



STUDY GUIDE

PHYSIOLOGY

SECOND YEAR MBBS (2023)

**Department of Physiology
CMH Lahore Medical College and IOD**



Vision Statement

The CMH Lahore Medical College and Institute of Dentistry aims to provide a highly conducive environment to train a new generation of technology savvy and socially responsible healthcare providers who are well-versed with their role within a healthcare team and while serving the community, demonstrate abilities to practice requisite communication skills, empathy, lifelong learning, critical thinking and decision making at a national or an international facility.

Mission Statement

The mission of CMH Lahore Medical College and Institute of Dentistry is to undertake following steps to materialize their vision:

1. Ensure provision of a conducive educational environment where students feel well-supported through implementation of learner-centered teaching approaches, inbuilt strong feedback loops and physically comfortable learning environment.
2. Sensitization of students about their role in the society as socially responsible professionals through participation in extracurricular activities like community-based programs, patient welfare societies, blood donors' society, and productive contribution to combat local and national calamities.
3. Students' exposure to the healthcare community, where sympathy and empathy are the cornerstones of our practice. Students commit to understanding their patients not only through their medical conditions but also through their emotions, fears, and unique life experiences. By fostering a culture of compassion, students aim to provide not just medical care but genuine understanding and support to enhance the well-being of those we serve.
4. Students' exposure to cutting-edge technology through campus learning management system and development of their e-portfolios.
5. Leadership and Smart Learning Strategies through implementation of interprofessional curriculum for undergraduate health professions' education students enrolled in medical, dental, allied health sciences, and nursing programs.
6. Provision of opportunities to undergraduate and post-graduate students to have practical experience of leading, working as a team member, critical thinking, problem solving, and decision making.
7. Formal teaching and training of professionalism for students to develop their full potential including communication, and lifelong learning skills through portfolio development among undergraduate and postgraduate students.
8. Implementation of a task-based and outcome oriented longitudinal module on 'Research' for undergraduate students, leading to publication of research article/s and for cultivation of evidence-based practices.

Internal Assessment

During the module the students shall be continually formatively assessed. The weightage of internal assessment shall be 20% in 2nd professional MBBS Examination. There shall be three modular and one pre -annual examination. The scores of tests at the end of each modular assessment and pre-annual examination shall be used for calculation of the internal assessment.

Module and Pre-Annual Examination

1. There will be three module examinations, one at the end of each module.
2. There will be only one pre-annual examination.
3. The structure of the paper of all the module examinations and pre-annual will be same as that for annual examination though syllabus will be different.
4. The syllabus for modular examination will be announced by the department at least 02 weeks prior to examination.
5. Pre-annual examination will be from whole syllabus.
6. The date sheet for Module and pre-annual examinations will be published by Examination branch of college while the examinations will be conducted by respective department. The result will be submitted to NUMS examination branch for incorporation in internal assessment before annual examination
6. Annual Professional Examination. The University shall take the second professional Examination as per PMC guidelines at the end of the academic year. Each subject section has table of specification of Module, Pre-annual and Annual examination. Annual Theory & Practical Examination shall be of 200 marks each in; Anatomy, Physiology and Biochemistry. The pass score shall be 50% in theory and practical separately.

Mode of Transmission

- 1. Lectures**
- 2. Tutorials**
- 3. Practicals**
- 4. Small group Discussions**
- 5. PBL**



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TABLE OF SPECIFICATION

Second Professional MBBS Examination (2023)

PHYSIOLOGY

Theory

Marks of theory paper = 80
 Time Allowed = 03 hrs
 Internal assessment (20%) = 20
Total Marks (MCQs:40%+SEQs:40%+IA:20%) = 100
Pass Marks = 50

Paper-1: (*Marks of MCQ component shall be rationalized to 40% weightage)

60 x MCQs (1 mark each) (60 Marks) Time = 60 min

Paper-2:

7x SEQs (5x6 Marks & 2x5 Marks) (40 Marks) Time = 120 min

*If a candidate obtains 50 marks in MCQs it will be rationalized as:

(50/60*40=33.33)

Ser	Modules	Topic	Number of MCQ's (60)		Number of SEQs (7) (5x6 Marks & 2x5 Marks)
			Recall:18	Application:42	
1.	Digestive System & Metabolism	General principles of GI function	02	02	01
		Propulsion & mixing of food in alimentary tract			
		Secretory functions of GIT			
		Digestion & Absorption in the GIT			
		Physiology of Gall bladder			
		Defecation Reflex			
		Hormones of GIT			
	Functions of liver, jaundice	-	01		
2	Genitourinary System	Urinary System			
		Body fluid compartments	01	01	01
		The Urinary System	03	06	
		Glomerular filtration, Renal			
		Blood Flow & their control			
		Renal tubular reabsorption & secretion			
Urine concentration & dilution					

		Renal Regulation of Osmolarity & blood volume			
		Acid base Regulation	02	02	01
		Renal Failure			
		Reproductive System			
		Male reproductive physiology			
		Female reproductive system			
		Pregnancy	02	03	01
		Parturition & Lactation			
		Neonatal physiology			
3	Neurosciences	Sensory receptors, Processing of information in neuronal pool	02	06	
		Sensory tracts and cortex			
		Brain analgesia system			
		Motor system/ Spindle / stretch reflex			01
		Cerebral Cortex, Memory			
		Pyramidal tract/ extra	01	06	
		Pyramidal tract			
		Cerebellum & Basal ganglia			
		Vestibular system			
		Cerebrovascular Accidents			
		Physiology of Speech			
		States of brain activity			
		Functions of thalamus and hypothalamus	01	04	
		CSF and blood brain barrier			
		Temperature Regulation			01
4	Maxillofacial & Special Senses	Physiology of Eye			
		Physiology of Ear	01	04	
		Physiology of taste			
		Physiology of olfaction			
5	Endocrinology	Basics of endocrinology	03	07	

		Hormones of hypothalamus and Pituitary gland			
		Hormones of thyroid gland			
		Calcium regulating hormones			
		Hormones of adrenal cortex			
		Hormones of pancreas			
		Pineal gland and thymus			
Total			60 (60 Marks)	7 (40 Marks)	

Table of Specifications for Annual Professional Exam: Practical

Viva (Theory) 40 marks		Practical/OSPE 40 marks			Total
Internal Examiner	External Examiner	OSPE (35)		Practical Journal	
		Observed	Unobserved		
20	20	25	10	05	80

***Number of observed stations are on the discretion of internal examiners but a minimum of three stations must be kept**

Example: - 1 Marks= 25 Maximum Stations = 5 Time per stations= 5 mins Total Time= 25 Minutes	Example: - 2 Marks =25 Stations = 3 Marks/ Stations= 8+8+9 Time / Stations= 8 Minutes
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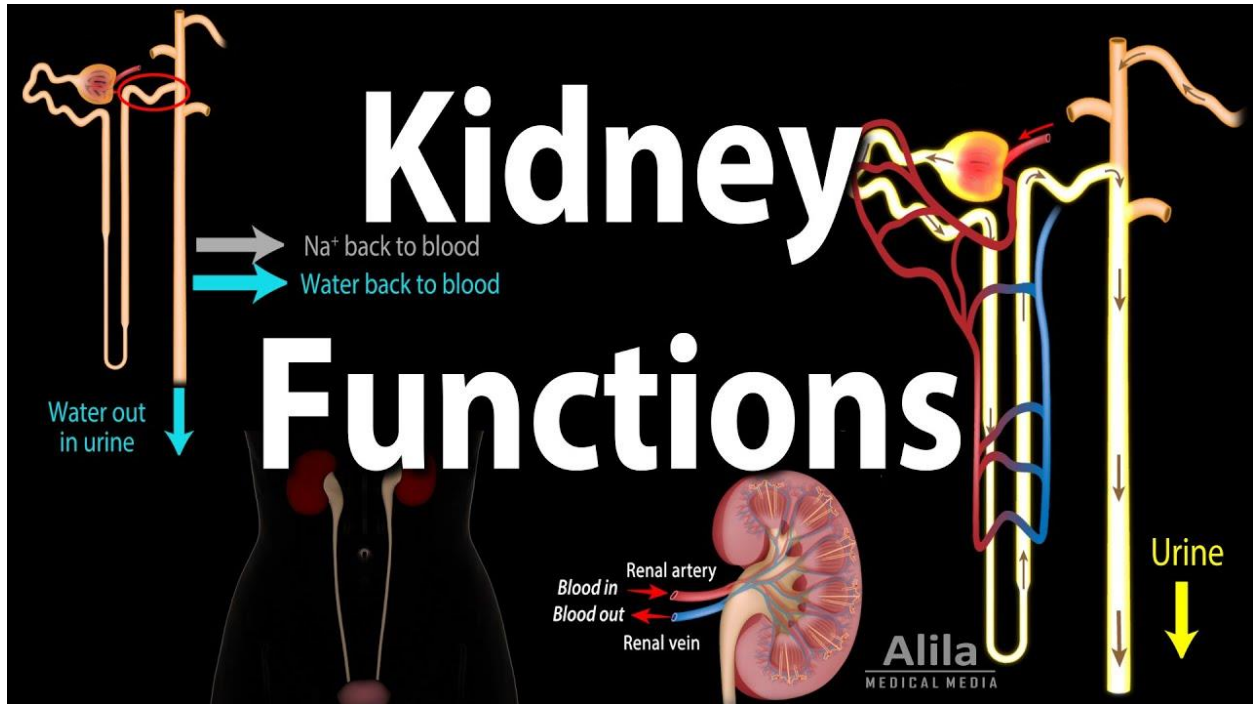
DISTRIBUTION OF BLOCKS AND TOPICS

YEAR TWO						
BLOCK I 10+2=12 weeks			BLOCK II 8+2=10 weeks		BLOCK III 10+2=12 weeks:	
4 weeks	6 weeks	2w	8 weeks	2w	10 weeks	2w
GIT / Bioenergetics & Biological Oxidation	Renal	EOB	Neuroscience	EOB	Special Senses, Endocrinology & Reproduction (ENR)/ Nutrition	EOB
Carbohydrate metabolism			Molecular Medicine & Genetics		Head & Neck	
Abdomen, Pelvis, Perineum			Brain and Spinal cord			
Behavioral Sciences, Research Methodology & Evidence based Medicine , Medicine & Allied and Surgery & Allied						

g. Proposed Contact Hours Distribution Year-II

SUBJECTS	SECOND YEAR
Anatomy <ul style="list-style-type: none"> • Embryology • Histology • Gross Anatomy 	250
Physiology	225
Biochemistry	125
Research Methodology & Evidence based Medicine	10
Medicine	25
Surgery	25
Pakistan Studies	15
Behavioral Science	30
Self-Directed Learning	100
Co-curricular activities	40
TOTAL HOURS	845

MODULE IV



Module IV

Summary: Code	<i>Y2M1</i>
Name	<i>Physiology</i>
Duration	<i>08 weeks</i>
Broad Themes of Module (Theme: a subject that is being integrated a majority of time of module)	<ul style="list-style-type: none">• Abdomen, pelvis and perineum• GIT• Urinary system
Subject Themes	<ul style="list-style-type: none">• GIT• Liver• Body fluids• Renal Physiology• Acid base balance
Prerequisite Module	<i>Y1M1 ,M2 &M3</i>

Mode of Information Transfer:

MIT
Lectures
Tutorials (PTT)
CBL
Practicals
Class tests

Physiology learning outcomes:

S.No.	Topic	Learning objectives
GIT Physiology		
1.	GIT physiology	<input type="checkbox"/> To know the physiologic anatomy of gastrointestinal wall <input type="checkbox"/> To understand the role of intestinal cells of cajal in the electrical activity of G.I smooth muscle <input type="checkbox"/> To know the enteric nervous system and its role in control of G.I function <input type="checkbox"/> To be able to differentiate between myenteric and sub mucosal plexuses <input type="checkbox"/> To be able to explain the autonomic control of G.I tract
2.	Chewing/swallowing reflex	<input type="checkbox"/> To be able to explain importance of chewing <input type="checkbox"/> To know the mechanism of chewing reflex <input type="checkbox"/> To be able to describe the process of swallowing <input type="checkbox"/> To understand different phases of swallowing reflex <input type="checkbox"/> To understand different steps occurring in the involuntary phase of swallowing <input type="checkbox"/> To know the effects of pharyngeal phase of swallowing on respiration <input type="checkbox"/> To know how different types of peristalsis in esophagus are taking place <input type="checkbox"/> To understand the importance of esophageal sphincter
3.	Functions of stomach & gastric emptying	<input type="checkbox"/> To be able to categorize different functions of stomach <input type="checkbox"/> To know the role of basic electrical rhythm in regulation of G.I motility <input type="checkbox"/> To understand the process of stomach emptying <input type="checkbox"/> To be able to explain the different factors regulating stomach emptying <input type="checkbox"/> To know secretion of different hormones taking place in stomach <input type="checkbox"/> To be able to explain different steps taking place in the secretion of hydrochloric acid in stomach
4.	Functions of small intestine	<input type="checkbox"/> To be able to categorize different types of movements taking place in small intestine <input type="checkbox"/> To understand role of ileocecal valve <input type="checkbox"/> To understand secretory functions of small intestine
5.	Functions of large intestine	<input type="checkbox"/> To be able to categorize different functions of large intestine <input type="checkbox"/> To be able to explain different types of movements taking place in colon <input type="checkbox"/> To understand the role of gastrocolic and duodenocolic reflexes in regulation of mass movements <input type="checkbox"/> To know the secretory functions of large intestine and its nervous control
7.	Defecation reflex	<input type="checkbox"/> To be able to explain the process of defecation <input type="checkbox"/> To understand the pathway of defecation reflex <input type="checkbox"/> To know different types of defecation reflex <input type="checkbox"/> To know the pathophysiological basis of megacolon

8.	Vomiting reflex	<input type="checkbox"/> To understand the factors leading to the process of vomiting <input type="checkbox"/> To be able to explain the location of vomiting center in the brain <input type="checkbox"/> To be able to explain the vomiting reflex <input type="checkbox"/> To understand the role of chemoreceptor trigger zone for initiating vomiting
9.	Hormones of GIT	<input type="checkbox"/> To be able to categorize the different types of G.I hormones <input type="checkbox"/> To understand the secretion of different hormones from G.I.T and their regulation
10.	Functions of liver	<input type="checkbox"/> To be able to categorize different functions of liver <input type="checkbox"/> To understand the role of liver in the metabolism of bilirubin <input type="checkbox"/> To know the synthetic functions of liver
Body fluids		
1.	Body fluid compartments	<input type="checkbox"/> To be able to explain total body water content and its distribution in different body compartments <input type="checkbox"/> To be able to quantify daily intake and output of water from body <input type="checkbox"/> To understand the fluid present in the potential spaces and mechanism of their collection in these spaces <input type="checkbox"/> To know the ionic composition of ECF and ICF
2.	Water balance	<input type="checkbox"/> To understand the basic principles of osmosis and osmotic pressure <input type="checkbox"/> To know the mechanism of maintenance of osmotic equilibrium between ICF and ECF <input type="checkbox"/> To be able to explain what would be the effect on ICF and ECF compartments when isotonic, hypotonic and hypertonic solution are added to ECF
3.	Edema	<input type="checkbox"/> To understand the role of starling forces in the development/ prevention of edema <input type="checkbox"/> To describe role of lymphatics in prevention of edema <input type="checkbox"/> To be able to understand safety factor and its role in the prevention of edema <input type="checkbox"/> To be able to describe the causes of intracellular edema <input type="checkbox"/> To be able to describe the causes of extracellular edema <input type="checkbox"/>
Renal Physiology		
1.	Renal physiology	<input type="checkbox"/> To know the functional anatomy of urinary system <input type="checkbox"/> To understand the multiple functions of kidneys <input type="checkbox"/> To know the physiology of micturition <input type="checkbox"/> To understand the processes involved in urine formation resulting from glomerular filtration, tubular reabsorption, and tubular secretion

2.	GFR and its regulation	<input type="checkbox"/> To know the composition of the glomerular filtrate and glomerular capillary membrane <input type="checkbox"/> To understand the determinants of the GFR <input type="checkbox"/> To understand the physiological control of glomerular filtration and renal blood flow <input type="checkbox"/> To know the autoregulation of GFR and renal blood flow
3.	Processing of glomerular filtrate	<input type="checkbox"/> To be able to describe reabsorption and secretion by the renal tubules <input type="checkbox"/> To understand the passive and active mechanisms involved in tubular reabsorption <input type="checkbox"/> To understand the reabsorption and secretion along different parts of the nephron <input type="checkbox"/> To learn about the regulation of tubular reabsorption <input type="checkbox"/> To know use of clearance methods to quantify kidney function
4.	Regulation of Potassium	<input type="checkbox"/> To know about the regulation of internal potassium distribution <input type="checkbox"/> To understand the potassium secretion by principal cells of late distal and cortical collecting tubules <input type="checkbox"/> To be able to explain different factors that regulate potassium secretion: plasma potassium concentration, aldosterone, tubular flow rate, and hydrogen ion concentration
5.	Regulation of B.P	<input type="checkbox"/> To know about the role of kidneys in pressure natriuresis and diuresis <input type="checkbox"/> To understand the renal regulation of body fluid volumes and arterial pressure <input type="checkbox"/> To understand role of nervous and hormonal factors in renal-body fluid feedback control
6.	Renal regulation of osmolarity	<input type="checkbox"/> To know the control of extracellular fluid osmolarity and sodium concentration by kidneys <input type="checkbox"/> To know the osmoreceptor-ADH feedback system <input type="checkbox"/> To understand the role of thirst in controlling extracellular fluid osmolarity and sodium concentration <input type="checkbox"/> To understand the role of angiotensin II and aldosterone in controlling extracellular fluid osmolarity and sodium concentration
7.	Micturition reflex	<input type="checkbox"/> To learn the physiologic anatomy and nervous connections of the bladder <input type="checkbox"/> To understand the filling of the bladder and bladder wall tone; the cystometrogram <input type="checkbox"/> To be able to explain the micturition reflex and facilitation or inhibition of micturition by the brain <input type="checkbox"/> To know about the abnormalities of micturition

8.	Formation of concentrated urine	<ul style="list-style-type: none"> <input type="checkbox"/> To understand the obligatory urine volume <input type="checkbox"/> To know about the requirements for excreting a concentrated urine—high ADH levels and hyperosmotic renal medulla <input type="checkbox"/> To understand the countercurrent mechanism producing a hyperosmotic renal medullary interstitium <input type="checkbox"/> To know the role of distal tubule and collecting ducts in excreting a concentrated urine <input type="checkbox"/> To understand the role of urea in hyperosmotic renal medullary interstitium and formation of concentrated urine <input type="checkbox"/> To understand the countercurrent exchange in the vasa recta in preservation of hyperosmolarity of the renal medulla <input type="checkbox"/> To be able to explain the concentrating mechanism and changes in osmolarity in different segments of the tubule <input type="checkbox"/> To be able to quantify renal urine concentration and dilution: “Free Water” and osmolar clearances <input type="checkbox"/> To know about the disorders of urinary concentrating ability
9.	Plasma clearance	<ul style="list-style-type: none"> <input type="checkbox"/> To know the use of clearance methods to quantify kidney function <input type="checkbox"/> To know about estimation of GFR by inulin clearance, and plasma creatinine clearance <input type="checkbox"/> To understand PAH clearance for estimation of renal plasma flow <input type="checkbox"/> To understand the calculation of filtration fraction, tubular reabsorption and secretion from renal clearance
10.	Acid base balance	<ul style="list-style-type: none"> <input type="checkbox"/> To know the defenses against changes in hydrogen ion concentration: buffers, lungs, and kidneys <input type="checkbox"/> To know the buffering of hydrogen ions in the body fluids <input type="checkbox"/> To understand the bicarbonate buffer system and quantitative dynamics of the bicarbonate buffer system <input type="checkbox"/> To understand the phosphate buffer system, proteins: important intracellular buffers <input type="checkbox"/> To be able to explain the respiratory regulation of acid-base balance <input type="checkbox"/> To understand renal control of acid-base balance and secretion of hydrogen ions and reabsorption of bicarbonate ions by the renal tubules <input type="checkbox"/> To understand the combination of excess hydrogen ions with phosphate and ammonia buffers in the tubule—A mechanism for generating new bicarbonate ions
11.	Acid base disorders	<ul style="list-style-type: none"> <input type="checkbox"/> To know the Renal Correction of acidosis—increased excretion of hydrogen ions and addition of bicarbonate ions to the extracellular fluid <input type="checkbox"/> To know the renal correction of alkalosis—decreased tubular secretion of hydrogen ions and increased excretion of bicarbonate ions <input type="checkbox"/> To understand causes of acid base disorders <input type="checkbox"/> To understand concept of anion gap

PRACTICALS

Block IV



Approved List of Practical Module IV

1.	Consultation of research paper at under graduate level
2.	Examination of Vital Signs
3.	Blood glucose estimation
4.	Determination of urine specific gravity
5.	Examination of body Temperature
6.	Examination of Body Mass Index (BMI)
7.	Any other practical relevant to that Module

MODULE V



Module V

Summary: Code	<i>Y2M11</i>
Name	<i>Physiology</i>
Duration	<i>09 weeks</i>
Broad Themes of Module (Theme: a subject that is being integrated a majority of time of module)	<ul style="list-style-type: none"> • CNS • ANS
Subject Themes	<ul style="list-style-type: none"> • ANS • Sensory system • Motor system • Spinal cord • Higher Mental Functions

Learning Outcomes:

By the end of this module, the student should be able to:

Explain the physiological mechanisms controlling the functions of Central Nervous System in relationship with sensory, motor and autonomic nervous system.

Module/Topic	Learning Objectives	Instructional Strategies	Assessment tools
Neurophysiology			
Processing of information in neuronal pool	<ul style="list-style-type: none"> • To be able to explain types of synapses—chemical and electrical and physiologic anatomy of the synapse and chemical substances that function as synaptic transmitters • To know the electrical events during neuronal excitation and electrical events during neuronal inhibition • To know about the transmission and processing of signals in neuronal pools ,relaying of signals through neuronal pools prolongation of a signal by a neuronal pool, after discharge, synaptic fatigue 	<ul style="list-style-type: none"> • Lectures • SGD • PBL/CBL 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ

Sensory receptors & receptor Potential	<ul style="list-style-type: none"> • To understand types of sensory receptors and the sensory stimuli and differential sensitivity of receptors • To understand the transduction of sensory stimuli into nerve impulses • To know the local electrical currents at nerve endings— receptor potentials, adaptation of receptors • To know the nerve fibers that transmit different types of signals, and their physiologic classification • To understand the transmission of signals of different intensity in nerve tracts—spatial and temporal summation 	<ul style="list-style-type: none"> • Lectures • SGD • PBL/CBL 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ
Sensory tracts	<ul style="list-style-type: none"> • To know the functional anatomy of dorsal column medial lemniscal system and anterolateral pathway • To understand the sensations carried by different sensory tracts • To differentiate between different sensory tracts 	<ul style="list-style-type: none"> • Lectures • SGD • PBL/CBL 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ
Sensory cortex	<ul style="list-style-type: none"> • To know about the somatosensory cortex and somatosensory association areas 	<ul style="list-style-type: none"> • Lectures • SGD • PBL/CBL 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ
Physiology of pain	<ul style="list-style-type: none"> • To understand the types of pain and their qualities— fast pain and slow pain • To know about the pain receptors and their stimulation • To understand the dual pathways for transmission of pain signals into the central nervous system • To understand the referred pain and visceral pain 	<ul style="list-style-type: none"> • Lectures • SGD • PBL/CBL 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ
Brain analgesia system	<ul style="list-style-type: none"> • To know the pain suppression system in the brain and spinal cord • To understand the brain's opiate system—endorphins and enkephalins 	<ul style="list-style-type: none"> • Lectures • SGD • PBL/CBL 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ
Clinical abnormalities/ thermal sensations	<ul style="list-style-type: none"> • To know the clinical abnormalities of pain and other somatic sensations • To know the thermal sensations, thermal receptors and their excitation and transmission of thermal signals in the nervous 	<ul style="list-style-type: none"> • Lectures • SGD • PBL/CBL 	<ul style="list-style-type: none"> • MCQ • SAQ/SEQ

	system		
Inner ear / auditory pathways	<ul style="list-style-type: none"> To be able to explain central auditory mechanisms and auditory nervous pathways To understand the function of the cerebral cortex in hearing and determination of the direction from which sound comes To understand the hearing abnormalities and types of deafness 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Motor system / Spindle / stretch reflex	<ul style="list-style-type: none"> To be able to explain organization of the spinal cord for motor functions To understand the muscle sensory receptors—muscle spindles and golgi tendon organs—and their roles in muscle control To understand the receptor function of the muscle spindle and muscle stretch reflex To understand the role of the muscle spindle in voluntary motor activity To know the clinical applications of the stretch reflex and golgi tendon reflex To know the function of the muscle spindles and golgi tendon organs in conjunction with motor control from higher levels of the brain 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Motor functions of spinal cord	<ul style="list-style-type: none"> To understand the flexor reflex and the withdrawal reflexes and crossed extensor reflex To be able to explain the reciprocal inhibition and reciprocal innervation To understand the reflexes of posture and locomotion and postural and locomotive reflexes of the cord To know the spinal cord reflexes that cause muscle spasm 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Spinal shock	<ul style="list-style-type: none"> To be able to explain spinal cord transection and spinal shock 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Pyramidal tract/ extra pyramidal tract	<ul style="list-style-type: none"> To be able to understand primary motor cortex premotor area, supplementary motor area To understand the transmission of signals from the motor cortex to the muscles 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ

	<ul style="list-style-type: none"> To understand extrapyramidal system and excitation of the spinal cord motor control areas by the primary motor cortex and red nucleus To know the role of the brain stem in controlling motor function and support of the body against gravity 		
Cerebellum	<ul style="list-style-type: none"> To be able to explain the contributions of the cerebellum and Its motor functions To know anatomical functional areas of the cerebellum To understand neuronal circuit of the cerebellum To know the clinical abnormalities of the cerebellum in these spaces 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Basal ganglia	<ul style="list-style-type: none"> To understand function of the basal ganglia in executing patterns of motor activity To know the role of the basal ganglia for cognitive control of sequences of motor patterns To understand function of the basal ganglia to change the timing and to scale the intensity of movements To be able to explain the functions of specific neurotransmitter substances in the basal ganglia 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Vestibular system	<ul style="list-style-type: none"> To understand the vestibular apparatus and function of the utricle and saccule in the maintenance of static equilibrium To understand the detection of head rotation by the semicircular ducts To be able to explain the vestibular mechanisms for stabilizing the eyes To understand other factors concerned with equilibrium 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Speech	<ul style="list-style-type: none"> To know the functions of specific cortical areas and association areas To understand the comprehensive interpretative function of the posterior superior temporal lobe- Wernicke's Area To understand the functions of the parieto-occipitotemporal cortex in 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ

	<p>the nondominant hemisphere</p> <ul style="list-style-type: none"> To understand higher intellectual functions of the prefrontal Association areas 		
Memory	<ul style="list-style-type: none"> To know the memory—roles of synaptic facilitation and synaptic inhibition To know about the short-term memory, intermediate long-term memory and consolidation of memory 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Sleep	<ul style="list-style-type: none"> To be able to describe slow-wave sleep and REM Sleep (paradoxical sleep, desynchronized sleep) To know the basic theories of sleep and physiologic effects of sleep To understand the origin of brain waves 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
EEG/epilepsy	<ul style="list-style-type: none"> To know about the effect of varying levels of cerebral activity on the frequency of the EEG To understand the changes in the EEG at different stages of wakefulness and sleep To understand epilepsy, grand mal epilepsy, petit mal epilepsy, focal epilepsy 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ
Functions of hypothalamus / temperature regulation	<ul style="list-style-type: none"> To know about the normal body temperatures To understand mechanisms of heat production and heat loss To be able to explain the regulation of body temperature—role of the hypothalamus To understand the neuronal effector mechanisms that decrease or increase body temperature To know the concept of a “set-point” for temperature control To understand the behavioral control of body temperature To know the abnormalities of body temperature regulation and fever 	<ul style="list-style-type: none"> Lectures SGD PBL/CBL 	<ul style="list-style-type: none"> MCQ SAQ/SEQ



PRACTICALS

Block V

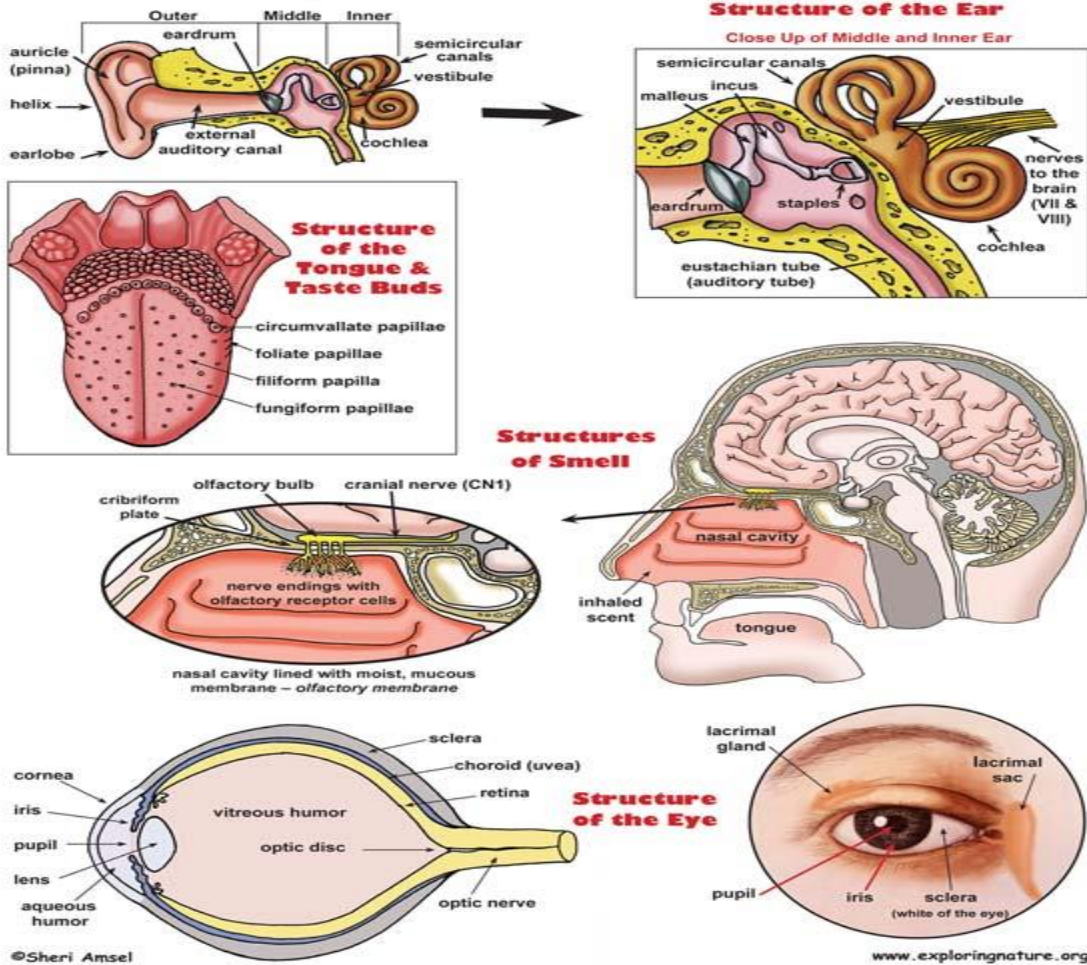
Approved List of Practical

Module V

1.	Examination of motor system
2.	Examination of Deep Tendon reflexes
3.	Examination of Cerebellar Function
4.	Examination of autonomic nervous system
5.	Examination of Sensory system
6.	Examination of Cranial nerves

MODULE VI

Special Senses



Module VI

Summary:

Code	<i>Y2M3</i>
Name	<i>Physiology</i>
Duration	<i>9 weeks</i>
Broad Themes of Module (Theme: a subject that is being integrated a majority of time of module)	<ul style="list-style-type: none">• Head, Neck and• Special Senses• Endocrine System• Reproductive system
Subject Themes	<ul style="list-style-type: none">• Endocrinology• Reproduction & neonatal physiology• Special Senses
Prerequisite Module	Y1M1&Y1M2

Mode of Information Transfer:

MIT
Lectures
Tutorials (PTT)
CBL
Practicals
Class tests

Physiology learning outcomes:

S No	Topic	Learning objectives
Endocrinology		
1.	Basics of endocrinology	<input type="checkbox"/> To understand the coordination of body functions by chemical messengers <input type="checkbox"/> To know the chemical structure and synthesis of hormones <input type="checkbox"/> To understand the hormone secretion, transport, and clearance from the blood <input type="checkbox"/> To know the feedback control of hormone secretion <input type="checkbox"/> To understand the transport of hormones in the blood And “clearance” of hormones from the blood
2.	Mechanism of action of hormones	<input type="checkbox"/> To learn the hormone receptors and Their activation <input type="checkbox"/> To understand the intracellular signaling After hormone receptor activation <input type="checkbox"/> To understand the second messenger mechanisms for mediating intracellular hormonal functions <input type="checkbox"/> To know the hormones that act mainly on the genetic machinery of the cell
3.	Hormones of hypothalamus	<input type="checkbox"/> To understand the pituitary gland and its relation to the hypothalamus <input type="checkbox"/> To understand the hypothalamic-hypophysial portal blood vessels of the anterior pituitary gland
4.	Hormones of pituitary gland	<input type="checkbox"/> To know the physiological functions of growth hormone <input type="checkbox"/> To understand the regulation of growth hormone secretion <input type="checkbox"/> To know the hypopituitarism and hypopituitarism <input type="checkbox"/> To be able to explain the posterior pituitary gland and its relation to the hypothalamus <input type="checkbox"/> To understand the physiological functions of ADH and oxytocin Hormone
5.	Thyroid gland	<input type="checkbox"/> To understand the synthesis and secretion of the thyroid metabolic hormones <input type="checkbox"/> To understand the physiologic functions of the thyroid hormones <input type="checkbox"/> To understand the regulation of thyroid hormone secretion <input type="checkbox"/> To understand the Diseases of the Thyroid gland
6.	Calcium regulating hormones	<input type="checkbox"/> To know the regulation of calcium and phosphate in the extracellular fluid and plasma <input type="checkbox"/> To know about actions of vitamin D <input type="checkbox"/> To understand the effect of parathyroid hormone on calcium and phosphate concentrations in the extracellular fluid <input type="checkbox"/> To understand the control of parathyroid secretion by calcium ion concentration <input type="checkbox"/> To understand actions of calcitonin <input type="checkbox"/> To know the pathophysiology of parathyroid hormone, vitamin D, and bone <input type="checkbox"/> disease

7.	Hormones of adrenal cortex	<input type="checkbox"/> To be able to explain synthesis and secretion of adrenocortical hormones <input type="checkbox"/> To understand the functions of the mineralocorticoids-aldosterone <input type="checkbox"/> To know the functions of the glucocorticoids <input type="checkbox"/> To know the abnormalities of adrenocortical secretion
8.	Hormones of pancreas	<input type="checkbox"/> To understand metabolic effects of insulin <input type="checkbox"/> To understand the mechanisms of insulin secretion <input type="checkbox"/> To understand the control of insulin secretion <input type="checkbox"/> To understand glucagon and its functions <input type="checkbox"/> To understand regulation of glucagon secretion <input type="checkbox"/> To know the pathophysiology of diabetes mellitus
Reproductive system		
1.	Male reproductive physiology	<input type="checkbox"/> To understand the physiologic anatomy of the male sexual organs <input type="checkbox"/> To understand the process of spermatogenesis <input type="checkbox"/> Function of the seminal vesicles and prostate gland <input type="checkbox"/> To understand the abnormal spermatogenesis and male fertility <input type="checkbox"/> To understand the testosterone and other male sex hormones
2.	Female reproductive system	<input type="checkbox"/> To know the physiologic anatomy of the female sexual organs <input type="checkbox"/> To understand the monthly ovarian cycle; function of the gonadotropic hormones <input type="checkbox"/> To know the gonadotropic hormones and their effects on ovarian follicle growth—the “follicular” phase of the ovarian cycle corpus luteum—“luteal” phase of the <input type="checkbox"/> To understand ovarian cycle <input type="checkbox"/> To know about functions of the ovarian hormones—estradiol and progesterone
3.	Menstrual cycle	<input type="checkbox"/> To know the regulation of the female monthly rhythm—interplay between the ovarian and hypothalamic-pituitary hormones and feedback oscillation of the hypothalamic- <input type="checkbox"/> To understand the pituitary-ovarian system <input type="checkbox"/> To be able to explain puberty and menarche and menopause
4.	Pregnancy	<input type="checkbox"/> To be able to describe maturation and fertilization of the ovum <input type="checkbox"/> Transport of the fertilized ovum in the fallopian tube <input type="checkbox"/> To understand the implantation of the blastocyst in the uterus and early nutrition of the embryo <input type="checkbox"/> To know about the response of the mother’s body to pregnancy <input type="checkbox"/> To be able to explain changes in the maternal circulatory system during pregnancy
5.	Placenta	<input type="checkbox"/> To know about hormonal factors in pregnancy <input type="checkbox"/> To understand human chorionic gonadotropin and its effect to cause persistence of the corpus luteum and to prevent menstruation <input type="checkbox"/> To know the placental hormones

6.	Parturition	<input type="checkbox"/> To know about the mechanism of parturition and onset of labor—a positive feedback <input type="checkbox"/> To know about the mechanics of parturition
Neonatal physiology		
1.	Neonatal physiology	<input type="checkbox"/> To understand growth and functional development of the fetus development of the organ systems <input type="checkbox"/> To understand adjustments of the infant to <input type="checkbox"/> extrauterine life <input type="checkbox"/> To understand the circulatory readjustments at birth <input type="checkbox"/> To know the special problems of prematurity

PRACTICALS

Block VI

Approved List of Practical

Module VI

1.	Testing the Visual Acuity
2.	Determination of the Field of Vision
3.	Testing the Color vision
4.	Demonstration of Sensation of Taste (Gustation)
5.	Determination of sense of olfaction
6.	Demonstration / Performance of Hearing Tests
7.	Demonstration of pure Tone Audiometry
8.	Pregnancy Test
9.	Any other practical relevant to that Module

List of Faculty

1. **Prof. Dr. Ambreen Tauseef**
Head of Department
2. **Dr. Farhat Khurram**
Associate Prof.
3. **Dr. Qudsia Umaira Khan**
Associate Prof.
4. **Dr. Amna Nadeem**
Assistant Prof.
5. **Dr. Jawaria Ilyas**
Assistant Prof.
6. **Dr. Aamina Quddus Qureshi**
Demonstrator
7. **Dr. Sarah Saad**
Demonstrator
8. **Dr. Ansa Abubakar**
Demonstrator
9. **Dr. Minahil Awais**
Demonstrator
10. **Dr. Shaiza Ijaz**
Demonstrator
11. **Dr. Kinza Sohail**
Demonstrator
12. **Dr. Ushna Khalid**
Demonstrator
13. **Dr. Abeera Wajid Shah**
Demonstrator

Break down of Lectures

	Topic	Teacher Name	Signature
Block – IV	GIT Physiology	Dr. Qudsia Assoc. Prof.	14
	Renal Physiology Body fluid & acid base	Prof. Dr. Ambreen Tauseef	16
	Reproduction	Dr. Ayesha Assoc. Prof.	12
Block – V	ANS + CNS	Dr. Farhat Assoc. Prof.	24
	HMF	Dr. Farhat Assoc. Prof.	12
Block - VI	Endocrinology	Dr. Amna Nadeem	21
	Sp. Senses	Dr. Javeria Ilyas	15

Academic Calendar - 2023

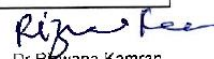
Weeks	Details	Dates	
		From	To
	Start of New Class	2 Jan 2023	
1-8	Block IV (08/11 Weeks)	2 Jan 2023	24 Feb 2023
9	Sports Week	27 Feb 2023	02 Mar 2023
	Note: 3rd March 2023 - full day routine classes		
10-11	Block IV (2/11 Weeks)	06 Mar 2023	17 Mar 2023
	Final Sports Day	07 Mar 2023	
	Note: The Academic Activities on 10th Mar 2023 will not be carried out for the Olympiad activities to go as plan		
12	Spring Vacation	20 Mar 2023	26 Mar 2023
	Block IV Exam (1/11 Week)	27 Mar 2023	31 Mar 2023
13	Anatomy	27 Mar 2023	
	Prep Leave	28 Mar 2023	
	Biochemistry	29 Mar 2023	
	Prep Leave	30 Mar 2023	
	Physiology	31 Mar 2023	
14-22	Block V (09/10 Weeks)	03 Apr 2023	02 Jun 2023
	Eid ul Fitr	21 - 25 Apr 2023 (Fri-Tue)	
	Labour Day	1st May 2023	
	Block V Exam (1/10 Week)	05 Jun 2023	09 Jun 2023
23	Anatomy	05 Jun 2023	
	Prep Leave	06 Jun 2023	
	Physiology	07 Jun 2023	
	Prep Leave	08 Jun 2023	
	Biochemistry	09 Jun 2023	
24-29	Block VI (06/10 Weeks)	12 Jun 2023	21 Jul 2023
	Eid ul Adha (Tentative)	29 - 30 Jun 2023 (Thu - Fri)	
30-33	Summer Vacations (4x Weeks)	24 Jul 2023	18 Aug 2023
	Independence Day	14 Aug 2023	
34-36	Block VI (03/10 Weeks)	21 Aug 2023	08 Sep 2023
	Block VI Exam (1/10 Weeks)	11 Sep 2023	15 Sep 2023
37	Anatomy	11 Sep 2023	
	Prep Leave	12 Sep 2023	
	Biochemistry	13 Sep 2023	
	Prep Leave	14 Sep 2023	
	Physiology	15 Sep 2023	
	Islamiyat / Pakistan studies	18 Sep 2023	
38	Pre-Annual Prep Leave (1x weeks)	18 Sep 2023	28 Sep 2023
	Pre-Annual Exam (2x Weeks)	29 Sep 2023	11 Oct 2023
39-40	Anatomy	29 Sep 2023	
	Prep Leave	30 Sep & 01 Oct 2023 (Sat & Sun)	
	Physiology	02 Oct 2023	
	Prep Leave	03 & 04 Oct 2023	
	Biochemistry	05 Oct 2023	
	Islamiyat / Pakistan studies	06 Oct 2023	
	OSPE	09 Oct, 10 Oct, 11 Oct 2023	
41-43	Prep Leave Annual Exam (35 days)	06 Oct 2023	06 Nov 2023
	NUMS University Annual Exam	07 Nov 2023 onwards	

Note:

- The dates for the Send-up Examination have been rescheduled, and it will now take place from September 28, 2023, to October 10, 2023

Dated: 15th Sep 2023

Prepared By: Miss Humaira Sardar


Dr Rizwana Kamran
Assistant Professor
SHaPE

S. No.	Book Name	Edition	Author
1.	Guyton and Hall	12 th Edition	JOHN E. HALL
2.	Guyton and Hall	13 th Edition	JOHN E. HALL
3.	Human Physiology	3 rd Edition	Slivertborn
4.	Principles of Physiology	3 rd Edition	Robert M. Berne Matthew N. Levy
5.	USMLE Step 1(Lecture notes)	2007-2008 Edition	KAPLAN
6.	Basis of Clinical Physiology	Volume 2	Professor M. Akram
7.	Manual of Experimental Physiology	1 st Edition	Prof. Dr. Shireen Khawar
8.	Manual of Experimental Physiology	4 th Edition	Prof. Dr. Zafar Ali Choudry
9.	Practical Physiology	1 st Edition	Prof. Dr. Shafiq Ahmed Iqbal
10.	Basis of Clinical Physiology	Volume 1	Prof. Dr. Muhammad Akram
11.	Basis of Clinical Physiology	Volume 2	Prof. Dr. Muhammad Akram
12.	ACSM's Resources for Clinical Exercise physiology		
13.	System wise SEQs and MCQs with key Reference: Physiology by Guyton	1 st Edition	Prof. Dr. Samina Malik
14.	Applicton & Lange's Review of PHYSIOLOGY	Twentieth Edition	David G. Penney
15.	Guyton and Hall Physiology Review	Third Edition	JOHN E. HALL
16.	Human Physiology (A Study Guide for Student)		M. Yusuf Abro
17.	Lab Manual Physiology (P-1)	Second Edition	M. Mazhar Hussain
18.	Clinical Electrophysiology		
19.	Lippincott's Illustrated Reviews Physiology		Robin R. Preston
20.	Review of Medical Physiology	Twentieth edition	William G. Ganong
21.	Board Review Series Physiology	2 nd Edition	Linda S. Costanzo
22.	Clinical Scenarios in Physiology		Saqib Sohail
23.	Essentials of Medical Physiology (JAYPEE)	5 th Edition	K Sembulingam Prema Sembulingam
24.	Study Guide for Understanding Statistics	Seventh Edition	Robert R. Pagano
25.	High-Yield Physiology		Ronald W. Dudek
26.	Nerve And Muscle Excitation	Second Edition	Douglas Junge
27.	Essentials of Medical Physiology	Volume 1	Mushtaq Ahmad
28.	Essentials of Medical Physiology	Volume 2	Mushtaq Ahmad
29.	MCQ's Physiology	2 nd Edition	Vijaya D Joshi
30.	Human Physiology (MCQ's)	4 th Edition	Lan C. Roddie
31.	Practical Physiology	Second Edition	G K PAL
32.	Ganong's (Review of Medical Physiology)	23 rd Edition	Kim E. Barrett
33.	Principles and Practice of Medicine	Seventeenth Edition	Christopher R. W. Edwards