STUDY GUIDE

DEPARTMENT OF PHYSIOLOGY

FIRST YEAR & SECOND YEAR MBBS

TABLE OF CONTENTS

Vision and Mission

The mission of the Department of Physiology, King Edward Medical University, is to deliver high-quality, integrated physiology education through student-centered teaching, clinically contextualized learning, and evidence-based assessment; to promote research and scholarly excellence in basic and applied physiology; and to contribute to improved healthcare outcomes by building strong foundational understanding of human body functions in health and disease.

The Department of Physiology at KEMU aims to:

- Provide concept-based and clinically integrated physiology education emphasizing mechanisms of normal body function
- Align teaching, learning, and assessment strategies with the national curriculum and competency-based medical education frameworks
- Foster analytical reasoning, critical thinking, and application of physiological principles to clinical problem-solving
- Promote professionalism, ethical conduct, and lifelong learning habits
- Encourage research, innovation, and scholarly inquiry in basic and translational physiology
- Strengthen interdisciplinary integration to enhance patient-centered and evidence-based medical practice

History

King Edward Medical University traces its origins to the establishment of the **Lahore Medical School** in **1860**, one of the earliest medical institutions in the subcontinent. **Dr. J.B. Scriven**, appointed as the **first Principal** on **10th October 1860**, also pioneered the teaching of **Physiology**, laying both academic and administrative foundations. In **1916**, the Department of Physiology was formally housed in the **Bahawalpur Block**, a purpose-built structure generously donated by **Sir Sadiq Muhammad Khan Abbasi, Nawab of Bahawalpur**. This significant contribution provided the department with the infrastructure necessary for organized teaching and academic advancement.

After the independence of Pakistan, **Prof. Dr. Shujjat Ali** was appointed as the first Head of the Department of Physiology at King Edward Medical College. Over the years, the department progressed significantly under the stewardship of several distinguished physiologists, each contributing to its academic growth and research development. Their collective efforts laid the groundwork for the development of a research-oriented culture within the department, which has since become a hallmark of King Edward Medical College.

The Department of Physiology is recognized for postgraduate training in MPhil Physiology by national regulatory bodies such as PM&DC and HEC and is in the process of accreditation for FCPS training in Physiology by CPSP. Through an integrated approach combining lectures, small group discussions, practical laboratory training, clinical correlation sessions, and research opportunities, the department is committed to training graduates (MBBS, DPT & Allied Health Sciences) and postgraduates (MPhil) who are well-prepared for clinical practice, academic careers, and research in basic and applied physiological sciences.

Dr. Muhammad Shoaib

Chairman/Professor of Physiology

It is a privilege to serve as Chairman of the Department of Physiology at King Edward Medical University — an institution rooted in tradition, excellence, and service. Our department stands on a strong academic foundation, and it is our collective responsibility to preserve these standards while preparing our students for the evolving demands of modern medicine.

Physiology is the cornerstone of clinical understanding. I encourage our students to approach it not merely as a subject to pass, but as a discipline to master. A clear grasp of physiological principles will shape your clinical reasoning, decision-making, and lifelong professional competence.

We are committed to providing an environment that promotes critical thinking, ethical conduct, collaborative learning, and meaningful research. Your curiosity, discipline, and integrity will determine the heights you achieve.

You are the future of healthcare in our nation. May you pursue knowledge with dedication and use it in the service of humanity with compassion and responsibility.

May Allah Almighty guide us all in our shared journey of learning and service.

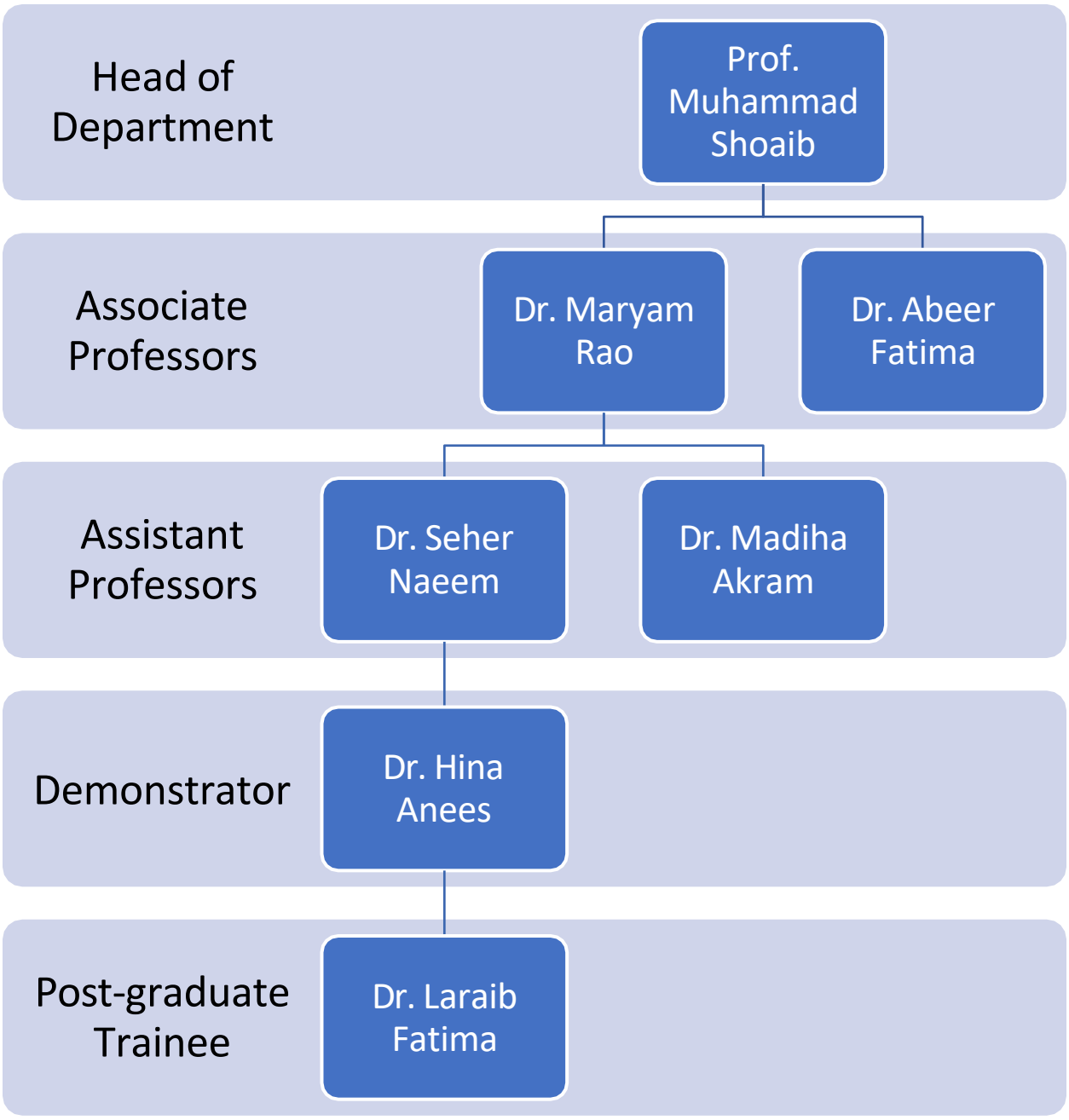
Introduction to the Physiology Study Guide

This study guide, developed by the **Department of Physiology, King Edward Medical University**, provides:

- An overview of the course and individual modules
- Expected learning outcomes for each module
- Prerequisite knowledge and recommended preparation
- Timetables for lectures, tutorials and practicals
- Teaching and learning strategies to support active learning
- Assessment methods and evaluation criteria
- Staff contacts and guidance notes

This guide is designed to encourage students to interact actively with Physiology through questions, practical activities, case discussions, and self-assessment exercises. It aims to promote **critical thinking, clinical reasoning, and application of knowledge**, preparing students not only for exams but also for future clinical practice.

DEPARTMENTAL ORGANOGRAM



Faculty

Serial #	FACULTY	DESIGNATION	QUALIFICATIONS	COORDINATOR
1.	**Dr.Muhammad Shoaib**	Chairman/ Professor	MBBS, MPhil.	
2.	**Dr. Maryam Rao**	Associate Professor	MBBS, MPhil, CMT	
3.	**Dr. Abeer Fatima**	Associate Professor	MBBS, MPhil, CHPE	2nd year MBBS
4.	**Dr. Seher Naeem**	Assistant Professor	MBBS, MPhil,CHPE,FCPS	1st Year MBBS
5.	**Dr. Madiha Akram**	Assistant Professor	MBBS, MPhil, CMT	DPT & AHS coordinator
6.	**Dr. Hina Anis**	Demonstrator	MBBS, MPhil, PhD (Health & Policy)	
7.	**Dr Laraib Fatima**	Postgraduate Trainee		

INTRODUCTION TO THE DEPARTMENT OF PHYSIOLOGY

OFFICES:

Following are the offices in Physiology Department for teaching and supporting staff which are fully air-conditioned. The details of different offices / rooms allocated for faculty members are as under:

FACULTY OFFICES:

- One Professor Office
- Two Associate Professor Offices
- Two Assistant Professor Offices
- Male Demonstrator Office
- Female Demonstrator Office
- PG room

The offices are spacious, airy & well lighted.

OTHER OFFICES:

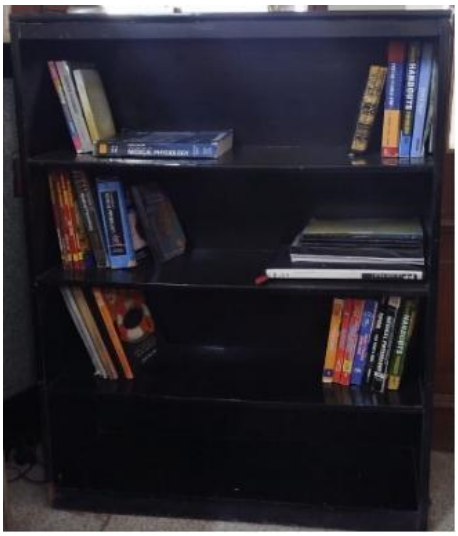
- P/A Stenographer Office
- Store Keeper Room
- Conference Room / Demonstration Room
- Museum

PHYSIOLOGY LABORATORY

There are three spacious Laboratories, vast enough to accommodate about more than 80 students at a time. The laboratory is equipped with all essential instruments, glassware and chemicals which are necessary for the students to perform practicals.

The laboratory attached corridor have been decorated with subject relevant pictures explaining various Physiological Mechanisms.

DEPARTMENTAL LIBRARY:



A Departmental Library comprising of a number of books on Physiology and allied subjects has been maintained in the department for consultation and reference for teaching faculty of the department & students.

CAPACITY AVAILABLE FOR STUDENTS IN LABORATORY & DEMONSTRATION ROOM

Sr. NO.	Office	Capacity for Students
01	3 Laboratories	80 students in one practical class

350 students of 1st Year MBBS and 350 students of 2nd Year MBBS are equally divided into four batches. Each practical batch comprises of around 80 students. The practical classes of 1st Year MBBS are scheduled on Monday, Tuesday, Wednesday & Thursday from 08:00 am to 10:00 am every week comprising of 50 students in each practical batch. One Demonstrator / Sr. Demonstrator is allocated to facilitate the students in carrying out practical.

The practical classes of 2nd Year MBBS are scheduled on Wednesday, Thursday, Friday & Saturday at 12:00 pm to 2:00 pm every week comprising of 80 students in each practical batch. One Demonstrator / Sr. Demonstrator is allocated to facilitate the students in carrying out practical.

Small Group Discussion (SGD's) SESSIONS:

1st Year MBBS

In routine one SGD's/Tutorial per week for 1st year MBBS are scheduled every Friday from 8;00am to 10;00 am in which 350 students are divided in four main groups which are further sub-divided into multiple small groups for group discussions. Faculty members facilitate the students during the SGD's session. Students actively participate in these small group discussions. Venues include demonstration rooms, Labs, Lecture theaters.

2nd Year MBBS

One tutorial session for 2nd year MBBS is scheduled on every Wednesday from 12:00 pm to 02:00 pm in which 350 students are divided into four main groups which are further sub-divided into multiple small groups for group discussions. Faculty members facilitate the students during the SGD session. Students actively participate in these small group discussions venue is demonstration room (museum) & Lecture Hall-II.

Lecture Halls:

Physiology Lecture Theater, located within the department is being used for coaching of 1st year & 2nd year students during the weekly lectures. Lecture halls have seating capacity for more than 350 students each. Lecture hall is well equipped with modern teaching technologies like HD multimedia and sound system. White boards are installed for the facilitation of students regarding teaching methodologies. It is very well ventilated, lighted, having air conditioning facilities. One lecture hall attendant is attached with every lecture hall where he maintains all necessary equipment which is mandatory for teaching purposes.

SECOND YEAR MBBS

SYLLABUS OUTLINE SECOND YEAR MBBS WITH STUDY OBJECTIVES

At the end of the course the student should be able to:

BODY FLUIDS AND KIDNEY

1. Describe the components and quantitative measurements of body fluids.
2. Discuss the different fluid compartments, tissue and lymph fluid.
3. Describe the structure of the kidney and nephron, and explain general functions of the kidney.
4. Describe the GFR and its regulation.
5. Describe the formation of urine including filtration, re-absorption and secretion.
6. Discuss plasma clearance.
7. Describe the mechanism of concentration and dilution of urine
8. Describe regulation of osmolality, water balance and acid base balance
9. Describe the role of the kidney in blood pressure regulation.
10. Describe the hormonal functions of the kidney.
11. Describe acidification of urine and its importance.
12. Describe the mechanism of micturition and its control.

Applied Physiology:

Understands:

1. Renal plasma clearance tests and their clinical significance.
2. Dehydration, rehydration, overhydration and oedema.
3. Renal failure and dialysis.
4. Metabolic acidosis and alkalosis.
5. Abnormalities of micturition.

NERVOUS SYSTEM

1. Describe general organization of the nervous system.
2. Describe the properties of synaptic transmission.
3. Classify the neurotransmitters and explain their functions.
4. Explain neuropeptides and their functions
5. List the types and describe the properties and functions of sensory receptors.
6. Describe the pathways **for** transmission of somatic sensations
7. Define reflex action. Classify and describe reflexes
8. Describe the muscle spindle and Golgi tendon organ. Explain their functions.
9. Describe the physiology of pain and analgesia system.
10. Explain the functions of the cerebral cortex.
it. Differentiate between the sensory and motor cortex and their functions.
12. Describe the motor pathways including pyramidal and extrapyramidal.

13. Describe basal nuclei (basal ganglia) and their functions.
14. Describe cerebellum and its function.
15. Describe the functions of vestibular apparatus.
16. Explain the organization and functions of reticular formation.
17. Explain mechanism and regulation of the muscle tone.
18. Describe the control of posture and equilibrium.
19. Explain the physiology of sleep.
20. Describe the physiology of memory.
21. Describe the mechanism and control of speech.
22. Discuss the functions of thalamus
23. Discuss the functions of hypothalamus
24. Explain the components and functions of limbic system.
25. Describe the production, circulation, absorption and functions of CSF.
26. Describe the blood brain and blood CSF barriers and their clinical significance.
27. Describe the organization and functions of the autonomic nervous system.

Applied Physiology

Understands:

1. Significance of dermatomes.
2. Injuries of the spinal cord.
3. Hemiplegia and paraplegia.
4. Diseases related to Basal ganglia.
5. Effects of cerebellar dysfunction.
6. Hydrocephalus.
7. Alzheimer's disease.
8. Speech disorders
9. Sleep disorders.
10. **Clinical** abnormalities of pain.

ENDOCRINOLOGY

1. Classify the hormones and describe mechanism of their action

2. Name the hormones secreted by the anterior and posterior pituitary and describe their regulation and functions.
3. Describe the neuroendocrine functions of the hypothalamus
4. Describe the physiological changes of growth and aging.
5. Describe the functions and regulation of the hormones secreted by thyroid gland.
6. Describe the hormones regulating calcium homeostasis (parathormone, vitamin D and calcitonin)
7. Name the hormones secreted by the adrenal cortex and describe their functions and regulation.

8. Name the hormones secreted by the adrenal medulla and describe their functions and regulation.
9. Describe the endocrine functions of the pancreas and regulation of pancreatic hormones.
10. Describe the endocrine functions of pineal gland.

Applied Physiology

Understands:

1. Acromegaly, gigantism and dwarfism.
2. Effects of pan-hypopituitarism.
3. Diabetes insipidus.
4. Thyrotoxicosis, myxedema and cretinism
5. Pheochromocytoma.
6. Cushing's disease / syndrome.
7. Addison's disease.
8. Hypocalcemia and hypercalcemia.
9. Adrenogenital syndrome.
10. Conn's syndrome. 1
11. Diabetes mellitus and hypoglycemia.

GASTROINTESTINAL TRACT

1. Describe the general functions of gastrointestinal tract.
2. Describe the enteric nervous system, control of gastrointestinal motility and secretion
3. Describe mastication, swallowing and their control
4. Describe the motility of the stomach, small intestine, large intestine and regulation.
5. Describe the functions of GIT hormones
6. Describe gallbladder motility and its regulation
7. Explain mechanism of vomiting and its control pathway
8. Explain defecation and its control pathway

Applied Physiology

Understands:

1. Dysphagia
2. Achalasia cardia
3. Diarrhea and constipation
4. Megacolon

REPRODUCTION

1. Describe the functions of the male reproductive system.
2. Describe the mechanism of erection and ejaculation.
3. Describe the production and function of testosterone.
4. Describe the physiological changes during male puberty.

5. Describe the function of the female reproductive system.
6. Explain the production and function of estrogen and progesterone.
7. Describe the functions of hypothalamic-hypophysia I-gonadal axis.
8. Describe the ovarian and endometrial cycle.
9. Describe the physiological changes during female puberty and menopause.
10. Discuss pregnancy and explain the physiological changes taking place in the mother.
11. Describe the functions of placenta.
12. Discuss the hormones regulating parturition, lactation and development of breast.

Applied Physiology

Understands:

1. Male infertility.
2. Female infertility.
3. Postmenopausal syndrome.
4. Contraception.
5. Basis for pregnancy tests.
6. Hypogonadism.
7. Cryptorchidism.

SPECIAL SENSES

1. Describe the optics of the eye, mechanism of accommodation, **light** reflex.
2. Explain visual acuity, depth perception, neural functions of the retina.
3. Describe the errors of refraction and their corrections.
4. Describe the secretion, circulation, drainage and functions of aqueous humor.
5. Describe the movements of eyeballs.
6. Describe the visual transduction, color vision, visual cortex and visual pathway.
7. Describe the mechanisms for the light and dark adaptation.
8. Describe the functions of external ear.
9. Enumerate the contents of middle ear cavity and functions of the middle ear
10. Describe the structure and functions of internal ear.
11. Explain the determination of the sound frequency, loudness, direction of sound, auditory pathway and auditory cortex.
12. Describe the signal transduction for hearing.
13. Describe the signal transduction for taste and smell.
14. Describe the pathways for the sense of taste and smell,

Applied Physiology

Understands:

1. Types of deafness.
2. Errors of refraction.
3. Lesions of the visual pathway.

4. Night blindness.
5. Color blindness.
6. Squint.
7. Argyll Robertson pupil.
8. Horner's syndrome.
9. Abnormalities of sense of smell and taste.
10. Glaucoma.

PHYSIOLOGY PRACTICAL SECOND YEAR MBBS

NERVOUS SYSTEM

1. Examination of superficial reflexes.
2. Examination of deep reflexes.
3. Examination of motor system.
4. Cerebellar function tests.
5. Examination of sensory system.
6. Examination of cranial nerves.

SPECIAL SENSES

1. Plotting of the field of vision (perimetry and confrontational methods).
2. Testing the visual acuity for near and distant vision.
3. Elicitation of light reflex (direct and consensJal) and accommodation reflex.
4. Ophthalmoscopy,
5. Examination of color vision.
6. Examination of hearing.
7. Examination of taste and smell.

PREGNANCY TEST

LECTURES BREAK UP SECOND YEAR MBBS

RENAL & BODY FLUID PHYSIOLOGY

Lecture #	Topic	Key Contents
1	Body Fluid Compartments	Distribution, composition, homeostasis, indicator dilution principle
2	Measurement of Body Fluids	Criteria for dyes, compartment volume determination, osmotic equilibrium, edema
3	Osmosis & Tonicity	Osmotic pressure, osmolarity, isotonic/hypertonic/hypotonic solutions
4	Fluid & Electrolyte Disorders	Hyponatremia, hypernatremia, edema (types, causes, safety factors)
5	Functional Anatomy of Kidney	Kidney structure, nephron, functions
6	Glomerular Filtration I	Filtration barrier, GFR concept
7	Glomerular Filtration II	Determinants of GFR, glomerular capillary membrane, JGA
8	Renal Blood Flow	Determinants, autoregulation, intrinsic/extrinsic control, pressure diuresis
9	RAAS & GFR Regulation	Angiotensin II functions, myogenic mechanism
10	Urine Formation Overview	Filtration, reabsorption, secretion
11	Proximal Tubule Function	Na^+, glucose transport, Tm, solvent drag, gradient-time transport
12	Loop of Henle	Structure, function, countercurrent role
13	Distal Tubule & Collecting Duct	Reabsorption regulation, hormonal control, glomerulotubular balance
14	Renal Clearance	Inulin, creatinine clearance, assessment of renal function
15	Urine Concentration I	Dilute urine, obligatory urine volume, specific gravity
16	Urine Concentration II	Countercurrent multiplier & exchanger, vasa recta, urea recycling
17	Regulation of Urine Output	ADH, aldosterone, osmoreceptors, thirst, cardiovascular reflexes
18	Micturition & Bladder	Reflex, cystometrogram, bladder disorders, urinalysis
19	Potassium Regulation	Renal K^+ handling and secretion
20	Calcium & Magnesium Regulation	Renal handling of Ca^{2+} and Mg^{2+}
21	Sodium & ECF Volume Regulation	Pressure natriuresis/diuresis, hormonal & neural control
22	Acid-Base Balance	Buffers, respiratory & renal regulation, phosphate/ammonia systems, disorders & anion gap

ENDOCRINOLOGY

Lecture #	Topic	Key Contents
1	Introduction to Endocrinology	Hormones definition, endocrine vs exocrine glands, chemical messengers
2	Hormone Classification	Peptide, steroid, amine hormones; solubility, transport, half-life
3	Hormone Dynamics	Hormone concentration, clearance, feedback mechanisms
4	Hormone Receptors	Types, specificity, up/down regulation, measurement of hormones
5	Mechanisms of Hormone Action I	G-protein coupled, second messengers (cAMP, IP_3/DAG), Ca–calmodulin
6	Mechanisms of Hormone Action II	Enzyme-linked, ion channel receptors, steroid & thyroid hormone action
7	Hypothalamus & Pituitary Overview	Hypothalamic hormones, portal circulation, anterior vs posterior pituitary
8	Growth Hormone I	Properties, mechanism, metabolic effects
9	Growth Hormone II	Growth effects, somatomedins (IGF), regulation (axis control)
10	Growth Hormone Disorders	Dwarfism, gigantism, acromegaly, panhypopituitarism
11	Posterior Pituitary Hormones	ADH (mechanism, DI, SIADH), oxytocin
12	Prolactin & Pituitary Integration	Prolactin functions, abnormalities, overall pituitary coordination
13	Thyroid Hormones I	Synthesis, storage, release, transport
14	Thyroid Hormones II	Mechanism of action, metabolic effects, regulation
15	Thyroid Disorders	Hypothyroidism, hyperthyroidism, goiter
16	Adrenal Cortex	Glucocorticoids, mineralocorticoids, regulation, functions
17	Adrenal Medulla	Catecholamines, stress response
18	Pancreatic Hormones	Insulin, glucagon, somatostatin, glucose homeostasis
19	Calcium Homeostasis	PTH, calcitonin, vitamin D
20	Integrated Endocrine Physiology	Hormonal interactions, stress response, clinical correlations

REPRODUCTION

Lecture #	Topic	Key Contents
1	Spermatogenesis & Male Hormonal Control	مراحل spermatogenesis, hypothalamic–pituitary–testicular axis
2	Male Accessory Functions & Semen	Seminal vesicles, prostate gland, semen composition
3	Sperm Function & Disorders	Capacitation, acrosome reaction, abnormalities of spermatogenesis
4	Testosterone & Regulation	Functions, mechanism of action, hormonal regulation
5	Oogenesis & Ovarian Cycle	Follicular development, phases of ovarian cycle
6	Female Hormones & Uterine Cycle	Estrogen, progesterone, endometrial cycle
7	Female Reproductive Regulation	HPO axis, puberty, menarche, menopause, anovulatory cycles
8	Pregnancy, Parturition & Lactation	Hormonal changes, fetal–maternal interactions, milk production
9	Fetal & Neonatal Physiology	Fetal circulation, changes at birth, prematurity issues

SENSORY SYSTEM

Lecture #	Topic	Key Contents
1	Organization of Nervous System	CNS/PNS, neuron structure & classification, neuroglia, major functional divisions
2	Functional Organization of CNS	Sensory & motor systems, stimulus concept, Bell-Magendie law, levels of CNS (spinal, subcortical, cortical)
3	Synaptic Physiology I	Types of synapses, electrical vs chemical, synaptic transmission, neurotransmitter release & recycling
4	Synaptic Physiology II	Neurotransmitters, receptors, EPSP/IPSP, summation, facilitation, presynaptic inhibition
5	Neural Circuits & Integration	Types of circuits, reverberation, inhibition, after-discharge, synaptic plasticity & fatigue
6	Sensory Receptors & Coding	Receptor types, transduction, adaptation, receptive fields, sensory coding, tonic vs phasic receptors
7	Sensory Principles & Fiber Types	Müller’s doctrine, labelled line, Weber-Fechner law, nerve fiber classification, neural pools
8	Somatic Sensations Overview	Classification, receptors, general sensory pathways
9	Dorsal Column System	DCML pathway, somatosensory cortex (areas I & II), homunculus, position sense
10	Anterolateral System & Thalamus	Spinothalamic tract, thalamic nuclei, dermatomes, corticofugal control
11	Pain Physiology	Types of pain, receptors, pathways, modulation, gate control theory, analgesia system
12	Applied Sensory Physiology	Referred pain, clinical pain syndromes, thermal sensation, headache

SPECIAL SENSES

Lecture #	Topic	Key Contents
1	Optics & Anatomy of Eye	Physiological anatomy, refraction, refractive power, reduced eye
2	Accommodation & Refraction Errors	Accommodation mechanism, pupillary control, depth of focus, refractive errors, presbyopia
3	Clinical Optics & Aqueous Humor	Visual acuity, ophthalmoscopy, cataract, aqueous humor formation & drainage
4	Intraocular Pressure & Retina Structure	Tonometry, glaucoma, retina (rods, cones, pigment layer), retinal detachment
5	Photochemistry of Vision	Visual cycle, rhodopsin, dark & light adaptation
6	Color Vision & Retinal Processing	Color vision, color blindness, retinal neurotransmitters
7	Retinal Cellular Organization	Photoreceptors, bipolar, horizontal, amacrine, ganglion cells, optic nerve fibers
8	Visual Pathways & Cortex	Visual pathway, visual cortex organization
9	Visual Reflexes & Disorders	Visual field defects, perimetry, eye movements, strabismus
10	Autonomic Control of Eye	Accommodation control, pupillary reflexes, Horner syndrome
11	Anatomy of Ear & Sound Transmission	Ear anatomy, cochlea, ossicles, impedance matching, attenuation reflex
12	Cochlear Function	Sound transmission, organ of Corti, hair cell excitation, endocochlear potential
13	Sound Perception	Frequency and loudness determination
14	Auditory Pathways & Localization	Auditory pathways, cortical function, sound localization
15	Hearing Disorders	Types of deafness, tuning fork tests, audiometry
16	Chemical Senses	Taste (modalities, receptors, pathway) and smell (olfaction, pathway)

MOTOR SYSTEM

Lecture #	Topic	Key Contents
1	Organization of Spinal Cord	Motor neurons, propriospinal connections, role of sensory receptors, muscle spindle structure
2	Stretch Reflex	Circuitry, dynamic vs static reflex, gamma system
3	Clinical Reflexes	Deep tendon reflexes, clonus, Golgi tendon reflex
4	Polysynaptic Reflexes	Flexor, withdrawal, crossed extensor reflex, locomotion
5	Spinal Cord Integration	Muscle spasms, autonomic reflexes, spinal shock, cord transection
6	Motor Cortex	Organization, motor homunculus, premotor & supplementary areas
7	Corticospinal Pathways	Pyramidal tract, motor output pathways
8	Extrapyramidal System	Corticorubrospinal pathway, role in motor control

9	Motor Signal Processing	Cortical columns, dynamic/static signals, sensory feedback
10	Motor Lesions	Stroke, UMN lesions, spasticity, loss of cortical control
11	Brainstem Control of Movement	Reticular formation, vestibular nuclei, posture & equilibrium
12	Cerebellum I – Anatomy & Circuits	Functional divisions, afferent/efferent pathways
13	Cerebellum II – Cellular Mechanisms	Purkinje cells, deep nuclei, inhibitory circuits
14	Cerebellum III – Functions	Coordination, timing, error correction
15	Cerebellar Disorders	Ataxia, intention tremor, dysmetria
16	Basal Ganglia	Circuits, functions, movement patterns, disorders
17	Cerebral Cortex	Functional areas, association cortex
18	Language & Communication	Broca's, Wernicke's areas, aphasias
19	Higher Cortical Functions	Prefrontal cortex, memory classification & mechanisms
20	Limbic System	Structures, functions, amygdala, behavior
21	Sleep & EEG	Sleep stages, theories, EEG patterns
22	Seizures & Psychiatric Disorders	Epilepsy, depression, schizophrenia, Alzheimer's
23	Autonomic Nervous System	Organization, sympathetic vs parasympathetic, reflexes
24	ANS Pharmacology & Brain Homeostasis	Autonomic drugs, cerebral blood flow, CSF, hydrocephalus

GASTROINTESTINAL TRACT

Lectures of GIT are **conducted in collaboration with Gastroenterology Department**

Lecture #	Topic	Key Contents
1	Introduction to GIT Physiology	Physiological anatomy, layers of GIT, basic electrical activity (BER/slow waves)
2	Enteric Nervous System	Organization (myenteric & submucosal plexus), functions
3	Regulation of GIT Function	Neural (ANS, ENS) and hormonal control
4	Splanchnic Circulation	GIT blood flow, regulation, clinical relevance
5	Oral & Esophageal Functions	Chewing, swallowing, phases of deglutition
6	Gastric Motility	Motor functions of stomach, gastric emptying
7	Intestinal Motility	Movements of small intestine, large intestine, defecation reflex
8	GIT Secretions Overview	General principles of secretion, regulation
9	Salivary & Gastric Secretion	Composition, regulation, functions
10	Pancreatic & Intestinal Secretions	Pancreatic juice, bile (if included), small & large intestinal secretions
11	Digestion & Absorption	Principles, absorption of nutrients, water & electrolytes
12	Applied GIT Physiology	Pathophysiology of GIT disorders (motility, secretion, absorption)

TEACHING SCHEDULE SECOND YEAR MBBS & VENUE

THEORY

Starting date of the session	**First week of January**
Venue	**Physiology Lecture Hall on Physiology Floor**
Course coverage	**9 Months**
No. of total lectures	**Five Lectures/week**
Days of Physiology lectures	**One lecture each on Tuesday, Thursday,**
	Friday and Saturday of each week.

PRACTICALS

Starting date of the session	**First week of January**
Venue	**Physiology Laboratory**
Days of Physiology practicaIs	**Monday, Tuesday, Thursday and Saturday.**

TUTORIALS/Small Group Discussions

Starting date of the session	**First week of January**
Venue	**Demonstration Rooms and Physiology**
	LT in Physiology department.
Days of Physiology tutorials/PBL	**Every Wednesday from** 12:30 **to 02:30 PM**

STUDY HOURS SECOND YEAR MBBS (36 WEEKS)

SESSION	DURATION	Sessions /week	STUDY HOURS/32 WEEKS
LECTURE	ONE HOUR	5	120
PRACTICAL CLASSES	2 HOURS	1	48
TUTORIAL CLASSES	2 HOURS	1	48
TESTS & SEND UP ASSESSMENTS			4 WEEKS
TOTAL CONTACT HOURS			216
SUMMER BREAK			4 WEEKS
PREP BEFORE EXAMS			4 WEEKS

CODE OF CONDUCT FOR STUDENTS

TIMINGS

The students are encouraged to follow the timings of lectures, practical & tutorial classes.

ATTENDANCE & SEND UP EXAMINATION

A minimum criterion for attendance for appearing in university examination is set to be 75%. The students are informed about their attendance record and deficiency twice a year. Classes are also arranged in summer vacations to meet the deficiency.

PRACTICAL NOTE BOOKS AND LAB COATS

- Students are encouraged to wear lab coat during practical classes.
- Practical copies are maintained and checked after every practical.
- Practical copy carries 5 marks in Professional examination.

ASSESSMENT METHODS

- Formative Assessment
- Summative Assessment

CLASS TESTS (DURING ACADEMIC SESSION)

- Class Tests are conducted comprising of MCQs and SEQs on 2" ten days of each month.
- Viva Voce are also conducted at regular intervals
- Sendup at the end of the year includes the entire syllabus.
- Results are displayed promptly on notice board in Physiology department.

ASSESMENTS RULES & REGULATIONS

- Tests are conducted sharp at the given time.
- Students are not allowed to enter the examination hall after 15 minutes of scheduled examination time.
- Students must sit according to the specified seating arrangement
- Cell phones are strictly prohibited in examination hall.

SECOND PROFESSIONAL MBBS

TABLE OF SPECIFICATION SECOND YEAR M.B.B.S

TOPIC	No. of MCQ	No. of SEQ
KIDNEY AND BODY FLUIDS	8	2
NERVOUS SYSTEM	12	2
SPECIAL SENSES	6	1
ENDOCRINOLOGY	8	2
REPRODUCTION	6	1
GIT	5	1
TOTAL	**45 MCQs**	**9 SEQS**

PAPER PATTERN

- MCQs - 30 marks
- SEQs - 60 marks
- Internal assessment - 10 marks

TOTAL MARKS - 100

FORMAT OF PRACTICAL & VIVA VOCE EXAMINATION

EXTERNAL EXAMINER	30
INTERNAL EXAMINER	30
(Including 5 marks for Practical Copy)	
PROCEDURE WRITING	10
PRACTICAL VIVA	20
INTERNAL ASSESSMENT	10
Total Marks	100

INTERNAL ASSESSMENT/EVALUATON

According to rules of KEMU Internal assessment carries total 20 marks (10% of total 200 marks). Internal assessment is calculated on the basis of performance in class tests, OSPE, Viva and sendup examination throughout the session.

- Class tests
- OSPE tests
- Sendup **performance**

CLASS TESTS

TOPIC 50 %	**MORE THAN 60 MAX. TOTAL**	**MORE THAN 50**		**LESS THAN**
50%				
TEST 1	2	1	0	2
TEST 2	2	1	0	2
TEST 3	2	1	0	2
TEST 4	2	1	0	2
TEST 5	2	1	0	2
TEST 6	2	1	0	2
TEST 7	2	1	0	2
TEST 8	2	1	0	2
TOTAL	16	8	0	16

SEND UP EXAMINATION

SENDUP %	**MORE THAN 60**	**MORE THAN 50%**	**LESS THAN 50 %**	**MAX. TOTAL**
SENDUP	2	1	0	2

MORE THAN 70 %	**MORE THAN 50** 3t	**LESS THAN 50 %**	**MAX. TOTAL**
2	1	0	2

MAXIMUM MARKS IN INTERNAL EVALUATION - 20

CONTACT HOURS 2026

Name of Department: Department of Physiology

Lectures Breakup					
	Total Lectures			**Assessments**	
First Year	Lectures: 113 hours Practical: 56 hours Tutorials/PBL: 56 hours TOTAL =225 Hours			• Foundation Module Test • Musculoskeletal Module Test **BLOCK 1 EXAM** • Cardiovascular Module Test • Respiratory Module Test **BLOCK 2 EXAM** • Blood & Immunity Module Test • Core Concepts Module Test **BLOCK 3 EXAM** **PROFESSIONAL EXAM**	
Second Year	Lectures: 113 hours Practical: 56 hours Tutorials/PBL: 56 hours TOTAL =225 Hours			• **Four class tests during academic year** • **Send – up exam** • **Professional exam**	
Third Year					
Fourth Year					
Final Year					
TOTAL					
Rotation in Clinical Wards	**1st Year (33)**	**2nd Year,**	**3rd Year,**	**4th Year,**	**5th Year,**
Number of Weeks	33	Not Applicable			
Working Days	06	Not Applicable			
Rotation/ Practical Breakup	**First Year MBBS** K- CORE (Clinical Orientation & Readiness Education) – 2hrs / week Practical– 56 hours / 33 weeks **Second Year MBBS** Practical = 56 hours /31 weeks				
Third Year	**Daily Hours**	**Total Weeks of Rotation**	**Total Rotation Hours**		
Fourth Year	**Daily Hours**	**Total Weeks of Rotation**	**Total Rotation Hours**		

Final Year	**Daily Hours**	**Total Weeks of Rotation**	**Total Rotation Hours**
1st Year	**Daily Hours**	**Total Weeks of Rotation**	**Total Rotation Hours**
	07	**33**	**66 hours / Annum**
2nd Year	**Daily Hours**	**Total Weeks of Rotation**	**Total Rotation Hours**
	07	Not Applicable	Not Applicable

Tutorial/PBL

Physiology PBL/CBL .....2nd year MBBS

Dated: 25-02-2026 **Time: 11:30-01:00**

Q1. Describe special characteristics of synaptic transmission. Mushtaq Ahmed Physiology page 134, Volume 1

Q2. Classify neurons (Histological, Physiological, classification according to size). Mushtaq Ahmed Physiology page 95 Volume 1

Q3. Give types of sensory receptors and the stimuli that they detect; what is modality of sensation?

Q4. Define stimulus, what is adequate stimulus? Mushtaq Ahmed Physiology page 108 Volume 1

Q5. What are the properties of receptors? Mushtaq Ahmed Physiology page 280 Volume 2

Q6. Describe the mechanism by which receptor potential is produced in the Pacinian corpuscle.

Q7. Describe the mechanism of adaptation of the receptors.

Q8. Give Physiological classification & functions of nerve fibers.

Q9. Describe properties of nerve fiber. Mushtaq Ahmed Physiology page 118 Volume 1

Note:
All students are directed to prepare the scenario and should be able to take part in discussion and answer the questions

Batch	Venue
A	Physiology lecture theatre
B	Physiology lab I
C	Physiology lab II
D	Physiology lab III

Dr. Maryam Rao
HOD/Associate professor
Deptt. of Physiology,KEMU,Lahore

CC
The Director Medical Education, KEMU, Lahore.

TIME TABLE OF 2ND YEAR MBBS (2022-2023) CLASSES

Day	08:00 – 09:00	09:00 – 10:00	10:00 – 10:30	10:30 – 11:30	11:30 – 12:30	12:30 – 02:30
Monday	Anatomy Demonstration	Anatomy Dissection	BREAK	Physiology Lecture	Biochemistry Lecture (Lecture Theatre 02)	Practical Histology C Physiology A Biochemistry B Biochemistry Tutorial D
Tuesday	Anatomy Demonstration	Anatomy Dissection		Anatomy Lecture	Physiology Lecture	Practical Histology A Physiology B Biochemistry D Biochemistry Tutorial C
Wednesday	Anatomy Dissection			Biochemistry Lecture (Lecture Theatre 02)	Physiology Lecture	Tutorial Physiology
Thursday	Anatomy Demonstration	Anatomy Dissection		Anatomy Lecture	Biochemistry Lecture (Lecture Theatre 02)	Practical Histology D Physiology C Biochemistry A Biochemistry Tutorial B
Friday	Anatomy Demonstration/ Pak Studies	Anatomy Lecture	10:00 – 11:00 Biochemistry Lecture (Lecture Theatre 02)		11:00 – 12:00 Physiology Lecture	
Saturday	Anatomy Dissection		BREAK	Anatomy Lecture	Physiology Lecture	Practical Histology B Physiology D Biochemistry C Biochemistry Tutorial A

ectures of Anatomy and Physiology will be delivered in Anatomy & Physiology Lecture Theatres, and Lectures of Biochemistry will be delivered in the ecture Theatre 02 of Maqbool Ahmed Block.

2/1/2023
Prof. Dr. Nakhshab Choudhry
Chairman / Professor
Department of Biochemistry
KEMU, Lahore.

02/01/23
Prof. Dr. Saqib Sohail
Chairman / Professor
Department of Physiology
KEMC, Lahore.

Prof. Dr. Farhana Sajjad
Chairperson / Professor
Department of Anatomy & Histology
KEMC, Lahore.