • Describe Parkinson's disease regarding etiology, pathophysiology, clinical features, and treatment		
10.Ventricular System		
• Relate the anatomical structures and physiological functions of the Ventricular system, the CSF, & the blood-brain & blood-CSF barriers to its clinical significance	LGIS	MCQs, SEQs/ SAQs OSPE, Structured Viva
Anatomy:		

- Describe the anatomical organization of the ventricular system of the brain
- Explain the boundaries of each ventricle along with their choroid plexus.
- Explain formation, circulation, and absorption of CSF.
- Liat the structures forming the blood-brain and blood-CSF barriers
- Identify the features of various ventricles on models and prosected specimens.
- Illustrate the floor of the fourth ventricle

Physiology:

- Discuss the functions of CSF.
- Differentiate between CSF and plasma
- Explain the physiological significance of blood-brain barrier

Clinical Relevance:

- Describe the process of lumbar puncture, including sequential enumeration of the anatomical structures that a needle passes through during a spinal tap.
- Explain causes & varieties of Hydrocephalus

11.Blood Supply of the Brain and Spinal Cord

• Relate the blood supply of different parts of the brain and spinal cord to its clinical significance	LGIS, SGD	MCQs, SAQs, SEQs OSPE, Structured Viva

Anatomy:

- Describe the blood supply of different parts of the brain and spinal cord, emphasizing the circle of Willis
- Explain the formation and importance of the venous system
- Identify various blood vessels of the brain and spinal cord on models and prosected specimens.

Clinical Relevance:

- Relate the interruption of cerebral circulation to cerebral artery syndromes due to anterior, middle, and posterior cerebral artery occlusion
- Correlate the clinical presentation of cerebrovascular accidents with the sites of lesion.

12.Cranial Nerves

Anatomy:

- Classify the cranial nerves into sensory, motor, and mixed nerves.
- Identify the nuclei and intracranial course of all cranial nerves

Clinical relevance:

- Explain the clinical presentations of lesions of nuclei and the intracranial course of all cranial nerves:

Practicals

Anatomy:

- Histology of nerve and ganglia
- Histology of the Spinal Cord
- Histology of cerebellum
- Histology of the cerebral cortex

Physiology:

- Examine the motor system on an SP
- Performs Deep tendon reflexes
- Examine the Cerebellar Functions on an SP
- Examine the autonomic nervous system on an SP
- Examine the Sensory system on an SP
- Perform superficial reflexes on an SP
- Record the normal body temperature
- Examine the 5th, 7th, 9th, 10th, 11th & 12th Cranial nerves on SP

Medical Biochemistry:

• Apply the knowledge of Nucleotide Chemistry in understanding genetic disorders, cancers, and developing anti-viral drugs and advanced gene therapy		

Nucleotide Chemistry

- Describe nitrogenous bases, nucleosides, nucleotides, and nucleic acids, their types, structure, and functions
- Discuss the synthetic derivatives of purines, pyrimidines, and nucleotides and their role in health and disease

• Apply the knowledge of nucleotide metabolism for understanding relevant metabolic disorders	LGIS, PBL, CBL SGD	MCQs, SEQs, SAQs OSPE, Structured Viva

Nucleotide Metabolism

- Explain nucleotide metabolism for understanding relevant metabolic disorders
- Outline the de novo synthesis of Purine, nucleotides, and deoxyribonucleotides
- Explain the salvage pathway of purine and pyrimidine nucleotides
- Describe the degradation of purines and pyrimidines with related diseases

Clinical Relevance:

- Relate the nucleotide metabolism with clinical disorders like gout, Lesch-Nyhan syndrome, orotic aciduria, immunodeficiencies, and other metabolic disorders

• Apply the knowledge of DNA, RNA, and biotechnology**,** and their role in Genetics and molecular medicine	LECTU RES PBL, CBL, SGD	

Molecular Genetics

- Describe DNA structure & types of state organization of Prokaryotic and Eukaryotic DNA
- Describe various types of RNA andtheir structure
- Outline Prokaryotic and Eukaryoticreplication, transcription, and translation
- Explain the Supercoiling of DNA

- Outline different mechanisms of gene regulation, expression, and their role in various metabolic and genetic disorders. Describe mutations, DNA Repair Mechanisms, Reverse transcription, post-translational modification, and various Genetic Diseases
- Relate genetics and molecular medicine in health and disease
- Describe PCR, different blotting techniques, RFLP, cloning, Probes, plasmids, and their role in forensic, prenatal diagnosis, and gene therapies.

Clinical Relevance:

- Analyze the role of DNA structure, types, and eukaryotic DNA organizations in genetic testing and therapy.
- Justify the importance of molecular medicine, genetics, and biotechnology in diagnosing and treating genetic disorders, cancers, and infectious diseases.
- Evaluate the importance of DNA replication in prokaryotes and eukaryotes, aiding in the development of antibiotics and antiviral drugs.
- Correlate the knowledge of mutations in diagnosing and treating genetic disorders and cancers

List of Medical Biochemistry Practicals (Neurosciences & Genetics)

• Collection and preservation of clinical specimens	Practical	OSPE

Learning Outcomes:

- Explain the guidelines, criteria, and method of collection of biospecimens (blood, urine, feces, saliva, sputum, tissuesample)
- Explain the use of different vacutainers, their additives, and application in the collection and preservation of blood samples

• Estimation and clinical interpretation of serum uric acid	Practical	OSPE/ Practical Performance

Learning Outcomes:

- Explain the indications, pre-requisites, principle, results, and clinical significance/diagnostic application
- Interpretation of laboratory report
- Demonstrate the test using the specified procedure and appropriate glassware/equipment

• **DNA extraction**	Practical	OSPE

Learning Outcomes:

- Explain the principle, method, and application of the phenol-chloroform DNA extraction method
- Explain the procedure of visualization of DNA bands using Gel electrophoresis and the Gel Doc system

• **PCR**	Practical	OSPE

Learning Outcomes:

- Explain the principle, protocol, procedure, application, advantages, and types of PCR

• **Justify the use of solutions in clinical practice**	Practical	OSPE
Learning Outcomes: • Explain different types of solutions and their applications in clinical practice (ORS, normal saline, dextrose, Ringer's lactate, Haemocoel)		

Learning Resources:

Anatomy: Reference Books:

Subject/discipline	Title and Author	Edition
Gross Anatomy	SNELL'S CLINICAL NEUROANATOMY	8
Histology	Basic Histology Text and Atlas by Luiz Carlos and Junqueira	16
	Basic Histology by Laiq Hussain Siddiqui	7
	DiFiore's atlas of histology	14
Embryology	Medical Embryology by Langman	15
	The Developing Human by Keith Moore	10

Other resources that can be explored:

- Pre-reading material
- PowerPoint Presentations
- Google
- Learning resource center
- Handouts

Physiology:

1. Learning Resources:

- Human Physiology 9th Edition by Sherwood
- Ganong's Review of Medical Physiology, 25th Edition
- BRS Physiology ,5th edition by Linda S.Costanzo
- A text book of practical physiology,8th edition by CL Ghai
- Guyton and hall review ,3rd edition

2. Online resources

- Google class room
- Understandingphysiology.wordpress.com

3. Library resources:

- Guyton and Hall Textbook of Medical Physiology (14th Edition)
- Human Physiology 9th Edition by Sherwood
- Ganong's Review of Medical Physiology, 25th Edition
- BRS Physiology ,5th edition by Linda S.Costanzo 50
- A text book of practical physiology,8th edition by CL Ghai
- Guyton and hall review ,3rd edition

Biochemistry

1. **Reference Books:**
    - Chemistry of Nucleotides- Harper's Biochemistry
    - Metabolism of Nucleotides- Lippincott's Biochemistry
    - Genetics-Lippincott's Biochemistry
    - Neurotransmitters-Lippincott's Biochemistry
2. **Library Resources:**
    - Mark's Biochemistry
    - Hashmi's biochemistry
    - Biochemistry By Lehninger

Teaching faculty/ Facilitators:

Anatomy:

Prof Dr Zubia Athar	zubiaathar@hotmail.com
Prof Dr Uzma Shahid	ua7567@gmail.com
Dr Nomana Mahmood	mahmoodnomana@gmail.com
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Dr. Syed Tauqeer Abbas	syedtauqeerabbas@gmail.com
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Dr. Kinza Talat	kanzatallat@gmail.com

Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
CBLs, SGDs, Quizzes, Viva	Class Tests End of Block Exams

Research Methodology

Block Learning Outcomes:

By the end of 2nd Block the 2nd Year MBBS students will be able to:

- Appraise the process of research.
- Differentiate between different data collection tools
- Validate a research design and data collection tool

Sr no.	Topic	Educational Strategies'	Name of instructor	Importance
1.	Overview of research process	LGIS	Dr. Khola	Must Know
Class Learning Outcomes: • Formulate a research question and research objectives • Select a study design according to research objectives				
2.	Data collection tool and Validity of research design and tool	LGIS	Dr. Khola	Need to Know
Class Learning Outcomes: • Outline types of data collection tools and types of questions • Formulate a data collection tool • Discuss the validity of the research design and data collection tool				

Learning Resources:

1. **Textbooks**
   - Park's Textbook of Preventive and Social Medicine
   - Public Health and Community Medicine (Shah, Ilyas, Ansari, Irfan's)
2. **Reference Books/ Library resources**
   - Basic Methods of Medical Research (Indrayan)
   - Handouts/SDL prepared by faculty.

Teaching faculty & contact address

Name	Email address
Dr. KholaWaheed Khan	kholawaheed@wahmedicalcollege.edu.pk

Assessment formats

Assessment Strategies (Formative)	Assessment Strategies (Summative)
Assignments	MCQs and SEQs

Behavioral Sciences

Subject Class Learning Outcomes:

1. Recognize influence of culture and community on Health behavior, perceptions and beliefs (PLO 3,5)
2. Practice patient centered behavioral guidance and interventions (PLO 1,5,6)
3. Analyze the influence of social determinants on health outcomes and how physician can use this knowledge in patient care (PLO 3,5,6)
4. Practice Professionalism and leadership qualities in clinical setup (PLO 1,2,3,6)
5. Practice key personal traits, including self-awareness, emotional intelligence, empathy and effective communication skills in medical practice (PLO 1,3,7)

Learning outcomes:

1. Critique the ethical boundaries of conduct in doctor-patient relationship (SLO 4,5)
2. Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors (SLO 1,3)
3. Recognize the factors contributing towards a state of psychological and social well-being of human (SLO 1,3)
4. Compare various models of leadership and management and assess their application in a medical context (SLO 4)
5. Analyze and implement effective decision-making strategies in crisis leadership within the context of medical emergencies (SLO 4,5)
6. Demonstrate effective communication skills in clinical practice (SLO 4,5)

Sr. No.	Topics	Educational Strategies	Name of instructor	Importance (Must Know Should Know Could Know)
1	Psychological Reactions in Doctor-Patient Relationship	LGIS	Ms. Zunaira Naveed	Must know
Learning Outcomes: • Critique the ethical boundaries of conduct in doctor-patient relationship				
2	Role of psychological factors in the precipitation & Management of illnesses	LGIS	Ms. Zunaira Naveed	Must know
Learning Outcomes: • Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors				

3	Role of psychological and social factors in diseases causing disability, handicap and stigma	LGIS	Ms. Sara Rubab	Must Know
Learning Outcomes: • Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors				
4	Medically Unexplained Physical Symptoms (MUPS)	LGIS	Ms. Sara Rubab	Must Know
Learning Outcomes: • Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors				
5.	Health & Normality	LGIS	Ms. Sara Rubab	Must Know
Learning Outcomes: • Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors				
6.	Defence Mechanisms	LGIS	Ms. Zunaira Naveed	Must Know
Learning Outcomes: • Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors				
7.	Psychological Reactions to Illness and Hospitalization	LGIS	Ms. Zunaira Naveed	Should Know
Learning Outcomes: • Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors				
8.	Psychosocial Assessment in Healthcare	LGIS	Dr. Hira Munir	Should Know
Learning Outcomes: • Illustrate human thought, behavior and interactions by health and disease situations influenced by psychological factors				
Leadership and Management				
1.	Leadership & Management styles and theories	LGIS	Mr. Saad-Ul-Hassan	Must Know
Learning Outcomes: • Compare various models of leadership and management and assess their application in a medical context				
2.	Healthcare Decision- Making	LGIS	Mr. Saad-	Should Know

	& Leadership		Ul-Hassan	
Learning Outcomes: • Analyze and implement effective decision-making strategies in crisis leadership within the context of medical emergencies				
3.	Decision Making Process in Healthcare	LGIS	Mr. Saad-Ul-Hassan	Should Know
Learning Outcomes: • Analyze and implement effective decision-making strategies in crisis leadership within the context of medical emergencies				
4.	Risk management & mitigation	LGIS	Mr. Saad-Ul-Hassan	Must Know
Learning Outcomes: • Analyze and implement effective decision-making strategies in crisis leadership within the context of medical emergencies				
5.	Crisis leadership in medical emergencies	LGIS	Mr. Saad-Ul-Hassan	Should Know
Learning Outcomes: • Analyze and implement effective decision-making strategies in crisis leadership within the context of medical emergencies				
Communication Skills				
1.	Introduction to Communication Skills	LGIS	Ms. Zunaira Naveed	Should Know
Learning Outcomes: • Demonstrate effective communication skills in clinical practice				
2.	Basic Communication Techniques	LGIS	Ms. Zunaira Naveed	Should Know
Learning Outcomes: • Demonstrate effective communication skills in clinical practice				
3.	Barriers to Communication	LGIS	Ms. Zunaira Naveed	Must Know
Learning Outcomes: • Demonstrate effective communication skills in clinical practice				
4.	Ways to enhance communication	LGIS	Ms. Zunaira Naveed	Must Know
Learning Outcomes: • Demonstrate effective communication skills in clinical practice				

Learning Resources:

- Handouts prepared by faculty.
- Online resources
- Lecture notes
- Reference Books

Teaching Faculty:

Name	Email address
Ms. Zunaira Naveed	naveedzunie@gmail.com
Ms. Sara Rubab	sararubab753@gmail.com
Mr. Saad-Ul-Hassan	saadmirza101@gmail.com
Dr. Hira Munir	Hiramunir144@gmail.com

Assessment formats:

Assessment Strategies (Formative)	Assessment Strategies (Summative)
● Directly observed behaviors, ● Small group discussions, ● Reflective writing ● Portfolios	● Assignments, ● Case studies, ● Quiz, Presentations

7. Rules & regulations:

i. Student's code of conduct

The Student Code of Conduct sets out the standards of conduct expected of students. It holds individuals and groups responsible for the consequences of their actions. Failure to fulfill these responsibilities may result in the withdrawal of privileges or the imposition of sanctions.

Wah Medical College is a community of students, faculty and staff involved in learning, teaching, research and other activities. All members of the WMC community are expected to conduct themselves in a manner that contributes positively to an environment in which respect, civility, diversity, opportunity and inclusiveness are valued, so as to assure the success of both the individual and the community. The Student Code of Conduct reflects a concern for these values and tries to ensure that members of the WMC can make use of and enjoy the activities, facilities and benefits of WMC without undue interference from others.

WMC STUDENT CODE OF CONDUCT

- Discipline
- Decent dress
- Good Manners
- Smart Turn Out
- Healthy Activities
- No smoking
- No Abusive Language
- Cooperative Attitude
- Respect for All

ii. Attendance policy

a. Students are required to mark attendance for every class.
b. The attendance is compiled by the respective department and submitted to student affairs by the 10th of each month.
c. The Students Affair Department will compile the absent report and a fine of Rs. 500/- for a lecture or for the whole day will be imposed on absent students. It is pertinent to mention here that a fine is imposed on students to compel them to attend classes regularly and not to generate the funds.
d. A compiled attendance state of all students along with those having attendance less than 75% duly highlighted will be submitted to the Students Affairs Department on monthly as well as quarterly basis by the concerned departments.
e. At the end of the academic year, a consolidated state of attendance of students will be submitted to the Students Affair Department.
f. Departments will submit the list of those students having attendance less than 75% at the end of academic year.
g. Admission forms of students having attendance less than 75% will NOT be submitted to NUMS for appearing in Annual University Exams.

8. Study Tips

Dear Students,

Becoming a doctor is a tough job, but you can make it easier for yourself by adopting some time-tested techniques or habits. It's never too early – or too late – to develop good study habits. The sooner you get into a good self-study pattern, the easier everything will be and the more your chances of getting good marks will improve. Here are our top tips for getting the most out of your self-directed study time. And remember **Perseverance is the Key to Success!**

9. Feedback on the study guide

We value your feedback and will use it for improvement of this Study guide. Kindly provide feedback for this study guide. At the email:

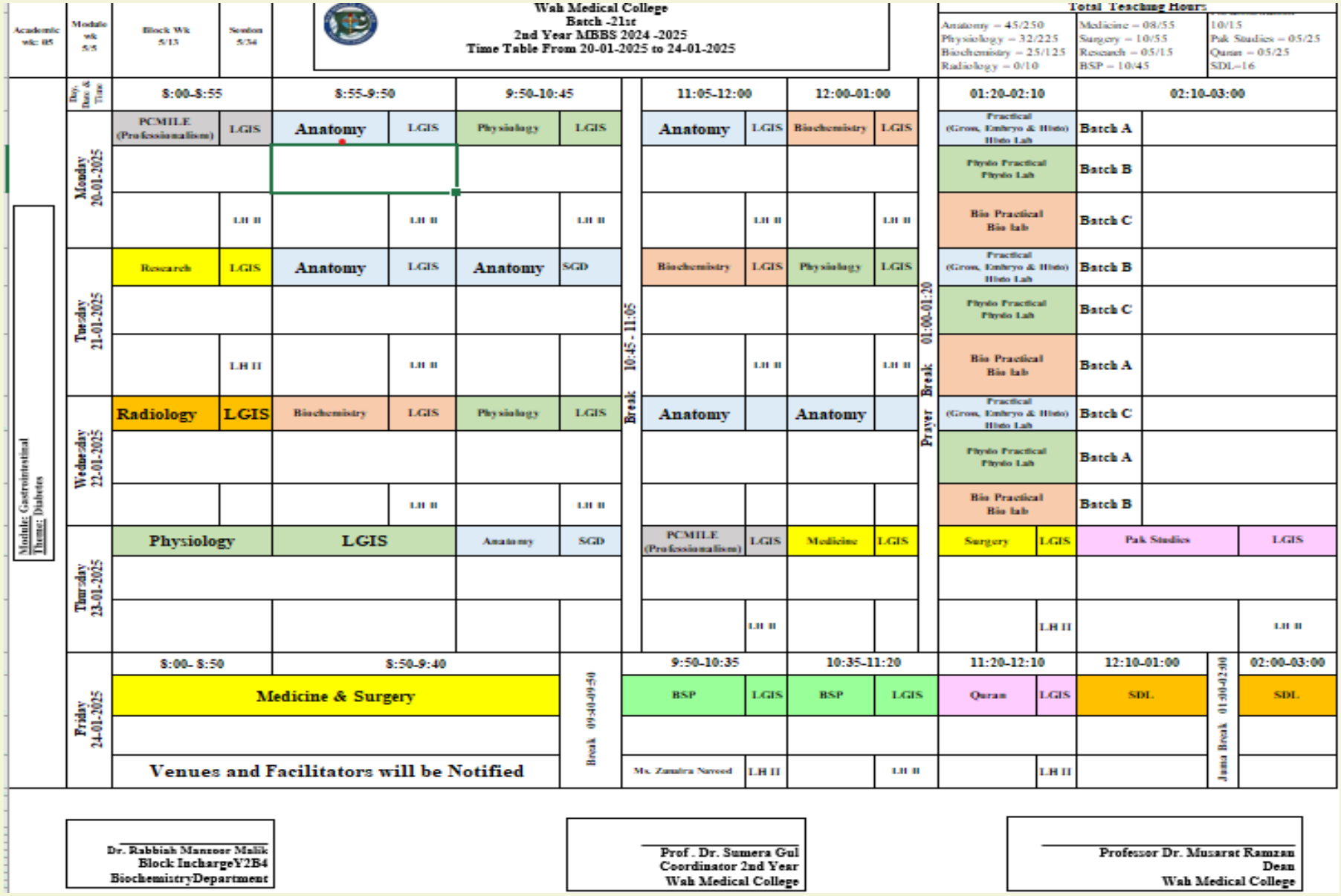
dme@wahmedicalcollege.edu.pk

dmewahmedicalcollege@gmail.com

10. References:

HARDEN, J.M. LAIDLAW, E.A. HESKETH, R. M. (1999). AMEE Medical Education Guide No 16: Study guides-their use and preparation. *Medical Teacher*, *21*(3), 248–265. https://doi.org/10.1080/01421599979491

11. Time table Template



Wah Medical College
Batch -21st
2nd Year MBBS 2024 -2025
Time Table From 20-01-2025 to 24-01-2025

Total Teaching Hours

Anatomy – 45/250	Medicine – 08/55	10/15	
Physiology – 32/225	Surgery – 10/55	Pak Studies – 05/25	
Biochemistry – 25/125	Research – 05/15	Quran – 05/25	
Radiology – 0/10	BSP – 10/45	SDL=16	

Academic wk: 05 | Module wk 5/5 | Block Wk 5/13 | Session 5/34

Module: Gastrointestinal
Theme: Diabetes

Day, Date & Time	8:00-8:55		8:55-9:50		9:50-10:45		Break 10:45 - 11:05	11:05-12:00		12:00-01:00		Prayer Break 01:00-01:20	01:20-02:10		02:10-03:00	
Monday 20-01-2025	PCMILE (Professionalism)	LGIS	Anatomy	LGIS	Physiology	LGIS		Anatomy	LGIS	Biochemistry	LGIS		Practical (Gross, Embryo & Histo) Histo Lab	Batch A		
													Physio Practical Physio Lab	Batch B		
		LH II		LH II		LH II			LH II		LH II		Bio Practical Bio lab	Batch C		
Tuesday 21-01-2025	Research	LGIS	Anatomy	LGIS	Anatomy	SGD		Biochemistry	LGIS	Physiology	LGIS		Practical (Gross, Embryo & Histo) Histo Lab	Batch B		
													Physio Practical Physio Lab	Batch C		
		LH II		LH II					LH II		LH II		Bio Practical Bio lab	Batch A		
Wednesday 22-01-2025	Radiology	LGIS	Biochemistry	LGIS	Physiology	LGIS		Anatomy		Anatomy			Practical (Gross, Embryo & Histo) Histo Lab	Batch C		
													Physio Practical Physio Lab	Batch A		
				LH II		LH II							Bio Practical Bio lab	Batch B		
Thursday 23-01-2025	Physiology		LGIS		Anatomy	SGD		PCMILE (Professionalism)	LGIS	Medicine	LGIS		Surgery	LGIS	Pak Studies	LGIS
									LH II					LH II		LH II
Friday 24-01-2025	8:00- 8:50		8:50-9:40				Break 09:40-09:50	9:50-10:35		10:35-11:20			11:20-12:10		12:10-01:00	02:00-03:00
	Medicine & Surgery							BSP	LGIS	BSP	LGIS		Quran	LGIS	SDL	SDL
	Venues and Facilitators will be Notified							Ms. Zunaira Nawaz	LH II		LH II			LH II		

Jumu Break 01:00-02:00

Dr. Rabbiah Manzoor Malik
Block InchargeY2B4
BiochemistryDepartment

Prof . Dr. Sumera Gul
Coordinator 2nd Year
Wah Medical College

Professor Dr. Musarrat Ramzan
Dean
Wah Medical College