



Highlight on 6,7,13,21,23,32,37

# 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 Biochemistry**

Amended upto AC-48/2023, Dated 12/12/2023

## **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 upto BOM 63/2021 [Resolution No. 4.1.1.2.ii, Resolution No. 4.4.1.5, Resolution No. 4.4.1.6]; Dated 17/02/2021.
4. Amended upto AC-41/2021, [Resolution No. 4.1], [Resolution No. 4.2] [Resolution No. 4.3], [Resolution No. 4.4], [Resolution No. 4.7], [Resolution No. 4.8], [Resolution No. 4.9], [Resolution No. 4.10]; Dated 27/08/2021.
5. Amended upto AC-42/2022, [Resolution No.3.3], [Resolution No. 3.6] [Resolution No.3.19]; Dated 26/04/2022. (incorporated at the end of Syllabus).
6. Amended upto AC - 48/2023, [Resolution No.5.3], [Resolution No. 5.4], [Resolution No. 5.5], [Resolution No.5.6], [Resolution No.5.7], [Resolution No.5.8], [Resolution No.5.10], [Resolution No.5.11] Dated 12/12/2023.

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.



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

\*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)

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

**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.

**Annexure – C– III**

**Distribution of Teaching Hours for First MBBS Biochemistry as per  
CBME curriculum**

<b>Sr.No.</b>	<b>Name of Topic Theory</b>		<b>Hours</b>
1	Distribution of Theory Lectures based on new MCI Competency based Syllabus UG (including Horizontal & Vertical Integration)		<b>80</b>
2	Distribution of Practical hours based on new MCI Competency based UG curriculum Practical Skills assessment	<b>34</b>	<b>150</b>
3	Distribution of Practical hours based on new MCI Competency based UG curriculum: Observation of Use of Equipments / Techniques in Biochemistry Practical	<b>36</b>	
4	Distribution of Practical hours based on new MCI Competency based UG curriculum: Name of Topic for Clinicobiochemical correlation- basis & rational of tests in various conditions	<b>16</b>	
5	PBL/ Tutorial/ Small Group discussion/revision practicals/ integrated teaching	<b>64</b>	
6	SDL		<b>20</b>
	<b>Total</b>		<b>250</b>

**Final Distribution of Total Teaching Hours**

<b>Subject- Biochemistry</b>	<b>Hours</b>
Lectures	80 hrs
Small Group Teaching/Tutorials/Integrated learning/Practical hours	150 hrs
Self directed learning hours	20 hrs
<b>Total hours</b>	<b>250 hrs</b>
Early Clinical Exposure	30 hrs

### Theory Syllabus I MBBS Batch 2020-2021 (As per CBME)

Theory: 80 hours

#### Topics For Theory Lectures with Teaching Hours & Competencies

Sr. No.	Topics	Competency No	Hours
1.	Molecular & functional organization of cell & subcellular components	BI 1.1	1
2.	Chemistry & Metabolism of Carbohydrates.	BI 3.1 to BI 3.10	9
3.	Chemistry & Metabolism of Proteins.	BI 5.1 to BI 5.5	9
4.	Chemistry & Metabolism of Lipids.	BI 4.1 to BI 4.7	9
5.	Chemistry & Metabolism of Nucleo proteins & cell cycle	BI 7.1	4
6.	Enzymes.	BI 2.1 to BI 2.7	5
7.	Biological oxidation.	BI 6.6	2
8.	Chemistry & Metabolism Hb.	BI 5.2, BI 6.11	4
9.	Integration of metabolism and starvation metabolism	BI 6.1	2
10.	Mechanism of hormones action.	BI 6.5 , BI 13.5	1
11.	Vitamins (Fat & Water soluble)	BI 6.5	5
12.	Nutrition	BI 8.1 to BI 8.5	3
13.	Molecular Biology	BI 7.1 to BI 7.7, BI 9.3	6
14.	Biochemistry of cancer.	BI 10.1 to BI 10.2	2
15.	Immunology	BI 10.3 to BI 10.5	3
16.	Oxidative stress & antioxidants	BI 7.6 to BI 7.7	2
17.	Kidney function tests, Thyroid function tests, Liver function tests, Adrenal function tests	BI 6.13 to BI 6.15	4
18.	Mineral Metabolism.	BI 6.9 to BI 6.10	4
19.	Water and Electrolyte Balance.	BI 6.7	2
20.	Acid base balance	BI 6.7 to 6.8	2
21.	ECM	BI 9.1 to 9.2	1
22.	Detoxification mechanisms, Role of xenobiotics in disease	BI 7.5	1
23.	*Biochemical Laboratory Biomarkers alterations in patients of Covid 19		1

## Practical Syllabus with Teaching Hours & Competencies

**1. Total Number of Practical hours including LCDS , Small group discussion, including tutorials and integrated teaching, revision practicals : 150 hours.**

### List of Practicals, LCDs, Small group discussions etc.

**First MBBS Practical Topics Total hours :34**

SR NO	Name of Topic for Practical Skills assessment	Competency No.	Teaching method
1	Perform urine analysis to estimate and determine normal Constituents	11.4	DOAP
2	Perform urine analysis to estimate and determine abnormal Constituents	11.4,11.20	DOAP
3	Demonstrate the estimation of blood glucose	11.21	DOAP
4	Demonstrate the estimation of blood urea	11.21	DOAP
5	Demonstrate the estimation of serum creatinine and creatinine clearance	11.7,11.21	DOAP
6	Demonstrate estimation of serum proteins, albumin and A:G ratio	11.8,11.21,11.22	DOAP
7	Demonstrate the estimation of serum total cholesterol and HDLcholesterol	11.9	PRACTICAL
8	Demonstrate the estimation of triglycerides	11.10	PRACTICAL
9	Demonstrate estimation of calcium .	11.11	PRACTICAL
10	Demonstrate estimation of phosphorus .	11.11	PRACTICAL
11	Demonstrate estimation of Uric acid .	11.17	PRACTICAL
12	Demonstrate the estimation of serum bilirubin	11.12	PRACTICAL
13	Demonstrate the estimation of SGOT and SGPT	2.2,11.13	PRACTICAL
14	Demonstrate the estimation of alkaline phosphatase	11.14	PRACTICAL
15	C.S.F. Analysis	<b>11.15</b>	PRACTICAL

### List of Lecture cum Demonstrations

<b>C</b>	<b>Lecture cum Demonstrations</b>		
<b>SR NO</b>	<b>Name of Topic for Observation of Use of Equipments/ Techniques in Biochemistry Practical</b>	<b>Competency No.</b>	<b>Teaching method</b>
1	Introduction to Biochemistry Laboratory Blood collection and anticoagulants	11.19	LCD
2	Common Laboratory instruments	B.I 11.16,11.19	LCD
3	First aid in Laboratory and Lab hazards	B.I. 11.1	LCD
4	Colorimetry	B.I 11.6	LCD
5	Autoanalyser	B.I B.I. 11.16	LCD
6	Spectrophotometry	B.I B.I.11.18	
7	pH meter	B.I 11.16	LCD
8	Paper chromatography of amino acid ,TLC	B.I. 11.5,11.16	LCD
9	Protein electrophoresis , PAGE	B.I. 11.16	LCD
10	Electrolyte analysis by ISE and Flammephotometry	B.I. 11.16	LCD
11	ABG analyzer	B.I. 11.16	LCD
12	ELISA	B.I. 11.16	LCD
13	Immunodiffusion	B.I. 11.16	LCD
14	Quality control	B.I. 11.16	LCD
15	DNA isolation from blood/ tissue	B.I. 11.16	LCD
16	GTT	B.I. 3.10	LCD
17	Advantages and disadvantages of use of fats in food	B.I.11.24	LCD
18	Calculate energy contents of different food items , identify food items with high and low glycemic index	11.23	LCD

**Total Hours :36 Hours**

**List of SGDs - Basis and rational of tests in various conditions**

Sr no	Name of Topic for Clinicobiochemical correlation – basis and rational of tests in various conditions	Competency No.	Teaching method
1	Diabetes mellitus	B.I.11.17	Small Group Discussion
2	Dyslipidemia, Myocardial infarction	B.I.11.17	Small Group Discussion
3	Renal failure,- proteinuria,- nephrotic syndrome	B.I.11.17	Small Group Discussion
4	Jaundice,- liver diseases	B.I.11.17	Small Group Discussion
5	Oedema , pancreatitis	B.I.11.17	Small Group Discussion
6	Disorders of acid- base balance	B.I.11.17	Small Group Discussion
7	Thyroid disorders	B.I.11.17	Small Group Discussion
8	Gout	B.I.11.17	Small Group Discussion

**TOTAL HOURS : 16**



**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 Biochemistry First MBBS from 23-24 batch onwards**

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

Subject	Competency Number	Competency
Biochemistry	Module 1.1,	Enumerate and describe the role of a physician in health care system
	Module 1.1	Describe and discuss the commitment to lifelong learning as an important part of physician growth.

One Brief Answer AETCOM question of 3 marks will be asked in paper 1 and paper 2 each.  
(Ref: NMC letter No. U. 1 4021 1812023-UGMEB dated 01.08.23)

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

Answer AETCOM question in Anatomy, Physiology and Biochemistry theory question paper I & II

Subject	Questions
<b>Anatomy</b>	<p><b>Module 1.5 &amp; 1.1</b></p> <ol style="list-style-type: none"> <li>1. Physician role and responsibility to society and community that he serves</li> <li>2. Duties of doctor</li> <li>3. "Cadaver as our first teacher" Justify</li> <li>4. Write a note on importance handling of biological tissues.</li> <li>5. Need for biomedical waste management</li> <li>6. Enumerate drum/bag colors used with the types of biomedical waste to be disposed in them.</li> <li>7. Write note on things you will do &amp; not do in dissection hall to show your respect for cadaver.</li> <li>8. Enumerate different locations in medical colleges and hospitals where biomedical waste disposal</li> </ol>
<b>Physiology</b>	<p><b>Module 1.2, 1.3, 1.4</b></p> <ol style="list-style-type: none"> <li>1. Empathy in patient care.</li> <li>2. Rights of patients,</li> <li>3. Responsibilities of patients</li> <li>4. Write dos and don'ts of doctor-patient verbal communication.</li> <li>5. Boundaries of the doctor-patient relationship</li> <li>6. Essentials elements of communication skill</li> <li>7. Barriers of communication.</li> <li>8. Methods of communication</li> </ol>
<b>Biochemistry</b>	<p><b>Module 1.1</b></p> <ol style="list-style-type: none"> <li>1. Enumerate and briefly describe the roles of IMG (physician) as per MCI.</li> <li>2. Describe the role of a physician in health care system</li> <li>3. Describe professional qualities of a physician.</li> <li>4. Describe role of a physician in patient care</li> <li>5. Outlook &amp; Expectations of patient from physician</li> <li>6. Effective listening</li> <li>7. Nonverbal communication</li> <li>8. Human dignity</li> </ol>

**\*Resolution No. 4.2 of AC-41/2021:** Resolved to add the subtopics mentioned for Paper 1 and Paper 2 topics under topic heads in 1<sup>st</sup> MBBS (CBME) Syllabus for Biochemistry [ANNEXURE-21]

**Paper wise distribution of Theory topics:**

**Structural formulae are not obligatory.**

**Paper- I (100 marks) 3 hours duration**

1. Cell.
2. Enzyme.
3. Chemistry and metabolism of proteins.
4. Chemistry and metabolism of purines and pyrimidines and related disorders, Cell cycle.
5. Molecular biology: Genetic code, Replication, Transcription, Translation, Regulation of gene expression, Recombinant DNA technology, PCR, DNA repair, gene mutation, Protein sorting & targeting.
6. Chemistry and Metabolism of haemoglobin.
7. Biological oxidation.
8. Immunology, Concept of vaccine development
9. Vitamins
10. Nutrition
11. Biochemical laboratory, Biomarkers alteration in patients of COVID-19

**PAPER - II (100 marks) 3 hours duration**

1. Chemistry and metabolism of carbohydrates.
2. Chemistry and metabolism of lipids.
3. Mineral metabolism: Water and electrolyte balance & imbalance.
4. Acid base balance and imbalance.
5. Integration of various aspects of metabolism and their regulatory pathways. Starvation metabolism.
6. Mechanism of hormone action.
7. Liver function tests, Kidney function tests, Thyroid function tests, Adrenal function tests.
8. Detoxification mechanisms, Role of xenobiotics in disease
9. Biochemical basis of cancer and carcinogenesis, Apoptosis
10. Oxidative stress & Antioxidants in health & diseases.
11. ECM

## Paper wise distribution of Theory subtopics

### Paper- I (100 marks) 3 hours duration

- 1. Cell:** Molecular and functional organization of a cell and its sub-cellular components.
- 2. Enzymes:**

General nature, classification & IUBMB nomenclature of enzymes, alloenzyme, coenzyme & co-factors. Specificity and mode of action of enzymes. Basic principles of enzyme activity, factors affecting enzyme activity, Enzyme inhibition (Kinetic not required), Enzyme inhibitors as poisons and drugs, therapeutic enzymes, Clinical utility of enzymes & isoenzymes. Enzymes in lab investigations, Enzymes based assay.
- 3. Chemistry and metabolism of proteins :**

General nature of amino acids, various ways of classification of amino acids, biologically important peptides, classification, properties and biological importance of proteins. Structural organization of proteins, structure-function relationships in relevant areas eg, hemoglobin and selected hemoglobinopathies. Plasma proteins-functions, clinical significance of various fractions, methods of separation (only principle).  
Protein Metabolism:  
Biochemical aspects of digestion and absorption of proteins. Fate of amino acid in the body (Deamination, Transamination, Transdeamination, Transmethylation, Decarboxylation), Fates of ammonia (Urea cycle, glutamine formation), Metabolism of aromatic and sulphur containing amino acids and their inborn errors. Metabolism of Glycine & Serine common disorders associated with protein metabolism. Interpretation of laboratory results of analytes associated with metabolism of proteins.
- 4. Chemistry and metabolism of purines and pyrimidines and related disorders.**

Nucleosides, Nucleotides. Biologically important free nucleotides, Biosynthesis of purines (sources of ring & regulatory steps only, conversion of IMP to GMP & AMP) and salvage pathway, Biosynthesis of pyrimidines, Breakdown of purines and pyrimidines, Common disorders associated with Nucleotide metabolism. Interpretation of laboratory results of analytes associated with Gout, Lesch- Nyhan Syndrome .
- 5. Molecular biology :**

Chemistry of nucleic acids: structure and function of DNA and RNA, Genetic code, DNA Replication & repair of DNA, Transcription, Translation, chain initiation, chain elongation , chain termination, Inhibitors of protein biosynthesis, Cell cycle, Gene Mutation, basic mechanism of gene expression & regulation. Lac- operon model.  
**Molecular Technologies:** The principles of genetic engineering and their applications in medicine. Protein sorting & targeting. Recombinant DNA technology and PCR, their role in diagnosis and treatment of diseases with genetic basis, Restriction endonuclease, Chimeric molecule, and Gene library.

## 6. Chemistry and Metabolism of hemoglobin.

Chemistry and functions of hemoglobin. Major types of hemoglobin and its derivatives found in the body and their physiological/ pathological relevance (HbS, M, Thalassemia). Haemoglobin Metabolism: Synthesis and break down of hemoglobin, porphyria (in brief), Fate of bilirubin, different types of Jaundice

## 7. Biological oxidation.

General concept of oxidation and reduction. Role of enzymes and co-enzymes in generation of ATP. Electron transport chain. Substrate level and Oxidative phosphorylation, Role of uncouplers and inhibitors.

## 8. Immunology.

Cellular and humoral components of the immune system & types and structure of antibody, Innate and adaptive immune responses, self/non-self-recognition and the central role of T-helper cells in immune responses, Antigens and concepts involved in vaccine development

## 9. Vitamins

General nature, classification, sources, active forms and metabolic role, deficiency manifestations, daily requirement and hypervitaminosis.

## 10. Nutrition:

Nutritional Importance of commonly used items of food (fruits and vegetables. (Macromolecules & its importance) and explain importance of dietary fiber, Balance diet for normal adult, Quality of dietary protein, SDA, protein energy malnutrition (Kwashiorkor and Marasmus), Dietary advice for optimal health in childhood and adult, in disease conditions like diabetes mellitus, coronary artery disease and in pregnancy, Causes (including dietary habits), effects and health risks associated with being overweight/ obesity

## PAPER - II (100 marks) 3 hours duration

### 1. Chemistry and metabolism of carbohydrates:

**Chemistry of carbohydrates:** Classification and biochemical importance, chemistry and functions of monosaccharides (excluding isomerism), disaccharides and polysaccharides including Glycosaminoglycans (mucopolysaccharides).

**Carbohydrate Metabolism:** Biochemical aspects of digestion and absorption of carbohydrates. Synthesis and break down of glycogen, Glycolysis, Rapoport Lumbering cycle, Citric acid cycle, Gluconeogenesis, HMP shunt pathway and its biological significance, Uronic acid pathway (significance only). Metabolism of Galactose and Galactosemia. Mechanism & significance of blood glucose regulation in health & disease, oral GTT and glycosuria, fructose metabolism & disorders Biochemistry of diabetes mellitus. Interpretation of laboratory results of analytes associated with metabolism of carbohydrates. Common poisons that inhibit crucial enzymes of carbohydrate metabolism.

### 2. Chemistry and metabolism of lipids.

Chemistry of Lipids: classification and biological importance of triacyl glycerol, phospholipids, spingolipids, glycolipids, fatty acids, prostaglandin- therapeutic uses of prostaglandins and inhibitors of eicosanoid synthesis. steroids and lipoproteins- Structure and functions of lipoproteins

Lipid Metabolism: Biochemical aspects of digestion and absorption of Lipids. Beta oxidation, biosynthesis of saturated fatty acids only, cholesterol biosynthesis, Lipoprotein metabolism, Regulation of lipoprotein metabolism & associated disorders, Ketogenesis,

Ketolysis and Ketosis. Fatty liver and atherosclerosis, Interpretation of laboratory results of analytes associated with metabolism of lipids.

**3. Mineral Metabolism:**

Study of (i) Calcium and phosphorous (ii) sodium, potassium & chloride; (iii) magnesium, copper & iodine; (iv) Iron, (v) manganese, selenium, zinc & fluoride. Sources, RDA & functions of various minerals in the body, their metabolism and homeostasis. Disorders associated with mineral metabolism

**4. Acid base balance and imbalance :** Maintenance of normal pH, mechanism of blood pH-buffer system, respiratory mechanism, renal mechanism. Disorders of Acid base balance. Interpretation of results of Arterial Blood Gas (ABG) analysis in various disorders.

**5. Water and electrolyte balance and imbalance**

Water distribution & regulation of water. Electrolyte distribution & regulation. Disorders of water & electrolytes.

**6. Integration of various aspects of metabolism and their regulatory pathways. Metabolic interrelationship of carbohydrates, lipids and proteins metabolism**

**7. Starvation metabolism.**

Metabolic processes & Biochemical changes that take place in specific organs in the body in the fed and fasting state

**8. Mechanism of hormone action.**

Hormones: General characteristics and Mechanism of hormone action. cAMP the second messenger, phosphatidylinositol /calcium system as second messenger

**9. Organ Function Tests:** Functions of the kidney, liver, thyroid and adrenal glands. Associated abnormalities of kidney, liver, thyroid and adrenal glands. Tests that are commonly done in clinical practice to assess the functions of these organs ( Liver function tests, Kidney function tests, Thyroid function tests, Adrenal function tests.)

**10. Detoxification mechanisms**

(Bio- transformation) oxidation, reduction, conjugation, hydrolysis. Role of xenobiotics in disease

**11. Biochemical basis of cancer and carcinogenesis**

Cancer initiation, promotion, oncogenes & oncogene activation. Causes of Cancer, carcinogens, p53 & apoptosis. Biochemical changes in cancerous cells. Various biochemical tumor markers and the biochemical basis of cancer therapy.

**12. Oxidative stress & Antioxidants in health & diseases.**

Anti-oxidant defense systems in the body, Role of oxidative stress in the pathogenesis of conditions such as cancer, complications of diabetes mellitus and atherosclerosis.

**13. ECM**

Functions and components of the extracellular matrix (ECM). Role of ECM components in health and disease.

**MGMIHS**  
**1<sup>st</sup> year MBBS. CBME**  
**Format for Internal assessment examinations**

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

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

**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% 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)

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)

### **PRACTICAL EXAM PATTERN**

**(Formative Assessment)**

<b>Pattern</b>	<b>Marks</b>
Q1- Long Quantitative Experiment	15
Q2- Urine Analysis	15
Q3- Spotting	10
Q4- Viva	10
<b>Total</b>	<b>50</b>

**(Summative Assessment)**

**\*Pattern of Preliminary/University Examination Biochemistry Practical:**

**Total100 marks**

<b>Pattern</b>	<b>Marks</b>
Q.A Long quantitative experiments	30
Q.B Urine Analysis	20
Spotting Q.C Quality Control Q.D .Interpretation of laboratory reports Q.E Interpretation of special techniques	25
Q.F communication Skill	05
Q.G Viva	20
<b>Total</b>	<b>100</b>

### **Internal assessment calculation**

<b>Sr. No.</b>	<b>Criteria</b>	<b>Theory</b>	<b>Practical</b>
1.	*All internal assessment examinations including preliminary examination  Day to Day assessment	25	10

Resolution No. 4.8 of AC-41/2021: Resolved to approve the change in the pattern of Internal Assessment calculation, 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**

**1<sup>st</sup> year MBBS CBME**

**INTERNAL ASSESSMENT CALCULATION**

<b>Sr. No.</b>	<b>Criteria</b>	<b>Theory</b>	<b>Practical</b>
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
<b>Total</b>		<b>100</b>	<b>100</b>

**FORMAT FOR INTERNAL ASSESSMENT EXAMINATIONS**

<b>Sr. No.</b>	<b>Exam</b>	<b>Theory</b>	<b>Practical</b>
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.



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.

**MGM Institute of Health Sciences, Navi Mumbai**

**Name of Institute:**

**Department of Anatomy/Physiology/Biochemistry**

<b>Faculty: MBBS</b>	<b>year/Phase1</b>		<b>Date: / /</b>
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		<b>Formative Assessment Theory</b>			<b>Continuous Internal assessment Theory</b>						
<b>Roll No.</b>	<b>Name of Student</b>	<b>1st PCT Theory</b>	<b>2<sup>nd</sup> PCT Theory</b>	<b>Prelims Theory paper 1 &amp; 2</b>	<b>Home Assignment</b>	<b>Continuous class test (LMS)</b>	<b>Seminar</b>	<b>Museum Study</b>	<b>Library Assignment</b>	<b>Attendance Theory</b>	<b>Total</b>
							<b>Self Directed Learning</b>				
		<b>100</b>	<b>100</b>	<b>200</b>	<b>15</b>	<b>30</b>	<b>15</b>	<b>15</b>	<b>15</b>	<b>10</b>	<b>500</b>

**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	1 <sup>st</sup> PCT Practical Exam	2 <sup>nd</sup> PCT Practical Exam	Prelims Practical Exam	Log Book (150)				Journals (Record book/ Portfolio)	Attendance Practical	Total
					Certifiable skill-based competencies (Through OSPE/OSCE/ Spots/Exercise/ other)	AETCOM Competencies	SVL Lab Activity	Research			
		100	100	100	60	30	40	20	40	10	500

**Professor & Head**  
**Department of \_\_\_\_\_**  
**Name of Institute**

**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 .
- 2<sup>nd</sup> 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 % attendandance 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.

<b>Sr. No.</b>	<b>Attendance % (Practical)</b>	<b>Marks</b>
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 calender or as per MGMIHS academic calender : 100 marks.
- II nd PCT i.e. First term examination to be conducted preferably after completing six months of academic academic calender or as per MGMIHS academic calender: 100 marks.
- III rd PCT i.e. Prelim examination to be conducted preferably after completing eight months of academic academic calender or as per MGMIHS academic calender : 200 marks.

**Formative assessments (Practical): 300 marks**

- Ist PCT i.e. Midterm examination to be conducted preferably after completing first three months of academic calender or as per MGMIHS academic calender : 100 marks.
- II nd PCT i.e. First term examination to be conducted preferably after completing six months of academic academic calender or as per MGMIHS academic calender: 100 marks.
- III rd PCT i.e. Prelim examination to be conducted preferably after completing eight months of academic academic calender or as per MGMIHS academic calender : 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 AC-41/2021:** Resolved to approve the distribution of the MCQs marks system/topic wise for Theory Paper I & II of 1<sup>st</sup> MBBS (CBME) Physiology and Biochemistry, effect from the batch admitted in 2020-21 onwards

**Annexure-26B of AC-41-2021**

**MGMIHS  
I MBBS CBME Biochemistry**

**MCQs Mark Distribution for University Theory Examination**

**Biochemistry Paper-I**

**Total marks 20**

<b>Sr. No.</b>	<b>Topic</b>	<b>MCQs (20)</b>
1	Cell	01
2	Enzymes	03
3	Chemistry and metabolism of proteins	02
4	Chemistry and metabolism of purines and pyrimidines and related disorders.	02
5	Molecular Biology	05
6	Chemistry and Metabolism of hemoglobin.	02
7	Biological oxidation.	01
8	Immunology	01
9	Vitamins	02
10	Nutrition	01
11	Biochemical laboratory, Biomarkers alteration in patients of COVID-19	00

**Biochemistry Paper-II**

**Total marks 20**

<b>Sr. No.</b>	<b>Topic</b>	<b>MCQs</b>
1	Chemistry and metabolism of carbohydrates	02
2	Chemistry and metabolism of lipids	02
3	Mineral metabolism	02
4	Acid base balance and imbalance.	02
5	Water and electrolyte balance & imbalance.	01
6	Integration of various aspects of metabolism and their regulatory pathways.	01
7	Starvation metabolism	01
8	Mechanism of hormone action.	01
9	Organ Function Tests	03
10	Detoxification mechanisms.	01
11	Biochemical basis of cancer and carcinogenesis.	02
12	Oxidative stress and Antioxidants in Health and Disease	01
13	Extracellular Matrix	01

**MGMIHS**  
**I MBBS CBME**  
**UNIVERSITY EXAMINATION PATTERN**

**I MBBS – BIOCHEMISTRY**

<b>Part of exam</b>	<b>Marks</b>
Theory Paper I	100 Marks
Theory Paper II	100 Marks
Practical	100 Marks
<b>Total</b>	<b>300 Marks</b>

**INTERNAL ASSESSMENT CALCULATION**

<b>Sr. No.</b>	<b>Criteria</b>	<b>Theory</b>	<b>Practical</b>
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
<b>Total</b>		<b>100</b>	<b>100</b>

**FORMAT FOR INTERNAL ASSESSMENT EXAMINATIONS**

<b>Sr. No.</b>	<b>Exam</b>	<b>Theory</b>	<b>Practical</b>
1.	Internal assessment examinations (Midterm + Terminal)	200 (100 + 100 )	100 (50 + 50 )
2.	Preliminary examination	200	100
3.	Additional Exam <ul style="list-style-type: none"> <li>• For students missing any of the three Internal Assessment exams / not qualifying for University Exam.</li> <li>• Marks to be computed as per the missed Exam / low score exam for non qualifying students.</li> </ul>	200	100

<b>Total</b>	<b>400</b>	<b>200</b>
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**\*Internal assessment examinations marks conversion to internal assessment marks -**

**Theory** – Total 400 marks will be converted to 50

**Practical** – Total 200 marks will be converted to 50

## **BLUEPRINT OF UNIVERSITY QUESTION PAPER**

### **I. 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:**

<b>Type of question</b>	<b>Numbers X Marks</b>	<b>Total marks</b>
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
<b>Total</b>		<b>100</b>

**Each Paper is divided into 3 sections:**

**Section A: MCQ 20 marks**

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

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

#### **1.3. Paper I & Paper II Contents**

##### **1.3.a. Paper I**

- Cell
- Enzyme.
- Chemistry and metabolism of proteins.
- Chemistry and metabolism of purines and pyrimidines and related disorders
- Molecular biology
- Chemistry and Metabolism of hemoglobin.
- Biological oxidation.
- Immunology, Concept of vaccine development
- Vitamins
- Nutrition
- Biochemical laboratory, Biomarkers alteration in patients of COVID-19
- AETCOM – 1 SAQ ( Module – 1.4)

##### **1.3.b. Paper II**

- Chemistry and metabolism of carbohydrates.
- Chemistry and metabolism of lipids.
- Mineral metabolism: Water and electrolyte balance & imbalance.
- Acid base balance and imbalance.
- Integration of various aspects of metabolism and their regulatory pathways.
- Starvation metabolism.
- Mechanism of hormone action.
- Liver function tests, Kidney function tests, Thyroid function tests, Adrenal function tests.
- Detoxification mechanisms, Role of xenobiotics in disease
- Biochemical basis of cancer and carcinogenesis, Apoptosis



- Oxidative stress & Antioxidants in health & diseases.
- ECM

#### 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"> <li>• 10 % of MCQ marks should be from clinically based questions (Any 2)</li> </ul>		
1.4. B Brief Answer Questions (BAQs) (10X3=30 Marks)		
Various Levels of Cognitive Domain must be considered as follows:		
<b>Level of cognitive domain</b>	<b>Number of questions</b>	<b>Marks</b>
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:		
<b>Level of cognitive domain</b>	<b>Number of questions</b>	<b>Marks</b>
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"> <li>• Long Answer Questions (LAQ) in both Papers I &amp; II must be structured, covering various levels of cognitive domain.</li> </ul>		

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

<b>Level of cognitive domain</b>	<b>Marks (Total = 76)</b>	<b>Percentage (%)</b>
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
<b>Knowledge (Remember)</b>	Define, describe, Draw, Find, Enumerate, Cite, Name, Identify, List, Label, Match, Sequence, Write, State
<b>Comprehension (Understand)</b>	Discuss, Conclude, Articulate, Associate, Estimate, Rearrange, Demonstrate understanding, Explain, Generalise, Identify, Illustrate, Interpret, Review, Summarise
<b>Application (Apply)</b>	Apply, Choose, Compute, Modify, Solve, Prepare, Produce, Select, Show, Transfer, Use
<b>Analysis (Analyze)</b>	Analyse, Characterise, Classify, Compare, Contrast, Debate, Diagram, Differentiate, Distinguish, Relate, Categorise
<b>Synthesis (Create)</b>	Compose, Construct, Create, Verify, Determine, Design, Develop, Integrate, Organise, Plan, Produce, Propose, Rewrite
<b>Evaluation (Evaluate)</b>	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. Topic wise weightage of marks

##### Paper I

Sr. No.	Topic	MCQs (20)	LAQ/SAQ/BAQ
1	Cell	01	5
2	Enzymes	03	15
3	Chemistry and metabolism of proteins	02	20
4	Chemistry and metabolism of purines and pyrimidines and related disorders.	02	15
5	Molecular Biology	05	15
6	Chemistry and Metabolism of Hemoglobin.	02	10
7	Biological oxidation.	01	10
8	Immunology	01	5
9	Vitamins	02	15
10	Nutrition	01	6
11	Biochemical laboratory, Biomarkers alteration in patients of COVID-19	00	00

## Paper II

<b>Sr. No.</b>	<b>Topic</b>	<b>MCQs</b>	<b>LAQ/ SAQ/ BAQ</b>
1	Chemistry and metabolism of carbohydrates	02	20
2	Chemistry and metabolism of lipids	02	20
3	Mineral metabolism	02	10
4	Acid base balance and imbalance.	02	10
5	Water and electrolyte balance & imbalance.	01	5
6	Integration of various aspects of metabolism and their regulatory pathways.	01	5
7	Starvation metabolism	01	9
8	Mechanism of hormone action.	01	5
9	Organ Function Tests	03	10
10	Detoxification mechanisms.	01	5
11	Biochemical basis of cancer and carcinogenesis.	02	7
12	Oxidative stress and Antioxidants in Health and Disease	01	5
13	Extracellular Matrix	01	5

**BLUEPRINT OF UNIVERSITY QUESTION PAPER.**

**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
<b>Total</b>		<b>100</b>

**Each Paper is divided into 3 sections:**

**Section A: MCQ 20 marks**

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

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

**1.3. Paper I & Paper II Contents**

**1.3.a. Paper I**

- Cell
- Enzyme.
- Chemistry and metabolism of proteins.
- Chemistry and metabolism of purines and pyrimidines and related disorders
- Molecular biology
- Chemistry and Metabolism of hemoglobin.
- Biological oxidation.
- Immunology, Concept of vaccine development
- Vitamins
- Nutrition
- Biochemical laboratory, Biomarkers alteration in patients of COVID-19
- AETCOM – 1 BAQ (Module – 1.1)

**1.3.b. Paper II**

- Chemistry and metabolism of carbohydrates.
- Chemistry and metabolism of lipids.
- Mineral metabolism: Water and electrolyte balance & imbalance.
- Acid base balance and imbalance.
- Integration of various aspects of metabolism and their regulatory pathways.
- Starvation metabolism.
- Mechanism of hormone action.
- Liver function tests, Kidney function tests, Thyroid function tests, Adrenal function tests.
- Detoxification mechanisms, Role of xenobiotics in disease
- Biochemical basis of cancer and carcinogenesis, Apoptosis
- Oxidative stress & Antioxidants in health & diseases.
- ECM
- AETCOM – 1 BAQ (Module – 1.1)

**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"> <li>10 % of MCQ marks should be from clinically based questions (Any 2)</li> </ul>		
1.4. B Brief Answer Questions (BAQs) (10X3=30 Marks)		
<ul style="list-style-type: none"> <li>2 BAQs will be from AETCOM module 1.1 will be there in each paper</li> </ul>		
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)		
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"> <li>Long Answer Questions (LAQ) in both Papers I &amp; II must be structured, covering various levels of cognitive domain.</li> </ul>		

**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
<b>Knowledge (Remember)</b>	Define, describe, Draw, Find, Enumerate, Cite, Name, Identify, List, Label, Match, Sequence, Write, State
<b>Comprehension (Understand)</b>	Discuss, Conclude, Articulate, Associate, Estimate, Rearrange, Demonstrate understanding, Explain, Generalise, Identify, Illustrate, Interpret, Review, Summarise
<b>Application (Apply)</b>	Apply, Choose, Compute, Modify, Solve, Prepare, Produce, Select, Show, Transfer, Use
<b>Analysis (Analyze)</b>	Analyse, Characterise, Classify, Compare, Contrast, Debate, Diagram, Differentiate, Distinguish, Relate, Categorise
<b>Synthesis (Create)</b>	Compose, Construct, Create, Verify, Determine, Design, Develop, Integrate, Organise, Plan, Produce, Propose, Rewrite
<b>Evaluation (Evaluate)</b>	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. Topic wise weightage of marks

##### Paper I

Sr. No.	Topic	MCQs (20)	LAQ/SAQ/BAQ
1	Cell	01	5
2	Enzymes	03	15
3	Chemistry and metabolism of proteins	02	20
4	Chemistry and metabolism of purines and pyrimidines and related disorders.	02	12
5	Molecular Biology	05	15
6	Chemistry and Metabolism of Hemoglobin.	02	10
7	Biological oxidation.	01	10
8	Immunology	01	5
9	Vitamins	02	15
10	Nutrition	01	6
11	Biochemical laboratory, Biomarkers alteration in patients of COVID-19	00	00
12	AETCOM - module 1.1	00	03

## Paper II

<b>Sr. No.</b>	<b>Topic</b>	<b>MCQs</b>	<b>LAQ/ SAQ/ BAQ</b>
1	Chemistry and metabolism of carbohydrates	02	20
2	Chemistry and metabolism of lipids	02	20
3	Mineral metabolism	02	10
4	Acid base balance and imbalance.	02	10
5	Water and electrolyte balance & imbalance.	01	5
6	Integration of various aspects of metabolism and their regulatory pathways.	01	5
7	Starvation metabolism	01	6
8	Mechanism of hormone action.	01	5
9	Organ Function Tests	03	10
10	Detoxification mechanisms.	01	5
11	Biochemical basis of cancer and carcinogenesis.	02	7
12	Oxidative stress and Antioxidants in Health and Disease	01	5
13	Extracellular Matrix	01	5
14	AETCOM module 1.1	00	03

## **2. PRACTICAL EXAMINATION PATTERN**

**2.1. Total Practical Marks                      100 marks**

<b>Pattern</b>	<b>Marks</b>
Q. A long Quantitative Experiment	30
Q. B Urine Analysis	20
Spotting Q. C Quality Control Q. D Interpretation of Laboratory results Q. E Interpretation of special Techniques	25
Q. F communication skills	5
Q.G Viva (Paper I & Paper II)	20
Total	100

<b>Eligibility to appear for university exams</b>	
Internal Assessment (Theory + Practical)	50% [combined Theory and Practical] [Theory - minimum 40% Practical- minimum 40%]
<b>Criteria for pass in university exams</b>	
Theory	50% Aggregate (Paper I + Paper II) [Each Paper minimum 40% ]
Practical	50%



**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)**

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**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.

**Model Question Paper For University Theory Exam**

**Department Of Biochemistry**

Annexure No 29C of AC-41/2021

Resolution No. 4.10 of AC-41/2021  
effective from 2021-22 onwards and to be revised  
as per question paper blue printing format  
as per 4.9 of AC-41/2021 in next BOS

**I<sup>st</sup> MBBS CBME**

**Paper-I**

**Section B**

**Q.1 Answer any 5 out of 6 (SAQ)**

**5 x 3 = 15 Marks**

- a) Causes and clinical features of Pellagra
- b) Structure and functions of Mitochondria
- c) Write any six biologically important peptides with functions
- d) Inhibitors of translation
- e) Enlist the specialized products formed from tyrosine
- f) Enzyme pattern in myocardial infarction

**Q.2 Answer any 3 out of 4 (BAQ)**

**3 x 5 = 15 Marks**

- a) Role of a physician in health care system
- b) Lac Operon concept of gene expression
- c) Cell mediated immunity
- d) A ten year old boy from rural area was brought to OPD for complaints of diminished vision in dim light. His cornea was ulcerated and there were white patches on conjunctiva.
  - I) Name vitamin deficient ( 1 Mark)
  - II) Give its RDA ( 1 Mark)
  - III) Explain it's biochemical role ( 3 Mark)

**Q.3 Answer any 1 out of 2 (LAQ)**

**1 x 10 = 10 Marks**

- a) Describe the pathway for biosynthesis of urea from ammonia. Add a note on metabolic disorders of urea cycle. (6 +4= 10 Marks)
- b) Describe various complexes of Electron Transport Chain. State sites of ATP synthesis. Add a note on inhibitors and uncouplers. (5 +2 + 3= 10 Marks)

### Section C

#### Q.1 Answer any 5 out of 6 (SAQ)

5 x 3 = 15 Marks

- a) Functions of plasma proteins
- b) Denaturation
- c) Coenzymes-definition and any 3 biochemical reactions
- d) Genetic code
- e) Purine salvage pathway
- f) Role of fibers in diet

#### Q.2 Answer any 3 out of 4 (BAQ)

3 x 5 = 15 Marks

- a) Sickel cell anemia
- b) 42 years old male presented with complaints of severe pain in right toe and knee joint. Laboratory analysis revealed elevated serum Uric acid levels.
  - I. Name the disease ( 1 Mark)
  - II. Name metabolism affected ( 1 Mark)
  - III. What is probable cause ( 2 Mark)
  - IV. Name any two drugs used in treatment of above disease . ( 1 Mark)
- c) Describe Wald's visual cycle
- d) Applications of recombinant DNA technology

#### Q.3 Answer any 1 out of 2 (LAQ)

1 x 10 = 10 Marks

- a) Define enzyme inhibition. List various types of . enzyme inhibition . Describe competitive inhibition in detail with examples .(1 +2 + 7= 10 Marks)
- b) Describe the sources, RDA, biochemical functions and deficiency manifestations of Vitamin B 12 . (1 +1 + 4 + 4= 10 Marks)

**Model Question Paper For University Theory Exam**

**Department Of Biochemistry**

**I<sup>st</sup> MBBS CBME**

**Paper-II**

**Section B**

**Q.1 Answer any 5 out of 6 (SAQ)**

**5 x 3 = 15 Marks**

- a) Role of calcitonin in regulation of calcium homeostasis
- b) Phase II reactions of detoxification
- c) Causes and clinical features of Wilson's disease,
- d) Structure and function of Elastin
- e) Liver function tests based on detoxification and excretory function.
- f) Write any three Glucose transporters with functions

**Q.2 Answer any 3 out of 4 (BAQ)**

**3 x 5 = 15 Marks**

- a) Metabolic interrelationship among adipose tissue, liver and extrahepatic tissue.
- b) Explain briefly on storage and absorption iron from intestine.
- c) What are the functional and therapeutic role of prostaglandins.
- d) A patient was brought to the hospital in state of coma. Acetone could be smelled on his breath. His investigation revealed following findings- Physical findings showed dehydration. Blood sugar- 270 mg/ dL, urine Benedict's test- Positive, urine Rothera's test – Positive, Blood pH-0.75

- I. What is probable diagnosis? ( 1 Mark)
- II. What does Positive Rothera's test indicate ? ( 1 Mark)
- III. Why is patient's Blood pH lower than normal ? ( 2 Marks)
- IV. What possible treatment should the patient be given ? ( 1 Mark)

**Q.3 Answer any 1 out of 2 (LAQ)**

**1 x 10 = 10 Marks**

- a) Define gluconeogenesis. Describe how glucose is synthesized from alanine and add a note on its regulation. (2 +6 + 2= 10 Marks)
- b) Discuss in detail the mechanism by which kidney maintains the blood pH. What is meant by metabolic acidosis and how it is compensated. (1 +6 + 3= 10 Marks)



Section C

**Q.1 Answer any 5 out of 6 (SAQ)**

**5 x 3 = 15**

- a) Regulation of cholesterol synthesis
- b) Write the enzyme defect and clinical features of Galactosemia
- c) Oncogenes in carcinogenesis
- d) Biochemical changes within 48 hrs of starvation.
- e) Mechanism of hormone action at nuclear level.
- f) Enumerate thyroid function tests and normal values T3 and T4

**Q.2 Answer any 3 out of 4 (BAQ)**

**3 x 5 = 15**

- a) Discuss the regulation of glycogen metabolism
- b) Function of phospholipids.
- c) Name the ketone bodies. Describe the process of ketogenesis. List the condition that lead to ketoacidosis
- d) Free radical scavenger mechanism.

**Q.3 Answer any 1 out of 2 (LAQ)**

**1 x 10 = 10**

- a) Name the site where beta oxidation of fatty acid occurs. Describe the steps involved in beta oxidation of fatty acids. Explain how much energy is released in beta oxidation of one molecule of palmitic acid. (1 + 6 + 3 = 10 Marks)
- b) Define Krebs's cycle. Describe the reactions of Krebs's cycle. Add a note on its energetics and significance. (1 + 6 + 1 + 2 = 10 Marks)

**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

LIST OF BIOCHEMISTRY BOOKS FOR FIRST MBBS-2023-24  
(UNDERGRADUATE COURSE /POSTGRADUATE COURSE)

A. TEXT BOOKS

S.N.	Name of the book	Name of the Author
1	Biochemistry for Medical student	D M Vasudevan & Shree Kumari
2	Text Book of Medical Biochemistry	U Satanarayan
3	Textbook of Biochemistry	M. Rafi
4	Medical Biochemistry	Pankaja Naik

B. PRACTICAL BOOKS

S.N.	Name of the book	Name of the Author
1	Manual of practical Biochemistry	M. Rafi
2	Biochemistry Review	U Satanarayan
3	Manual of practical Biochemistry	D M Vasudevan & Shree Kumari
4	Manual of practical Biochemistry	Dr. S. K. Gupta

C. REFERENCE BOOK

S.N.	Name of the book	Name of the Author
1	Harper's illustrated Biochemistry	Robert K Murray
2	Lipponcott's illustrated Reviews	Richard A Harvey
3	Biochemistry	Dinesh Puri
4	Biochemistry	Devlin
5	Biochemistry	Lubert. Stryer
6	Medical Biochemistry	N V Bhagwan
7	Text Book Of Biochemistry	Chaterjee, R. Shinde

**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. 3.3 of Academic Council (AC-42/2022):** Resolved to approve SLOs of competencies from BI 1.1 to B.I. 10.5 of Biochemistry theory and B.I.11.1-11.24 of practical curriculum as per CBME curriculum in the programme First MBBS Biochemistry for theory and Practical with effect from the batch admitted in academic year 21-22. [ANNEXURE-5]

Complete finals MBBS Competencies and SLOs 09.03.2022 (Link)

[Biochemistry CBME Syllabus](#)

**Resolution No. 3.6 of Academic Council (AC-42/2022):** Resolved to continue the existing method for additional exam for Ist 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]

राष्ट्रीय आयुर्विज्ञान आयोग

~~Annex-15~~

**National Medical Commission**  
**(Undergraduate Medical Education Board)**

**No. U.11026/1/2022-UGMEB**

**Dated the 31<sup>st</sup> 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 6<sup>th</sup> meeting of National Medical Commission, which was held on 24<sup>th</sup> 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 **14<sup>th</sup> 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 1<sup>st</sup> 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, 1<sup>st</sup> 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 1<sup>st</sup> 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 12<sup>th</sup> June every year to be culminated on International Yoga day, i.e. 21<sup>st</sup> 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 1<sup>st</sup> 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 2<sup>nd</sup> 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 2<sup>nd</sup> MBBS.

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

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

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## 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 <sup>st</sup>	14 <sup>th</sup> Feb '22 to 31 <sup>st</sup> Jan '23, Exam - Feb.	11.5 months (incl. F.C.) Exam , Result = 1 month	14 months (incl. one month FC)
2 <sup>nd</sup>	1 <sup>st</sup> March,'23 to 29 <sup>th</sup> Feb,'24 Exam- March, '24	12 months Exam , Result = 1 month	12 months
3 <sup>rd</sup> (III-part-1)	1 <sup>st</sup> April,'24 to 15 <sup>th</sup> Jan,'25, Exam – till 31 <sup>th</sup> 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 <sup>th</sup> (III-part-2)	1 <sup>st</sup> March,'25 to 31 <sup>st</sup> March, '26	13 months NeXT (theory ) – April, '26 Univ. (practical) – April, '26	13 months
Internship	1 <sup>st</sup> May, '26 to 30 <sup>th</sup> April '27,	12 months	12 months
NeXT & Counselling	May, June, '27	Counselling before 15 <sup>th</sup> 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 <sup>TH</sup> -1	2	3	4	5	6	7	8	9	10	11
2023	12	Exam, Results	2 <sup>ND</sup> PROF-1	2	3	4	5	6	7	8	9	10
2024	11	12	Exam, Results	3 <sup>RD</sup> 1 <sup>ST</sup> -1	2	3	4	5	6	7	8	9
2025	10- exam in 2 <sup>nd</sup> 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

#### **2<sup>nd</sup> 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

#### **3<sup>rd</sup> 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 <sup>st</sup> Professional	<ul style="list-style-type: none"> <li>Collect demographic profile of allotted families, take history and conduct clinical examination of all family members</li> </ul>	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"> <li>Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor</li> </ul>	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"> <li>Maintain communication &amp; follow up of remedial measures</li> </ul>	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"> <li>Take part in environment protection and sustenance activities.</li> </ul>	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 <sup>nd</sup> Professional	<ul style="list-style-type: none"> <li>Take history and conduct clinical examination of all family members</li> </ul>	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"> <li>Organize health check-up and coordinate treatment of adopted family under overall guidance of mentor</li> </ul>	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"> <li>Maintain communication &amp; follow up of remedial measures</li> </ul>	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"> <li>Take part in environment protection and sustenance activities.</li> </ul>	<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 <sup>rd</sup> Professional	<ul style="list-style-type: none"> <li>Final counselling of the family members of allotted families and analyze the health trajectory of adopted family under overall guidance of mentor</li> </ul>	<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>



<b>TOTAL</b>	1 <sup>st</sup> Prof 2 <sup>nd</sup> Prof 3 <sup>rd</sup> Prof	9 visits 6 visits <u>5 visits</u> <b>20 visits</b>	27 hrs 30 hrs 16 hrs +5 hours in <u>last visit</u> <b>78 hrs</b>		
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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 (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	ADDICTIONS IF ANY	HEIGHT (CMS)	WEIGHT (KG)
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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

PROTO TYPE LOG B

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

ANY

1ST PROF/  
 MBBS

DATE OF  
 SR. NO. 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)

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