MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)
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COMPETENCY BASED MEDICAL EDUCATION

(CBME)

(with effect from 2023-2024 Batches)

Curriculum for

First M.B.B.S

Human Physiology

Amended upto AC-52/2025, Dated 28/11/2025

Amended History

1. Approved as per BOM 57/2019 [Resolution no. 3.1.1.13]; Dated 26/4/2019.
2. Amended upto BOM 62/2020 [Resolution No. 3.2.1.3.i]; Dated 16/09/2020.
3. Amended Up to BOM 63/2021 [Resolution No. 4.1.1.2.ii, Resolution No. 4.4.1.6]; Dated 17/ 02/2021.
4. Amended Up to AC-41/2021, [Resolution No. 4.1], [Resolution No. 4.3], [Resolution No. 4.4], [Resolution No. 4.6], [Resolution No. 4.7], [Resolution No. 4.8], [Resolution No. 4.9], [Resolution No. 4.10]; Dated 27/08/2021.
5. Amended Up to AC-42/2022, [Resolution No. 3.4], [Resolution No. 3.5], [Resolution No. 3.6], [Resolution No. 3.15], [Resolution No. 3.19]; Dated 26/04/2022 (incorporated at the end of syllabus).
6. Amended Up to AC -48/2023 [Resolution No 5.3,5.4,5.6, 5.8 (i),5.8 (ii), 5.9,5.10, 5.11] Dated 12/12/2023.
7. Amended Up to AC-50/2024 [Resolution No. 4.18, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.15, 4.18, 4.22, 4.24] Dated 27/11/2024.
8. Amended as per AC-52/2025, [Resolution No. 6.4, (Annexure-36)]; Dated 28/11/2025. (For admitted batch 2025-26 onwards).

Resolution No. 4.4 of AC-41/2021 - Resolved to include "MGMIHS Graduate Attributes" in 1st MBBS Anatomy Physiology and Biochemistry syllabi and cover them in the foundation course, Journals & logbooks, with effect from the batch admitted in 2021-22 onwards

Annexure-23 of AC-41-2021

MGM INSTITUTE OF HEALTH SCIENCES, NAVI MUMBAI

GRADUATE ATTRIBUTES

A student graduating from MGM Institute of Health Sciences, Navi Mumbai, should attain the following attributes:

1. Dynamic professionalism
2. Exemplary leadership
3. Effective communication skills
4. Scholarly attitude
5. Element of critical thinking
6. Enthusiasm for research
7. Social commitment
8. Global competencies

Dynamic professionalism:

Abide by professional codes of conduct, demonstrate high personal standards of behaviour, be considerate, trustworthy and honest, act with integrity. Apply effective strategies to maintain their own physical, psychological, social and spiritual well-being. Should be able to apply profession-specific knowledge, clinical skills and professional attitudes in implementation of evidence-based protocols for optimal outcome.

Exemplary leadership:

Focuses on the qualities required to effectively manage a career, as a practitioner or academician , work effectively within a system aiming at quality improvement ,fostering a spirit of team-building.

Effective communication skills:

Communicates effectively and humanely with all stakeholders, their families, colleagues, through a variety of means , gathers and conveys information respectfully , in a culturally acceptable and dignified manner.

Scholarly attitude:

Demonstrates a lifelong commitment to reflective learning, strives to maintain professional competence. Committed to learn, disseminate, apply and translate knowledge

Element of critical thinking:

Will develop a habit of inquiry, use the knowledge gained for dealing with complex situationsfoster an ambience conducive for effective learning with constructive criticism, exercise critical judgement in evaluating sources of information.

Enthusiasm for research:

Develop intellectual curiosity and embark upon opportunities to develop research capabilities. Imbibe the basic principles of research methodology and engage in ethicalresearch.

Social commitment:

Inculcate values of self-awareness, empathy, mutual respect. Understand our obligation to society and foster an ability to work in a diverse cultural setting. Understand how one's actions can enhance the well-being of others.

Global competencies:

Team- building, communication, self-management, collaborative working, openness and respect for a range of perspectives.

Resolution No. 5.5 of Academic Council (AC-48/2023): Resolved to accept distribution of subjects and teaching elements in first professional MBBS from First MBBS 2023-24 batch onwards, as per new CBME guidelines published on 01.08.2023

(As per NMC guidelines letter No. U. 1 4021 1812023-UGMEB dated 01.08.23)

Distribution of subjects and teaching elements in first professional MBBS from First MBBS 23-24

First Professional phase of 12 months including Foundation Course of one week and university exams. It shall consist of - Anatomy , Physiology , Biochemistry , Introduction to Community Medicine , Humanities , Professional development including Attitude , Ethics & Communication (AETCOM) module , family adoption programme through village outreach where-in each student shall adopt minimum of three (03) families and preferably at least five (05) families , Pandemic module and early clinical exposure , ensuring alignment & all types of integration and simulation- based learning.

Resolution No. 5.6 of Academic Council (AC-48/2023): Resolved to accept the final distribution of subject wise teaching hours for first professional MBBS from First MBBS 2023-24 batch onwards, as per new CBME guidelines published on 01.08.2023

Distribution of Subject Wise Teaching Hours for 1 st MBBS

(As per NMC guidelines letter No. U. 1 4021 1812023-UGMEB dared 01.08.23, page No. 69)

Subject	Lecture (Hrs)	SGL (Hrs)	SDL (Hrs)	Total (Hrs)
Foundation Course (FC) will be conducted at the beginning of 1st MBBS for 01 week				**39**
Anatomy	210	400	**10**	**620**
Physiology	130	300	**10**	**440**
Biochemistry *	78	144	**10**	**232**
ECE**	27	-	**0**	**27**
Community Medicine	20	20	**-**	**40**
FAP			**27**	**27**
AETCOM ***		26		**26**
Sports + Extra –curricular activities				**10**
Formative Examination and Term examinations				**60**
Total				**1521#**
***Foundation Course (FC)** **Remaining 121 hours of FC will be** spread throughout year. Thus, FC will be total **160 hours.**	**Every Saturday**			**121**
Total				**1642#**

***Including molecular biology**

****Early Clinical exposure hours to be divided equally in all three subjects.**

***** AETCOM module shall be a longitudinal programme.**

 # includes hours for Foundation course also.

Resolution No. 4.6 of Academic Council (AC-50/2024): Resolved to approve & adopt the distribution of subject wise teaching hours for first professional MBBS from 2024-25 batch onwards as per new CBME guidelines published on 12/09/2024. **Annexure - 26**

Distribution of Subject Wise Teaching Hours for 1 st MBBS

(With effect from batch 2024-2025)

Subject	Lecture (Hrs)	SGL (Hrs)	SDL (Hrs)	Total (Hrs)
Foundation Course (FC) will be conducted at the beginning of 1st MBBS for 01 week				**80**
Anatomy	180	430	**10**	**620**
Physiology	130	305	**10**	**445**
Biochemistry *	82	157	**10**	**249**
ECE**	27	-	**0**	**27**
Community Medicine	20	20	**-**	**40**
FAP			**27**	**27**
AETCOM ***		26		**26**
Sports + Extra –curricular activities				**10**
Total				**1521#**

As per NMC "Guidelines for Competency Based Medical Education (CBME) Curriculum 2024" on 12/09/2024. , page No- 53

***Including molecular biology**

****Early Clinical exposure hours to be divided equally in all three subjects.**

***** AETCOM module shall be a longitudinal programme.**

 # includes hours for Foundation course also.

Resolution No. 5.3 of Academic Council (AC-48/2023): Resolved to approve distribution of hours of foundation course of First MBBS 2023-24 batch as per new CBME guidelines published on 01.08.2023 **[ANNEXURE-7].**

(As per NMC guidelines letter No. U. 1 4021 1812023-UGMEB dared 01.08.23, page No. 69)

Foundation Course

(One Week (39 hrs) + Spread over 6 months at the discretion of college (121 Hrs)

Foundation course Subject/ contents	Teaching Hours
Orientation	**30**
Skill module	**34**
Field visit to community health center	**08**
Introduction to professional Deployment & AETCOM module	**40**
Sports, Yoga and extra- curricular activities	**16**
Enhancement of language/computer skills	**32**
Total	**160**

Resolution No. 5.7 of Academic Council (AC-48/2023): Resolved to accept "learner doctor program (Clinical clerkship)" for first professional MBBS from First MBBS 2023-24 batch onwards, as per new CBME guidelines published on 01.08.2023

(As per NMC guidelines letter No. U. 14021 1812023-UGMEB dated 01.08.23)

Learner-Doctor program (Clinical clerkship) for first professional MBBS from First MBBS 23-24 batch

- **Introduction to hospital environment**
- **Early clinical exposure**
- **Understanding perspectives of illness**
- **Family adoption program**

Resolution No. 4.4 of Academic Council (AC-50/2024): Resolved to approve and adopt the distribution of hours of foundation course of First MBBS from 2024-25 batch onwards.
Annexure: 6

(As per NMC "Guidelines for Competency Based Medical Education (CBME) Curriculum 2024" on 12/09/2024, page No. 52)

Foundation Course

Foundation Course- 2 weeks at start of the course

Subject/ contents	Teaching Hours
Orientation Module including History of Indian Medicine	15
Skills Module	15
Community orientation module	5
Professional Development and Ethics Module (P&E) including Mental health	20
Enhancement of Language and Computer Skills Module including Clinico -laboratory communication	10
Sports and Extracurricular Activities	15
Total	80

Annexure – C – III

MGM Institute of Health Sciences, Navi Mumbai

CBME-First M.B.B.S. (2019-20 batch)

PHYSIOLOGY COURSE CONTENT

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. Vol. 1; page no.91-118)

Total Teaching (hours) - 440

- Lectures(hours)-130
- Small group teachings/tutorials/Integrated teaching/Practical's (hours)-300
- Self directed learning (hours)-10
- Early clinical exposure(hours)- 9

1 General Physiology (8 hours)

Competency No.	Topics & subtopics
PY. 1.1	Structure and Functions of a Mammalian Cell
PY. 1.2	Principles of Homeostasis
PY. 1.3	Intercellular communication
PY. 1.4	Apoptosis – Programmed cell death
PY. 1.5	Transport mechanisms across cell membranes
PY. 1.6	Fluid compartment of the body, its ionic composition & measurements
PY. 1.7	Concept of pH & Buffer systems in the body
PY. 1.8	Molecular basis of resting membrane potential and action potential in excitable tissue
PY. 1.9	Methods used to demonstrate the functions of the cells and its products, its communication and their applications in Clinical care and research.

2 Hematology (10 hours)

Competency No.	Topics & subtopics
PY.2.1	Describe the composition and functions of blood components
PY. 2.2	Original, forms, variations and functions of plasma proteins
PY. 2.3	Synthesis and functions of Hemoglobin & explain its breakdown. Describe variants of hemoglobin
PY. 2.4	RBC formation (erythropoiesis & its regulation) and its functions
PY. 2.5	Types of anemia's & Jaundice
PY. 2.6	WBC formation (granulopoiesis) & its regulation
PY. 2.7	Formation of platelets, functions & variations
PY. 2.8	Physiological basis of hemostasis and anticoagulants. Describe bleeding & clotting disorders (Hemophilia, purpura)
PY. 2.9	Different blood groups and clinical importance of blood grouping, blood banking and transfusion
PY.2.10	Types of immunity, development of immunity and its regulation, * Covid-19 related – role of nutrition, immunity boosters, cytokine storm

3 Nerve and Muscle Physiology (9 hours)

Competency No.	Topics & subtopics
PY. 3.1	Structure and functions of a neuron and neuroglia; Nerve Growth Factor & other growth factors/cytokines
PY. 3.2	Types, functions & properties of nerve fibers
PY. 3.3	Degeneration and regeneration in Peripheral nerves
PY. 3.4	Structure neuro-muscular junction and transmission of impulses
PY. 3.5	Action of neuro-muscular blocking agents
PY. 3.6	Pathophysiology of Myasthenia gravis
PY. 3.7	Types of muscle fibers and their structure
PY. 3.8	Action potential and its properties in different muscle types (skeletal & smooth)
PY. 3.9	Molecular basis of muscle contraction in skeletal and in smooth muscles
PY. 3.10	Mode of muscle contraction (isometric and isotonic)
PY. 3.11	Energy source and muscle metabolism
PY. 3.12	Gradation of muscular activity
PY. 3.13	Muscular dystrophy: myopathies

4 Gastro-intestinal Physiology (10 hours)

Competency No.	Topics & subtopics
PY.4.1	Describe the structure and functions of digestive system
PY. 4.2	Composition, mechanism of secretion, functions, and regulation of saliva, gastric, pancreatic, intestinal, juiceable secretion
PY. 4.3	GIT movements, regulation and functions, defecation reflex. Role of dietary fiber.
PY. 4.4	Physiology of digestion and absorption of nutrients
PY. 4.5	Source of GIT hormones, their regulation, and functions
PY. 4.6	Gut-Brain Axis
PY. 4.7	Structure and functions of liver and gall bladder
PY. 4.8	Gastric function tests, pancreatic exocrine function test & liver function tests
PY. 4.9	Physiology aspects of; peptic ulcer, gastro- oesophageal reflux disease, vomiting, diarrhea, constipation, Adynamic ileus, Hirschsprung's disease

5 Cardiovascular Physiology (CVS) (18 hours)

Competency No.	Topics & subtopics
PY.5.1	Describe the functional anatomy of heart including chambers,sounds; and Pacemaker tissue and conducting system.
PY. 5.2	Properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions
PY. 5.3	Events occurring during the cardiac cycle
PY. 5.4	Generation, conduction of cardiac impulse

PY. 5.5	Physiology of electrocardiogram (E.C.G.), its applications and the cardiac axis
PY. 5.6	Abnormal ECG, arrhythmias, heart block and myocardial infarction.
PY. 5.7	Hemodynamics of circulatory system
PY. 5.8	Local and systemic cardiovascular regulatory mechanisms
PY. 5.9	Factors affecting heart rate, regulation of cardiac output & blood pressure
PY. 5.10	Regional circulation including microcirculation, lymphatic, coronary, cerebral, capillary, Skin, foetal, pulmonary, and splanchnic circulation
PY. 5.11	Patho-physiology of shock, syncope and heart failure

6 Respiratory Physiology (12 hours)

Competency No.	Topics & subtopics
PY. 6.1	Functional anatomy of respiratory tract
PY. 6.2	Mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities, alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs
PY. 6.3	Transport of respiratory gases: Oxygen and Carbon dioxide
	Regulation of respiration -- Neural & chemical
PY. 6.4	Physiology of high-altitude, deep-sea diving
PY. 6.5	Principles of artificial respiration oxygen therapy, *ventilators**,** acclimatization, and decompression sickness
PY. 6.6	Pathophysiology of dyspnea, hypoxia, cyanosis asphyxia; drowning, periodic breathing
PY. 6.7	Lung function tests & their clinical significance, *pulse oximetry

7 Renal Physiology (8 hours)

Competency No	Topics & subtopics
PY. 7.1	Structure and function of kidney
PY. 7.2	Structure and functions of juxta glomerular apparatus and role of renin-angiotensin system
PY. 7.3	Mechanism of urine formation and processes involved
PY. 7.4	Significance & implication of Renal clearance
PY. 7.5	Renal regulation of fluid and electrolytes & acid-base balance
PY. 7.6	Innervations of urinary bladder, physiology of micturition and its abnormalities
PY. 7.7	Artificial kidney, dialysis, and renal transplantation
PY. 7.8	Renal Function Tests
PY. 7.9	Cytometry and discuss the normal cystometrogram

8 Endocrine Physiology (10 hours)

Competency No	Topics & subtopics
PY. 8.1	Physiology of bone and calcium metabolism
PY. 8.2	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo and hyper) secretion of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas and hypothalamus
PY. 8.3	Physiology of Thymus & Pineal Gland
PY. 8.4	Function tests: Thyroid gland; Adrenal cortex, Adrenal medulla, and pancreas
PY. 8.5	Metabolic and endocrine consequences of obesity & metabolic syndrome, Stress response. Outline the psychiatry component pertaining to metabolic syndrome
PY. 8.6	Mechanism of action of steroid, protein and amine hormones

9 Reproductive Physiology (8 hours)

Competency No	Topics & subtopics
PY. 9.1	Sex determination; sex differentiation and their abnormalities and outline psychiatry and practical implementation of sex determination
PY. 9.2	Puberty: onset, progression, states; early and delayed puberty and outline adolescent clinical and psychological association
PY. 9.3	Male reproductive system: functions of testis and control of spermatogenesis & factors modifying it andoutline its association with psychiatric illness
PY. 9.4	Female reproductive system: (a) functions of ovary and its control; (b) menstrual cycle – hormonal, uterine and ovarian changes
PY. 9.5	Physiological effects of sex hormones
PY. 9.6	Contraceptive methods for male and female. Discuss their advantages & disadvantages
PY. 9.7	Effects of removal of gonads on physiological functions
PY. 9.8	Physiology of pregnancy, parturition & lactation and outline the psychology and psychiatry-disorders associated with it
PY. 9.10	Physiological basis of various pregnancy tests
PY. 9.11	Hormonal changes and their effects during perimenopause and menopause
PY. 9.12	Common causes of infertility in a couple and role of IVF in managing a case of infertility

10 Neurophysiology (32 hours)

Competency No	Topics & subtopics
PY. 10.1	Organization of nervous system
PY. 10.2	Functions and properties of synapse, reflex, receptors
PY. 10.3	Somatic sensations & sensory tracts

PY. 10.4	Motor tracts, mechanism of maintenance of tone, control of body movements, posture and equilibrium & vestibular apparatus
PY. 10.5	Structure and functions of reticular activating system, autonomic nervous system (ANS)
PY. 10.6	Spinal cord, its functions, lesion & sensory disturbances
PY. 10.7	Functions of cerebral cortex, basal ganglia thalamus, hypothalamus. Cerebellum and limbic systemand their abnormalities
PY. 10.8	Behavioral and EEG characteristics during sleep and mechanism responsible for its production
PY. 10.9	Physiological basis of memory, learning and speech
PY. 10.10	Chemical transmission in the nervous system. (Outline the psychiatry element)
PY. 10.13	Perception of smell and taste sensation
PY. 10.14	Patho-physiology of altered smell and taste sensation
PY. 10.15	Functional anatomy of ear and auditory pathways & physiology of hearing
PY. 10.16	Pathophysiology of deafness. Hearing tests
PY. 10.17	Functional anatomy of eye, physiology of image formation, physiology of vision including color vision, refractive errors, color blindness, physiology of pupil and light reflex
PY. 10.18	Physiological basis of lesion in visual pathway
PY. 10.19	Auditory & visual evoke potentials

11 Integrated Physiology (5 hours)

Competency No	Topics & subtopics
PY. 11.1	Mechanism of temperature regulation
PY. 11.2	Adaptation to altered temperature (heat and cold)
PY. 11.3	Mechanism of fever, cold injuries and heat stroke
PY. 11.4	Cardio-respiratory and metabolic adjustment during exercise; physical training effects
PY. 11.5	Physiological consequences of sedentary lifestyle
PY. 11.6	Physiology of Infancy
PY. 11.7	Physiology of aging; free radicals and antioxidants
PY. 11.8	Cardio-respiratory changes in exercise (isometric and isotonic) with that in the resting state and under different environmental conditions (heat and cold)
PY. 11.9	Interpretation of growth charts
PY. 11.10	Interpretation of anthropometric assessment of infants
PY. 11.11	Concept, criteria for diagnosis of Brain death and its implications
PY. 11.12	Physiological effects of meditation, *Yogic breathing practices, breathing positions

*Applicable from 2023-24 Batch onwards

PRACTICAL COMPETENCIES

Competency Number	COMPETENCY	Suggested Teaching Learning method
Topic: Hematology		
PY2.11	Estimate Hb, RBC, TLC, RBC indices, DLC, Blood groups, BT/CT	DOAP sessions
PY2.12	Describe test for ESR, Osmotic fragility, Hematocrit. Note the findings and interpret the test results etc	Demonstration
Topic: Nerve and Muscle Physiology		
PY3.14	Perform Ergography	DOAP sessions
PY3.15	Demonstrate effect of mild, moderate and severe exercise and record changes in Cardiorespiratory parameters	DOAP sessions
PY3.16	Demonstrate Harvard Step test and describe the impact on induced physiologic parameters in a simulated environment	DOAP sessions
PY3.17	Describe Strength-duration curve	Small group discussion
PY3.18	Observe with Computer assisted learning (i) amphibian nerve - muscle experiments (ii) amphibian cardiac experiments	Demonstration, Computer assisted learning methods
Topic: Gastro-intestinal Physiology		
PY4.10	Demonstrate the correct clinical examination of the abdomen in a normal volunteer or simulated environment	DOAP session
Topic: Cardiovascular Physiology (CVS)		
PY5.12	Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	DOAP sessions
PY5.13	Record and interpret normal ECG in a volunteer or simulated environment	DOAP sessions
PY5.14	Observe cardiovascular autonomic function tests in a volunteer or simulated environment	DOAP sessions
PY5.15	Demonstrate the correct clinical examination of the cardiovascular system in a normal volunteer or simulated environment	DOAP sessions
PY5.16	Record Arterial pulse tracing using finger plethysmography in a volunteer or simulated environment	DOAP sessions, Computer assisted learning methods

Topic: Respiratory Physiology		
PY6.8	Demonstrate the correct technique to perform & interpret Spirometry	DOAP sessions
PY6.9	Demonstrate the correct clinical examination of the respiratory system in a normal volunteer or simulated environment	DOAP sessions
PY6.10	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment	DOAP sessions
Topic: Reproductive Physiology		
PY9.9	Interpret a normal semen analysis report including (a) sperm count, (b) sperm morphology and (c) sperm motility, as per WHO guidelines and discuss the results	Small group discussion
Topic: Neurophysiology		
PY10.11	Demonstrate the correct clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes, cranial nerves in a normal volunteer or simulated environment	DOAP sessions
PY10.12	Identify normal EEG forms	Small group teaching
PY10.20	Demonstrate (i) Testing of visual acuity, colour and field of vision and (ii) hearing (iii) Testing for smell and (iv) taste sensation in volunteer/ simulated environment	DOAP sessions
Topic: Integrated Physiology		
PY11.9	Interpret growth charts	Small group teaching
PY11.10	Interpret anthropometric assessment of infants	Small group teaching
PY11.13	Obtain history and perform general examination in the volunteer / simulated environment	DOAP sessions
PY11.14	Demonstrate Basic Life Support in a simulated environment	DOAP sessions

PHYSIOLOGY (CODE: PY)

Resolution No. 4.18 of Academic Council (AC-50/2024): Resolved to include the competencies, as per the new guidelines dated 12.09.2024, in the syllabus and in the I MBBS CBME logbook from the academic year 2024-25. [ANNEXURE-38]

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DEPARTMENT OF PHYSIOLOGY

PHYSIOLOGY COMPETENCIES

S.N.	Topics	New (2024) 12	Old (2018) 11
		Competencies	
1.	GP	7	9
2.	Blood	13	13
3.	Nerve Muscle	12	18
4.	GIT	12	10
5.	CVS	16	16
6.	RS	13	10
7.	Renal	9	9
8.	Endocrine	7	6
9.	Reproductive	10	12
10.	CNS	20	20 (CNS + Sp. Senses)
11.	Sp. Senses	7	
12.	Integrated	10	14

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PHYSIOLOGY (Topics = 12, Competencies = 136)							
	Topic 1: General Physiology	**Number of competencies: (7)**			**Number of competencies that require certification : (NIL)**		
PY1.1	Describe the structure and functions of a cell, intercellular communication and their applications in Clinical care and research	K	KH	Y	LGT	Written/Viva voce	
PY1.2	Discuss the principles of homeostasis and feedback mechanism	K	KH	Y	LGT	Written/Viva voce	
PY1.3	Describe apoptosis (programmed cell death) , explain its mechanism of action and physiological significance.	K	KH	Y	LGT SGT	Written/Viva voce	
PY1.4	Describe and discuss various transport mechanisms across cell membranes	K	KH	Y	LGT Student Seminar	Written/Viva voce/Assignments	
PY1.5	Describe the fluid compartments of the body, its ionic composition & measurement methods	K	KH	Y	LGT	Written/Viva voce	
PY1.6	Describe the concept of pH & Buffer systems in the body	K	KH	Y	LGT SGT	Written/Viva voce	
PY1.7	Describe the molecular basis of resting membrane potential (RMP) and generation of action potential in a nerve fibre	K	KH	Y	LGT SGT/Tutorial	Written/Viva voce	
	Topic 2: Haematology	**Number of competencies: (13)**			**Number of competencies that require certification : (01)**		
PY2.1	Describe the composition and functions of blood and its components	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.2	Discuss the origin, forms, variations and functions of plasma proteins and its clinical implications	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.3	Describe the physiological structure, synthesis , functions and breakdown of Hemoglobin. Discuss its variants and clinical significance.	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.4	Describe Erythropoiesis & discuss its regulation in physiological and pathological situations	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.5	Describe anaemias, polycythemia & jaundice and discuss its physiological principles of management	K	KH	Y	LGT SGT, Student Seminar, ECE	Written/Viva voce	
PY2.6	Describe the formation of WBC (Leucopoiesis), structure and function of various WBC types and their regulatory mechanisms	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY2.7	Discuss 'Immunity' in terms of its types, development, regulation and physiological significance	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY2.8	Describe the formation of platelets (thrombopoiesis), structure, functions and variations.	K	KH	Y	LGT SGT	Written/Viva voce	
PY2.9	Describe hemostasis, coagulation pathways, mechanism of action of anticoagulants and briefly discuss pathophysiological aspects of bleeding & clotting disorders (e.g. hemophilia, purpura)	K	KH	Y	LGT SGT, ECE- Visit to blood bank Flipped Classroom	Written/Viva voce	
PY2.10	Discuss types of blood groups, clinical importance of blood grouping, blood banking and transfusion	K	KH	Y	LGT SGT,ECE- Visit to blood bank	Written/Viva voce	
PY2.11	Estimate Hb, RBC, TLC, DLC, Blood groups, BT/CT, RBC indices	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	01 EACH
PY2.12	Describe the test to measure Erythrocyte Sedimentation Rate (ESR), Osmotic fragility, Hematocrit, and interpret its findings	K	KH	Y	Demonstration	Written /Viva voce/OSPE (Question station)	
PY2.13	Describe steps for reticulocyte and platelet count	K	KH	Y	Demonstration	Written /Viva voce	
	Topic 3: Nerve and Muscle Physiology	**Number of competencies: (12)**			**Number of competencies that require certification : (01)**		
PY3.1	Describe the structure and functions of a neuron and neuroglia; Discuss nerve growth factors	K	KH	Y	LGT	Written/Viva voce	
PY3.2	Describe the types, functions, properties of nerve fibers including strength duration curve, chronaxie and rheobase	K	KH	Y	LGT	Written/Viva voce	
PY3.3	Classify nerve injury and discuss the mechanism of degeneration and regeneration in peripheral nerves	K	KH	Y	LGT	Written/Viva voce	
PY3.4	Describe the microscopic structure of neuro-muscular junction (NMJ) and mechanism of neuromuscular transmission	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.5	Discuss the applied aspects of neuromuscular junction : myasthenia gravis, Lambert Eaton syndrome and neuromuscular blocking agents.	K	KH	Y	LGT SGT, ECE (classroom / hospital setting)	Written/Viva voce	
PY3.6	Describe the different types of muscle fibres, their structure and physiological basis of action potential	K	KH	Y	LGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY3.7	Describe properties, action potential and molecular basis of muscle contraction in skeletal muscle	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY3.8	Describe properties, action potential and molecular basis of muscle contraction in smooth muscle	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.9	Describe the mode of muscle contraction (isometric and isotonic), energy source, muscle metabolism and gradation of muscular activity	K	KH	Y	LGT	Written/Viva voce	
PY3.10	Enumerate and briefly discuss myopathies	K	KH	Y	LGT SGT	Written/Viva voce	
PY3.11	Perform Ergography and calculate the work done by a skeletal muscle	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	01 EACH
PY3.12	Observe with Computer assisted learning (i) Amphibian nerve -muscle experiments (ii) Amphibian cardiac experiments	S	SH	Y	DOAPs	Practical/OSPE/Viva voce	
	Topic 4: Gastro-intestinal Physiology	**Number of competencies: (12)**			**Number of competencies that require certification : (01)**		
PY4.1	Describe the functional anatomy of digestive system	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.2	Enumerate various Gastrointestinal hormones (GI) hormones, discuss their functions and regulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.3	Describe the composition, mechanism of secretion, functions, and regulation of saliva	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.4	Describe the composition, mechanism of secretion, functions, and regulation of gastric juice. Discuss various gastric function tests	K	KH	Y	LGT	Written/Viva voce	
PY4.5	Describe the composition, mechanism of secretion, functions, and regulation of pancreatic juice including various pancreatic exocrine function tests	K	KH	Y	LGT	Written/Viva voce	
PY4.6	Describe the composition, mechanism of secretion, functions, and regulation of intestinal juices	K	KH	Y	LGT	Written/Viva voce	
PY4.7	Describe the physiology of digestion and absorption of nutrients	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.8	Describe GIT movements, its regulation and physiological significance including defecation reflex and the role of dietary fibres	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY4.9	Describe the structure , functions and secretion of liver and gallbladder with elaboration of various liver function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY4.10	Describe the Gut-Brain Axis and its physiological significance	K	KH	Y	LGT SGT,	Written/Viva voce	
PY4.11	Discuss (in brief) the applied physiology of GIT viz. Peptic ulcer, gastroesophageal reflux disease, vomiting, diarrhoea, constipation, Adynamic ileus, Hirschsprung's disease	K	KH	Y	LGT SGT, ECE, SDL	Written/Viva voce	
PY4.12	Obtain relevant history and conduct correct General and Clinical examination of the abdomen in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAP (Simulation or real life setting)	Skill assessment/ Viva voce/OSCE	1
Topic 5: Cardiovascular Physiology		**Number of competencies: (16)**			**Number of competencies that require certification : (03)**		
PY5.1	Describe the functional anatomy of heart including chambers and coronary circulation	K	KH	Y	LGT	Written/Viva voce	
PY5.2	Describe the properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.3	Describe generation and conduction of cardiac impulse along with the conduction pathway (including pacemaker potential).	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.4	Discuss the physiological events occurring during the cardiac cycle, concurrent pressure volume changes, generation of heart sounds and murmur	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY5.5	Describe the physiology of electrocardiogram (E.C.G), the cardiac axis and its applications	K	KH	Y	LGT SGT, ECE	Written/Viva voce/OSCE (Question station)	
PY5.6	Discuss physiological variations in ECG waveforms, abnormal waveforms and intervals , arrhythmias, heart blocks and myocardial Infarction	K	KH	Y	LGT SGT/Student seminars/ECE	Written/Viva voce	
PY5.7	Discuss haemodynamics of circulatory system	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY5.8	Describe and discuss local and systemic cardiovascular regulatory mechanisms	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.9	Describe heart rate, factors affecting heart rate, and its regulation	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY5.10	Describe cardiac output, factors affecting cardiac output and its regulation.	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.11	Describe blood pressure, factors affecting blood pressure and its regulation	K	KH	Y	LGT SGT/Student seminars	Written/Viva voce	
PY5.12	Describe & discuss regional circulation including microcirculation, lymphatic circulation, cerebral, capillary, skin, foetal, pulmonary and splanchnic circulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY5.13	Describe the patho-physiology of shock, syncope heart failure with physiological basis of its management	K	KH	Y	LGT SGT / Student seminars	Written/Viva voce	
PY5.14	Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	S	SH	Y	DOAPs (Simulation or real life setting)	Practical/OSPE/ Viva voce	3
PY5.15	Record and interpret normal ECG in a volunteer or simulated environment	S	SH	Y	DOAPs (Simulation or real life setting)	Practical/OSPE/ Viva voce	1
PY5.16	Obtain relevant history and conduct General and Clinical examination of the cardiovascular system in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	1
Topic 6: Respiratory Physiology		**Number of competencies: (13)**			**Number of competencies that require certification : (02)**		
PY6.1	Describe the functional anatomy of respiratory tract and non-respiratory functions of lungs	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.2	Describe the mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities (Static and Dynamic)	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.3	Describe the alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.4	Discuss the transport of respiratory gases viz Oxygen and Carbon dioxide across lungs and whole body	K	KH	Y	LGT	Written/Viva voce	
PY6.5	Describe the chemoreceptors (peripheral and central) and neural centres of respiration including chemical and neural regulation of respiration	K	KH	Y	LGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY6.6	Describe and discuss the pathophysiology of dyspnoea, hypoxia, cyanosis, asphyxia, drowning, periodic breathing and oxygen therapy	K	KH	Y	LGT SGT	Written/Viva voce	
PY6.7	Discuss various lung function tests and their clinical significance in obstructive and restrictive lung diseases	K	KH	Y	LGT SGT, Tutorials Flipped Classroom	Written/Viva voce	
PY6.8	Discuss the physiology of high altitude and acclimatization	K	KH	Y	LGT	Written/Viva voce	
PY6.9	Discuss the physiology of deep sea diving and decompression sickness	K	KH	Y	LGT	Written/Viva voce	
PY6.10	Perform Spirometry and interpret the findings (Digital / Manual)	S	P	Y	DOAPs	Skill assessment/ Viva voce/OSCE	1
PY6.11	Describe principles and methods of artificial respiration	S	SH	Y	DOAPs	Practical/OSPE/ Viva voce	
PY6.12	Obtain relevant history and conduct correct General and Clinical examination of the respiratory system in a normal volunteer or simulated environment	S,A,C	SH	Y	DOAPs	Practical/OSPE/ Viva voce	1
PY6.13	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment	S	SH	Y	DOAPs	Practical/OSPE/ Viva voce	
Topic 7: Renal Physiology		**Number of competencies: (9)**			**Number of competencies that require certification : (NIL)**		
PY7.1	Describe the functional anatomy of kidney and non-excretory functions of kidney	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.2	Describe the structure and functions of juxta glomerular apparatus and role of renin-angiotensin system	K	KH	Y	LGT	Written/Viva voce	
PY7.3	Describe the mechanism of urine formation involving processes of filtration (Glomerular filtration), tubular reabsorption & secretion.	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY7.4	Describe the mechanism of urine concentration and dilution (Counter current Multiplier & Exchanger)	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY7.5	Describe the renal regulation of fluid and electrolytes & acid-base balance	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.6	Describe the innervations of urinary bladder, physiology of micturition and its abnormalities	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY7.7	Describe cystometry and discuss the normal cystometrogram	K	KH	Y	LGT SGT	Written/Viva voce	
PY7.8	Discuss various Renal Function Tests with its physiological significance and clinical implication of Renal clearance	K	KH	Y	LGT SGT, ECE (classroom / hospital setting)	Written/Viva voce	
PY7.9	Discuss the role of artificial kidneys, dialysis and indications of renal transplant	K	KH	Y	LGT	Viva voce	
Topic 8: Endocrine Physiology		**Number of competencies: (7)**			**Number of competencies that require certification : (NIL)**		
PY8.1	Describe the functional anatomy of endocrine glands, mechanism of hormonal action (steroid and peptide) and hypothalamus pituitary axis {HPA}	K	KH	Y	LGT Flipped Classroom	Written/Viva voce	
PY8.2	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pituitary gland	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.3	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of thyroid gland including thyroid function tests	K	KH	Y	LGT SGT, ECE	Written/Viva voce	
PY8.4	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of adrenal gland and its function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.5	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of parathyroid gland with emphasis of physiology of bone and calcium metabolism	K	KH	Y	LGT SGT/Tutorials	Written/Viva voce	
PY8.6	Describe the synthesis, secretion, transport, physiological actions, regulation and effect of altered (hypo and hyper) secretion of pancreatic gland including pancreatic function tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY8.7	Describe the physiology of Thymus & Pineal Gland	K	KH	Y	LGT	Written/Viva voce	
Topic 9: Reproductive Physiology		**Number of competencies: (10)**			**Number of competencies that require certification : (NIL)**		

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY9.1	Explain sex determination, sex differentiation and their abnormalities and discuss the effects of removal of gonads on physiological functions	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.2	Describe and discuss puberty: onset, progression, stages; early and delayed puberty.	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.3	Describe the functional anatomy of male reproductive system, functions of testis, spermatogenesis and discuss the functions and regulations of testosterone hormone	K	KH	Y	LGT SGT	OSPE/Viva voce	
PY9.4	Describe the functional anatomy of female reproductive system: functions of ovary and its hormones (estrogen and progesterone) ; hormonal regulation by hypothalamic pituitary gonadal (HPG axis)	K	KH	Y	LGT SGT , Student Seminar	Written/Viva voce	
PY9.5	Discuss the menstrual cycle, uterine and ovarian changes, hormonal regulation and its implications in reproductive physiology	K	KH	Y	LGT SGT, ECE	Written/Viva voce	
PY9.6	Enumerate male and female contraceptive methods, rationale of its prescription, side effects and its advantages & disadvantages	K	KH	Y	LGT SGT, ECE,SDL	Written/Viva voce	
PY9.7	Discuss the physiology of pregnancy, parturition & lactation.	K	KH	Y	LGT SGT, Flipped Classroom	Written/Viva voce	
PY9.8	Discuss the physiological basis of various pregnancy tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.9	Discuss the hormonal changes and their effects during perimenopause and menopause	K	KH	Y	LGT SGT	Written/Viva voce	
PY9.10	Discuss the common causes of infertility in a couple and role of IVF in managing a case of infertility	K	KH	Y	LGT SGT, visit to IVF lab	Written/Viva voce	
	Topic 10: Central Nervous System Physiology	**Number of competencies: (20)**			**Number of competencies that require certification : (02)**		
PY10.1	Describe and discuss the functional organization of central nervous system (brain and spinal cord)	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.2	Describe the functional anatomy of peripheral nervous system (including autonomic nervous system)	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.3	Classify the neurotransmitters and discuss the chemical transmission in the nervous system.	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY10.4	Discuss the classification, functions and properties of synapse	K	KH	Y	LGT SGT ,Student Seminar	Written/Viva voce	
PY10.5	Discuss the classification, functions and properties of reflex	K	KH	Y	LGT SGT, Student Seminar	Written/Viva voce	
PY10.6	Discuss the classification, functions and properties of receptors	K	KH	Y	LGT SGT , Student Seminar	Written/Viva voce	
PY10.7	Discuss somatic sensations, ascending tracts, (sensory tracts) and applied aspects of sensory system	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.8	Discuss Physiology of pain including pain pathways and its modulation with special emphasis on gate control theory of pain	K	KH	Y	LGT SGT, visit to pain clinic	Written/Viva voce	
PY10.9	Describe the course of descending tracts (pyramidal and extra pyramidal), its clinical implications including difference in Upper motor neuron (UMN)and lower motor neuron (LMN) lesions	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.10	Discuss types and clinical features of spinal cord lesions (complete, incomplete transection and hemisection - Brown Sequard syndrome)	K	KH	Y	LGT SGT, Tutorials, ECE	Written/Viva voce	
PY10.11	Describe functional anatomy of cerebellum, its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.12	Discuss functional anatomy of basal ganglia , its connections, functions and Clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.13	Discuss the mechanism of maintenance of tone, posture and control of body movements	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
PY10.14	Discuss functional anatomy of thalamus , its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.15	Discuss functional anatomy of hypothalamus and limbic system , its connections, functions and clinical abnormalities .	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.16	Discuss functional anatomy of cerebral cortex, its connections, functions and Clinical abnormalities	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.17	Discuss the structure and functions of reticular activating system, sleep physiology and EEG waveforms during sleep wake cycle	K	KH	Y	LGT SGT, visit to sleep lab	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY10.18	Discuss the physiological basis of memory, learning and speech and clinical alterations in speech	K	KH	Y	LGT SGT	Written/Viva voce	
PY10.19	Obtain relevant history and conduct correct General and Clinical examination of the nervous system: Higher functions, sensory system, motor system, reflexes in a normal volunteer or simulated environment	S	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	4 (each)
PY10.20	Obtain relevant history and conduct correct General and Clinical examination of the cranial nerves in a normal volunteer or simulated environment	S	P	Y	DOAPs	OSCE/Viva voce	1 (each)
	Topic 11: Special Senses	**Number of competencies: (7)**			**Number of competencies that require certification : (NIL)**		
PY11.1	Describe and discuss physiology of smell and its applied aspects	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.2	Describe and discuss physiology of taste sensation and applied aspects	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.3	Describe and discuss functional anatomy of ear and auditory pathways, vestibular apparatus and equilibrium	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.4	Discuss physiology of hearing, pathophysiology of deafness and hearing tests	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.5	Discuss functional anatomy of eye, visual pathway, light and pupillary reflex and clinical implication of lesions in visual pathway	K	KH	Y	LGT SGT	Written/Viva voce	
PY11.6	Discuss physiology of image formation, refractive errors and physiological principles of its management	K S	P	Y	LGT SGT ECE	Written/Viva voce	
PY11.7	Discuss physiology of vision including colour vision and colour blindness	K	KH	Y	LGT SGT Flipped Classroom	Written/Viva voce	
	Topic 12: Integrated Physiology	**Number of competencies: (10)**			**Number of competencies that require certification : (NIL)**		
PY12.1	Describe physiological mechanism of temperature regulation	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.2	Discuss adaptation to altered temperature (heat and cold) and mechanism of fever, cold injuries and heat stroke	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.3	Discuss cardio-respiratory and metabolic adjustments during exercise (isometric and isotonic), effects of physical training under different environmental conditions (heat and cold)	K	KH	Y	LGT SGT	Written/Viva voce	

Number	COMPETENCY The student should be able to:	Predominant Domain K/S/A/C	Level K/KH/ SH/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
PY12.4	Discuss physiological consequences of sedentary lifestyle; metabolic and endocrinal consequences of obesity & metabolic syndrome.	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.5	Describe physiology of Infancy, Interpret growth charts and anthropometric assessment of infants	K	KH	Y	LGT SGT, ECE	Written/Viva voce	
PY12.6	Describe and discuss physiology of aging, role of free radicals and antioxidants	K	KH	Y	LGT SGT	Written/Viva voce	
PY12.7	Discuss the concept, criteria for diagnosis of Brain death and its implications	K	KH	Y	Small group teaching	Practical/OSPE/ Viva voce	
PY12.8	Discuss the physiology of yoga and meditation	K	KH	Y	Small group teaching	Practical/OSPE/ Viva voce	
PY12.9	Obtain history and perform general examination in the volunteer / simulated environment	S	SH	Y	DOAPs	Skill assessment/ Viva voce/OSCE	
PY12.10	Demonstrate Basic Life Support in a simulated environment	S	SH	Y	DOAPs, Simulation lab (Simulation or real life setting)	Skill assessment/ Viva voce/OSCE	

Resolution No. 4.15 of Academic Council (AC-50/2024): Resolved to approve and implement the alignment of topics of Phase I subjects with the permission of few changes at local institute level if required. **Phase I MBBS Alignment**

(ANATOMY, PHYSIOLOGY, BIOCHEMISTRY)

Suggested Phase-I Alignment Table (Anatomy, Physiology & Biochemistry) (Topics written here are indicative and can be adjusted if required)			
Month	**Anatomy**	**Physiology**	**Biochemistry**
1	-General Anatomy -Lower Limb (LL)	General Physiology, Blood	Cell membrane and organelles, extracellular matrix, Chemistry of carbohydrates, amino-acid & proteins, Lab Safety and Biomedical Waste Management and Chromatography (Demo)
2	-LL/UL -General Embryology & Histology	Blood, N-M	Plasma protein, immunoglobulins, Enzymes, Hemoglobin structure and Hemoglobinopathies, Electrophoresis (Demo), Heme synthesis, Porphyria's, Hemecatabolism, iron metabolism (mineral) Bilirubin formation, Jaundice, colorimetry (Demo)
3	UL -General Embryology & Histology	ANS, CVS	Clinical Enzymology, Chemistry of lipids, and lipoprotein metabolism, carbohydrate metabolism, vitamins, Estimation of Protein and albumin
4	-Abdomen -Related Systemic Embryology & Histology	GIT, Renal	Vitamins, Nutrition, Liver Function Tests, Renal Function Tests, acid-base balance and its disorders, water and electrolyte normal and abnormal analysis of urine(DOAP), Estimation of Urea, creatinine
5	-Abdomen,Pelvis -Related Systemic Embryology & Histology	GIT (contd.), Repro.	Metabolism of proteins and their metabolic disorders, Metabolism of carbohydrates and their metabolic disorders, Diabetes mellitus, Electron transport chain and oxidative phosphorylation, Xenobiotics, Estimation of Glucose.
6	-Thorax -Related systemic Embryology & Histology	Repro (contd.), RS	Metabolism of lipids (remaining) and disorders, Metabolism of proteins, minerals, vitamins, Reproductive Hormones, Prenatal screening, new born screening.
7	H & N–I -Related Systemic Embryology & Histology, Genetics	Endocrine (Neck region), CNS	Hormone Biochemistry; Tumour markers and, Thyroid Function Tests, Adrenal Function tests, Free radicals, and antioxidants
8	H & N–II -Related Systemic Embryology & Histology, Genetics	CNS contd , Special senses	Purine and pyrimidines metabolism, gout, purine salvage pathway, replication, DNA damage and repair mechanism, transcription, translation, post-translational modifications, protein synthesis inhibitors, genetic code, and mutations, estimation of uric acid
9	- Neuroanatomy -Related Systemic Embryology & Histology	CNS (Contd.) Integrated physiology	Molecular biology techniques and Miscellaneous.

Annexure – 3

Distribution of Subject Wise Teaching Hours for 1 st MBBS

(Ref: NMC letter No. D – 11011/500/2024- Academic cell (e – 8284443) Dated 12/9/2024)

Subject	Lecture (Hrs)	SGL (Hrs)	SDL (Hrs)	Total (Hrs)
Foundation Course (FC)				**80**
Anatomy	210	400	**10**	**620**
Physiology	**130**	**305**	**10**	**445**
Biochemistry *	78	144	**10**	**232**
ECE**	27	-	**0**	**27**
Community Medicine	20	20	**-**	**40**
FAP			**24**	**24**
AETCOM ***		26		**26**
Sports + Extra –curricular activities				**10**
Total				**1521#**

***Including molecular biology**

****Early Clinical exposure hours to be divided equally in all three subjects.**

***** AETCOM module shall be a longitudinal programme.**

 # includes hours for Foundation course also.

MGM Institute of Health Sciences, Navi Mumbai

CBME-First M.B.B.S. (2024-25 batch Onwards

PHYSIOLOGY COURSE CONTENT

(Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2024. Vol. 1; page no.75-86)

Total Teaching (hours) - 445

- Lectures(hours)-130
- Small group teachings/tutorials/Integrated teaching/Practical's (hours)-305
- Self directed learning (hours)-10
- Early clinical exposure(hours)- 9

1 General Physiology (8 hours)

Competency No.	Topics & subtopics
PY. 1.1	Structure & Functions of a Mammalian Cell, Intercellular communication & its application in clinical care and research.
PY. 1.2	Principles of Homeostasis & feedback mechanism
PY. 1.3	Apoptosis – Programmed cell death
PY. 1.4	Transport mechanisms across cell membranes
PY. 1.5	Fluid compartment of the body, its ionic composition & measurements
PY. 1.6	Concept of pH & Buffer systems in the body
PY. 1.7	Molecular basis of resting membrane potential and action potential in excitable tissue

2 Hematology (10 hours)

Competency No.	Topics & subtopics
PY.2.1	Describe the composition and functions of blood components
PY. 2.2	Original, forms, variations and functions of plasma proteins & clinical implications
PY. 2.3	Synthesis and functions of Hemoglobin & explain its breakdown. Describe variants and clinical significance.
PY. 2.4	Erythropoiesis & its regulation in physiological and pathological situation.
PY. 2.5	Describe anemias, polycythemia & Jaundice, principles of management
PY. 2.6	WBC formation (granulopoiesis), structure, functions & its regulation
PY. 2.7	Types of immunity, development of immunity and its regulation
PY. 2.8	Formation of platelets, functions & variations
PY. 2.9	Physiological basis of hemostasis and anticoagulants. Describe bleeding & clottingdisorders (Hemophilia, purpura)
PY.2.10	Different blood groups and clinical importance of blood grouping, blood bankingand transfusion

3 Nerve and Muscle Physiology (9 hours)

Competency No.	Topics & subtopics
PY. 3.1	Structure and functions of a neuron and neuroglia; Nerve Growth Factor
PY. 3.2	Types, functions & properties of nerve fibers. Strength duration curve, chronaxie & rheobase
PY. 3.3	Degeneration and regeneration in Peripheral nerves
PY. 3.4	Structure neuro-muscular junction and transmission of impulses
PY. 3.5	Myasthenia gravis, Lambert Eaton syndrome and neuro-muscular blocking agents
PY. 3.6	Types of muscle fibers and their structure and physiological basis of action potential
PY. 3.7	Properties, action potential and molecular basis of muscle contraction in skeletal muscle
PY. 3.8	Properties, action potential and molecular basis of muscle contraction in smooth muscles
PY. 3.9	Mode of muscle contraction (isometric and isotonic), Energy source and muscle metabolism and gradation of muscular activity.
PY. 3.10	Muscular dystrophy: myopathies

4 Gastro-intestinal Physiology (10 hours)

Competency No.	Topics & subtopics
PY.4.1	Describe the structure and functions of digestive system
PY. 4.2	Source of GIT hormones, their regulation, and functions
PY. 4.3	Composition, mechanism of secretion, functions, and regulation of saliva.
PY. 4.4	Composition, mechanism of secretion, functions, and regulation of gastric juice. Discuss gastric function test
PY. 4.5	Composition, mechanism of secretion, functions, and regulation of pancreatic juice. Discuss gastric function test including pancreatic exocrine function test
PY. 4.6	Composition, mechanism of secretion, functions, and regulation of intestinal juice
PY. 4.7	Physiology of digestion and absorption of nutrients
PY. 4.8	GIT movements, regulation and functions, defecation reflex. Role of dietary fiber.
PY. 4.9	Structure, functions and secretion of liver and gall bladder & liver function tests
PY. 4.10	Gut-Brain Axis and its significance
PY. 4.11	Physiology aspects of; peptic ulcer, gastroesophageal reflux disease, vomiting, diarrhea, constipation, Adynamic ileus, Hirschsprung's disease

5 Cardiovascular Physiology (CVS) (18 hours)

Competency No.	Topics & subtopics
PY.5.1	Functional anatomy of heart including chambers,sounds and coronary circulation
PY. 5.2	Properties of cardiac muscle including its morphology, electrical, mechanical and metabolic functions
PY. 5.3	Generation, conduction of cardiac impulse. Pacemaker tissue and conducting system.
PY. 5.4	Events occurring during the cardiac cycle. Concurrent pressure volume changes, heart sound and murmur

PY. 5.5	Physiology of electrocardiogram (E.C.G.), its applications and the cardiac axis
PY. 5.6	Abnormal ECG, arrhythmias, heart block and myocardial infarction.
PY. 5.7	Hemodynamics of circulatory system
PY. 5.8	Local and systemic cardiovascular regulatory mechanisms
PY. 5.9	Describe heart rate. Factors affecting heart rate and its regulation
PY. 5.10	Describe cardiac output, factors affecting cardiac output and its regulation
PY. 5.11	Describe blood pressure, factors affecting blood pressure and its regulation
PY. 5.12	Regional circulation including microcirculation, lymphatic, cerebral, capillary, Skin, foetal, pulmonary, and splanchnic circulation
PY. 5.13	Patho-physiology of shock, syncope and heart failure with management

6 Respiratory Physiology (12 hours)

Competency No.	Topics & subtopics
PY. 6.1	Functional anatomy of respiratory tract and non-respiratory functions
PY. 6.2	Mechanics of normal respiration, pressure changes during ventilation, lung volume and capacities
PY. 6.3	alveolar surface tension, compliance, airway resistance, ventilation, V/P ratio, diffusion capacity of lungs
PY. 6.4	Transport of respiratory gases: Oxygen and Carbon dioxide
PY. 6.5	Chemoreceptor (peripheral and central) and neural centers of respiration including chemical and neural regulation
PY. 6.6	Pathophysiology of dyspnea, hypoxia, cyanosis asphyxia; drowning, periodic breathing
PY. 6.7	Lung function tests & their clinical significance in obstructive and restrictive lung diseases
PY. 6.8	Physiology of high-altitude and acclimatization
PY. 6.9	Deep-sea diving and decompression sickness

7 Renal Physiology (8 hours)

Competency No	Topics & subtopics
PY. 7.1	Structure and function of kidney and non-excretory functions
PY. 7.2	Structure and functions of juxta glomerular apparatus and role of renin-angiotensin system
PY. 7.3	Mechanism of urine formation and processes involved in filtration (Glomerular filtration), tubular reabsorption &secretion
PY. 7.4	Mechanism of urine concentration dilution (Countercurrent Multiplier and Exchanger)
PY. 7.5	Renal regulation of fluid and electrolytes & acid-base balance
PY. 7.6	Innervations of urinary bladder, physiology of micturition and its abnormalities
PY. 7.7	Cytometry and discuss the normal cystometrogram
PY. 7.8	Renal Function Tests with significance & implication of Renal clearance
PY. 7.9	Artificial kidney, dialysis, and renal transplantation

8 Endocrine Physiology (10 hours)

Competency No	Topics & subtopics
PY. 8.1	Functional anatomy of endocrine gland, hormonal action and hypothalamus pituitary axis.
PY. 8.2	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo and hyper) secretion of pituitary gland, parathyroid gland, adrenal gland, pancreas and hypothalamus
PY. 8.3	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo and hyper) secretion of thyroid gland. Thyroid function tests.
PY. 8.4	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo and hyper) secretion of adrenal gland and function tests. and pancreas
PY. 8.5	Synthesis, secretion, transport, physiological actions, regulation and effects of altered (hypo and hyper) secretion of parathyroid gland. Physiology of bone and calcium metabolism
PY. 8.6	Mechanism of action of steroid, protein and amine hormones
PY. 8.7	Physiology of Thymus & Pineal Gland

9 Reproductive Physiology (8 hours)

Competency No	Topics & subtopics
PY. 9.1	Sex determination; sex differentiation and their abnormalities and effect of removal of gonads.
PY. 9.2	Puberty: onset, progression, states; early and delayed puberty
PY. 9.3	Male reproductive system: functions of testis and control of spermatogenesis. Functions and regulations of testosterone.
PY. 9.4	Female reproductive system: functions of ovary and its hormones (estrogen and progesterone) and its control; hormonal regulation by hypothalamic pituitary gonadal (HPG axis)
PY. 9.5	Menstrual cycle, uterine and ovarian changes, hormonal regulation and its implication Physiological effects of sex hormones
PY. 9.6	Contraceptive methods for male and female. Discuss their advantages & disadvantages
PY. 9.7	Physiology of pregnancy, parturition & lactation
PY. 9.8	Physiological basis of various pregnancy tests
PY. 9.9	Hormonal changes and their effects during perimenopause and menopause
PY. 9.10	Common causes of infertility in a couple and role of IVF in managing a case of infertility

10 Central Nervous System physiology (22 hours)

Competency No	Topics & subtopics
PY. 10.1	Organization of central nervous system (brain and spinal cord)
PY. 10.2	Functional anatomy of peripheral nervous system (including autonomic nervous system)
PY. 10.3	Classify neurotransmitters. Chemical transmission of nervous system
PY. 10.4	Classification, functions and properties of synapse

PY. 10.5	Classification, functions and properties of reflex
PY. 10.6	Classification, functions and properties of receptors
PY. 10.7	Somatic sensations, ascending tracts and applied aspects of sensory system
PY. 10.8	Physiology of pain, pathways and special emphasis of gate control theory of pain.
PY. 10.9	Course of descending tract (pyramidal and extra pyramidal), clinical implications, difference between upper motor neuron and lower motor neuron lesions
PY. 10.10	Types and clinical features of Spinal cord lesions (complete, incomplete transection and hemisection- Brown Sequard syndrome)
PY. 10.11	Functional anatomy of Cerebellum, its connection, functions and clinical abnormalities
PY. 10.12	Functional anatomy of basal ganglia, its connection, functions and clinical abnormalities
PY. 10.13	Mechanism of maintenance of tone, posture and control of body movements
PY. 10.14	Functional anatomy of thalamus, its connection, functions and clinical abnormalities
PY. 10.15	Functional anatomy of hypothalamus, its connection, functions and clinical abnormalities
PY. 10.16	Functional anatomy of cerebral cortex, its connection, functions and clinical abnormalities
PY. 10.17	Structure and functions of reticular activating system, sleep physiology and EEG waveforms during sleep wake cycle
PY. 10.18	Physiological basis of memory, learning and speech and clinical alteration in speech

11 Special Senses (10 hours)

PY. 11.1	Physiology of smell and its applied aspects
PY. 11.2	Physiology of taste and its applied aspects
PY. 11.3	Functional anatomy of ear and auditory pathways, vestibular apparatus and equilibrium
PY. 11.4	Physiology of hearing, Pathophysiology of deafness. Hearing tests
PY. 11.5	Functional anatomy of eye, visual pathway, pupil and light reflex, clinical implication of lesions in visual pathway
PY. 11.6	Physiological basis of physiology of image formation, refractive errors, principals of its management
PY. 11.7	Physiology of vision including colour vision and colour blindness

12 Integrated Physiology (5 hours)

Competency No	Topics & subtopics
PY. 12.1	Mechanism of temperature regulation
PY. 12.2	Adaptation to altered temperature (heat and cold) and Mechanism of fever, cold injuries and heat stroke
PY. 12.3	Cardio-respiratory and metabolic adjustment during exercise (isometric and isotonic); physical trainingeffects under different environment conditions (heat and cold)
PY. 12.4	Physiological consequences of sedentary lifestyle: metabolic and endocrinal consequences of obesity & metabolic syndrome.
PY. 12.5	Physiology of Infancy, Interpretation of growth charts and anthropometric assessment of infants
PY. 12.6	Physiology of aging; role of free radicals and antioxidants
PY. 12.7	Concept, criteria for diagnosis of Brain death and its implications
PY. 12.8	Physiological of meditation and Yoga

PRACTICAL COMPETENCIES

Competency Number	COMPETENCY	Suggested Teaching Learning method
Topic: Hematology		
PY2.11	Estimate Hb, RBC, TLC, RBC indices, DLC, Blood groups, BT/CT	DOAP sessions
PY2.12	Describe test for ESR, Osmotic fragility, Hematocrit.and interpret the test results	Demonstration
Topic: Nerve and Muscle Physiology		
PY3.11	Perform Ergography and calculate work done by a skeletal muscle	DOAP sessions
PY3.12	Observe with Computer assisted learning (i) amphibian nerve - muscle experiments (ii) amphibian cardiac experiments	DOAP sessions
Topic: Gastro-intestinal Physiology		
PY4.12	Obtain relevant history and conduct correct general and clinical examination of the abdomen in a normal volunteer or simulated environment	DOAP (simulation or real life setting)
Topic: Cardiovascular Physiology (CVS)		
PY5.14	Record blood pressure & pulse at rest and in different grades of exercise and postures in a volunteer or simulated environment	DOAP (simulation or real life setting)
PY5.15	Record and interpret normal ECG in a volunteer or simulated environment	DOAP (simulation or real life setting)
PY5.16	Obtain relevant history and conduct general and clinical examination of the cardiovascular system in a normal volunteer orsimulated environment	DOAP sessions

Topic: Respiratory Physiology		
PY6.10	Perform &interpret Spirometry (Digital/Manual)	DOAP sessions
PY6.11	Describe principles and methods of artificial respiration	DOAP sessions
PY6.12	Obtain relevant history and conduct correct General and clinical examination of the respiratory system in a normal volunteer or simulated environment	DOAP sessions
PY6.13	Demonstrate the correct technique to perform measurement of peak expiratory flow rate in a normal volunteer or simulated environment	DOAP sessions
Topic: Central Nervous System physiology		
PY10.19	Obtain relevant history and correct General and clinical examination of theHigher functions, sensory system, motor system, reflexes in a normalvolunteer or simulated environment	DOAP sessions
PY10.20	Obtain relevant history and correct General and clinical examination of the cranial nerve in a normal volunteer or simulated environment	DOAP sessions
Topic: Special Sense		
PY11.6	Physiological basis of physiology of image formation, refractive errors, principals of its management	SGT
Topic: Integrated Physiology		
PY12.9	Obtain history and perform general examination in thevolunteer / simulated environment	DOAP sessions
PY12.10	Demonstrate Basic Life Support in a simulatedenvironment	DOAP sessions

Resolution No 5.4 of Academic council (AC-48/2023): Resolved to approve AETCOM competencies distribution from First MBBS 2023-24 batch onwards , as per new CBME guidelines published on 01.08.2023.

***AETCOM Competencies distribution for Physiology First MBBS from 23-24 batch onwards**

(Ref: NMC letter No U14021 1812023-UGMED dated 01.08.23)

AETCOM IN PHYSIOLOGY **Total Hrs :16**

AETCOM Module taught by physiology department are

Module 1.2: What does it mean to be a patient?	1.Enumerate and describe professional qualities and roles of a physician 2. Demonstrate empathy in patient encounters	KH
Module 1.3: Doctor – patient relationship		SH
Module 1.4: The foundation of communication-1	Demonstrate ability to communicate to patients in a patient, respectful non-threatening, non- judgmental and empathetic manner	SH

Resolution No. 5.8 of Academic Council (AC-48/2023)

One Brief answer AETCOM question of 03 marks will be asked in Paper - 1 and Paper- 2 each.

(Ref: NMC letter No. U. 1 4021 1812023-UGMEB dated 01.08.23)

*	**Common questions on AETCOM modules – Physiology 1.2, 1.3, 1.4**
1	Empathy in patient care.
2	Rights of Patients
3	Responsibility of Patients
4	Write dos and don’ts of doctor patient verbal communication
5	Boundaries of the doctor -patient relationship
6	Essentials elements of communication skill
7	Barriers of communication
8	Methods of communication

Resolution No. 4.5 of Academic Council (AC-50/2024): Resolved to approve & adopt AETCOM competencies (modules) distribution subject-wise in the Anatomy, Physiology & Biochemistry and also distribution of modules in theory paper I & II from First MBBS 2024-25 batch onwards.

AETCOM Competencies Distribution for Anatomy, Physiology and Biochemistry from First MBBS 24-25 batch onwards

(Ref: NMC letter No. D-11011/500/2024-AcademicCell (e-8284443)
UGMEB Dated 12/09/2024)

Subject	Paper	Module Number	Competency
Anatomy	**Paper I**	Module 1.5	• The cadaver as our first teacher Demonstrate respect and follow the correct procedure when handling cadavers and other biologic tissue
	Paper II	Module 1.4	• Demonstrate ability to communicate to patients in a patient, respectful, nonthreatening, non-judgmental and empathetic manner
Physiology	**Paper I**	Module 1.2,	• Enumerate and describe professional qualities and roles of a physician
	Paper II	Module 1.3	• Demonstrate empathy in patient encounters
Biochemistry	**Paper I**	Module 1.1,	• Enumerate and describe professional qualities and roles of a physician • Describe and discuss commitment to lifelong learning as an important part of physician growth
	Paper II	Module 1.1	• Describe and discuss the role of a physician in health care system • Identify and discuss physician's role and responsibility to society and the community that she/ he serves

Assessment:
All internal and University exams must have one question/application based question
On AETCOM in each theory paper (5%) and it should be assessed in various components of Practical/clinical exams.

***Resolution No. 4.7 of AC-41/2021:** Resolved to approve the distribution of the MCQs marks system/topic wise for Theory Paper I & II of 1st MBBS (CBME) Physiology and Biochemistry, effect from the batch admittedin 2020-21 onwards

Annexure-26A of AC-41-2021

I MBBS – CBME – PHYSIOLOGY

PAPER WISE TOPIC DISTRIBUTION

PHYSIOLGY PAPER – I	
SECTION A	All topics of paper I
SECTION B	General Physiology, Blood, CVS, AETCOM
SECTION C	RS, Endocrine, Reproduction,
PHYSIOLGY PAPER – II	
SECTION A	All topics of paper II
SECTION B	Nerve and Muscle Physiology, GIT, Special senses AETCOM
SECTION C	CNS, Renal, Integrated Physiology

* SPECIFIC TOPIC DISTRIBUTION IN MCQ PHYSIOLOGY PAPER FOR I MBBS

Sr. No.	Topic	No. of questions
PHYSIOLGY PAPER – I		
1	General Physiology	2
2	Blood	3
3	CVS	5
4	RS	4
5	Endocrine	4
6	Reproduction	2
	Total	20
PHYSIOLGY PAPER – II		
1	Nerve and Muscle Physiology	3
2	GIT	3
3	Special senses	3
4	CNS	6
5	Renal system	4
6	Integrated Physiology	2
	Total	20

Resolution No. 5.8 of Academic Council (AC-48/2023):
i. Resolved to approve internal assessment pattern of theory and practical for first professional MBBS from First MBBS 2023-24 batch onwards, as per new CBME guidelines published on 01.08.2023.

Annexure-12A of AC-48/2023

MGM Institute of Health Sciences, Navi Mumbai
Name of Institute:
Department of Anatomy/Physiology/Biochemistry

Faculty: MBBS	**year/Phase1**		**Date: / /**

		Formative Assessment Theory			**Continuous Internal assessment Theory**						
Roll No.	**Name of Student**	**1st PCT Theory**	**2nd PCT Theory**	**Prelims Theory paper 1 & 2**	**Home Assignment**	**Continuous class test (LMS)**	**Seminar Assignment**	**Museum**	**Library**	**Attendance Theory**	**Total**
							Self Directed Learning				
		100	**100**	**200**	**15**	**30**	**15**	**15**	**15**	**10**	**500**

Professor & Head
Department of_____
Name of Institute:

MGM Institute of Health Sciences, Navi Mumbai
Name of Institute:
Department of Anatomy/Physiology/Biochemistry

Faculty:MBBS	year/Phase1		Date: / /

		Formative Assessment Practical			Continuous Internal assessment Practical						
Roll No.	Name of Student	1st PCT Practical Examination	2nd PCT Practical Examination	Prelims Practical Examination	Log Book (150)				Journals (Record book/ Portfolio)	Attendance Practical	Total
					Certificate skill based competencies (Through OSPE/OSCE/Spot/ Exercise/other	AETCOM Competencies Research	SVL Lab Activity	Research			
		100	100	100	60	30	40	20	40	10	500

Professor& Head
Department of_____
Name of Institute

- Preliminary examination pattern will be as per University examination
- Respective colleges/ departments will conduct internal assessment examinations and maintainrecords of the same.

Resolution No. 5.8 of Academic Council (AC-48/2023): SOP for conduction of continuous internal assessment pattern of theory and practical including Attendance marks distribution tabular format for Anatomy, Physiology and Biochemistry **[ANNEXURE-13]**

SOP for conduction of Continuous Internal Assessment for preclinical Departments - Anatomy , Physiology and Biochemistry

(As per NMC guidelines letter No. U. 1 4021 1812023-UGMEB dated 01.08.23)

SOP for conduction of Continuous Internal Assessment Theory/ Practical

1. **Continuous Internal Assessment Theory :** Total marks 100

   A. **Home assignment** (15 marks) :
   Minimum 03 assignments to be submitted by student as per following schedule.
   - 1 st home assignment (5 marks): Before Ist PCT i.e. Midterm examination .
   - 2nd home assignment (5 marks): Before II nd PCT i.e. First term examination.
   - 3 rd home assignment (5 marks) : Before III rd PCT i.e. Prelim examination .

   B. **Continuous class tests** (LMS 30 marks):
   Minimum 03 class tests MCQ/SAQ/BAQ/LAQ to be conducted throughout the year for total 30 marks.

   C. **Self directed learning** (45 marks): 10 hours
   a. **Seminar** (15 marks) : 04 hours
   - Each seminar to be given in group of 10-20 students as per directions of HOD of respective department .
   - Total time allotted for presentation will be of 8-10 minutes followed by question answer session (maximum 02 min)
   - Minimum 10 seminar topics should be completed throughout the year in allotted 04 hours for all students per subject i.e. 05 seminars of 10 min duration per hour.

   b. **Museum study** (15 marks): 03 hours
   - Minimum 01 specimen/model/ poster/ chart /graph/ lab instrument etc relevant to that particular subject should be given as museum study assignment .
   - If museum is not available in the department or the relevant study material is available in museum of other department then collaboration can be done with that particular department where museum facility is available .
   - 01 Hour will be allotted for 01 assignment .
   - The students should submit assignments preferably as per given timeline or as decided by concerned HOD before Prelim examination .

   c. **Library assignment** (15 marks):
   - Minimum 01 library assignment of 03 hours duration per subject to be completed by student in library which will be given by Anatomy, Physiology and Biochemistry departments.
   - The students should submit assignment preferably as per given timeline or as decided by concerned HOD before Prelim examination.

- Students should write assignment preferably on following topics which will be distributed amongst three departments i.e. 01 topic per department should be given to student.
    1. Working of Central library, Various facilities available in library and library research tools, E-resources / e-Database available in library eg ProQuest, UpToDate, MUHS Digital library, NDL etc
    2. How to use library resources for better research, Concept of textbook, journals, reference books, e- library.
    3. SWAYAM, Shodhganga, E-Shodhsindhu and Antiplagiarism software

Attendance (Theory) : 10 marks

Every 10 % attendance in Theory will be given 01 mark.

Students having 75 % attendance in theory and 80 % attendance in practical will only be eligible to appear for University examination.

Sr. No.	Attendance % (Theory)	Marks
1.	75-80	7.5-8.0
2.	81-85	8.1-8.5
3.	86-90	8.6-9.0
4.	91-95	9.1-9.5
5.	96-100	9.6-10.0

2. **Continuous Internal Assessment Practical** : Total marks 200
    A. Logbook : 150 marks
    B. Journal : 40 marks
    C. Attendance : 10 marks

A. Logbook : Logbook will have four sections as per following mark distribution.

*Section I : Certifiable skill based competencies

- Total marks : 60
- Assessment by OSPE/OSCE/Spots/exercises/Others etc evenly distributed throughout year.

*Section II :AETCOM Competencies (30 marks) to be assessed as per MGMIHS guidelines and evenly distributed throughout year.

*Section III :SVL Lab activity (40 marks): Minimum 01 activity one per term .

*Section IV :Research (20 marks) : Students shall do minimum 02 activity /department evenly distributed throughout year like

1. Participation in Student induction program on Research.
2. Visit to Central Research facilities .
3. Small Group Discussion : Students will discuss topic related to research in group of maximum 20 students under supervision of teacher.
4. Data Collection
5. Simple audit.
6. Participation in Poster presentation activity on topics related to Research. One topic can be given to a group of maximum 20 students.
7. Any other.

B. Journal :40 marks

Ist PCT Journal marks : 10
II nd PCT Journal marks :10
Prelim Journal marks: 20
Journal marks will be counted under independent head other than formative practical assessment .

C. Attendance practical : 10 marks

Every 10 % attendance in practical will be given 01 mark.

Sr. No.	Attendance % (Practical)	Marks
1.	75-80	7.5-8.0
2.	81-85	8.1-8.5
3.	86-90	8.6-9.0
4.	91-95	9.1-9.5
5.	96-100	9.6-10.0

Formative assessments (Theory): 400 marks

- Ist PCT i.e. Midterm examination to be conducted preferably after completing first three months of academic calendar or as per MGMIHS academic calendar : 100 marks.
- II nd PCT i.e. First term examination to be conducted preferably after completing six months of academic calendar or as per MGMIHS academic calendar: 100 marks.
- III rd PCT i.e. Prelim examination to be conducted preferably after completing eight months of academic calendar or as per MGMIHS academic calendar : 200 marks.

Formative assessments (Practical): 300 marks

- Ist PCT i.e. Midterm examination to be conducted preferably after completing first three months of academic calendar or as per MGMIHS academic calendar : 100 marks.
- II nd PCT i.e. First term examination to be conducted preferably after completing six months of academic calendar or as per MGMIHS academic calendar: 100 marks.
- III rd PCT i.e. Prelim examination to be conducted preferably after completing eight months of academic calendar or as per MGMIHS academic calendar : 100 marks.

Note : Students should attend all internal examinations. If student is unable to attend any exam due to unavoidable circumstances/medical reasons, he will have to take permission of Head of the institution to appear for only one additional examination which will be conducted after prelim exam

Resolution No. 4.7 of Academic Council (AC-50/2024): Resolved to approve the structured format of internal assessment for all the subjects of first MBBS 2024-25 onwards. Annexure-27

Internal Assessment Pattern for Theory and Practical

Phase -1 MBBS- (2024-25 CBME)

FORMAT FOR INTERNAL ASSESSMENT EXAMINATION IN ANATOMY, PHYSIOLOGY, BIOCHEMISTRY

Sr. No.	Exam	Theory	Practical
1.	Internal assessment examinations	200	200
2.	Preliminary examination	200	100
Total		**400**	**300**

- Preliminary examination pattern will be as per University examination
- Respective colleges/ departments will conduct internal assessment examinations and maintain records of the same.

Sr. No.	Exam	Theory	Practical
1.	Internal assessment examinations (Midterm + Terminal)	200 (100 + 100)	200 (100 + 100)
2.	Preliminary examination	200	100
3.	• Additional examination for students missing any of the three Internal Assessment exams / not qualifying for University Exam. • Marks to be computed as per the missed Exam / low score exam for non-qualifying students.	200/100	100

***Internal assessment examinations marks conversion to internal assessment marks -** Student's internal assessment examinations scores [Midterm, Terminal, Preliminary and additional (where applicable)] will be converted to 50 marks for theory and 50 marks for Practical internal assessment.

INTERNAL ASSESSMENT CALCULATION (THEORY)

Sr. No.	Criteria	Theory
1.	*All internal assessment examinations including preliminary examination	**50**
2.	**Day to Day assessment**	
	Continuous class test (Minimum two – one in each term of 30 marks) (MCQ /SAQ/LAQ/BAQ/Home assignment etc.)	**30**
3.	Self-Directed Learning (SDL) (Seminar/ Case presentation/ PBL/ TBL)	**15**
4	Attendance	**05**
Total		**100**

INTERNAL ASSESSMENT CALCULATION (PRACTICAL

Sr. No.	Criteria	Practical
1.	*All internal assessment examinations including preliminary examination	**50**
2.	**Certifiable competencies assessment (**Viva/ Spotters/ OSPE**) & logbook** (Minimum two – one in each term of 25 marks)	**25**
3.	AETCOM	**10**
4.	Journals +ECE	**10**
5	Attendance	**05**
Total		**100**

Mark Distribution for Attendance for Theory and Practical

Attendance in Percentage	Marks (Out of 5)
75 -80 %	2.5 -3
81- 85 %	3.1- 3.5
86 – 90 %	3.6- 4.0
91 – 95 %	4.1-4.5
96 – 100 %	4.6-5.0

In spite of all (Attendance of theory + practical, IA and Certifiable competency) measures, if student is still not meeting the criteria to be eligible for regular exam he shall be detained and offered remedial for same batch supplementary exam. For attendance, he will be allowed remedial measures only if attendance is more than 60% for each component.

Resolution No. 5.8 of Academic Council (AC-48/2023) : updated blueprint of question papers of Anatomy, Physiology and Biochemistry from First MBBS 2023-24 batch onwards, as per new CBME guidelines published on 01.08.2023.

Annexure-14B of AC-48/2023

BLUE PRINT OF UNIVERSITY QUESTION PAPER - PHYSIOLOGY

1.THEORY EXAMINATION PATTERN

1. 1. Theory Question Paper Pattern:

Two papers each of 3 hours duration and carrying 100 marks each.

1.2. Marks distribution for each paper:

Type of question	Numbers X Marks	Total marks
Multiple Choice Questions	20X1	20
Long Answer Questions (LAQ)	2X10	20
Short Answer Questions (SAQ)	6X5	30
Brief Answer Questions (BAQ)	10X3	30
Total		**100**

Each Paper is divided into 3sections:
Section A: MCQ20marks
Section B: BAQ5/6x3=15; SAQ3/4x5=15; LAQ1/2x10=10, Total40
Section C: BAQ5/6x3=15; SAQ3/4x5=15; LAQ1/2x10=10, Total40

1.3. Paper I &Paper II Contents

A. Specific topic distribution in MCQ physiology paper for Ist MBBS

Sr. No.	Topic	No. of questions
PHYSIOLGYPAPER– I		
1	General Physiology	2
2	Blood	3
3	CVS	5
4	RS	4
5	Endocrine	4
6	Reproduction	2
	Total	20
PHYSIOLGYPAPER– II		
1	Nerve and Muscle Physiology	3
2	GIT	3
3	Special senses	3
4	CNS	6
5	Renal system	4
6	Integrated Physiology	1
	Total	20

B. Specific topic distribution Physiology-PaperI& PaperII

PHYSIOLGYPAPER-I	
SECTIONA	All topics of Paper-I
SECTIONB	General Physiology, Blood, CVS, AETCOM
SECTIONC	RS, Endocrine, Reproduction,
PHYSIOLGYPAPER-II	
SECTIONA	All topics of Paper-II
SECTIONB	Nerve and Muscle Physiology, GIT, Special senses AETCOM
SECTIONC	CNS, Renal, Integrated Physiology

1.4. Note to exam paper setters (Ref.: GMER2019-Assessment)

1.4. A Multiple-Choice Questions (MCQs)(20X1=20Marks)		
• 10% of MCQ marks should be from clinically based questions (Any2)		
1.4.B Brief Answer Questions (BAQs)(10X3=30Marks)		
Various Levels of Cognitive Domain must be considered as follows:		
1 BAQ will be from AETCOM modules(In Paper I & II)		
Level of cognitive domain	**Number of questions**	**Marks**
Knowledge	3	3X3=9
Comprehension	3	3X3=9
Application	2	2X3=6
Analysis	2	2X3=6
Synthesis	1	1X3=3
Evaluation	1	1X3=3
1.4.C Short Answer Questions (SAQs)(6X5=30Marks)		
2. SAQ will be clinical application based (Each one in section B and C)		
Various Levels of Cognitive Domain must be considered as follows:		
Level of cognitive domain	**Number of questions**	**Marks**
Knowledge	2	2X5=10
Comprehension	2	2X5=10
Application	1	1X5=5
Analysis	1	1X5=5
Synthesis	1	1X5=5
Evaluation	1	1X5=5

1.4.D Long Answer Question (LAQ)(2X10=20Marks)
• Long Answer Questions (LAQ)in both Papers I &II must be structured, covering various levels of cognitive domain.

1.4.E Percentage of marks allotted to various levels of cognitive domains:

Level of cognitive domain	**Marks (Total=76)**	**Percentage (%)**
1.Knowledge	19	25
2.Comprehension	19	25
3.Application	11	15
4.Analysis	11	15
5.Synthesis	8	11
6.Evaluation	8	10

1.4. F Verbs in various levels in Knowledge domain.

Level	**Suggested Verbs**
Knowledge(Remember)	Define,describe,Draw,Find,Enumerate,Cite,Name,Identify,List,Label, Match,Sequence,Write,State
Comprehension (Understand)	Discuss, Conclude, Articulate, Associate, Estimate, Rearrange, Demonstrate understanding, Explain, Generalize, Identify, Illustrate, Interpret, Review, Summarize
Application (Apply)	Apply,Choose,Compute,Modify,Solve,Prepare,Produce,Select,Show,Transfer,Use
Analysis (Analyze)	Analyse, Characterise, Classify, Compare, Contrast, Debate, Diagram, Differentiate, Distinguish, Relate, Categorise
Synthesis (Create)	Compose, Construct, Create, Verify, Determine, Design, Develop, Integrate, Organise, Plan, Produce, Propose, Rewrite
Evaluation (Evaluate)	Appraise, Assess, Conclude, Critic, Decide, Evaluate, Judge, Justify, Predict, Prioritise, Prove, Rank

(Reference GMER-2019, Assessment Module Page no.17& Revised Bloom's Taxonomy by Anderson .L.W. etal in(2001))

1.5. Paper I

S. No.	Topics	MCQ (20x1= 20marks)	Brief Answer Question (BAQ) (10x3=30 marks)	Short Answer Question (SAQ) (6x5= 30marks)	Long Answer Question(LAQ) (2x10= 20marks)	Total Marks
	Section-B					
1.	General Physiology	2X1=2	2X3=6	1X5=5(1X5=5 option)		13 (+5option)
2.	Blood	3X1=3	1X3=3 (1X3=3 option)	1X5=5	1X10=10 (option)	11(+13 Option)
3	CVS	5X1=5	1X3=3 (1X3=3 option)	1X5=5 (1X5=5 option)	1X10=10	23 (+8)
4	AETCOM		1X3=3			3
	Section-C					
4	RS	4X1=4	1X3=3(1X3=3 option)	1X5=5(1X5=5 option)	1X10=10	21(+8)
5	Endocrine,	4x1=4	2X3=6	1X5=5(1X5=5 option)	1X10=10 (option)	15(+15)
6	Reproduction	2X1=2	2X3=6(1X3=3 option)	1X5=5	1X10=10 (option)	14(+13)
	Total	**20**	**30**	**30**	**20**	**100**

1.6. Paper II

S. No.	Topics	MCQ (20x1= 20marks)	Brief Answer Question (BAQ) (10x3=30 marks)	Short Answer Question (SAQ) (6x5= 30marks)	Long Answer Question (LAQ) (2x10= 20marks)	Total Marks
	Section-B					
1.	Nerve and Muscle Physiology	3X1=3	1X3=3 (1X3=3option)	1X5=5	1X10=10	21(+3)
2.	GIT	3X1=3	2X3=6	1X5=5 (1X5=5option)	1X10=10 (option)	14(+10)
3	Special senses	3X1=3	1X3=3	1X5=5 (1X5=5option)	1X10=10 (option)	11(+10)
4	AETCOM		1X3=3			3
	Section-C					
4	CNS	6X1=6	2X3=6	1X5=5	1X10=10	27
5	Renal	4x1=4	2X3=6	1X5=5 (1X5=5option)	1X10=10 (option)	15(+15)
6	Integrated Physiology	1X1=1	1X3=3 (1X3=3option)	1X5=5	-	9(+3)
	Total	**20**	**30**	**30**	**20**	**100**

1. PRACTICAL EXAMINATION PATTERN

Total Practical Marks **100 marks**

Sr. No	Heading	Marks
1	Hematology	15
2	Clinical-I (RS & CVS)	15
3	Clinical-II (Abdomen& CNS)	15
4	Human Experiment (Spirometry, Ergography, Perimetry, Harvard step test, Posture, mild & moderate exercise on cardiovascular system)	10
5	Spots	20
6	Communication skill	05
7	Viva	20
	Total=	**100**

2.1 Hematology	**15 marks**
Practical performance **(**Any one of- Hemoglobin estimation, RBC count, WBC count, DLC, Blood group determination, determination of BT &CT)	10 X 1 = 10 marks
Application based question discussion	5 marks
Total	**15 marks**

2.2. Clinical –I (CVS & RS)	**15 Marks**
Perform One skill from CVS	8
Perform One skill from RS	7
Total	**15 marks**

2.3. Clinical –II (CNS & ABDOMEN)	**15 Marks**
Perform One skill from CNS including cranial nerves	8
Perform One skill from Abdomen	7
Total	**15 marks**

2.4. Human Experiment **(**Performance of Any one of- Spirometry, Ergography, Perimetry, Harvard step test, Posture, mild & moderate exercise on cardiovascular system)	**10 Marks**
Total	**10 marks**

2.5. Spots	**20 Marks**
Spots – 10 questions X 2 marks each	10X2
Total	**20 marks**

2.5.a. Spots Distribution	**Marks**
Amphibian graphs	3x2=6
Charts	2X2=4
Calculation	1x2=2
Endocrine photographs	2X2=4
Demonstration topics (Not included in any other heads of practicals)	2X2=4
Total	**20 Marks**

2.6. Communication Skills	**5 Marks**

2.7. VIVA VOCE		**20 marks**
Viva-1	**Topics of paper-I** General Physiology, Blood, CVS, RS, Endocrine, Reproduction	10 marks
Viva-2	**Topics of paper-II** Nerve and Muscle Physiology, GIT, Special senses, CNS, Renal, Integrated Physiology	10 marks
Total		**20 marks**

Resolution No. 4.22 of Academic Council (AC-50/2024):

(i) Resolved to approve the Blueprint of Question paper for I MBBS program in Physiology for the University Theory and Practical with effect from the batch admitted in 2024-25 onwards.

(ii) It was resolved to include 10 case based or scenario based MCQs.

(iii) It was further resolved to discuss similar blueprints for all the Internal examinations in the next BOS-PHYSIOLOGY meeting.

[ANNEXURE-40]

BLUEPRINT OF UNIVERSITY QUESTION PAPER- PHYSIOLOGY

(as per CBME-2024 guidelines dated 12/9/2024)

1. THEORY EXAMINATION PATTERN

1. 1. Theory Question Paper Pattern:

Two papers each of 3 hours duration and carrying 100 marks each.

1.2. Marks distribution for each paper:

Type of question	Numbers X Marks	Total marks
Multiple Choice Questions	20 X 1	20
Long Answer Questions (LAQ)	2 X 10	20
Short Answer Questions (SAQ)	6 X 5	30
Brief Answer Questions (BAQ)	10 X 3	30
Total		**100**

1.2 Each Paper is divided into 3 sections:

Section A: MCQ 20 marks

Section B: BAQ 5/6 x 3= 15; SAQ 3/4 x 5= 15; LAQ 1/2 x 10 = 10, Total 40

Section C: BAQ 5/6 x 3= 15; SAQ 3/4 x 5= 15; LAQ 1/2 x 10 = 10, Total 40

1.3 Paper I & Paper II Contents

A. Specific topic distribution Physiology -Paper I & Paper II

PHYSIOLGY PAPER-I	
SECTION A	All topics of Paper-I
SECTION B	Blood, Respiratory system, Reproduction, AETCOM
SECTION C	General Physiology, Cardiovascular system, Endocrine
PHYSIOLGY PAPER-II	
SECTION A	All topics of Paper-II
SECTION B	Nerve and Muscle Physiology, GIT, Special senses AETCOM
SECTION C	CNS, Renal, Integrated Physiology

1.3. Note to exam paper setters

1.4.A **Multiple Choice Questions (MCQs)** (20X1) =20 Marks
10 MCQ of 1 mark each in subject specific, 10 MCQ scenario/clinical application based
1.4. B Brief Answer Questions (BAQs) (10X3=30 Marks)
• 3 BAQ will be of Reasoning questions
1.4. C Short Answer Questions (SAQs) (6X5=30 Marks)
• 2 SAQ will be clinical application based/ based on subject competencies in integrated module- (anemia, ischemic heart disease, diabetes mellitus, tuberculosis, hypertension and thyroid) • 1 SAQ on -AETCOM-1.2 module (What it means to be a patient) in paper -1, - AETCOM-1.3 module (Doctor patient relationship) in Paper-2
1.4.D Long Answer Question (LAQ) (2X10=20 Marks)
• Long Answer Questions (LAQ) in both Papers I & II must be structured, coveringvarious levels of cognitive domain.

1.4.E Percentage of marks allotted to various levels of cognitive domains:

Level of cognitive domain	Percentage (%)	Marks (136)
1. Knowledge	25	34
2. Comprehension	50	68
3. **Problem solving**: (Application, Analysis Synthesis)	25	34

1.4.F Verbs in various levels in Knowledge domain.

Level	Suggested Verbs
Knowledge (Remember)	Define, describe, Draw, Find, Enumerate, Cite, Name, Identify, List, Label, Match, Sequence, Write, State
Comprehension (Understand)	Discuss, Conclude, Articulate, Associate, Estimate, Rearrange, Demonstrate understanding, Explain, Generalize, Identify, Illustrate, Interpret, Review, Summarize
Problem solving: (Application, Analysis, Synthesis)	Apply, Choose, Compute, Modify, Solve, Prepare, Produce, Select, Show, Transfer, Use, Analyse, Characterise, Classify, Compare, Contrast, Debate, Diagram, Differentiate, Distinguish, Relate, Categorise, Compose, Construct, Create, Verify, Determine, Design, Develop, Integrate, Organise, Plan, Produce, Propose, Rewrite

(Reference GMER-2019, Assessment Module Page no.17& Revised Bloom's Taxonomy by Anderson, L.W. et al in (2001))

1.4. Paper I

S. No.	Topics	Core /Non-core	Total Marks allotted (Depending on the percentage weightage)	MCQ marks allocated (20 marks)	Marks allocated for BAQ/SAQ/LAQ
SECTION B					
1.	Blood	yes	23	3	20
2.	Respiratory system	yes	22	4	18
3	Reproduction,	yes	17	2	15
4	AETCOM (1.2 MODULE)	yes	5		5
SECTION C					
5	General Physiology	yes	12	2	10
6	Cardiovascular system	yes	33	5	28
7	Endocrine	yes	24	4	20
TOTAL			**136**	**20**	**116**

1.5. Paper II

S. No.	Topics	Core /Non-core	Total Marks allotted (Depending on the percentage weightage)	MCQ marks allocated (20 marks)	Marks allocated for BAQ/SAQ/LAQ
	SECTION B				
1.	Nerve and Muscle Physiology	yes	24	3	21
2.	GIT	yes	21	3	18
3	Special senses	yes	16	2	14
4	AETCOM (1.3 MODULE)	yes	5		5
	SECTION C				
5	CNS	yes	35	6	29
6	Renal	yes	22	4	18
7	Integrated Physiology	yes	13	2	11
	Total		**136**	**20**	**116**

2. PRACTICAL EXAMINATION PATTERN

Total Practical Marks 100 marks

Sr. No	Heading	Marks
1	Haematology	15
2	Clinical-I (RS & CVS)	15
3	Clinical-II (Abdomen& CNS)	15
4	Human Experiment (Spirometry, Ergography, Perimetry, Harvard step test, Posture, mild & moderate exercise on cardiovascular system)	10
5	Spots	20
6	Communication skill	05
7	Viva	20
	Total=	**100**

2.1 Haematology	**15 marks**
Practical performance (Any one of- Hemoglobin estimation, RBC count, WBC count, DLC, Blood group determination, determination of BT &CT)	10 X 1 = 10 marks
Application based question discussion	5 marks
Total	**15 marks**

2.2. Clinical –I (CVS & RS)	**15 Marks**
Perform One skill from CVS	8
Perform One skill from RS	7
Total	**15 marks**

2.3. Clinical –II (CNS & ABDOMEN)	**15 Marks**
Perform One skill from CNS including cranial nerves	8
Perform One skill from Abdomen	7
Total	**15 marks**

2.4. Human Experiment (Performance of Any one of- Spirometry, Ergography, Perimetry, Harvard step test, Posture, mild & moderate exercise on cardiovascular system)	**10 Marks**
Total	**10 marks**

2.5. Spots	**20 Marks**
Spots – 10 questions X 2 marks each	10X2
Total	**20 marks**

2.5.a. Spots Distribution	**Marks**
Amphibian graphs	3x2=6
Charts	2X2=4
Calculation	1x2=2
Endocrine photographs	2X2=4
Demonstration topics (Not included in any other heads of practicals)	2X2=4
Total	**20 Marks**

2.6. Communication Skills	**5 Marks**

2.7. VIVA VOCE		**20 marks**
Viva-1	**Topics of paper-I** General Physiology, Blood, CVS, RS, Endocrine, Reproduction	10 marks
Viva-2	**Topics of paper-II** Nerve and Muscle Physiology, GIT, Special senses, CNS, Renal, Integrated Physiology	10 marks
Total		**20 marks**

Eligibility to appear for University exams	
Internal Assessment (Theory + Practical)	at least 50%o marks of the total marks (combined in theory and practical not less than 40% marks in theory and practical separately)
Criteria for pass in University exams	
Theory + Practical	The aggregate or sum-total of theory and practical is 50% However, the minimum score in theory/ practical examination shall be at least 40% of the allotted marks.

Resolution No. 5.10 of Academic Council (AC-48/2023): Resolved to accept University passing criteria as per CBME guidelines published on 01.09.2023 from First MBBS 2023-24 batch onwards (Ref F.No. U/14021/8/2023-UGMEB Corrigendum Amended Page 58 guidelines) **[ANNEXURE-18].**

Criteria of passing in subject

(Reference No: U/14021/8/2023-UGMEB 2023)

In subjects that have two papers, the learner must secure minimum 40% of marks in aggregate (both papers together) to pass in the said subject.
Criteria for passing in a subject: A candidate shall obtain 50% marks in aggregate and 60: 40 (minimum) or 40:60 (minimum) in University conducted examination separately in Theory and in Practical (practical includes; practical/clinical and viva voce) in order to be declared as passed in that subject.

Resolution No. 4.9 of Academic Council (AC-50/2024): Resolved to approve the criteria of attendance in the pattern of eligibility to appear for professional examinations from First MBBS 2024-25 batch as per new CBME guidelines published on 12/09/2024. **[ANNEXURE-29]**

The criteria of attendance of students for eligibility to university examination.

(Government of India National Medical Commission Letter no D-11011/500/2024-Academic Cell e- 8284443- UGMEB Dated 12/09/2024 page 39,40 and 42, 43)

I. Eligibility to appear for Professional examinations

The performance in essential components of training are to be assessed, based on following three components:
Attendance

Internal Assessment

Certifiable Competencies Achieved:

(a) Attendance

There shall be a minimum of 75% attendance in theory and 80% attendance in practical /clinical for eligibility to appear for the examinations in that subject. In subjects that are taught in more than one phase - the learner must have 75% attendance in theory and 80% attendance in practical in each phase of instruction in that subject. There shall be a minimum of 75% attendance in AETCOM and minimum of 80% attendance in family visits under Family adoption 40 programme. Each student shall adopt minimum 3 families/ households and preferably five families. The details shall be as per Family Adoption Program guidelines.

If an examination comprises more than one subject (for e.g., General Surgery and allied branches), the candidate must have a minimum of 75% attendance in each subject including its allied branches, and 80% attendance in each clinical posting. Learners who do not have at least 75% attendance in the electives will not be eligible for the Third Professional - Part II examination/ NExT.

Remedial measures:

A student whose has deficiency(s) in any of the 3 criteria that are required to be eligible to appear in university examination, should be put into remedial process as below:

During the course: If Internal assessment (IA) or attendance is less or/and certifiable competencies not achieved and marked in log book in quarterly/ six monthly monitoring, the students/parents must be intimated about the possibility of being detained much before the final university examination, so that there is sufficient time for remedial measures. These students should be provided remedial measures as and when needed to improve IA. Any certifiable competency/ IA marks deficiency should be attended with planned teaching/tests for them. Student should complete the remedial measures and it should be documented.

In spite of all above measures, if student is still not meeting the criteria to be eligible for regular exam he shall be offered remedial for the same batch supplementary exam. For attendance, he will be allowed remedial measures ONLY IF attendance is more than 60% for each component. At the end of phase: If Internal assessment (IA) or attendance is less or/and certifiable competencies not achieved and marked in log book at the end of regular classes in a phase, the student is detained to appear in regular university examination of that batch.

I MBBS (Anatomy, Physiology & Biochemistry)

Time – 3 hrs. Preliminary / University examination

(* Applicable from 2023-24 Batch onwards)

Each subject – 2 papers (I / II) – 100 X 2 = **Total 200 Marks**

Each paper

- **Section A** – MCQ – 20 X 1 mark = **20 Marks**
    - **10% MCQ i.e. 2 in each paper must be clinical based**

- **Section B &C**

Q1. Answer any 5 out of 6 (BAQ) (5X3 marks =15 marks)

Q2. Answer any 3 out of 4 (SAQ) (3X5 marks =15 marks)

- 1 SAQ will be clinical application based in both sections (B&C)
- **1 BAQ will be from AETCOM modules in Paper I & Paper II**

Q3. Answer any 1 out of 2(LAQ) (1X10 marks =10marks)

Resolution No. 5.8 of Academic Council (AC-48/2023) : updated blueprint of question papers of Anatomy, Physiology and Biochemistry from First MBBS 2023-24 batch onwards, as per new CBME guidelines published on 01.08.2023.

MGM IHS NAVI MUMBAI

IMBBS –UNIVERSITY EXAMINATION
MODEL QUESTION PAPER

Subject: Physiology paper –I **Date:**
Total Marks: 100 **Duration: 3 hours**

Instructions to students:

1. Attempt all questions.
2. Maximum marks are indicated in the right.
3. Draw diagrams where ever necessary.
4. Mobile phones, blue tooth or any other communications/ electronics devices are not allowed in the hall or the adjacent area

SECTION A

Q-1 MCQ **Marks: 01X20=20**

1) During cardiac cycle immediately after closure of A.V valves there is a) isometric contraction b) isometric relaxation c) isotonic contraction d) isotonic relaxation	2) Male and female appearance is mostly dependent upon a) Genotype of somatic tissue b) Genotype of gonadal tissue c) level of circulating sex hormones d) hypothalamic sex hormones
3) The diffusion capacity of a gas across alveolo – capillary barrier a) is greater for oxygen than CO2 b) remain constant during exercise c) is unaffected if one lung is removed d) is expressed as vol. per unit time per unit pressure gradient	4) Pure oxygen therapy can be of value in hypoxia due to a) carbon monoxide poisoning b) stagnant hypoxia c) hypoventilation d) anemia
5) All of the following are hormones released by anterior pituitary gland except: a. Growth Hormone b. TSH c. Oxytocin d. ACTH	6) The following tests assess the thyroid functions except a) basal metabolic rate b) Iodine uptake studies c) protein bound iodine d) plasma cholesterol level
7) Chemical regulation of respiration is maximally affected by a) O2 b) CO2 c) H + ions d) lactic acid	8) Coronary blood flow is normally predominantly controlled by a) hormones b) sympathetic impulse c) auto regulation d) parasympathetic impulse

9) Which of the following hormones is responsible for secretary phase a) LH & FSH b) prolactin c) progesterone d) oestrogen	10)Insulin promotes cellular transport of a) potassium b) magnesium c) glucose only d) all of the above
11) An act of quiet inspiration a) increases venous return to the heart b) involves less muscular effort than expiration c) begins when intrapleural pressure rises above atmospheric pressure d) is assisted by surface tension forces in the alveoli	12) The resting cardiac cell membrane: a) Is primarily permeable to K+ ions. b) Has resting membrane potential - 65 mV. c) Favors inward movement of K+ ions at -85 mV. d) Influenced by extra-cellular Na+ ion concentration
13) Ejection fraction value: a) Should be about 0.6 for a healthy heart. b) Below 0.5 suggest cardiac disease. c) Below 0.3 is associated with high mortality. d) All of the above	14) The largest fraction of serum calcium is a) bound to serum albumin b) bound to serum globulin c) freely ionized d) bound with citrate
15) The total body water a) comprises 60 to 70 % of total body weight b) obesity increases the proportion of water c) in infants proportion is less than adults d) is a larger proportion of body weight with increasing age	16) Specific agglutinin of ABO blood group system a) are present at birth b) are monovalent c) appear at two to eight month after the birth d) do not agglutinate saline suspended R.B.C
17) Bilirubin a) is a blood pigment b) give colour to the urine & stools c) is formed after degradation of haemoglobin d) is conjugated in R.E. cells	18) Resting membrane potential of an excitable tissue is affected by change in extra cellular concentration of a) K+ b) Na+ c) Ca++ d) all of the above
19) A 66-year-old man sought medical care at the hospital due to severe chest pain lasting for 24 hours. The patient was aware of being hypertensive and was a smoker. Without any prior symptom, he started to have severe chest pain and sought emergency medical care after about 24 hours, due to pain persistence. What will be the definitive investigation to rule out Acute MI? A. Chest X ray B. Chest CT scan C. ECG D. Blood test	20) 12-year-old boy is referred by his family physician to hematologist for jaundice, recurrent acute bone pains, and weakness. Complete blood count (CBC) reveals a hemoglobin of 6.5 g/dL, MCV 82.3 fL, reticulocyte count 7 percent, and bilirubin 84 mg/dL. Sickle solubility test is positive. What can be this condition? a) Sickle cell anemia b) Hemolytic jaundice c) Normocytic anemia d) All

SECTION-B

Marks:40

Q1. Answer any 5 out of 6 (BAQ) (5X3 marks=15 marks)

A. Differences between ICF & ECF
B. Negative feedback mechanism
C. Anticoagulants
D. Immunoglobulins-Types & Functions
E. Conducting system of heart
F. Rights of patient.

Q2. Answer any 3 out of 4(SAQ) (3X5 marks=15marks)

A. Active Transport
B. Coronary circulation
C. Extrinsic mechanism of coagulation
D. 45-year-old man, presented to OPD having chest pain, His medical history was significant for dyslipidemia, generalized anxiety and history of smoking. On examination BP was 178/106 mm Hg. He was ruled out for acute coronary syndrome.
   a. What condition does the case suggest of? (1mark)
   b. What are the complications of this condition? (1mark)
   c. Describe long term regulation of blood pressure. (3marks)

Q3.Answerany1out of 2(LAQ) (1X10 marks=10marks)

1. What is immunity? What are the different types of immunity? Describe the role of lymphocytes in immunity.(2+4+4)
2. Define shock. Classify shock. Describe the different stages of shock. (2+4+4)

SECTION-C

Marks: 40

Q1.Answer any 5 out of 6 (BAQ)
(5X3marks=15marks)

1. Intra thoracic pressure
2. Bohr's effect.
3. Actions of Insulin on muscle
4. Gigantism
5. Oxytocin
6. Infertility

Q2.Answer any 3 out of 4(SAQ)
(3X5marks =15marks)

1. Spermatogenesis.
2. Actions of Glucocorticoids
3. High altitude acclimatization
4. A 63-year-old self-employed plumber presented with upper respiratory tract infection 10 days ago, and he now has a productive cough with green sputum, breathlessness and fatigue. He has visited his general practitioner with similar symptoms two or three times every year in the last decade. His FEV1 was 52%, 6 months ago.

   a. What condition does the case suggest of? (1mark)
   b. What are the signs and symptoms of this condition? (2mark)
   c. Describe FVC and FEV in this condition with diagram. (2mark)

Q3.Answer any 1 out of 2 (LAQ) (1X10 marks=10marks)

1. Describe the chemical regulation of respiration.

2. Enumerate hormones secreted by anterior pituitary gland. Describe the actions of growth hormone and regulation of GH. (3+5+2)

Resolution No. 5.8 of Academic Council (AC-48/2023) :updated blueprint of question papers of Anatomy, Physiology and Biochemistry from First MBBS 2023-24 batch onwards, as per new CBME guidelines published on 01.08.2023.

MGMIHS NAVI MUMBAI

I MBBS –UNIVERSITY EXAMINATION
MODEL QUESTION PAPER

Subject: Physiology paper –II **Date:**
TotalMarks:100 **Duration: 3 hours**

Instructions to students:

1. Attempt all questions.
2. Maximum marks are indicated in the right.
3. Draw diagrams where ever necessary.
4. Mobile phones, blue tooth or any other communications/ electronics devices are not allowed in the hall or the adjacent area

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SECTION-A **MCQ** **Mark: 1X20=20**

1.Troponin A. regulates some enzymes B. Has Ca2+ receptor site C. is similar to calmodulin D. All	2. Secretion from the G-cells of (Gastric) antrum A. Stimulates pepsin secretion B. Inhibits Cl secretion C. Is secreted by antral distension D. Is secreted by the acid in the antrum
3. Functions of limbic system include A. intellectual development B. adaptation to external environment C. species preservation D. all	4. In the presence of ADH, The distal nephron is least permeable to : A. water B. ammonia C. urea D. sodium
5. The decrease in active force that occurs at lengths longer than the optimal length is caused by: A. Overlap of actin filaments with each other. B. Neural inhibition. C. Insufficient Ca2+ release. D. d) Insufficient overlap of actin and myosin filaments.	6. Bile helps in: A. Digestion and absorption of fats B. absorption of fat soluble vitamins C. stimulate secretion of bile by liver D. all of the above
7. Which of the following ion is not handled at loop of Henle : A. Na+ B. Cl C. K+ D. Urea	8. Cerebellar lesion produces all EXCEPT A. Adiadokokinesia B. Dysmetria C. Ataxia D. Spontaneous tremors
9. The receptor potential A. is a generator potential B. propagates along the membrane C. travels along a myelinated fibre fast D. follows all or none law	10.Following are the structures supplied by sympathetic alone EXCEPT A. Adrenal medulla B. Most arterioles C. Ureter D. Gastric glands

11. A 24-year-old man, came to OPD as he felt increasingly weak, nauseated, and feverish and pain on the right side of the abdomen. He has no appetite because the thought of food makes him nauseous. he noticed that his eyeballs were yellow. What could be the condition A. Anemia B. Jaundice C. Constipation D. Peptic ulcer	12. Concerning urinary concentration: A. the thick loop of Henle generates most of the osmotic gradient needed for reabsorption of water in the collecting duct B. the tubular urine that reaches the collecting duct is generally hypotonic with respect to plasma C. in the absence of ADH, urine is not concentrated along the length of the collecting duct D. all are correct
13. Renin causes A. Increased H2O reabsorption B. Decreased sodium reabsorption C. Angiotensin I formation D. Increased sodium reabsorption	14.Color vision is tested by A. Snellen's chart B. Jaeger's chart C. Ishihara's chart D. Landold's chart
15. Which of these substances on accumulation causes muscular fatigue: A. Pyruvic acid B. Creatine phosphate C. Lactic acid D. None of these	16.Relationship between intensity of stimulus and number of impulses generated in a sensory nerve fibre is A. logarithmic B. as per Weber- Fechner law C. based on properties of receptors D. all
17. Broca's area is brain area for : A. Speech B. Writing C. Stereognosis D. None of the Above	18. All of the following are temperature decreasing mechanisms except: A. Cutaneous vasodilatation B. shivering C. sweating D. decreased voluntary activity
19. Bilateral pupillary defect where light reflex is lost with intact near reflex is called A. Argyll -Robertson pupil B. Adies pupil C. Myotonic pupil D. None	20. A 53-year-old male presented with a history of left-sided hearing loss. The patient denied otalgia, otorrhea, vertigo. His microscopic ear exam demonstrated a white, fleshy mass medial to the tympanic membrane. What type of Deafness is this? A. Conductive deafness B. Neural deafness C. Total deafness D. Cortical deafness

SECTION-B

Marks: 40

Q1. Answer any 5 out of6(BAQ) (5X3marks =15marks)

A. Myasthenia gravis
B. Action potential in smooth muscle
C. Gastrin
D. Color vision
E. Digestion of carbohydrate in GIT
F. Boundaries of the doctor-patient relationship

Q2.Answer any 3 out of4(SAQ) (3X5 marks =15marks)

A. Neuromuscular junction-structure and transmission
B. Visual Pathway
C. Five Functions of Liver
D. A healthy male comes with the history of pain abdomen and burning sensation in stomach since 2 months associated with waterish vomiting, nausea since 10 days. History reveled that person is chronic tobacco chewer and smoker.
   a. What condition does the case suggest? (1mark)
   b. How the HCl secretion in stomach regulated? (2mark)
   c. What is the physiological basis of treatment? (2mark)

Q3. Answer any 1 outof2(LAQ) (1X10 marks=10marks)

A. Describe the mechanism of contraction of skeletal muscle under following headings.
   - ❖ Structure of sarcomere with neat, labeled diagram(3)
   - ❖ Changes in sarcomere during contraction(3)
   - ❖ sliding filament theory of muscle contraction(4)

B. Describe the stages & regulation of deglutition. Add a note on Achalasia cardia. (5+3+2)

SECTION-C

Marks: 40

Q1. Answer any 5 out of6(BAQ) (5X3 marks =15marks)

A. Difference between Cortical and Juxtra medullary Nephron
B. Renal clearance
C. Stretch reflex
D. Signs of Cerebellar ataxia
E. Heat loss mechanisms
F. Physiological effects of meditation

Q2. Answer any 3 out of4(SAQ) **(3X5 marks =15marks)**

A. Describe any 5 Properties of synapse
B. Micturition reflex
C. Physiological changes of aging process
D. A 38 years old male patient came to medicine OPD with the complaints of periorbital puffiness on face, pedal edema, oliguria since 4 months. On examination, he had pallor, his BP was high, and on investigation he had high level of serum creatinine and presence of proteins in urine.
   a. What is the likely diagnosis?(1mark)
   b. What is the cause of puffiness on face, pedal edema? (2mark)
   c. What is the treatment option and why? (2mark)

Q3. Answer any 1 out of 2(LAQ) **(1X10 marks=10marks)**

A. Describe pathway for pain sensation. Add note on referred pain. (7+3)
B. Describe the role of kidney in regulation of acid-base balance of the body.

Resolution No. 4.8 of Academic Council (AC-50/2024): Resolved to approve changes in format of university & preliminary examination pattern for Theory paper I & II for all the three subjects- Anatomy, Physiology & Biochemistry as per new CBME guidelines dated 12/9/24 with inclusion of 10 scenario based MCQ, reasoning questions in BAQ and clinical as well as integrated topics in SAQ. **[ANNEXURE-28]**

Phase -1 MBBS, CBME (2024-25)

Preliminary / University examination Pattern (Theory)

Paper I & II – 100 X 2 = Total 200 Marks

Each paper – Time – 3 hrs. **Total- 100 Marks**

- **Section A – MCQ – 20 X 1 mark = 20 Marks**
  (Scenario based MCQs shall be accorded a weightage of 10 % of the total marks (100) i.e. 10 Marks in each theory paper)

- **Section B -**
  Q.1. Answer any 5 out of 6 (BAQ) - 5 X 3 =15 marks
  (3 BAQ will be as reasoning question in Paper I & II)

  Q.2. Answer any 3 out of 4 (SAQ) - 3 X 5=15 marks
  (1 SAQ will be clinical application based in paper I&II excluding integrated topics)
  1 SAQ will be from AETCOM modules in Paper I & II)

  Q.3. Answer any 1 out of 2 (LAQ) - 1 X 10 =10 marks
  LAQ should be structured (With defined marks distribution)

- **Section C –**
  Q.1. Answer any 5 out of 6 (BAQ) - 5 X 3 =15 marks
  (3 BAQ will be as reasoning question in Paper I & II)

  Q.2. Answer any 3 out of 4 (SAQ) - 3 X 5=15 marks
  (2 SAQ will be on integrated topic in paper I&II)

  Q.3. Answer any 1 out of 2 (LAQ) - 1 X 10=10 marks
  LAQ should be structured (With defined marks distribution)

Integrated topics: anemia, ischemic heart disease, diabetes mellitus, tuberculosis, hypertension and thyroid.

Resolution No. 5.11 of Academic Council (AC-48/2023): Resolved to accept revised books of list for Anatomy, Physiology and Biochemistry from first MBBS 2023-24 Batch onwards

Annexure-20B of AC-48/2023

DEPARTMENT OF PHYSIOLOGY
MGM'S MEDICAL COLLEGE

LIST OF PHYSIOLOGY BOOKS FOR FIRST MBBS-2023-24
(UNDERGRADUATE COURSE)

A. TEXT BOOKS

S.N.	Name of the book	Name of the Author
1	Textbook of Medical Physiology	Guyton & Hall
2.	Textbook of Physiology	Indu Khurana
3	Comprehensive Textbook of Medical Physiology Vol I &Vol II	G.K. Pal
4	Textbook of Physiology Volumes I & II	A. K. Jain
5	Textbook of Medical Physiology	D Venkatesh &H.H Sudhakar
6	CC Chatterjee's Human Physiology Volumes I & II	Nitin Ashok John
7	Fundamentals of Medical Physiology	L. Prakasam Reddy

B. PRACTICAL BOOKS

S.N.	Name of the book	Name of the Author
1	Practical Physiology	A. K. Jain
2	Practical Physiology	G. K. Pal
3	Textbook of Practical Physiology	C. L. Ghai
4	Physiology Practical Manual & logbook of certificate competencies	Raj Kapoor

C. REFERENCE BOOKS

S.N.	Name of the book	Name of the Author
1.		
2.	Ganong's review of medical physiology	Barrett & Barman
3.	Understanding Medical Physiology: A textbook for medical students	R. L. Bijlani &Manjunatha
4.	Effective Medical Communication	Subhash Parija &Balachandra Adkoli
5.	Humanities in Medical Education	Rajiv Mahajan &Tejinder Singh
6.	Human Physiology	N Geetha
7.	Clinical application based Questions in Physiology	Pranali Shimpi, Latita Chandan

Resolution No. 4.24 of Academic Council (AC-50/2024): Resolved to approve the recommended & reference books for the UG in Physiology. **[ANNEXURE-42]**

DEPARTMENT OF PHYSIOLOGY

LIST OF PHYSIOLOGY BOOKS FOR FIRST MBBS-CBME 2024-25

A. TEXT BOOKS

S.N.	Name of the book	Name of the Author
1.	Comprehensive Textbook of Medical Physiology Vol I & Vol II – 04th Edn.	G.K. Pal
2.	Textbook of Physiology Volumes I & II 10th Edn.	A. K. Jain
3.	Textbook of Medical Physiology – 14th Edn. – 4th south Asia Edn.	Guyton & Hall
4.	Textbook of medical physiology(3rd Edition)	D Venkatesh HH Sudhakar
5.	Fundamental of medical physiology – Vol-1 & 2 (8th Edition)	L. Prakasam Reddy
6.	Human Physiology vol-1 & 2 (14th Edition)	CC Chatterjee's Nitin ashok john

B. PRACTICAL BOOKS

S.N.	Name of the book	Name of the Author
1.	Textbook of Practical Physiology(5th Edition)	G. K. Pal
2.	Manual Of Practical Physiology with Viva-Voce Questions (7th Edition)	A. K. Jain
3.	Physiology Practical Manual and logbook of certificate competencies(4th Edition)	Raj kapoor
4.	Ghai's Textbook of Practical Physiology(10th Edition)	C. L. Ghai VP Varshney Mona Bedi
5.	Manual Of Practical Physiology	CC Chatterjee Nitin Ashok John Surrinder H Singh Yuvraj Gharu
6.	Practical Physiology	L Prakasam Reddy

C. REFERENCE BOOKS

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology 3rd Edn.	Indu Khurana
2.	Ganong's review of medical physiology – 26th Edn.	Barrett & Barman
3.	Textbook of Physiology	Manjinder Kaur
4.	Understanding Medical Physiology: A textbook for medical students	R. L. Bijlani & Manjunatha
5.	Effective Medical Communication	Subhash Parija & Balachandra Adkoli
6.	Humanities in Medical Education	Rajiv Mahajan &Tejinder Singh
7.	Competency Based Questions and Answers Physiology (CBS publishers)	Sushrutha academy
8.	Principles of physiology (5th Edition)	Debasis Pramanik
9.	Human Physiology the mechanism of body function	Vander, Sherman & luciano's
10.	Human Physiology (2nd Edition)	N Geetha

Annex-16 of AC-42/2022

दूरभाष/Phone : 25367033, 25367035, 25367036
फेक्स/Fax : 0091-11-25367024
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पॉकेट -14, सेक्टर-8, द्वारका, फेस-1, नई दिल्ली-77
Pocket- 14, Sector- 8, Dwarka,
Phase – 1, New Delhi-77

ANNEX-15

राष्ट्रीय आयुर्विज्ञान आयोग
National Medical Commission
(Undergraduate Medical Education Board)

No. U.11026/1/2022-UGMEB **Dated the 31st March, 2022**

Circular

Subject : Implementation of new Competency Based Medical Education for Undergraduate Course Curriculum.

The new Competency Based Medical Education for Undergraduate Course Curriculum was discussed in detail in the 6th meeting of National Medical Commission, which was held on 24th March, 2022 at New Delhi.

2. After detailed discussion and deliberation, it has been unanimously decided in the said meeting of the Commission to implement new Competency Based Medical Education for Undergraduate Course Curriculum from the current batch of MBBS students i.e. 2021-22, admitted in the month Feb-March 2022.

3. The new Competency Based Medical Education for Undergraduate Course Curriculum would is being implemented with the objective of covering all three domains of learning (Cognitive, Affective & Psychomotor). The new course curriculum introduced in August 2019 enriches the medical student with a sound base and balanced approach to overall aspect with the introduction of foundation course which includes Family Adoption Programme, Yoga, meditation, Local Language adaptation and skills.

4. All State Governments/UTs, universities and medical colleges/institutes are requested to take immediate necessary steps to implement the new Competency Based Medical Education for Undergraduate Course Curriculum from the current batch of MBBS students i.e. 2021-22, admitted in the month Feb-March 2022.

Dhanvar

(Dr. Aruna V. Vanikar)
President

Encl:

(i) Guidelines for implementation of new CBME Course curriculum.
(ii) Academic Calendar for MBBS Batch
(iii) Month-wise schedule of new CBME Course
(iv) Curriculum for Family Adoption Programme
(v) Brief modified transliteration of Maharshi Charak Shapth

Guidelines for implementation of new CBME Course curriculum for MBBS batch 2021-22 admitted in Feb-March 2022

1. The said guidelines are for the UG CBME **2021 (admitted in 2022)** batch.
2. The curriculum of UG CBME 2021 will begin from **14th Feb 2022**in all medical colleges across the country. The basic framework and inclusions of CBME will not be disturbed as they are vital components of outcome-based education. It is mainly the **redistribution of hours**in view of COVID-19 pandemic within the time frame that needs consideration for 2021-'22 (admitted in Feb. 2022) batch.
3. Redistribution with timeline of professional years for 2021-'22 (admitted in Feb. 2022) is provided in slides herewith.

Since the duration for 1st professional has been reduced from 14 months to 12months, the period can be adjusted by :

a. Having one week of Foundation Course at the beginning of the academic calendar and thenspreading remaining three weeks of Foundation Course in first six months beyond curricular hours
b. Allocating Sports & Extracurricular hours for regular teaching
c. Reducing duration of vacation (1 week in Summer &1 week in Winter, at the discretion of University and college)
d. Final, 1st exams will be for Forensic Medicine, Toxicology and Community Medicine
e. All clinical subjects will be taught as per curriculum parallel and exams will be covered under NEXT.

4. **Early clinical exposure and Integration**retained since theyare all teaching-learning methods/strategies for addressing identified competencies.

5. **Self directed learning (SDL):** Some SDL hours can be reduced, specifically from Phase-I subjects like Anatomy (there are 40 hours), Physiology (20 hours). Some SDL hours can go beyond office hours if required(as such also students may be required to do certain things for SDL beyond regular hours).

6.**Electives**promote academic flexibility and may be offered onsite based on student's need and choice. One month of Electives (Block A & B, 15 days each) can be adjusted for this batch, wherein Block A (pre/para clinical electives) can have electives along with clinical postings and Block B (clinical electives) without clinical posting.

7. **Family adoption** program is recommended as a part of curriculum of Community Medicine and should begin from 1st professional year and remain throughout the curriculum. The orientation towards the same may be a part of foundation course under the theme of 'Field visit to community health centre' (8 hrs) which is already allocated to foundation course in GMER 2019.

The family adoption shall include villages not covered under PHC adopted by medical college, and if travel time from college to site is more than 2 hours on week-ends, in such situation, bastis / jhuggis/ towns or on outskirts of cities may be adopted.

7. Modified 'Maharshi CharakShapath' isrecommended when a candidate is introduced to medical education.

8. Yoga training is recommended to be initiated duringfoundation course,(1hour, preferably in the morning in orientation week). Yoga practices shall be for maximum 1 hour every day during theperiod of 10 days beginning from 12th June every year to be culminated on International Yoga day, i.e. 21st June, to be celebrated in all medical schools across the country. These may be practiced by all batches of MBBS. Yoga module will be made available to all

colleges by UGMEB- NMC. However colleges may adopt their own modules. Yoga unit may be inducted under PMR department or any other department of all colleges at their discretion.

9. **Assessment**: A robust continuous formative and internal assessment is required to ensure competencies and thereby a competent medical graduate. If required, we can have two internal assessments and the third internal assessment can be calculated from various unitary and continuous tests taken throughout the year.

10: **Supplementary examinations**:Supplementary exam be conducted between 4 to6 weeks from the date of declaration of results of regular university examinations. The result of Supplementary examinations be declared within 10 days from the date of completion of examinations.

11. There shall be no supplementary/ repeater batch. For students who fail in their university examination:

- Students who pass in 1st MBBS supplementary examination shall be offered special classes and ward postings to cover up the syllabus, so that he/she copes up with subjects. Subsequently (after passing in supplementary examination) the student shall continue with his/her regular batch. Attendance of special classes/ postings for such studentsshall be counted. Students who fail to pass in supplementary examination, shall be joining the subsequent junior batch.

- Students who pass in 2nd MBBS supplementary examination shall be offered special classes and ward postings to cover up the syllabus, so that he/she copes up with subjects. The student shall not join classes of the Final MBBS till he/she is given a chance of passing in first supplementary examination. He/she shall continue with his regular batch after passing in supplementary examination of 2nd MBBS.

Attendance of special classes/ postings be counted. Students who fail to pass in supplementary examination of 2nd MBBSmay be allowed to continue with his/her regular batch. However the student shall have to pass 2nd MBBS before taking up Final MBBS examination, as per the existing guidelines.

12. Details and guidelines on NEXT examination shall be notified by NMC.

CURRICULUM FOR FAMILY ADOPTION PROGRAMME

Need of the Program:

In India, around 65.5 % of population resides in rural settings (as per 2020 statistics) whereas availability of health care facilities and services are skewed towards urban set ups. Though adequate healthcare supplies exist in the community, it is the access to healthcare to a rural citizen that is a major concern. Issues like health illiteracy, ignorance about communicable and non communicable diseases, means to reach health care facility, services, take time off from their daily wages work and workforce shortages are some of the barriers that limits timely and quality health related awareness and care leading to a scenario of 'Scarcity in abundance'. Hence there is a need to take measures to make healthcare more accessible to the rural and needy population and impart community based and community oriented training to budding healthcare professionals.

Aim:

Family adoption program aims to provide an experiential learning opportunity to Indian Medical graduates towards community based health care and thereby enhance equity in health.

Objectives of the Program:

During the Medical UG training program, the learner should be able to :

1. Orient the learner towards primary health care
2. Create health related awareness within the community
3. Function as a first point of contact for any health issues within the community
4. Act as a conduit between the population and relevant health care facility
5. Generate and analyse related data for improving health outcomes and Evidence based clinical practices.

Specifics of the Program:

Family adoption program is recommended as a part of curriculum of Community Medicine and should begin from 1st professional year with competencies being spread in ascending manner for entire MBBS training program. The orientation towards the same may be a part of Foundation course under the theme of 'Field visit to community health centre' (8 hrs) which is already allocated to foundation course as per GMER 2019.

The family adoption shall preferably include villages not covered under PHCs adopted by medical college. If transit time from college to site is more than 2 hours, then bastis / jhuggis/ towns on outskirts of cities may be considered for family adoption. Medical students may be divided into teams and each team may be allocated visits, with 5 families per student. These families may be introduced during their first visit; however, the model may be flexible depending upon the number of students and available families for adoption. The entire team should work under a mentor teacher for entire part of the training program.

Other considerations:

Every college may arrange one diagnostic medical camp in the village wherein identification of: anemia, malnutrition in children, hypertension, diabetes mellitus, ischemic heart diseases, kidney diseases, any other local problems may be addressed.

If required, patients shall be admitted in the hospital for acute illness under care of student, charges may be waived off or provide concession or govt. schemes.

For chronic illness, students shall be involved.

Subsidized treatment charges may be provided under govt. schemes or welfare schemes.

Camps may be arranged by Dean and Community Medicine/ P.S.M. department with active involvement of Associate/ Asst. Professors, social worker and supporting staff. Local population may be involved with village leaders.

Visit by students be made to the visit as mentioned in table below. Annual follow up diagnostic camp can be continued by the PSM department. As a step towards environment consciousness, students may be encouraged for tree plantation/medicinal plants around beginning of monsoons, in the environs of the families adopted. This could be also included in the environs of the hostels/ residence of students wherever possible.

At the end of the programme, students may be envisioned to become leaders for the community.

TARGETS TO BE ACHIEVED BY STUDENTS:

First Professional Year:

-Learning communication skills and inspire confidence amongst families

-Understand the dynamics of rural set-up of that region

- Screening programs and education about ongoing government sponsored health related programs

- Learn to analyse the data collected from their families

-Identify diseases/ ill-health/ malnutrition of allotted families and try to improve the standards

2nd Professional Year

- Inspire active participation of community through families allotted
- Continue active involvement to become the first doctor /reference point of the family by continued active interaction
- Start compiling the outcome targets achieved

3rd Professional Year

- Analysis of their involvement and impact on existing socio-politico-economic dynamics in addition to improvement in health conditions

-Final visit in the last months in advance to examination schedule, to have last round of active interaction with families

-prepare a report to be submitted to department addressing:

1) Improvement in general health
2) Immunization
3) Sanitation
4) De-addiction
5) Improvement in anemia, tuberculosis control
6) Sanitation awareness
7) Any other issues
8) Role of the student in supporting family during illness/ medical emergency
9) Social responsibility in the form of environment protection programme in form of plantation drive (medicinal plants/trees), cleanliness and sanitation drives with the initiative of the medical student

Professional Year	Competency The student should be able to	Objectives	Suggested Teaching Learning methods	Suggested Assessment methods	Teaching Hours
1st Professional	• Collect demographic profile of allotted families, take history and conduct clinical examination of all family members	By the end of this visit, students should be able to compile the basic demographic profile of allocated family members	Family survey, Community clinics Community clinics, Multispecialty camps	Community case presentation, OSPE, logbook, journal of visit	6 hrs
	• Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the basic health profile and treatment history of allocated family members	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics,	Community case presentation, OSPE, logbook, journal of visit	9 hrs
	• Maintain communication & follow up of remedial measures	By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment and suggested remedial measures	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences	Community case presentation, OSPE, logbook based certification of competency, journal of visit	6 hrs
	• Take part in environment protection and sustenance activities.	By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance			6hrs

		like study of environment of families, tree plantation/ herbal plantation activities conducted in the village		logbook based certification of competency, journal of visit	(Total 27 hrs, 9 visits)
2nd Professional	• Take history and conduct clinical examination of all family members	By the end of this visit, students should be able to compile the updated medical history of family members and report their vitals and anthropometry	Family survey, Community clinics	Community case presentation, OSPE, logbook, journal of visit	6 hrs
	• Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor	By the end of this visit, students should be able to report the details of clinical examination like Hb %, blood group, urine routine and blood sugar along with treatment history of allocated family members	Community clinics, Multispecialty camps	Community case presentation, OSPE, logbook, journal of visit	9 hrs
	• Maintain communication & follow up of remedial measures	By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment, and suggested remedial	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics,	Community case presentation, OSPE, logbook based certification of competency,	9 hrs

	• Take part in environment protection and sustenance activities.	measures along with details of vaccination drive By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenancelike study of environment of families, tree plantation/ herbal plantation activities conducted in the village	Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences	journal of visit logbook based certification of competency, journal of visit	6 hrs (Total 30 hrs, 6 visits)
3rd Professional	• Final counselling of the family members of allotted families and analyze the health trajectory of adopted family under overall guidance of mentor	By the end of this visit, students should be able to update the medical history of family members and their vitals and anthropometry By the end of this visit, students should be able to report the details of clinical examination like Hb %, blood group, urine routine and blood sugar along with treatment history of allocated family members	Family survey, Community clinics Community clinics, Multispecialty camps	Community case presentation, OSPE, logbook, journal of visit Community case presentation, OSPE, logbook, journal of visit	3hrs 4 hrs

		By the end of this visit, students should be able to provide details of communication maintained with family members for follow-up of treatment, and suggested remedial measures along with details of vaccination drive - By the end of this visit, students should be able to report the activities undertaken for environment protection and sustenance like study of environment of families, tree plantation/ herbal plantation activities conducted in the village By the last visit, students should be able to analyze and report the health trajectory of adopted family along with remedial measures adopted at individual, family and community level	Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics, Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences - Small group discussion (report of the health trajectory of adopted family)	Community case presentation, OSPE, logbook based certification of competency, journal of visit logbook based certification of competency, journal of visit -Logbook based certification of competency, journal of visit	4 hrs 4 hrs 4 hrs +6 hrs in last visit (total 21 hrs, 5 visits)

TOTAL	1st Prof 2nd Prof 3rd Prof	9 visits 6 visits <u>5 visits</u> **20 visits**	27 hrs 30 hrs 16 hrs +5 hours in <u>last visit</u> **78 hrs**		

PROTO-TYPE LOG BOOK FOR FAMILY ADOPTION

COLLEGE NAME, UNIVERSITY

ADDRESS DETAILS

NAME OF THE STUDENT:

ROLL NO.:

VILLAGE NAME:

TEHSIL/ DISTRICT:

STATE/ UNION TERITORY:

NAME OF THE MENTOR:

MENTOR STATUS: Asst. Prof/ S.R. And Details: (If changed, details of subsequent mentors)

NAME OF ASHA WORKER:

ADDRESS OF ASHA WORKER:

EXPERIENCE (SINCE HOW MANY YEARS IS HE/ SHE EMPLOYED)

(SEPARATE PAGE FOR EACH FAMILY BE MAINTAINED)

-FAMILY NAME AND ADDRESS

- Approximate size of living space of house-hold
- Malaria/ flu/ etc pertinent to the region
    - If there is any illness or medical emergency required by the house-hold, the student should take initiative in being the primarycontact for the family.
    - The student in turn should consult his/her mentor for further management of the patient.
    - The hospital to which the college is attached must provide treatment facilities to the patient.
    - Government schemes may be utilized for optimal management.
    - Follow-up records must be maintained by the student. These must be periodically evaluated by mentors with the help of senior residents.
    - The entire data sheet may be prepared by every student and submitted latest by the end of the last visit for evaluation.
    - Progress notes must include every demographic point and history recorded.

PROTO TYPE LOG BOOK

NAME	AADHAAR NO.	BIRTH DATE	AGE	POSITION IN FAMILY (eg. Head, wife, sibling order, grand mother, etc)	DIETARY HABITS, DIET	LITERACY: EDUCATIONAL QUALIFICATION annual progress of children to be recorded	EMPLOYMENT for income source, eg. Labourer/ land owner/ teacher, etc	NAME OF SCHOOL OF CHILD grade/ standard, medium of learning	ADDICTIONS IF ANY	HEIGHT (CMS)	WEIGHT (KG)
1ST PROF/ MBBS											
SR. NO.	DATE OF VISIT										
1											
2											
2ND MBBS											
1											
2											
FINAL-1ST PROF-FINAL MBBS-1ST											
1											
2											

PROTO TYPE LOG B

		IMMUNIZATION STATUS	PULSE	BP	R.R.	BLD GP, Rh	HEMOGLOBIN	URINE PROTEIN	URINE SUGAR	ANY POS.FINDING IN URINE	BLOOD SUGAR	IMMUNIZATION STATUS	ORAL CHECK-UP	**HYGEINE STATUS**
1ST PROF/ MBBS														
SR. NO.	DATE OF VISIT													
1														
2														
2ND MBBS														
1														
2														
FINAL-1ST PROF-FINAL MBBS-1ST														
1														
2														

BRIEF TRANSLITERATION OF MAHARSHI CHARAK SHAPATH

- During the period of study I shall live a disciplined life with my teachers and peers. My action shall be guarded, service oriented and free from indiscipline and envy. In my dealings I shall be patient, obedient, humble, constantly contemplative and calm. I shall aim my full efforts and ability towards the desired goal of my profession.
- As a Physician, I shall always use my knowledge for welfare of mankind.
- I shall always be ready to serve patients, even if I am extremely busy and tired. I shall not harm any patient for the sake of monetary or selfish gains, nor shall I entertain a desire for lust, greed or wealth. Immorality shall not emerge even in my thoughts.
- My dressing shall be decent yet impressive and inspiring confidence. My conduct shall always be appropriate, pleasant, truthful, beneficial and polite. I shall use my experience in actions appropriate for that time and place.
- I shall constantly endeavor to accomplish/ keep updated with the latest developments in the field and widen my knowledge.
- I shall treat patient of gender other than mine in presence of relatives or attendants.
- When examining a patient, my discretion, attention and senses shall be concentrated on the cure of the disease. I shall not divulge the confidentiality related to the patient or family inappropriately.
- Although an authority (in my subject), I shall not display my knowledge and skill with arrogance.

Resolution No. 6.4 of Academic Council (AC-52/2025):
Resolved to approve the Physiology- clinical examination skill modules from first MBBS 2025-26 batch onwards [ANNEXURE-36].

Annexure-36 of AC-52/2025

MGMIHS

Department of Physiology

Clinical examination skill modules

Faculty Guide for teaching

PREFACE

The undergraduate competency based medical education curriculum focuses on outcomes and gives emphasis to skill development. The competencies ‘Shows How’ (SH) or ‘Perform’ (P) listed in competency document are in relation to the skills to be acquired by the learner. The CBME 2024 guidelines, also mentions that - Learners have to complete the required certifiable competencies for that phase and completed the log book as one of the eligible criteria for university examination.

Skill: Skill is the ability to perform a task leading to a specific predefined outcome.
Skill may be:

a) Intellectual or cognitive which includes clinical reasoning and decision-making skills,
b) Procedural or psychomotor skills that require manual dexterity and include laboratory and clinical skills,
c) Communication skills,
d) Team skills including leadership skills.

Clinical examination skills are the backbone of medical practice, and mastering these skills is essential for shaping competent and compassionate future doctors. While technology and medical knowledge continue to advance, the physical exam remains irreplaceable.

An attempt has been made to develop clinical examination skill modules as per annexure A of NMC Module 5 Skill training. This document will help the trainers to teach the I MBBS students the clinical examination as part of Physiology curriculum. Also, it will be helpful for skill assessment in preparation of OSCE station checklist.

These modules are prepared by Dr Yashoda Kattimani, Professor & Head, Physiology, MGM MC Vashi, NM with the help of Tutors -Dr. Jay Shinde and Dr Sharadha Nakum.

OVERVIEW OF “DOAP METHOD”

The DOAP (Demonstrate, Observe, Assist, Perform) method is a four-stage skill-training approach.

In this method, a trainer first demonstrates a skill, and the trainee observes, next the trainee assists in the skill's execution, and finally performs the skill independently or with supervision.

This technique enhances skill acquisition by breaking down tasks, reducing cognitive load, and providing practical experience in a structured way.

Steps of the DOAP method:

1. **Demonstrate:**

   The trainer or expert performs the skill to be learned, providing a clear example of the correct procedure.

2. **Observe:**

   The trainee watches the demonstration attentively to understand the steps and nuances of the skill.

3. **Assist:**

   The trainee helps the trainer or another experienced person as they perform the skill, gaining practical familiarity with the process.

4. **Perform:**

   The trainee attempts the skill, initially in a simulated or controlled environment, progressing to performing it under supervision or independently.

OVERVIEW OF CLINICAL EXAMINATION

Clinical examination consists of

I) History taking, II) General examination, III) Systemic examination

I) History taking: The doctor listens to the patient's complaints and collects relevant information.

II) General examination: It involves examination of the patient as a whole. It should be done before systemic examination. It aids in diagnosis.

III) Systemic examinations: consists of four methods:

1. Inspection 2. Palpation 3. Percussion 4. Auscultation

1. INSPECTION: It means art of seeing or observing without touching the subject. The various points to be observed are different for different systems.

2. PALPATION: It is examination by touch with the flat of palm. It may be of two types- superficial
and deep. Certain findings such as temperature, tenderness and consistency are elicited only by superficial palpation. Abdominal organs - liver, spleen etc. are examined by deep palpation.

3. PERCUSSION: Percussion means tapping or giving an impact. Middle finger of the left hand called the pleximeter is placed on the skin surface. Middle finger of the right hand called the plexor strikes the middle phalanx of the pleximeter.

Rules of percussion:

- Pleximeter finger is placed on the surface without any air gap with the other fingers kept above the surface.
- Tip of the plexor finger is used to give a tap on the middle phalanx of the pleximeter in a perpendicular direction.
- While giving the tap, the movement is only at the wrist joint with the elbow and shoulder fixed.

- As soon as the percussion stroke is delivered the plexor should be lifted up or else it will dampen the percussion note.
- Percussion is done from resonant area to dull area and should be done parallel to the long axis of the organ.

Three types of notes are heard.

- Resonant – over the lungs
- Tympanic- over the hollow viscus
- Dull – over the heart, liver, spleen

4.AUSCULTATION: It means listening. The instrument used is called stethoscope.

The chest piece has two parts -bell and diaphragm.

Method of stethoscopy:

1. There should be quietness in the room.
2. The ear piece when applied to the ear should direct downwards and forwards.
3. The chest piece should be applied to the skin surface without hair or clothing.

Department of Physiology

Outline of a Session Plan-Examination of Radial Pulse

Parameter	Description
Name of the lesson	Radial Pulse Measurement
Number of learners	100 -First-Year MBBS Students (Physiology)
Competency	PY5.14 Record pulse at rest in a volunteer
Objectives of the session (SLO)	By the completion of this module the students should be able to demonstrate • Examination of radial pulse with 3 fingers placed correctly on wrist. • Complete the examination of pulse under the headings of: -Rate, Rhythm, Tension, Force, Volume, Condition of arterial wall, Equality on both sides & locate other peripheral pulses. • Report basic characteristics of the pulse.
Primary teaching method	DOAP (Demonstrate, obverse, Assist, Perform)
Breakup of the session-Steps of Examination	➢ Introduce, Greet the Patient and Obtains verbal consent. ➢ Ensures appropriate position of the patient -hand position to be semi flexed wrist & semi prone forearm ➢ Ensures patient comfort and explains the test procedure ➢ Correctly identifies the anatomical location of the radial artery (radial side of the wrist, lateral to flexor carpi radialis tendon). ➢ Uses pads of 3 fingers (index, middle, ring finger). ➢ Applies appropriate pressure & Maintains gentle and consistent palpation. ➢ Counts pulse for a full 60 seconds ➢ Accurately determines the pulse rate ➢ Assesses the rhythm (regular/irregular). ➢ Assesses the volume/character ➢ Reports findings clearly to the examiner ➢ Thank the patient.
Teaching aids required	Peers /clinical subjects / Standardized Patient
Infrastructure required (Venue)	Physiology clinical Lab
Student preparation required/ prior reading required	Lecture on heart Rate & reading from physiology journal
Assessment method chosen	OSCE

Department of Physiology

Outline of a Session Plan-Examination of Blood Pressure

Parameter	Description
Name of the lesson	Clinical Exam of BP and Effect of Posture
Number of learners	100
Competency	PY5.14 Record BP at rest & in different postures in a volunteer
Objectives of the session (SLO)	By the completion of this module the students should be able to • Identify the parts of the BP apparatus & tell their functions. • Prepare the patient and equipment correctly for blood pressure measurement. & Select the appropriate cuff size. • Accurately estimate systolic blood pressure using the palpatory method. • Perform the auscultatory method for blood pressure measurement using a stethoscope and sphygmomanometer. • Identify Korotkoff sounds & know the importance of auscultatory gap. • Record the BP of the subject at rest (5min in supine position), immediately on sitting up, 5 min after sitting, immediately on standing from sitting & 5 min after standing. • Accurately record and communicate the measured blood pressure values to the examiner
Primary teaching method chosen	DOAP (Demonstrate, Observe, Assist, Perform)

Breakup of the session - Steps of Examination	➢ Introduce, Greet the Patient and take verbal consent. ➢ Ensures sphygmomanometer and stethoscope are functional ➢ Ensures appropriate position of the patient ➢ Ensures patient comfort and explains the test procedure ➢ Exposes the upper arm area ➢ Tie the BP cuff correctly on arm about 3cm above the cubital crease ➢ Palpate the radial pulse & Inflate the cuff till pulse disappears ➢ Deflate the cuff, record the systolic BP when the pulse reappears, by palpatory method with accuracy of ±10 mmHg. ➢ Palpate the Brachial pulse in cubital fossa, place the chest piece of stethoscope there. ➢ Inflate the cuff + 30 mmHg above systolic BP ➢ Deflate the cuff slowly and identify the Korotkoff sounds. ➢ Record the systolic BP at the appearance of first Korotkoff sound by auscultatory method with accuracy of ±10 mmHg ➢ Continue to deflate the cuff and Record the diastolic BP at disappearance of Korotkoff sound by auscultatory method with accuracy of ±10 mmHg ➢ Thank the patient for cooperation ➢ State the findings and concludes.
Teaching aids required	Sphygmomanometer & Stethoscope /peers/volunteer
Infrastructure required (Venue)	Clinical Physiology Lab
Student preparation required/ prior reading required	Knowledge on Determinants of BP and BP regulation & reading from physiology journal
Assessment method chosen	Clinical exam / OSCE

Department of Physiology

Outline of a Session Plan-Examination of CVS

Parameter	Description
Name of the lesson	Clinical Examination of CVS
Number of learners	100 -First-Year MBBS Students (Physiology)
Competency	PY5.16 Obtain relevant history and conduct general and clinical examination of the cardiovascular system in a normal volunteer or simulated environment
Objectives of the session	• Demonstrate appropriate patient communication. • Prepare the patient for a cardiovascular system examination. • Perform a systematic inspection of the patient for cardiovascular signs. • Accurately palpate apex beat • Percuss the chest for cardiac dullness and cardiac boarders • Perform basic auscultation of heart sounds and identify their characteristics. • Understand the physiological basis and clinical significance of normal and abnormal findings during a cardiovascular examination. • Adhere to principles of professionalism, patient safety, and hygiene throughout the procedure
Primary teaching method	DOAP (Demonstrate, observe, Assist, Perform)
Breakup of the session- Steps of Examination	Examine Under headings- Inspection, palpation, Percussion, Auscultation ➢ Greets patient and introduce self & Obtain verbal consent ➢ Performs hand hygiene before the examination After Examination ➢ Thank the patient ➢ Report findings
Inspection	Look for ➢ Shape of the precordium (normal/bulging / retraction) ➢ Pulsations in the precordium area (Apex beat) ➢ Pulsations outside the precordium (in supra sternal notch, epigastrium and Neck) ➢ Distended veins in the neck and thorax

Palpation-Apex Beat	➢ Observe for visible apex pulsation ➢ Use the flat palm, placed on the left side of the chest (around 4th to 6th ICS), identify the apex pulsations ➢ Localize the apex beat using fingertips ➢ Identify the intercostal space and note if it is in the mid-clavicular line ➢ Describe: -Position: (Usually left 5th ICS, MCL) & Character
Percussion-Borders of Heart	Used proper percussion technique (as per percussion rules). **Left Border-** ➢ Locate the apex beat, start percussion in the same ICS from resonant lung area from anterior axillary line to sternum moving medially to detect cardiac dullness. ➢ Mark the point of dullness. ➢ Then go one ICS above and repeat the same procedure to mark the point of dullness in 4^{th}, 3^{th}, 2^{nd} ICS. ➢ Joining the point of dullness -gives left border. **Right border:** ➢ Start percussion from right 2nd intercostal space, move downward, till get the liver dullness (6 ICS) ➢ Start percussion one ICS above from resonant lung area from anterior axillary line to sternum moving medially to detect cardiac dullness in $5^{th,}4^{th}$, 3^{th}, 2^{nd} ICS. ➢ On the right side, there is no area of dullness in $5^{th,}4^{th}$, 3^{th}, 2^{nd} ICS, hence conclude that right border of heart is retro sternal.

<table>
<tr><td>Auscultation-
Heart sounds</td><td>

Check if the stethoscope is clean and functional
Use diaphragm for high-pitched sounds (S1, S2)

<table>
<tr><th>Valve Area</th><th>Location</th><th>What to Hear</th></tr>
<tr><td>Aortic</td><td>2nd right intercostal space, parasternal</td><td>S1, S2, S2 louder</td></tr>
<tr><td>Pulmonary</td><td>2nd left intercostal space, parasternal</td><td>S1, S2, S2 slightly louder</td></tr>
<tr><td>Tricuspid</td><td>4th left ICS, lower left sternal edge</td><td>S1, S2, S1 louder</td></tr>
<tr><td>Mitral</td><td>5th ICS, midclavicular line (apex)</td><td>S1, S2, S1 loudest</td></tr>
</table>

Check for any abnormal sounds-Murmurs

</td></tr>
<tr><td>Teaching aids required</td><td>Stethoscope / peer/ volunteer/</td></tr>
<tr><td>Infrastructure required (Venue)</td><td>Physiology clinical Lab</td></tr>
<tr><td>Student preparation required/ prior reading required</td><td>Lecture on anatomy of heart, heart Rate & Reading from physiology journal</td></tr>
<tr><td>Assessment method chosen</td><td>OSCE</td></tr>
</table>

Department of Physiology

Outline of a Session Plan-Examination of RS

Parameter	Description
Name of the lesson	Clinical Examination of RS
Number of learners	100 -First-Year MBBS Students (Physiology)
Competency	PY6.10 Obtain relevant history and conduct general and clinical examination of the respiratory system in a normal volunteer or simulated environment
Objectives of the session	• Demonstrate appropriate patient communication. • Identify signs and symptoms of respiratory illness. • Prepare the patient for a respiratory system examination. • Perform systematic examination of the respiratory system. • Inspect normal vs abnormal shapes of the chest. • Describe the principle of tactile vocal fremitus and its application. • Describe the rules of percussion. • Auscultate and note the difference between vesicular and bronchial breath sounds. • Types of abnormal auscultation breath sounds. • Correlate clinical findings with underlying physiology and pathology. • Adherence to principles of professionalism, patient safety, and hygiene throughout the procedure
Primary teaching method	DOAP (Demonstrate, observe, Assist, Perform)
Breakup of the session-Steps of Examination	Examine Under headings- Inspection, palpation, Percussion, Auscultation ➢ Greets patient and introduce self & Obtain verbal consent ➢ Performs hand hygiene before the examination After Examination ➢ Thank the patient ➢ Report findings

Inspection	Look for ➢ Shape of the chest (symmetric/asymmetric) ➢ Movement of the chest (respiratory rate/type of breathing) ➢ Position of trachea (central/shifted) ➢ Visible neck veins/apex beat/surgical scars
Palpation	➢ Measure the Anteroposterior and Transverse diameter and Expansion of the chest ➢ Check for chest movement. • **For front side and back** : Fix the partially spread out fingers of both hands on symmetrical areas on either side of both axillae and bring the two extended thumbs in the midline. Ask the subject to breathe deeply but slowly in and out. Observe that two thumbs move away equally from the midline. Confirm whether the movements on Rt. and Lt. side are equal or not. • For apical expansion: Standing behind the subject keep hands on the shoulders with the thumbs posteriorly in midline. Ask the subject to take deep inspiration and expiration. During inspiration, the fingers are lifted up due to expansion of apices. Compare the uplift of lingers on both sides ➢ Confirm the position of the trachea by placing the index and the ring finger on either head of the sternocleidomastoid muscle and middle finger on the suprasternal notch. Normally the resistance encountered is equal on both sides. ➢ Detect tactile vocal fremitus using the ulnar border of the hand placing in intercostal spaces of chest wall while the patient is made to repeat the words with a nasal twang such as 'ninety-nine' or 'one-one-one' over and over again keeping the intensity and pitch of tone strictly constant. ➢ The same hand must be used throughout, simultaneously proceeding systematically downwards from the apices to the bases, first anteriorly, then along the axillae and finally posteriorly. Position of subject: * For front side: Sitting position with head and shoulders erect. * For back side: Sitting position with the subject bending forward with the head flexed

	and crossed arms resting on shoulders. * For axillary region - sitting position with both the hands-on head.
Percussion	Use proper percussion technique (as per rules of percussion) Start percussion at the apices of the lungs, comparing identical areas on the two sides, and slowly proceeding downwards, Percuss first anterior wall, then axillae and finally along the posterior wall. ➢ Define the Borders of the lung. ➢ Difference in percussion note due to the presence of liver on the right and spleen and heart on the left. ➢ Determine the state of the underlying tissue.
Auscultation	➢ Check if the stethoscope is clean and functional ➢ Check for air-entry (equal/unequal). ➢ Type of breathing (bronchial/vesicular) on various regions of the lungs. ➢ Vocal resonance – corresponding intercostal space on both sides are auscultated simultaneously, while the patient is made to repeat the words with a nasal twang such as 'ninety-nine' or 'one-one-one' over and over again keeping the intensity and pitch of tone strictly constant. ➢ Any abnormal lung sounds (heard/not heard).
Teaching aids required	Stethoscope/cardboards/measuring tape/peer/ volunteer
Infrastructure required (Venue)	Physiology clinical Lab
Student preparation required/ prior reading required	Lecture on anatomy of the lungs, organs in the thorax, physiology of the mechanics of breathing and journal reading
Assessment method chosen	OSCE

Department of Physiology

Outline of a Session Plan-Examination of Abdomen

Parameter	Description
Name of the lesson	Clinical Examination of Abdomen
Number of learners	100 -First-Year MBBS Students (Physiology)
Competency	PY4.0 Obtain relevant history and conduct general and clinical examination of the gastrointestinal system in a normal volunteer or simulated environment
Objectives of the session	• Demonstrate appropriate patient communication and consent • Position and drape the patient correctly for an abdominal examination • Perform systematic inspection of the oral cavity, hands, face, and abdomen for gastrointestinal signs • Execute light and deep palpation of all abdominal quadrants, including targeted palpation of liver, spleen, kidneys, and aorta • Measure liver span and detect splenic or renal enlargement using percussion techniques • Identify ascites with shifting dullness and fluid thrill tests • Auscultate for bowel sounds and vascular bruits, interpreting normal and abnormal findings • Correlate findings with underlying physiological mechanisms and common pathological conditions • Maintain professionalism, patient safety, and infection control throughout the procedure
Primary teaching method	DOAP (Demonstrate, observe, Assist, Perform)

Parameter	Description
Breakup of the session- Steps of Examination	Examine Under headings- Inspection, palpation, Percussion, Auscultation ➢ Greets patient and introduce self & Obtain verbal consent ➢ Performs hand hygiene before the examination After Examination ➢ Thank the patient ➢ Report findings
Inspection	• Observe patient posture, comfort, and any signs of distress • Inspect hands for clubbing, leukonychia, palmar erythema • Examine face and eyes for jaundice, pallor, xanthelasma • Inspect oral cavity for glossitis, ulcers, fetor hepaticus • Abdomen exposed from Xiphi-sternum to pubic symphysis. ➢ Observe abdomen for contour (flat (normal), distended or retracted), scars, striae, visible peristalsis, or pulsations ➢ Look for hernias at umbilical and inguinal regions ➢ Note dilated abdominal veins or caput medusae
Palpation	•Ask the subject to flex the thighs on the abdomen and to breath quietly through his mouth •Warm hands and begin with superficial palpation in all nine quadrants for tenderness or guarding • Proceed to deep palpation to detect masses or organ enlargement • **Liver** • Start palpating with the flat of the hand from the right iliac fossa moving gradually upwards to the costal margin. To palpate smaller enlargement, tips of the fingers are gently inserted beneath the costal margin and the subject is asked to take a deep breath. • Describe size, surface, and consistency • **Spleen** • Palpate from right iliac fossa diagonally toward left costal margin during inspiration • Note if spleen tip is palpable and its characteristics • **Kidneys** • Use bimanual ballottement technique to assess mobility and size. Place one hand behind in the loin at the renal angle to maintain a forward pressure, whilst the other hand is placed flat on

Parameter	Description
	the abdomen in the lumbar region with the fingers pointing towards costal margin. Try to palpate kidney between two hands • **Aorta** • Palpate just left of midline above umbilicus for pulsation •**Fluid thrill** (for Ascites) -Instruct the subject to press the ulnar border of one of his hands along the midline to impede vibrations travelling through the skin. Tap on one side of the abdominal wall and note if there is any significant impact felt by the flat of the other hand placed on the other side of the abdominal wall.
Percussion	• Percuss all quadrants for tympanic note and dullness pattern • **Liver Span** • Begin at right mid clavicular line, percuss down from lung resonance to liver dullness, mark upper border • Percuss upward from abdominal resonance to liver dullness, mark lower border, measure span • Ascites • **shifting dullness**-Percuss from umbilicus towards the flank until dull note is heard. Keeping the pleximeter in the same position instruct the subject to lie on the opposite flank and wait for a minute to allow the fluid to gravitate. Percuss from where your left. noting that the dull point has become tympanic. Continue towards the opposite flank until a dull note is heard. Repeat the procedure as done before so that the dull point becomes tympanic. • **Horse shoe shaped dullness**: Percuss from the umbilicus towards the periphery in all directions to mark horse shoe shaped dullness at the periphery
Auscultation	• Ensure stethoscope is clean and functional • Place diaphragm lightly over right lower quadrant, listen for bowel sounds for at least thirty seconds • Note frequency, pitch, and character of bowel sounds • Auscultate over epigastrium and renal arteries for bruits • Listen over liver for venous hum if portal hypertension suspected
Teaching aids required	Stethoscope / peer/ volunteer/ measuring tape
Infrastructure required (Venue)	Physiology clinical Lab

Parameter	Description
Student preparation required/ prior reading required	Lecture on anatomy of abdomen, Revise concepts of referred pain, peristalsis, and liver function tests & Reading from physiology journal
Assessment method chosen	OSCE

Department of Physiology

Outline of a Session Plan-Examination of Sensory System

Parameter	Description
Name of the lesson	Clinical Examination of Sensory System
Number of learners	100 -First-Year MBBS Students (Physiology)
Competency	PY10.11 Obtain relevant history and conduct general and clinical examination of the sensory component of the nervous system in a normal volunteer
Objectives of the session	• Demonstrate clear patient communication and informed consent • Position and drape the patient correctly for a sensory examination • Test superficial sensations including light touch, pain, and temperature • Assess deep sensations including vibration sense and proprioception • Evaluate cortical sensations such as stereognosis, graphesthesia, two-point discrimination, and tactile localization • Correlate sensory findings with spinal segmental levels and major ascending pathways • Differentiate patterns of sensory loss related to peripheral nerve, root, spinal cord, and cortical lesions • Maintain professionalism, patient safety, and infection control throughout the procedure
Primary teaching method	DOAP (Demonstrate, observe, Assist, Perform)
Steps of Examination	Before Examination • Greets patient and introduce self & Obtain verbal consent • Performs hand hygiene before the examination • Perform examination After Examination • Thank the patient • Report findings

Parameter	Description
Inspection	• Observe patient comfort, limb positioning, and any splints or dressings • Note muscle wasting, scars, or skin changes that may influence sensory findings •Examination of Spine for any deformity or abnormal swelling or Tenderness
Superficial Sensations	▪ For all tests, ask patient to close eyes and respond "yes" when sensation is felt ▪ Identical dermatomes should be tested • <u>Light Touch</u> • Use a wisp of cotton • <u>Pain</u> • Use sterile pin or broken cotton swab stem • Alternate sharp and blunt ends, asking patient to identify each stimulus • <u>Temperature</u> • Use test tubes filled with warm and cool water • Touch skin in random order, asking patient to differentiate warm from cool
Deep Sensations	• Vibration Sense • Strike a 128 Hz tuning fork, place on bony prominence, ask when vibration starts and stops • Proprioception **Sense of position**- Move the limb passively in various directions through the air finally leaving it in some definite position. Ask the subject to keep the other limb in a similar position. with eyes closed **Appreciation of movement** - Hold distal phalanx of finger or toe, move slightly up or down, ask patient to identify direction with eyes closed

Parameter	Description
Cortical Sensations	• **Stereognosis** • Place familiar object in patient hand, ask for identification • **Graphesthesia** • Trace a number on patient palm, ask for recognition • **Tactile Localization** • Touch a point on skin, ask patient to indicate exact spot • **Two Point Discrimination** • Use calipers, find minimal distance at which two simultaneous touches are perceived as separate
Teaching aids required	• Cotton wool, disposable pin • Test tubes with warm and cool water • 128 Hz tuning fork • Calipers • Assorted familiar objects (coin, key) • Volunteer
Infrastructure required (Venue)	Physiology clinical Lab
Student preparation required/ prior reading required	Lecture on dorsal column and spinothalamic pathways, revise dermatomal charts and nerve distributions & Reading from physiology journal
Assessment method chosen	OSCE

Department of Physiology

Outline of a Session Plan-Examination of Motor System

Parameter	Description
Name of the lesson	Clinical Examination of Motor System
Number of learners	100 -First-Year MBBS Students (Physiology)
Competency	PY10.11 Obtain relevant history and conduct general and clinical examination of the motor component of the central nervous system in a normal volunteer
Objectives of the session	• Demonstrate respectful patient communication and informed consent • Position and expose the patient appropriately • Observe muscle bulk, posture, and involuntary movements • Assess muscle tone • Test muscle strength across major joints and grade power • Evaluate coordination with cerebellar tests • Elicit and interpret superficial and deep tendon reflexes • Examine gait and stance • Correlate findings with underlying disorders • Maintain professionalism, patient safety, and infection control throughout the procedure
Primary teaching method	DOAP (Demonstrate, observe, Assist, Perform)
Steps of Examination	Before Examination • Greets patient and introduce self & Obtain verbal consent • Performs hand hygiene before the examination • Perform examination After Examination • Thank the patient • Report findings

Parameter	Description
Inspection	• Observe body posture, muscle wasting, hypertrophy, or fasciculations • Look for abnormal limb positions suggestive of contractures or spasticity • Identify involuntary movements such as tremor, chorea, athetosis, or dystonia
Tone of Muscles	➢ Tone is checked by feel of the muscles and the resistance to passive movements. • Ensure patient relaxation and explain passive movements • Upper Limbs • Flex and extend elbow and wrist, supination pronation of forearm • Lower Limbs • Flex and extend hip and knee • Roll thigh side to side assessing for clasp knife phenomenon cogwheel rigidity or lead pipe rigidity
Power	➢ Power is tested by noting active movements at each joint, without resistance and then against resistance. • Grade strength on the Medical Research Council scale from 0 to 5 • Upper Limbs • Shoulder abduction & adduction, elbow flexion extension, wrist extension, finger grip • Lower Limbs • Hip flexion, knee extension flexion, ankle dorsiflexion plantar flexion, big toe extension
Coordination	• Upper Limbs • Finger nose test, Finger to finger test, Diadochokinesia • Lower Limbs • Heel knee test, foot tapping, Walking along a straight line (Tandem gait) Romberg with eyes open and closed Note for rebound phenomenon

Parameter	Description
Reflexes	**• Deep Tendon Reflexes** • Biceps, triceps, supinator, knee jerk, ankle jerk graded from 0 to 4+ a. **Jaw jerk**: (Pons) Ask the subject to keep the mouth partially open with jaw muscles relaxed. Keep the index finger over the chin and percuss with the hammer. There is partial closure of the mouth. b. **Biceps jerk**: (C5 C6) Elbow is flexed at right angle, the forearm is slightly pronated and supported on the examiner's forearm. The thumb is placed on the biceps tendon to fix it and percussed with a hammer. The contraction of biceps is either seen or felt. c. **Triceps jerk** (C6 C7 C8) : The elbow is flexed at right angle and strike the triceps tendon at olecranon process just above elbow joint with hammer. There is contraction of triceps muscle and extension of elbow. d. **Supinator jerk** (C5,C6) : The forearm is flexed at right angle and is in midprone position. Support it at the wrist and strike the brachioradialis tendon,1-2 inches above the wrist over the styloid process. There is flexion and partial supination of the forearm. e. **Knee jerk** (L2 L3 L4) : Ask the subject to cross one leg over the other and allow the upper leg to hang loosely. give a sharp tap on the patellar tendon with hammer. Extension of the leg and contraction of quadriceps is seen. f. **Ankle jerk** (S1 S2) : Ask the subject to kneel with one leg on a chair. Slightly dorsiflex the foot and give a tap on tendo achilles with the hammer. Plantar flexion of the foot is observed. If the knee and ankle jerks are exaggerated, patellar and ankle clonus can be elicited **• Superficial Reflexes** 1.**Abdominal reflex** (T7 T12): Gently stroke the skin of abdomen with the blunt end of percussion hammer in the area where you want to elicit the reflex. Stroke should be directed towards umbilicus from all directions but never radiating from it. Contraction of underlying muscles is observed. 2.**Plantar reflex**: (L5 S1 S2) See that the sole is dry and warm. With the sharp end of the hammer start stroking from the lower lateral border of the sole at the bae of toes turn medially and proceed further up to the base of great

Parameter	Description
	toe. The plantar flexion of the great toe is a normal response. When there is dorsiflexion of the great toe and fanning of toes, the response is called Babinski's sign 3.**Conjunctival reflex**: Ask the subject to look in front. Touch the bulbar conjunctiva of one eye with a fine wisp of cotton bringing it from the lateral side. Both eyes blink briskly. Examine each eye separately. 4.**Corneal reflex**: Touch the cornea with a fine wisp of cotton bringing it from the lateral side. Other details are similar to that of the conjunctival reflex. Examine each eye separately. **• Special Signs** • Clonus at ankle or knee, Hoffmann sign in upper limb
Gait and Stance	• Observe casual gait, tandem walking, heel and toe walking • Assess stance stability with Romberg and pronator drift
Teaching aids required	• Neurological hammer • Tongue depressor for plantar reflex • Examination bed • Volunteer or mannequin
Venue	Physiology clinical Lab
Student preparation required/ prior reading required	Lecture on neuron pathways, corticospinal tract, and cerebellar circuits, Revise grading scales for power and reflexes & Reading from physiology journal
Assessment method chosen	OSCE

Department of Physiology

Outline of a Session Plan-Examination of Cranial Nerves

Parameter	Description
Name of the lesson	Clinical Examination of Cranial Nerves
Number of learners	100 -First-Year MBBS Students (Physiology)
Competency	PY10.11 Obtain relevant history and conduct general and clinical examination of the cranial nerves in a normal volunteer
Objectives of the session	• Communicate clearly with the patient and obtain informed consent • Position and drape the patient appropriately for a cranial nerve examination • Inspect and test each cranial nerve systematically, recording normal and abnormal findings • Correlate clinical signs with underlying neuroanatomy and common pathologies • Maintain professionalism, patient safety, and infection control throughout the procedure
Primary teaching method	DOAP (Demonstrate, obverse, Assist, Perform)
Steps of Examination	Before Examination • Greets patient and introduce self & Obtain verbal consent • Performs hand hygiene before the examination • Perform examination After Examination • Thank the patient • Report findings
Inspection	• Observe speech, facial symmetry, eye position, and any involuntary movements
CN I Olfactory	Ask the subject to clean the nostrils. • Test each nostril separately with familiar nonirritant odors such as coffee, peppermint, eucalyptus, camphor, asafetida, oil of clover.

Parameter	Description
	• Ask the patient to identify the smell while keeping eyes closed
CN II Optic	• Assess visual acuity for **Distant Vision**-with a Snellen chart with good illumination Ask the subject to sit comfortable at a distance of 6 meters from the chart. (subject can read the language) Ask the subject to cover one eye with the palm and to read the chart with the open eye from above downwards. Record the line and number up to which the subject can read. **Near vision**- with Jaeger's test types Ask the subject to sit with his back to the light and to hold the well illuminated chart at a distance of 30 cms. Each eye is tested separately and finally both the eyes together. Subject reads from big type to the finest type. Record the type up to which the person can read. • Test visual fields by confrontation in all quadrants • Inspect the optic fundus with an ophthalmoscope • Check pupillary reaction to light and accommodation. **1.Direct light reflex**: Ask the subject to look at a distant object so that his accommodation is relaxed. Cover one eye with the hand and throw light in the other bringing the torch from the lower lateral field of the eyes. The pupil constricts immediately. Examine both the eyes separately **2.Accommodation reflex**: Ask the subject to look at distant object. Suddenly hold the index finger vertically about six inches in front of the subject's nose and instruct him to look at it. The pupils constrict as the eye converge •Test for color vision by Asking the subject to identify the numbers on the plate of Ishihara's Chart
CN III, IV, VI- Oculomotor, Trochlear, Abducens	• Inspect for ptosis, strabismus, and pupil size • Assess extraocular movements in the six cardinal gazes, noting diplopia or nystagmus Ask the subject to sit comfortably on a stool. Fix the subject's head with the help of your hand so that the subject will not move his head. Ask him to follow the movements of your finger which is at a distance of 1 meter from his eyes. Move your finger to the right, left, upwards, downwards and in all the four oblique directions. Examine each eye separately with the other eye covered

Parameter	Description
	•Examine conjugate deviation and concomitant strabismus In subjects having paralytic squint - one of the eyes may fail to show the optimum range of movements. Ask the subject to cover one eye with hand. Hold the finger in front in the center and ask him to fix the gaze. Now ask to uncover the closed eye and watch its position. The covered eye must also show fixation at the finger. In subjects having concomitant squint the covered eye is not found to be fixed and the subject moves it in order to fix it. Such a movement indicates presence of squint. • Test convergence -Ask the subject to look at any distant object. Now ask him to look at the finger suddenly placed at about 30 cm in front of him. Both the eyes turn inwards and fix on the finger.
CN V Trigeminal	• Motor: palpate masseter and temporalis during jaw clench, attempt jaw opening against resistance • Test the power of the pterygoids by side to side movements of the partially open jaw • Sensory: test light touch and sharp pain over ophthalmic, maxillary, and mandibular divisions using cotton wool and a pin • Corneal & conjunctival reflex: lightly touch cornea/conjunctiva with a wisp of cotton, observe consensual blink • Test for jaw jerk
CN VII Facial	• Inspect facial symmetry at rest • Ask the patient to raise eyebrows, close eyes tightly, show teeth, puff cheeks, and whistle • Taste (optional): test sweet sour or salt bitter on the anterior two thirds of the tongue
CN VIII Vestibulocochlear	• Hearing: perform whispered voice test, Rinne, and Weber with a 512 Hz tuning fork Rinne's test: Test each ear separately. Place the base of the vibrating tuning fork on the mastoid process. When the sound is no longer audible, remove it from the bone and hold its vibrating prongs close to the auditory meatus.

Parameter	Description
	Schwabach test: Place the vibrating tuning fork on the mastoid process of the subject. When the sound is no longer audible to the subject, place the fork on examiners mastoid process. When it is no longer audible to examiners ear, bring the tuning fork to the subject's auditory meatus. When the subject ceases to hear it, then bring it to examiners auditory meatus. Weber's test: Place the base of the vibrating tuning fork on the subject's vertex or on the forehead in the midline. Ask subject to identify by which ear he hears better. • Vestibular: observe for nystagmus and perform Romberg test if indicated
CN IX, X- Glossopharyngeal, Vagus	• Inspect palate elevation when the patient says “ah,” observe uvular deviation • Evaluate gag reflex with a tongue depressor • Listen for hoarseness or nasal quality of voice • Assess swallowing by asking the patient to take a sip of water
CN XI Accessory	• Ask the patient to shrug shoulders against resistance to test trapezius • Ask the patient to turn head side to side against resistance to test sternocleidomastoid
CN XII Hypoglossal	• Inspect tongue for wasting or fasciculations at rest • Ask the patient to protrude tongue and move it left and right, note deviation • Test tongue strength by pressing the tip against the inside of each cheek
Teaching aids required	• Snellen chart or near reading card • Torch and ophthalmoscope • Cotton wool, sterile pin, and wisp for corneal reflex • 512 Hz tuning fork • Tongue depressor and flavored solutions for taste testing • Volunteer
Infrastructure required (Venue)	Physiology clinical Lab

Parameter	Description
Student preparation required/ prior reading required	Lecture on brain stem nuclei and cranial nerve pathways, revise reflex arcs for pupillary and gag reflexes & Reading from physiology journal
Assessment method chosen	OSCE

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