



MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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COMPETENCY BASED MEDICAL EDUCATION

(CBME)

(with effect from 2019-2020 Batches)

Curriculum for

First M.B.B.S

Human Physiology

Amended upto AC-42/2022, Dated 26/04/2022

Amended History

1. Approved as per BOM 57/2019 [Resolution no. 3.1.1.13]; Dated 26/4/2019.
2. Amended upto BOM 63/2021 [Resolution No. 4.1.1.2.ii, Resolution No. 4.4.1.6]; Dated 17/02/2021.
3. Amended upto 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.
4. Amended upto 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).

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 situations foster 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 ethical research.

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.

Annexure – C – II

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) - 495

- Lectures(hours)-160
- Small group teachings/tutorials/Integrated teaching/Practicals (hours)-310
- Self directed learning (hours)-25
- Early clinical exposure(hours)- 30

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 Haematology (15 hours)

Competency No.	Topics & subtopics
PY. 2.2	Origin, 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 anaemias & 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 (11 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 fibres 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 (13 hours)

Competency No.	Topics & subtopics
PY. 4.2	Composition, mechanism of secretion, functions, and regulation of saliva, gastric, pancreatic, intestinal, juices and bile secretion
PY. 4.3	GIT movements, regulation and functions, defecation reflex. Role of dietary fibre.
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) (21 hours)

Competency No.	Topics & subtopics
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	Haemodynamics 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 (15 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	Cystometry and discuss the normal cystometrogram

8 Endocrine Physiology (14 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, Stressresponse. Outline the psychiatry component pertaining to metabolic syndrome
PY. 8.6	Mechanism of action of steroid, protein and amine hormones

9 Reproductive Physiology (7 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 and outline 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 (41 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 system and their abnormalities
PY. 10.8	Behavioural 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 colour vision, refractive errors, colour 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 (8 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 2020-21 Batch onwards

PRACTICAL COMPETENCIES

Competency Number	COMPETENCY	Suggested Teaching Learning method
Topic: Haematology		
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

*** Resolution No. 4.1 of AC-41/2021 : Resolved to continue the same AETCOM questions and their distribution for Anatomy, Physiology & Biochemistry as per syllabus in 2019-20, for subsequent batches.**

*	Common questions on AETCOM modules - Physiology
1	Describe professional qualities of a physician.
2	Outlook & Expectations of patient from physician
3	Empathy in patient care.
4	Describe role of a physician in patient care
5	Rights of patients,
6	Responsibilities of patients
7	Human dignity
8	Duties of doctors

***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 admitted in 2020-21 onwards

Annexure-26A of AC-41-2021

I MBBS – CBME – PHYSIOLOGY

PAPER WISE TOPIC DISTRIBUTION

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

*** SPECIFIC TOPIC DISTRIBUTION IN MCQ PHYSIOLOGY PAPER FOR I MBBS**

Sr. No.	Topic	No. of questions
PHYSIOLOGY PAPER – I		
1	General Physiology	2
2	Blood	3
3	CVS	5
4	RS	4
5	Endocrine	4
6	Reproduction	2
	Total	20
PHYSIOLOGY 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

MGMIHS
1st year MBBS. CBME
Format for Internal assessment examinations

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

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

Physiology Practical internal assessment exam pattern

Midterm & Terminal (50 Marks)

S.No	Heading	Marks
1.	Haematology	10
2.	Clinical	10
3.	Human Experiment & Spots	10
4.	Communication skill	05
5.	Journal	05
6.	Viva	10
Total =		50

***Prelim & University exam (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 effects on Cardiorespiratory system)	10
5.	Spots	20
6.	Communication skill	05
7.	Viva	20
Total =		100

* Applicable from 2020-21batch onwards.

***Resolution No. 4.8 of AC-41/2021:** Resolved to approve the change in the pattern of Internal Assessment calculations, to be implemented from current batch of 1st MBBS (CBME) (i.e. AY- 2020-21) onwards

Annexure-27C of AC-41-2021

MGM Medical College, Navi Mumbai & Aurangabad

1st year MBBS CBME

INTERNAL ASSESSMENT CALCULATION

Sr. No.	Criteria	Theory	Practical
1.	*All internal assessment examinations including preliminary examination	50	50
2.	Day to Day assessment		
	➤ Day to Day assessment (PBL/ TBL/ Seminar/ MCQ test etc)	30	
	➤ Day to Day assessment (Viva/ Spotters/ OSPE / OSVE etc)		30
3.	Logbooks (Foundation Course, AETCOM, Competency logbook, SDL – each 5 marks)	20	
	Journals + ECE Logbook		20
Total		100	100

FORMAT FOR INTERNAL ASSESSMENT EXAMINATIONS

Sr. No.	Exam	Theory	Practical
1.	Internal assessment examinations (Midterm + Terminal)	200 (100 + 100)	100 (50 + 50)
2.	Preliminary examination	200	100
3.	Additional examination for students who have missed any of 3 internal assessment exams or are not qualifying	200	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 each for theory and practical internal assessment.

BLUEPRINT OF UNIVERSITY QUESTION PAPER

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

Each Paper is divided into 3 sections:

Section A: MCQ 20 marks

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

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

1.3. Paper I & Paper II Contents

PHYSIOLOGY PAPER-I	
SECTION A	All topics of Paper-I
SECTION B	General Physiology, Blood, CVS, AETCOM
SECTION C	RS, Endocrine, Reproduction,
PHYSIOLOGY PAPER-II	
SECTION A	All topics of Paper-II
SECTION B	Nerve and Muscle Physiology, GIT, Special senses

SECTION C	CNS, Renal, Integrated Physiology
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1.4. Note to exam paper setters (Ref.: GMER 2019 - Assessment)

1.4.A Multiple Choice Questions (MCQs) (20X1=20 Marks)		
<ul style="list-style-type: none"> 10 % of MCQ marks should be from clinically based questions (Any 2) 		
1.4. B Brief Answer Questions (BAQs) (10X3=30 Marks)		
Various Levels of Cognitive Domain must be considered as follows:		
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=30 Marks)		
1 SAQ will be clinical application based (In section B)		
1 SAQ will be from AETCOM modules (In Paper I)		
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=20 Marks)		
<ul style="list-style-type: none"> 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, Generalise, Identify, Illustrate, Interpret, Review, Summarise
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. et al in (2001))

1.5. Paper I

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

1.6. Paper II

S. No.	Topics	MCQ (20 x 1 = 20 marks)	Brief Answer Question (BAQ) (10 x 3 = 30 marks)	Short Answer Question (SAQ) (6 x 5 = 30 marks)	Long Answer Question (LAQ) (2 x 10 = 20 marks)	Total Marks
Section-B						
1.	Nerve and Muscle Physiology	4X1=4	1X3=3 (1 more in option)	1X5=5	1X10=10	22(+3 as options)
2.	GIT	3X1=3	2X3=6	1X5=5 (1 more in option)	1X10=10 (option)	14(+15 as options)
3	Special senses	2X1=2	2X3=6	1X5=5 (1 more in option)	1X10=10 (option)	13(+15 as options)
Section-C						
4	CNS	5X1=5	2X3=6	1X5=5	1X10=10	26
5	Renal	3x1=3	2X3=6	1X5=5 (1 more in option)	1X10=10 (option)	14(+15 as options)
6	Integrated Physiology	3X1=3	1X3=3 (1 more in option)	1X5=5	1X10=10 (option)	11(+13 as options)
Total		20	30	30	20	100

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)	50% - Combined theory & practical [Theory - minimum 40% Practical- minimum 40%]
Criteria for pass in university exams	
Theory	50% aggregate (Paper I + II) (Each Paper minimum 40%)
Practical	50%

I MBBS (Anatomy, Physiology & Biochemistry)

Time – 3 hrs. **Preliminary / University examination**

(* Applicable from 2020-21 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** -

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
- 1 SAQ will be from AETCOM modules (in Paper I)

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

➤ LAQ should be structured (With defined marks distribution)

• **Section C** –

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

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

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

➤ LAQ should be structured (With defined marks distribution)

DEPARTMENT OF PHYSIOLOGY
I MBBS –CBME

Model question paper- Physiology Paper I

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.
-

Section-A

MCQ

Mark: 1X20=20

Section-B

Marks: 40

Q1. Answer any 5 out of 6 (BAQ)

(5X3 marks =15 marks)

- A. Facilitated diffusion
- B. Positive feedback mechanism with one example
- C. Functions of plasma proteins
- D. Name 3 Anticoagulants with their action
- E. Factors affecting Venous return
- F. Empathy in patient care

Q2. Answer any 3 out of 4 (SAQ)

(3X5 marks =15 marks)

1. Primary active transport
2. Normal ECG waves with the help of a diagram. Mention uses of ECG
3. Factors regulating the heart rate
4. A 6-year-old boy came with the history of swelling in the knee joint. His elder brother, 8 years old also had similar episodes of swelling. Mother gave history of profuse bleeding after a fall in both children. On general examination child was afebrile , pulse rate was 98/min, respiratory rate 20/min, BP= 102/72 mm of Hg. Swelling around the right knee of Circumference 30cm .It was warm and tender.The range of movement was reduced
 - a. What condition does the case history suggest? (1 mark)
 - b. What are the tests you would recommend to make a diagnosis (2mark)
 - c. Mention any 2 bleeding disorders and describe any one (2 mark)

Q3. Answer any 1 out of 2(LAQ)

(1X10 marks =10marks)

1. Define erythropoiesis. List the different stages of erythropoiesis. Describe the changes in each stage. What are the factors necessary for erythropoiesis. (1+2+4+3)
2. Define shock. Enumerate different types of shock .What are the signs and symptoms of shock. Describe the compensatory mechanism in Hypovolaemic shock. (1+3+2+4)

Section-C**Marks: 40****Q1. Answer any 5 out of 6 (BAQ)****(5X3 marks =15 marks)**

1. Functional residual capacity
2. Classify Hypoxia with one example for each type.
3. Classify hormones with one example for each type
4. Cretinism
5. Spermatogenesis
6. Ovulation

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

1. Describe the transport of CO₂ in the blood.
2. Pulmonary surfactant
3. Actions of Growth hormone
4. A 40 year old male presented to medical officer with signs of Tetany
 - a. What is the cause of Tetany? (1 mark)
 - b. Enlist the signs of this disorder. (2 mark)
 - c. What are the hormones involved in prevention of Tetany (2)

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

1. Describe the actions of insulin. Add a note on Diabetes Mellitus (7+3)
2. How is respiration regulated? Describe the neural regulation of respiration.(2+8)

DEPARTMENT OF PHYSIOLOGY
I MBBS –CBME

Model question paper- Physiology Paper II

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.
-

Section-A

MCQ

Mark: 1X20=20

Section-B

Marks: 40

Q1. Answer any 5 out of 6 (BAQ)

(5X3 marks =15 marks)

- A. Difference between fast twitch and slow twitch muscle fibres
- B. Enteric nervous system
- C. Endo-cochlear potential
- D. Compound Action Potential
- E. Secretin
- F. Errors of refraction

Q2. Answer any 3 out of 4 (SAQ)

(3X5 marks =15 marks)

- A. Sarcomere
- B. Peristalsis
- C. Light and Dark adaptation
- D. A 8-year-old boy was referred to doctor for a hearing test. His parents reported that more recently they noticed him turning his head when spoken to. He had experienced a few ear infections that responded well to antibiotics. The parents mentioned a maternal aunt who is “nearly totally deaf” and wears binaural hearing aids. Otosopic examination showed a clear ear canal and a normal-appearing tympanic membrane on the both side.
 - 1) What type of hearing loss the case history suggestive of? (1 mark)
 - 2) If you were asked to perform Rinne test and Weber test, how would you interpret the findings? (2 mark)
 - 3) Classify deafness. Write two causes for each. (2 mark)

Q3. Answer any 1 out of 2(LAQ)

(1X10 marks =10marks)

- A. Describe the Neuro-muscular junction under following headings.
 - ❖ Structure with neat, labeled diagram (3)
 - ❖ Transmission of an impulse (4)
 - ❖ Neuro muscular blocking agents (3)
- B. Describe the composition, functions and regulation of gastric juice secretion. (3+3+4)

Section-C

Marks: 40

Q1. Answer any 5 out of 6 (BAQ)

(5X3 marks =15 marks)

- A. Withdrawal reflex
- B. Functions of Prefrontal lobe
- C. Renal clearance
- D. Juxtaglomerular apparatus
- E. Heat Gain Mechanism
- F. Physiological effects of meditation

Q2. Answer any 3 out of 4 (SAQ)

(3X5 marks =15 marks)

- A. Synaptic inhibition
- B. Acidification of urine
- C. Acute effects of exercise on cardio-respiratory system
- D. A 60 year old male presented to medical officer with signs of flexion attitude, pill rolling movement of thumb over fingers, resting tremors.
 - 1) What is the likely diagnosis?(1 mark)
 - 2) What is the cause of the same? (1 mark)
 - 3) Enlist all the signs of this disorder. (3 mark)

Q3. Answer any 1 out of 2(LAQ)

(1X10 marks =10marks)

A. Describe the sleep under following heading.

- ❖ Physiological changes during sleep (4)
- ❖ Characteristic features of different types of sleep. (3)
- ❖ EEG changes during sleep. (3)

B. Describe the concentration and dilution mechanism of urine formation under following headings.

- ❖ Counter current multiplier (3)
- ❖ Counter current exchanger (3)
- ❖ Role of urea (2)
- ❖ Role of ADH (2)

**LIST OF PHYSIOLOGY BOOKS FOR FIRST MBBS-CBME
(UNDERGRADUATE COURSE)**

A. TEXT BOOKS

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology Volumes I & II	A. K. Jain
2.	Textbook of Medical Physiology	Guyton & Hall
3.	Comprehensive Textbook of Medical Physiology Vol I & Vol II	G.K. Pal
4.	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

C. REFERENCE BOOKS

S.N.	Name of the book	Name of the Author
1.	Textbook of Physiology	Indu Khurana
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

Resolution No. 4.13 of AC-41/2021: Resolved to approve the two books - Communication skills & Early clinical Exposure, as reference books for Medical College Library and departments

1. Communication Skills in Clinical Practice - KR Sethuraman
2. Textbook of Early clinical Exposure Setting and Planning - Dr. Motilal C Tayade

Resolution No. 3.4 of Academic Council (AC-42/2022): Resolved to approve model question papers of Physiology as per subject blueprint and addition of point about available choice of option in LAQ of both papers (Sections B & C) in First MBBS theory with effect from the batch admitted in academic year 21-22.

This change is to be included in pattern of examination in CBME curriculum Physiology for First MBBS. [ANNEXURE- 6B]

I MBBS (Physiology)

Time – 3 hrs.

Preliminary / University examination

(* Applicable from 2020-21 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% MCO i.e. 2 in each paper must be clinical based

- Section B -

Q1. Answer any 5 out of 6 (BAQ)

(5X3 marks =15 marks)

- 1 SAQ will be from AETCOM modules (in Paper I)

Q2. Answer any 3 out of 4 (SAQ)

(3X5 marks =15 marks)

- 1 SAQ will be clinical application based

Q3. Answer any 1 out of 2(LAQ)

(1X10 marks =10marks)

➤ LAQ should be structured (With defined marks distribution)

- Section C –

Q1. Answer any 5 out of 6 (BAQ)

(5X3 marks =15marks)

Q2. Answer any 3 out of 4 (SAQ)

(3X5 marks =15 marks)

Q3. Answer any 1 out of 2 (LAQ)

(1X10 marks =10marks)

➤ LAQ should be structured (With defined marks distribution)

DEPARTMENT OF PHYSIOLOGY

I MBBS –CBME

Model question paper- Physiology Paper I

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.
-

Section-A

MCQ

Mark: 1X20=20

Section-B

Marks: 40

Q1. Answer any 5 out of 6 (BAQ)

(5X3 marks =15 marks)

- A. Facilitated diffusion
- B. Positive feedback mechanism with one example
- C. Functions of plasma proteins
- D. Name 3 Anticoagulants with their action
- E. Factors affecting Venous return
- F. Empathy in patient care**

Q2. Answer any 3 out of 4 (SAQ)

(3X5 marks =15 marks)

1. Primary active transport
2. Normal ECG waves with the help of a diagram. Mention uses of ECG
3. Factors regulating the heart rate
- 4. A 6-year-old boy came with the history of swelling in the knee joint. His elder brother, 8 years old also had similar episodes of swelling. Mother gave history of profuse bleeding after a fall in both children. On general examination child was afebrile , pulse rate was 98/min, respiratory rate 20/min, BP= 102/72 mm of Hg. Swelling around the right knee of Circumference 30cm .It was warm and tender.The range of movement was reduced**
 - a. What condition does the case history suggest? (1 mark)**
 - b. What are the tests you would recommend to make a diagnosis (2mark)**
 - c. Mention any 2 bleeding disorders and describe any one (2 mark)**

Q3. Answer any 1 out of 2(LAQ)

(1X10 marks =10marks)

1. Define erythropoiesis. List the different stages of erythropoiesis. Describe the changes in each stage. What are the factors necessary for erythropoiesis. (1+2+4+3)
2. Define shock. Enumerate different types of shock .What are the signs and symptoms of shock. Describe the compensatory mechanism in Hypovolaemic shock. (1+3+2+4)

Section-C**Marks: 40****Q1. Answer any 5 out of 6 (BAQ)****(5X3 marks =15 marks)**

1. Functional residual capacity
2. Classify Hypoxia with one example for each type.
3. Classify hormones with one example for each type
4. Cretinism
5. Spermatogenesis
6. Ovulation

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

1. Describe the transport of CO₂ in the blood.
2. Methods of contraception in females
3. Actions of Growth hormone
4. A 40 year old male presented to medical officer with signs of Tetany
 - a. What is the cause of Tetany? (1 mark)
 - b. Enlist the signs of this disorder. (2 mark)
 - c. What are the hormones involved in prevention of Tetany (2)

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

1. Describe the actions of insulin. Add a note on Diabetes Mellitus (7+3)
2. How is respiration regulated? Describe the neural regulation of respiration.(2+8)

DEPARTMENT OF PHYSIOLOGY

I MBBS –CBME

Model question paper- Physiology Paper II

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.

Section-A

MCQ

Mark: 1X20=20

Section-B

Marks: 40

Q1. Answer any 5 out of 6 (BAQ)

(5X3 marks =15 marks)

- A. Difference between fast twitch and slow twitch muscle fibers
- B. Enteric nervous system
- C. Endo-cochlear potential
- D. Compound Action Potential
- E. Secretin
- F. Errors of refraction

Q2. Answer any 3 out of 4 (SAQ)

(3X5 marks =15 marks)

- A. Sarcomere
- B. Peristalsis
- C. Light and Dark adaptation
- D. A 8-year-old boy was referred to doctor for a hearing test. His parents reported that more recently they noticed him turning his head when spoken to. He had experienced a few ear infections that responded well to antibiotics. The parents mentioned a maternal aunt who is “nearly totally deaf” and wears binaural hearing aids. Otosopic examination showed a clear ear canal and a normal-appearing tympanic membrane on the both side.
 - 1) What type of hearing loss the case history suggestive of? (1 mark)
 - 2) If you were asked to perform Rinne test and Weber test, how would you interpret the findings? (2 mark)
 - 3) Classify deafness. Write two causes for each. (2 mark)

Q3. Answer any 1 out of 2(LAQ)

(1X10 marks =10marks)

- A. Describe the Neuro-muscular junction under following headings.
 - ❖ Structure with neat, labeled diagram (3)
 - ❖ Transmission of an impulse (4)
 - ❖ Neuro muscular blocking agents (3)
- B. Describe the composition, functions and regulation of gastric juice secretion. (3+3+4)

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

- A. Withdrawal reflex
- B. Functions of Prefrontal lobe
- C. Renal clearance
- D. Juxtaglomerular apparatus
- E. Heat Gain Mechanism
- F. Physiological effects of meditation

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

- A. Synaptic inhibition
- B. Acidification of urine
- C. Acute effects of exercise on cardio-respiratory system
- D. A 60 year old male presented to medical officer with signs of flexion attitude, pill rolling movement of thumb over fingers, resting tremors.
 - 1) What is the likely diagnosis?(1 mark)
 - 2) What is the cause of the same? (1 mark)
 - 3) Enlist all the signs of this disorder. (3 mark)

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

A. Describe the sleep under following heading.

- ❖ Physiological changes during sleep (4)
- ❖ Characteristic features of different types of sleep. (3)
- ❖ EEG changes during sleep. (3)

B. Describe the concentration and dilution mechanism of urine formation under following headings.

- ❖ Counter current multiplier (3)
- ❖ Counter current exchanger (3)
- ❖ Role of urea (2)
- ❖ Role of ADH (2)

Resolution No. 3.5 of Academic Council (AC-42/2022): Resolved to approve revision of marks in Paper-II allotted for Integrated Physiology and to follow MCQ distribution as per annexure 26(A) of AC-41-2021 in the programme First MBBS Physiology for theory with effect from the batch admitted in academic year 21-22 as follows:

1. Revision of marks in Physiology Paper –II allotted for Integrated Physiology, Reduced from 2 to 1 marks.
2. Error in the total marks in the MCQ distribution in annexure 26(A) of AC- 41-2021 (21 marks instead of 20 marks in Physiology Paper II), it was corrected to 20 Marks.
3. Revision of marks in Physiology Paper–II allotted for Integrated Physiology. Previous blueprint as per CBME curriculum on website which included 11 marks compulsory + 13 optional for integrated physiology As suggested we have reduced the marks to 9 marks compulsory + 3 optional for integrated physiology.

This change is to be included in pattern of examination in CBME curriculum Physiology for First MBBS Physiology. **[ANNEXURE-7A & 7B]**

~~Annexure~~ 5a

BLUEPRINT OF UNIVERSITY QUESTION PAPER-PHYSIOLOGY

1. THEORY EXAMINATION PATTERN

Annex-7A of AC-42/2022

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

Each Paper is divided into 3 sections:

Section A: MCQ 20 marks

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

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

1.3. Paper I & Paper II Contents

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

Sr. No.	Topic	No. of questions
PHYSIOLOGY PAPER – I		
1	General Physiology	2
2	Blood	3
3	CVS	5
4	RS	4
5	Endocrine	4
6	Reproduction	2
	Total	20
PHYSIOLOGY 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	1
	Total	20

1.

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

Resolution No. 3.15 of Academic Council (AC-42/2022): Resolved to approve the list of books recommended for first MBBS Physiology (CBME) for Theory/Practical with effect from the batch admitted in academic year 21-22. [ANNEXURE-12]

Annex-12

Annex-12 of AC-42/2022

Physiology Textbooks and Practical books for 2021-22

S.N.	Name of the book	Name of the Author
Theory		
1.	Comprehensive Textbook of Medical Physiology Vol I & Vol II	G.K. Pal
2.	Textbook of Physiology Volumes I & II	A. K. Jain
3.	Textbook of Medical Physiology	Guyton & Hall
4.	Fundamentals of Medical Physiology	L. Prakasam Reddy
5.	Textbook of Medical Physiology	D. Venkatesh and H.H.Sudhakar
6.	CC Chatterjee's Human Physiology	Nitin Ashok Jain
Practical		
1.	Practical Physiology	A. K. Jain
2.	Practical Physiology	G. K. Pal
3.	Textbook of Practical Physiology	C. L. Ghai
4.	Physiology Practical Manual	Raj Kapoor

Resolution No. 3.6 of Academic Council (AC-42/2022): Resolved to continue the existing method for additional exam for 1st MBBS (CBME) as per guidelines given by NMC in First MBBS Anatomy/ Physiology/Biochemistry for theory/Practical.

Resolution No. 3.19 of Academic Council (AC-42/2022): It is resolved to approve all the suggestions given by NMC Undergraduate board as per NMC Notification dated 31.03.2022 related to First MBBS Anatomy/Physiology/Biochemistry except Point No. 7 in relation to Oath ceremony, with effect from the batch admitted in academic year 21-22. [ANNEXURE - 16]

Annex-15 of AC-42/2022

दूरभाष/Phone : 25367033, 25367035, 25367036
फैक्स/Fax : 0091-11-25367024
ई-मेल/E-mail : ug@nmc.org.in,

पॉकेट -14, सेक्टर-8, द्वारका, फेस-1, नई दिल्ली-77
Pocket- 14, Sector- 8, Dwarka,
Phase - 1, New Delhi-77

राष्ट्रीय आयुर्विज्ञान आयोग

National Medical Commission
(Undergraduate Medical Education Board)

Annex-15

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 be 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.

Shambhar

(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 12 months, the period can be adjusted by :
 - a. Having one week of Foundation Course at the beginning of the academic calendar and then spreading 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 they are 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' is recommended when a candidate is introduced to medical education.

8. Yoga training is recommended to be initiated during foundation course, (1 hour, preferably in the morning in orientation week). Yoga practices shall be for maximum 1 hour every day during the period 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 to 6 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 students shall 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 MBBS may 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.

ACADEMIC CALENDER FOR MBBS BATCH(2021-22) ADMITTED IN FEB-MAR 2022

Professional year	Time frame	Months available (Teaching + Exam)	Comparison with GMER 2019
1 st	14 th Feb '22 to 31 st Jan '23, Exam - Feb.	11.5 months (incl. F.C.) Exam , Result = 1 month	14 months (incl. one month FC)
2 nd	1 st March,'23 to 29 th Feb,'24 Exam- March, '24	12 months Exam , Result = 1 month	12 months
3 rd (III-part-1)	1 st April,'24 to 15 th Jan,'25, Exam – till 31 th Jan, '25	9.5 months Exam - 15 days (FMT, Community Med)	13 months
Electives + results	Block A–(first half) Feb, '25 Block B–(second half) Feb, '25	1 month	2 months
4 th (III-part-2)	1 st March,'25 to 31 st March, '26	13 months NeXT (theory) – April, '26 Univ. (practical) – April, '26	13 months
Internship	1 st May, '26 to 30 th April '27,	12 months	12 months
NeXT & Counselling	May, June, '27	Counselling before 15 th June	1 month
PG	July, '27		

MONTH-WISE SCHEDULE FOR NEW CBME COURSE FOR MBBS BATCH 2021-22 JOINED IN FEB-MAR 2022

MBBS	1	2	3	4	5	6	7	8	9	10	11	12
2022	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	months	14 TH -1	2	3	4	5	6	7	8	9	10	11
2023	12	Exam, Results	2 ND PROF-1	2	3	4	5	6	7	8	9	10
2024	11	12	Exam, Results	3 RD 1 ST -1	2	3	4	5	6	7	8	9
2025	10- exam in 2 nd half	11-Electives	12	13	14	15	16	17	18	19	20	21
2026	22	23	24	25- NEXT & Univ. final practical, Results	INTERNS HIP- 1	2	3	4	5	6	7	8
2027	9	10	11	12	NEXT, counsell ng	couns elling	PG					

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
1 st Professional	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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)
2 nd Professional	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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

	<ul style="list-style-type: none"> Take part in environment protection and sustenance activities. 	<p>measures along with details of vaccination drive</p> <p>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</p>	<p>Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences</p>	<p>journal of visit</p> <p>logbook based certification of competency, journal of visit</p>	<p>6 hrs</p> <p>(Total 30 hrs, 6 visits)</p>
3 rd Professional	<ul style="list-style-type: none"> Final counselling of the family members of allotted families and analyze the health trajectory of adopted family under overall guidance of mentor 	<p>By the end of this visit, students should be able to update the medical history of family members and their vitals and anthropometry</p> <p>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</p>	<p>Family survey, Community clinics</p> <p>Community clinics, Multispecialty camps</p>	<p>Community case presentation, OSPE, logbook, journal of visit</p> <p>Community case presentation, OSPE, logbook, journal of visit</p>	<p>3hrs</p> <p>4 hrs</p>

		<p>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</p>	<p>Reporting of follow up visits, PRA techniques (transact walk, group discussion) Community clinics,</p>	<p>Community case presentation, OSPE, logbook based certification of competency, journal of visit</p>	<p>4 hrs</p>
		<p>- 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</p>	<p>Participation in and Process documentation of activities (NSS activities) along with reporting of photographic evidences</p>	<p>logbook based certification of competency, journal of visit</p>	<p>4 hrs</p>
		<p>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</p>	<p>- Small group discussion (report of the health trajectory of adopted family)</p>	<p>-Logbook based certification of competency, journal of visit</p>	<p>+6 hrs in last visit (total 21 hrs, 5 visits)</p>

TOTAL	1 st Prof 2 nd Prof 3 rd 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		
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PROTO-TYPE LOG BOOK FOR FAMILY ADOPTION

COLLEGE NAME, UNIVERSITY

ADDRESS DETAILS

NAME OF THE STUDENT:

ROLL NO.:

VILLAGE NAME:

TEHSIL/ DISTRICT:

STATE/ UNION TERRITORY:

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	DIETARY HABITS, DIET	LITERACY: EDUCATIONAL QUALIFICATION	EMPLOYMENT for income source, eg. Labourer/ land owner/ teacher, etc	NAME OF SCHOOL OF CHILD	ADDICTIONS IF ANY	HEIGHT (CMS)	WEIGHT (KG)
				(eg. Head, wife, sibling order, grand mother, etc)		annual progress of children to be recorded		grade/ standard, medium of learning			

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

IMMUNIZATI ON STATUS	PULSE	BP	R.R.	BLD GP, Rh	N	HEMOGLOBI PROTEIN	URINE SUGAR	ANY POS.FINDIN G IN URINE	BLOOD SUGAR	IMMUNIZATION STATUS	ORAL CHECK-UP	HYGEINE STATUS
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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.
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MGM INSTITUTE OF HEALTH SCIENCES

(Deemed to be University u/s 3 of UGC Act, 1956)

Grade 'A' Accredited by NAAC

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