Highlighted on 3 & 40

MGM INSTITUTE OF HEALTH SCIENCES

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

(CBME)

(with effect from 2019-2020 Batches)

Curriculum for Second M.B.B.S Pharmacology

Amended upto AC - 49/2024, Dated 25/04/2024

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. 3.2.2.1], Dated 16/09/2020.
3. Amended upto BOM 63/2021 [Resolution No. 4.4.2.2.i, Resolution No. 4.4.2.2.ii], Dated 17/02/2021.
4. Amended upto AC-41/2021 [Resolution No. 4.19], Dated 27/08/2021.
5. Amended upto AC-44/2022 [Resolution No. 5.18], Dated 09/12/2022
6. Amended upto AC-46/2023 [Resolution No. 5.11, Resolution No. 5.16], Dated 28/04/2023.
7. Approved as per Resolution No. 5.12 of AC-48/2023, dated 12/12/2023.
8. Amended as per AC-49/2024 [Resolution No. 4.9, (40A, 40C)], Dated 25/05/2024

Resolution No. 4.9 of Academic Council (AC-49/2024): Resolved to approve the changes in the CBME second professional teaching hours, Phase-II MBBS 2022-23 (late admission batch 2022) [ANNEXURE - 40A, 40C].

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

No. U.14021/8/2023-UGMEB **Dated, the 01st August, 2023**

Subject: - Competency Based Medical Education Curriculum (CBME) Guidelines- National Medical Commission.

Under Graduate Medical Education Board invited comments on draft Competency Based Medical Education Guidelines vide Public Notice of even no. dated 23/06/2023.

2. After consideration of comments received, in exercise of powers conferred by the National Medical Commission Act, 2019 and particularly by sections 10, 24, 25, and 57 of the said Act, Under Graduate Medical Education Board publishes the Competency Based Medical Education Guidelines.

3. Guidelines shall be effective from the date of its publication i.e.; 01/08/2023.

01/08/2023
(Shambhu Sharan Kumar)
Director, UGMEB

- Enlist and describe the cell organelles with their molecular ad functional organization.
- Delineate structure, function and interrelationships of various biomolecules and consequences of deviation from the normal.
- Understand basic enzymology and emphasize on its clinical applications wherein regulation of enzymatic activity is disturbed.
- Describe digestion and assimilation of nutrients and consequences of malnutrition.
- Describe and integrate metabolic pathways of various biomolecules with their regulatory mechanisms.
- Explain the biochemical basis of inherited disorders with their associated squeal.
- Describe mechanisms involved in maintenance in water, electrolyte and acid base balance and consequences of their imbalances.
- Outline the molecular mechanisms of gene expression and regulation, basic principles of biotechnology and their applications in medicine.

c. Skills

At the end of the course, the student shall be able to:

- Make use of conventional techniques / instruments to perform biochemical analysis relevant to clinical screening and diagnosis;
- Analysis and interpret investigative data;
- Demonstrate the skills of solving scientific and clinical problems and decision making.

d. Integration:

The teaching/learning programme should be integrated horizontally and vertically, as much as possible, to enable learners to make clinical correlations and to acquire an understanding of the cellular and molecular basis of health and disease.

2nd Professional Year:

4. PATHOLOGY

a. Competencies:

The undergraduate must demonstrate:

- Comprehension of the causes, evolution and mechanisms of diseases,
- Knowledge of alterations in gross and cellular morphology of organs in disease states,
- Ability to correlate the natural history, structural and functional changes with the clinical manifestations of diseases, their diagnosis and therapy,

b. Broad subject specific objectives

Knowledge:

At the end of one and half years, the student shall be able to:-

- Describe the structure and ultra structure of a sick cell, causes and mechanisms of cell Injury, cell death and repair.
- Correlate structural and functional alterations in the sick cell.
- Explain the path physiological processes, which govern the maintenance of homeostasis, mechanisms of their disturbance and the morphological and clinical manifestation associated with it.
- Describe the mechanisms and patterns of tissue response to injury so as to appreciate the path physiology of disease processes and their application to clinical science.
- Correlate the gross and microscopic alterations of different organ systems in common disease to the extent needed for understanding disease processes and their clinical significance.
- Develop an understanding of steps in neoplastic changes in the body and their effects in order to appreciate need for early diagnosis and further management of neoplasia.
- Understand mechanisms of common hematological disorders and develop a logical approach in their diagnosis and management.
- Develop understanding of the blood banking, blood donors & transfusion of blood & blood products, (components).
- Understand pathophysiology of infectious diseases in relation with tissue changes.

- Describe the various immunological reactions in understanding the disease process & tissue transplant.
- Develop an understanding for genetic disorders.
- Understand the vital organ function test of Kidney, liver & thyroid.

c. Skills

At the end of one and half years, the student shall be able to:

- Describe the rationale and principles of routine technical procedures of the diagnostic laboratory tests & perform it.
- Interpret routine diagnostic laboratory tests and correlate with clinical,hematological and morphological changes.
- Perform the simple bed-side tests on blood, urine and other biological fluid samples:
- Draw a rational scheme of investigations aimed at diagnosing and managing the cases of common disorders.
- Able to understand the microscopic and macroscopic features of common diseases.
- Develop different type of skills such as observation skills, communication skill and presentation skill.
- Understand biochemical/physiological disturbances that occur as a result of disease in collaboration with all concerned departments.

d. Integration: The teaching should be aligned and integrated horizontally and vertically in organ systems recognizing deviations from normal structure and function and clinically correlated so as to provide an overall understanding of the etiology, mechanisms, laboratory diagnosis, and management of diseases.

5. MICROBIOLOGY

a. Competencies:

The undergraduate learner demonstrates:

- Understanding of role of microbial agents in health and disease,
- Understanding of the immunological mechanisms in health and disease,
- Ability to correlate the natural history, mechanisms and clinical manifestations of infectious diseases as they relate to the properties of microbial agents,
- Knowledge of the principles and application of infection control measures,
- An understanding of the basis of choice of laboratory diagnostic tests and their interpretation, antimicrobial therapy, control and prevention of infectious diseases.
- Knowledge of outbreak investigation and its control.

b. Broad subject specific objectives

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

- Explain how the different microorganisms can cause human infection.
- Understand commercial, opportunistic and pathogenic organisms and describe host parasite relationship.
- Describe the characteristics (morphology, cultural characteristics, resistance, virulence factors, incubation period, mode of transmission etc.) of different microorganisms.
- Explain the various defense mechanisms of the host against the microorganisms which can cause human infection.
- Describe the laboratory diagnosis of microorganisms causing human infections and disease.
- Describe the prophylaxis for the particular infecting microorganisms

c. Skills

At the end of the course the student shall be able to

- Plan the laboratory investigations for the diagnosis of infectious diseases.
- Perform laboratory procedures to arrive at the etiological diagnosis of infectious diseases caused by bacteria, fungi, viruses and parasites including the drug sensitivity profile.
- Perform and interpret immunological and serological tests.
- Operate routine and sophisticated instruments in the laboratory.
- Develop microteaching skills and Pedagogy
- Successfully implement the chosen research methodology

d. Integration: The teaching should be aligned and integrated horizontally and vertically in organ systems with emphasis on host-microbe-environment interactions and their alterations in disease and clinical correlations so as to provide an overall understanding of the etiological agents, their laboratory diagnosis and prevention.

6. PHARMACOLOGY

a. Competencies: The undergraduate must demonstrate:

- Knowledge about essential and commonly used drugs and an understanding of the pharmacologic basis of therapeutics,
- Ability to select and prescribe medicines based on clinical condition and the pharmacologic properties, efficacy, safety, suitability and cost of medicines for common clinical conditions of national importance,
- Knowledge of pharmacovigilance, essential medicine concept and sources of drug information and industry-doctor relationship,
- Ability to counsel patients regarding appropriate use of prescribed drug and drug delivery systems.

b. Broad subject specific objectives

(A) **Knowledge:**

At the end of the course, the student shall be able to

- Describe the Pharmacokinetics and Pharmacodynamics of essential and commonly used drugs.
- Enlist the indications, contraindications, interactions and adverse reactions of commonly used drugs.
- Tailor the use of appropriate drugs in disease with consideration of its cost, efficacy and safety for-
    a. Individual needs and
    b. Mass therapy, under National Health Programs.
- Integrate the list of drugs of addiction and recommend the management of drug addiction.
- Explain pharmacological basis of prescribing drugs in special medical situations such as

  pregnancy, lactation, infancy, old age, renal damage, hepatic damage and immuno-compromised patients.
- Explain the concept of rational drug therapy in clinical pharmacology.
- State the principles underlying the concept of 'Essential Drugs'.
- Evaluate the ethics and modalities involved in the development and introduction of new drugs.

c. Skills

At the end of the course, the student shall be able to

- Prescribe drugs for common ailments.
- Identify adverse reactions and drug interactions of commonly used drugs.
- Interpret the data obtained from the experiments designed for the study of effect of drugs in various experimental and clinical studies.
- Analyze the information regarding common pharmaceutical preparations and critically evaluate drug formulations.
- Appraise the Principles of Clinical Pharmacy and Dispense the Medications giving proper instructions.

d. Integration: Practical knowledge of use of drugs in Clinical Practice will be acquired through Integrated Teaching vertically with phase 1 subjects and horizontally with other phase 2 subjects.

3rd Professional year

7. FORENSIC MEDICINE AND TOXICOLOGY

a. Competencies: The learner must demonstrate:

- Understanding of medico-legal responsibilities of physicians in primary and secondary care settings,
- Understanding of the rational approach to the investigation of crime, based on scientific and legal principles,
- Ability to manage medical and legal issues in cases of poisoning /overdose,
- Understanding the medico-legal framework of medical practice and medical negligence,
- Understanding of codes of conduct and medical ethics,
- Understanding concept of deceased donor, brain death, and Human Organ Transplantation Act.

b. Broad subject specific objectives:

Knowledge: At the end of the course, the student shall be able to

- Identify the basic Medico-legal aspects of hospital and general practice.
- Define the Medico-legal responsibilities of a general physician while rendering community service either in a rural primary health centre or an urban health centre.

- Appreciate the physician's responsibilities in criminal matters and respect for the codes of Medical ethics.
- Diagnose, manage and identify legal aspect of common acute and chronic poisonings.
- Describe the Medico-legal aspects and findings of post-mortem examination in cases of death due to common unnatural conditions and poisonings.
- Detect occupational and environmental poisoning, prevention and epidemiology of common poisoning and their legal aspects particularly pertaining to Workmen's Compensation Act.
- Describe the general principles of analytical toxicology.

c. Skills

At the end of the course, the student shall be able to

- Make observations and draw logical inferences in order to initiate enquiries in criminal matters and Medico-legal problems and be able to -
- Carry on proper Medico-legal examination and documentation/Reporting of Injury and Age.
- Conduct examination for sexual offences and intoxication.
- Preserve relevant ancillary materials for medico-legal examination.
- Identify important post-mortem findings in common unnatural deaths.
- Diagnose and treat common emergencies in poisoning and chronic toxicity.
- Make observations and interpret findings at post-mortem examination.
- Observe the principles of medical ethics in the practice of his profession.

d. Integration:

The teaching should be aligned and integrated horizontally and vertically recognizing the importance of medico-legal, ethical and toxicological issues as they relate to the practice of medicine.

8. COMMUNITY MEDICINE

a. Competencies: The undergraduate must demonstrate:

- Understanding of the concept of health and disease,
- Understanding of demography, population dynamics and disease burden in National and global context,
- Comprehension of principles of health economics and hospital management,
- Understanding of interventions to promote health and prevent diseases as envisioned in National and State Health Programmes.
- Understanding of physical, social, psychological, economic and environmental determinants of health and disease,
- Ability to recognize and manage common health problems including physical, emotional and social aspects at individual family and community level in the context of National Health Programmes,
- Ability to Implement and monitor National Health Programmes in the primary care setting,
- General knowledge about Organ and Tissue donation,
- Knowledge of maternal and child wellness as they apply to national health care priorities and programmes,
- Ability to recognize, investigate, report, plan and manage community health problems including malnutrition and emergencies.

b. Broad subject specific objectives:

Knowledge: At the end of the course the student shall be able

- Explain the principles of sociology including demographic population dynamics.
- Identify social factors related to health, disease and disability in the context of urban and rural societies.
- Appreciate the impact of urbanization on health and disease.
- Observe and interpret the dynamic of community behaviors.

- Describe the elements of normal psychology and social psychology.
- Observe the principles of practice of medicine in hospital and community settings.
- Describe the health care delivery systems including rehabilitation of the disabled in the country.
- Describe the National Health Programmes with particular emphasis on maternal and child health programmes, family welfare planning and population control.
- Describe the epidemiological methods and techniques.
- Outline the demographic pattern of the country and appreciate the roles of the individuals, family, community and socio-cultural milieu in health and disease.
- Describe the health information systems.
- Acquire, understand, integrate, apply and manage information in context to health care problems and health care delivery system in various communities, health care settings and hospitals.
- Describe the principles and components of primary health care, National Rural Health Mission and the national health policies to achieve the goal of "Health for all" with regards to identify the environmental, bio-waste and occupational hazards and their control.
- Describe the importance of water and sanitation in human health.
- Describe the principles of health economies, health administration, health education in relation to community.
- Critically analyze the problem (s) and apply his/her knowledge to solve the problem in holistic manner.
- Describe and apply principles of prevention, promotion and maintenance of health.

c. Skills: At the end of the course, the student shall be able to –

- Use the principles and practice of medicine in hospital and community settings and familiarization with elementary practices.
- Use the Art of communication with patients including history taking and medico social work.

- Use epidemiology as a scientific tool to make rational decisions relevant to community and individual patient intervention.
- Organize health care services for vulnerable and disadvantages groups.
- Organize health care services in case of calamities.
- Collect, analyze, interpret and present simple community and hospital base data.
- Diagnose and manage common health problems (including communicable and non-communicable diseases) and emergencies at the individual, family and community levels keeping in mind the existing health care resources and in the context of the prevailing socio-culture beliefs.
- Diagnose and manage common nutritional problems at the individual and community level.
- Plan, implement and evaluate a health education Programme with skill to use simple audio-visual aids.
- Interact with other members of the health care team and participate in the organization of health care services, health advocacy and implementation of national health programmes.
- Perform Administrative functions at health centers
- Observe the principles of medical ethics in the practice of his profession.

d. Integration:

Department shall adopt an integrated approach towards other clinical disciplines, public health services, NGOs, environmental sciences, social sciences, management, hospital administration, research, etc. to impart training to enable the graduate to work at all levels of health care. The teaching should be aligned and integrated horizontally and vertically in order to allow the learner to understand the impact of environment, society and national health priorities as they relate to the promotion of health and prevention and cure of disease.

9. OTO-RHINOLARYNGOLOGY (ENT)

AETCOM Competencies for Second MBBS

Subject	Competency Number	Competency
Pathology	2.6	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as they pertain to refusal of care including do not resuscitate and withdrawal of life support.
	2.4 A	Demonstrate ability to work in a team of peers and superiors.
	2.4 B	Demonstrate respect in relationship with patients, fellow team members, superiors and other health care workers.
	2.7	Identify, discuss and defend, medico-legal, socio-cultural and ethical issues as they pertain to consent for surgical procedures.
Microbiology	Module 2.2 A	Describe and discuss the role of non-malfeasance as a guiding principle in patient care
	Module 2.2 B	Describe and discuss the role of autonomy and shared responsibility as a guiding principle in patient care
	Module 2.2 C	Describe and discuss the role of beneficence of a guiding principle inpatient care
	Module 2.2 D	Describe and discuss the role of a physician in health care system
	Module 2.2 E	Describe and discuss the role of justice as a guiding principle in patient Care
	Module 2.3	Describe and discuss the role of justice as a guiding principle in patient care
	Module 2.5	Identify, discuss and defend medico-legal, socio-cultural and ethical issues as it pertains to patient autonomy, patient rights and shared responsibility in health care
Pharmacology	Module 2.1	Demonstrate ability to communicate to patients in a patient, respectful, non-threatening, non-judgmental and empathetic manner.
	Module 2.8	Demonstrate empathy in patient encounters.

Table1: Time distribution of MBBS Programme & Examination Schedule

Proposed AcademiCalenderfor CBME 2023-24 Batch 2023

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2023									1	2	3	4
2024	5	6	7	8	9	10	11	12-Ist Prof, exam, result	13- 2nd MBBS	14	15	16
2025	17	18	19	20	21	22	23	24- 2nd Prof exam, result	25- Final 1st	26	27	28
2026	29	30	31	32	33	34	35	36- Final 1st exam, result	37- Final 2nd	38	39	40
2027	41	42	43	44	45	46	47	48	49	50	51	52
2028	53	54 NEXT-1	1- CRMI	2	3	4	5- 2nd proposed NEXT	6	7	8	9	10
2029	11	12-NEXT-Step 2										

Legends:

AETCOM: Attitude, Ethics and Communication skills

FAP: Family Adoption Programme (village outreach)

SDL: Self Directed Learning

SGL: Small Group Learning (tutorials/ Seminars/ Integrated Learning)

PCT (mentioned in Assessments): Part Completion Test

Table no. 5- Distribution of Subject Wise Teaching Hours for II MBBS

Subjects	Lectures	SGL	Clinical Postings*	SDL	Total
Pathology	80	165	-	10	255
Pharmacology	80	165	-	10	255
Microbiology	70	135	-	10	215
Community Medicine	15	0	0	10	25
FAP	0	0	30		30
Forensic Medicine and Toxicology	12	22	-	08	42
Clinical Subjects	59		540	-	599
AETCOM	-	29	-	8	37
Sports, Yoga and extra-curricular activities	-	-	-	20	35
Pandemic module				28	28
Final total	316	516	585	104	1521

Pl. note: Clinical postings shall be for 3 hours per day, Monday to Friday.

There will be 15 hours per week for all clinical postings.

Name of Institute :

DEPARTMENT OF Pathology/Pharmacology/Microbiology

Faculty : MBBS	**Year/Phase- II**	

			Formative Assessment_Theory			Continuous Internal assessment_Theory						
S.No.	**Roll No.**	**Name of Student**	**1st PCT Theory**	**2nd PCT Theory**	**Prelims Theory (Paper I & II)**	Home Assignment	Continuous Class Test (LMS)	Seminar	Museum study	Library assignments	Attendance Theory	**Total**
								Self Directed Learning				
			100	**100**	**200**	**15**	**30**	**15**	**15**	**15**	**10**	**500**

Professor & Head
Department of _____
Name of Institute

Name of Institute :

Department of Pathology/Pharmacology/Microbiology

Faculty : MBBS | **Year/Phase- II** | **Date : dd/mm/yyyy**

			Formative Assessment			Continuous Internal Assessment (Practical)						
S.No.	**Roll No.**	**Name of Student**	**1st PCT Practical/First Ward Leaving Examination**	**2nd PCT Practical /Second Ward Leaving Examination**	**Prelims Practical**	**Log book (150)**				***Journal (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

MGM Health Science and Institute, (Aurangabad, Vashi, Kamothe)

Department of Pathology/Pharmacology/Microbiology

II MBBS Phase II CBME batch

Guidelines for Internal Assessment for Practical

1. 1st PCT (100 marks): 1st term ending examination including OSPE
2. 2nd PCT (100 marks): 2nd term ending examination including OSPE
3. Prelims practical (100 marks): Prelims including OSPE
4. LOG book (150 marks)

   a. **Certifiable Skills based competencies (60 marks):** entries in the log book have to be made as per certifiable skills in every department.

   b. **AETCOM competencies (30 marks):** Common logbook exist for all three subject periodic regular entries should be made by the students AETCOM sessions and assessment by the facilitator and combine marks of out of 30 will be granted to the students

   c. **SVL Lab activity (40 marks):** 2 skill modules have been prepared by each dept (Preferably using the skill Lab and out of 20 marks will be awarded to student on their competency)

   E-content videos of SVL activity as per subject will be circulated.
   20 marks will be assigned to student and evaluated (Google form/ MCQ/one-word question of as desired).

   d. Research (20 marks):

   1. Research (20mks): Students will be assigned to write protocol. The assigned faculty will guide the students to write a protocol for research paper and this will be assessed. OR
   2. External faculty/ internal faculty other than core subject teacher can be mobilised e.g. Research cell faculty/ library faculty can be mobilised to conduct few lectures and this can be assessed/ evaluated (Google form/ MCQ/one-word question of as desired) combined by all three-core department.

1. **Journal (Record book/ Portfolio) (40 marks):** should be awarded out of 40 marks as per their records.

2. Attendance Practical (10 marks):

% of attendance	Marks allotted
91-100	10
81-90	9
71-80	8
61-70	7
51-60	6
41-50	5
31-40	4
21-30	3

11-20	2
1-10	1

MGM Health Science and Institute, (Aurangabad, Vashi, Kamothe)

Department of Pathology/Pharmacology/Microbiology

II MBBS Phase II CBME batch

Guide lines for Internal Assessment for Theory

1. 1st PCT (100 marks): 1st term ending examination

2. 2nd PCT (100 marks): 2nd term ending examination

3. Prelims Theory (200 marks): Paper I, and Paper II

4. **Home assignment (15 marks):** posters / model answers for important questions/PPT preparation/to be to submit to respective faculty of respective dept.

5. **Continuous (30 marks) LMS:** MCQ/one liners/ one word/ picture based MCQ/ as per dept should be conducted and record should be maintaining (minimum 3 should be conducted) at regular interval.

6. **Seminar (15marks):** Each student will present seminar on the given topic and will be assessed by respective departmental faculty.

7. **Museum study (15 marks):** Each student will prepare museum relevant material (charts /model/writeup/catalogue/mount a specimen/mount a slide/exercise on drug dosages form) and will be assessed by respectively departmental faculty.

8. **Library assignment (15mks):** Students will be asked to use the journal section and avail the journals present in the library and select an article of their choice (the departmental faculty can divide 150 students among themselves in a group of 20 students or as permissible and each group will be assigned each faculty. The faculty can either designate journal /paper topic or student can choose himself. A summary written by the student in his own words will be submitted to the faculty.

9. **Attendance theory (10 marks):**

% of attendance	Marks allotted
91-100	10
81-90	9
71-80	8
61-70	7
51-60	6
41-50	5
31-40	4
21-30	3
11-20	2
1-10	1

II[nd] MBBS CBME Curriculum
Pharmacology

Lectures	Practical//Tutorials/Integrated Learning /Seminars / Small group teaching	SDL	TOTAL
80 hrs	141 hrs	12 hrs	233 hrs

List of Lectures			
Number	**COMPETENCY** **The student should be able to**	**Lecture Topics**	**Hours**
	General Pharmacology		
PH1.1	Define and describe the principles of pharmacology and pharmacotherapeutics	Introduction to Pharmacology	1
PH1.9	Describe nomenclature of drugs i.e. generic, branded drugs		
PH1.3	Enumerate and identify drug formulations and drug delivery systems	Routes of administrations	1
PH1.11	Describe various routes of drug administration, eg., oral, SC, IV, IM, SL		
PH1.4	Describe absorption, distribution, metabolism & excretion of drugs	absorption	1
		metabolism	1
PH1.51	Describe occupational and environmental pesticides, food adulterants, pollutants and insect repellents		
PH1.8	Identify and describe the management of drug interactions	Drug interactions and TDM	1
PH1.2	Describe the basis of Evidence based medicine and Therapeutic drug monitoring		
PH1.5	Describe general principles of mechanism of drug action	PD-I	1
		PD-II	1
PH1.6	Describe principles of Pharmacovigilance & ADR reporting systems	ADR	1
PH1.7	Define, identify and describe the management of adverse drug reactions (ADR)		
PH1.63	Describe Drug Regulations, acts and other legal aspects	Drug Regulations and Schedules	1

PH1.64	Describe overview of drug development, Phases of clinical trials and Good Clinical Practice	Drug development processand GCP	1
PH1.60	Describe and discuss Pharmacogenomics and Pharmacoeconomics	Pharmacogenomics and Pharma coeconomics	1
		Total Hours	11

Number	COMPETENCY The student should be able to	lecture topics	Hours
	Autonomic Nervous System		
PH1.13	Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti-adrenergic drugs	Adrenergic agonists	1
		Alpha blocker	1
		Beta Blocker	1
PH1.14	Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs	Cholinergic agonists and Anti-cholinesterases	1
		Anticholinergics	1
	Total Hours		**5**
	Autacoids and Related Drugs		
PH1.16	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act by modulating autacoids, including: anti-histaminics, 5-HT modulating drugs, NSAIDs, drugs for gout, anti-rheumatic drugs, drugs for migraine	NSAIDS-I and II	2
		anti-histaminics	1
		5-HT modulating drugs and drugs for migraine	1
		Drugs for gout, anti-rheumatic drugs,	1
	Total Hours		**5**
	Drugs acting on Peripheral Nervous System		
PH1.15	Describe mechanism/s of action, types, doses, side effects, indications and contraindications of skeletal muscle relaxants	Skeletal Muscle Relaxants	1
PH1.17	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of local anesthetics	Local Anesthetics	1
		Total Hours	2
	CNS		
PH1.18	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of general anaesthetics, and pre- anesthetic medications	General Anesthetics	1
PH1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti- depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for	sedatives & hypnotics	1
		anxiolytics	1
		anti-psychotic	1

	neurodegenerative disorders, anti-epileptics drugs)	anti- depressant drugs and anti-maniacs	1
		opioid agonists and antagonists	1
		drugs used for neurodegenerative disorders	1
		anti-epileptics drugs	1
		Total Hours	**8**

	Drugs acting on Kidney		
PH1.24	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs affecting renal systems including diuretics, antidiuretics- vasopressin and analogues	Diuretics and antidiuretics	1
	Drugs affecting Blood and Blood Formation		
PH1.25	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs acting on blood, like anticoagulants, antiplatelets, fibrinolytics, plasma expanders	Coagulants and anticoagulants	1
		Antiplatelets and fibrinolytics	1
		plasma expanders and Rx of shock	1
PH1.35	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in hematological disorders like: 1.Drugs used in anemias 2.Colony Stimulating factors	Haematinics and Erythropoietin	1
		Total Hours	**4**
	Cardiovascular drugs		
PH1.26	Describe mechanisms of action, types, doses, side effects, indications and contraindications of the drugs modulating the renin- angiotensin and aldosterone system	Drugs affecting renin- angiotensin and aldosterone system	1
PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock	Antihypertensive drugs	1
PH1.28	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease	Antianginal drugs and Drugs for Myocardial infarction	2

PH1.29	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure	Cardiac glycosides	1
		Drugs for Heart failure	1
PH1.30	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the antiarrhythmics	Antiarrhythmic drugs	1
		Total Hours	**7**

	Respiratory System Drugs		
PH1.32	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD	Drugs used in bronchial asthma and COPD	1
		Total Hours	**1**
	Gastrointestinal Drug		
PH1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 1. Acid-peptic disease and GERD 2. Antiemetics and prokinetics 3. Antidiarhoeals 4 .Laxatives 5. Inflammatory Bowel Disease 6. Irritable Bowel Disorders, biliary and pancreatic diseases	Acid-peptic disease and GERD	1
		Antiemetics and prokinetics	1
		Total Hours	**2**
	Hormones and Related Drugs		
PH1.36	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis)	Thyroid Hormones and Thyroid Inhibitors	1
		Insulin	1
		Oral hypoglycemic agents	1
		Hormones and Drugs affecting calcium balance	1
PH1.37	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used as sex hormones, their analogues and anterior Pituitary hormones	Introduction & Anterior Pituitary hormones	1
		Estrogens & antagonists	1
		Progestins & antagonists	1

PH1.39	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception	Oral contraceptives & Pro-fertility agents	1
PH1.40	Describe mechanism of action, types, doses, side effects, indications and contraindications of 1. Drugs used in the treatment of infertility, and 2. Drugs used in erectile dysfunction	Androgens and Erectile Dysfunction	1
PH1.38	Describe the mechanism of action, types, doses, side effects, indications and contraindications of corticosteroids	Corticosteroids	2
PH1.41	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of uterine relaxants and stimulants	Oxytocin and Other Drugs acting on Uterus	1
		Total Hours	**12**

	Antimicrobial Drugs		
PH1.42	Describe general principles of chemotherapy	Antimicrobial agents: General Considerations	1
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program	Penicillins	1
		Cephalosporins & other beta lactums	1
		Aminoglycosides	1
		Fluoroquinolones	1
		Macrolides	1
PH1.44	Describe the first line antitubercular dugs, their mechanisms of action, side effects and doses.	Antitubercular drugs	1
PH1.45	Describe the dugs used in MDR and XDR Tuberculosis		
PH1.46	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antileprotic drugs	Antileprotic agents	1
PH1.47	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis	Antimalarial agents	2
		Antiameobic & Other antiprotozoal Drugs	1

		Antihelminthics	1
PH1.55	Describe and discuss the following National Health Programmes including Immunisation, Tuberculosis, Leprosy, Malaria, HIV, Filaria, Kala Azar, Diarrhoeal diseases, Anaemia & nutritional disorders, Blindness, Non-communicable diseases, cancer and Iodine deficiency		
PH1.48	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV	Antifungal agents	1
		Antiviral agents	1
		Pharmacotherapy of STDs	1
		Pharmacotherapy of UTI	1
PH1.62	Describe and discuss antiseptics and disinfectants		
PH1.49	Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drugs	Anticancer Drugs	1
		Total Hours	**17**

	Miscellaneous Topics		
PH1.50	Describe mechanisms of action, types, doses, side effects, indications and contraindications of immunomodulators and management of organ transplant rejection	Immunomodulators and vaccines	1
PH1.54	Describe vaccines and their uses		
PH1.52	Describe management of common poisoning, insecticides, common sting and bites	General Principles of Management of Poisoning	1
PH1.53	Describe heavy metal poisoning and chelating agents		
PH1.56	Describe basic aspects of Geriatric and Pediatric pharmacology	Geriatric and Pediatric pharmacology	1
PH1.57	Describe drugs used in skin disorders	Drugs acting on skin and mucous membrane	1
PH1.58	Describe drugs used in Ocular disorders	Ocular Pharmacology	1
PH1.59	Describe and discuss the following: Essential medicines, Fixed dose combinations, Over the counter drugs, Herbal medicines	Essential medicines, Herbal medicines and nutraceuticals	1
PH1.61	Describe and discuss dietary supplements and nutraceuticals		
		Total hours	**6**
		Grand Total Teaching hours	**80**

List of Practical//Tutorials/Integrated Learning /Seminars / Small group teaching Topics

Number	COMPETENCY The student should be able to	Practical//Tutorials/Integrated Learning /Seminars / Small group teaching Topics	Hours
	Practical's		
PH1.10	Describe parts of a correct, complete and legible generic prescription. Identify errors in prescription and correct appropriately	Prescription Writing	**2**
PH5.7	Demonstrate an understanding of the legal and ethical aspects of prescribing drugs		
	Practical's		
	Clinical Pharmacy		
PH2.1	Demonstrate understanding of the use of various dosage forms (oral/local/parenteral; solid/liquid)	Introduction to Practical Pharmacology	2
		Route of Administration-Oral	2
		Introduction to Pharmacy Pharmacy preparations (Solution, suspension, emulsion)	6
		Route of Administration-Topical	2
		Pharmacy preparations (Lotion, Liniment, Ointment)	6
		Route of Administration-Parental	2
PH2.3	Demonstrate the appropriate setting up of an intravenous drip in a simulated environment	Skill lab	2
PH2.2	Prepare oral rehydration solution from ORS packet and explain its use	Pharmacy preparation (ORS Powder)	2

PH2.4	Demonstrate the correct method of calculation of drug dosage in patients including those used in special situations	PK-I	2
		PK-II	2
	Clinical Pharmacology		
PH3.1	Write a rational, correct and legible generic prescription for a given condition and communicate the same to the patient	Single drug therapy	2
		Multiple drug therapy	4
		Fixed drug combination	2
PH3.2	Perform and interpret a critical appraisal (audit) of a given prescription	Criticism of prescription	4
PH3.3	Perform a critical evaluation of the drug promotional literature	Sources of Drug Information including scrutiny of Promotional Literature	4
PH3.6	Demonstrate how to optimize interaction with pharmaceutical representative to get authentic information on drugs	Skill lab	
PH3.4	To recognise and report an adverse drug reaction	ADR-I	2
		ADR-II	2
		ADR Reporting system and forms	2
		Subjective & Objective effects of Drugs	
PH3.5	To prepare and explain a list of P-drugs for a given case/condition	Rational Pharmacotherapy I	2
		Case Study-I	2
		Case study-II	2
		Rational Pharmacotherapy II	2
PH3.7	Prepare a list of essential medicines for a healthcare facility	National essential drug list	2
PH3.8	Communicate effectively with a patient on the proper use of prescribed medication	Skill station: Steps for drug delivery (Topical and Inhalational)	2

	Experimental Pharmacology		
PH4.1	Administer drugs through various routes in a simulated environment using mannequins	Skill lab-Parenteral routes	2
PH4.2	Demonstrate the effects of drugs on blood pressure (vasopressor and vaso-depressors with appropriate blockers) using computer aided learning	Screening Techniques for New Drugs	2
		PD-I	2
		PD-II	2
		CAL based learning	2
		CAL based learning	2
		CAL based learning	2
	Total hours: 76		
	Tutorials/Small group Teaching		
PH1.4	Describe absorption, distribution, metabolism & excretion of drugs	Distribution	1
		Excretion	1
		Kinetics of Elimination	1
PH1.5	Describe general principles of mechanism of drug action	Factors modifying Drug actions	1
PH1.13	Describe mechanism of action, types, doses, side effects, indications and contraindications of adrenergic and anti-adrenergic drugs	Adrenergic agonists	1
PH1.14	Describe mechanism of action, types, doses, side effects, indications and contraindications of cholinergic and anticholinergic drugs	Anticholinesterases and Rx of Organophosporus poisoning	1
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program	Sulphonamides and Cotrimoxazole	1
		Tetracyclines & Chloramphenicol	1

PH1.49	Describe mechanism of action, classes, side effects, indications and contraindications of anticancer drugs	Anticancer Drugs	1
PH5.2	Communicate with the patient regarding optimal use of a) drug therapy, b) devices and c) storage of medicines	Rational Pharmacotherapy-I	1
PH5.3	Motivate patients with chronic diseases to adhere to the prescribed management by the health care provider		
PH5.4	Explain to the patient the relationship between cost of treatment and patient compliance		
PH5.6	Demonstrate ability to educate public & patients about various aspects of drug use including drug dependence and OTC drugs	Rational Pharmacotherapy-II	1
		Total Hours	11
	Seminars		
PH1.32	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD	Bronchial Asthma	2
PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock	Hypertension	2
PH1.29	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in congestive heart failure	CCF	2
PH1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti- depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)	Treatment of Epilepsy	2

PH1.28	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in ischemic heart disease (stable, unstable angina and myocardial infarction), peripheral vascular disease	Angina Pectoris	2
PH1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti- depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)	Parkinson's disease	2
PH1.19	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs which act on CNS, (including anxiolytics, sedatives & hypnotics, anti-psychotic, anti- depressant drugs, anti-maniacs, opioid agonists and antagonists, drugs used for neurodegenerative disorders, anti-epileptics drugs)	Pain Management	2
PH1.36	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis)	Diabetes	2
PH1.47	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis	Malarial	2
PH1.44	Describe the first line antitubercular dugs, their mechanisms of action, side effects and doses.	TB	2
PH1.48	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV	UTI	2
PH1.23	Describe the process and mechanism of drug deaddiction	Drug addiction & Over Dose Toxicity	2

PH1.39	Describe mechanism of action, types, doses, side effects, indications and contraindications the drugs used for contraception	Contraception	2
PH1.48	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in UTI/ STD and viral diseases including HIV	HIV	2
PH1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 4. Acid-peptic disease and GERD 5. Antiemetics and prokinetics Antidiarrhoeals 4 .Laxatives 7. Inflammatory Bowel Disease Irritable Bowel Disorders, biliary and pancreatic diseases	Peptic Ulcer	2
Total Hours			30
	Integrated Topics		
PH1.12	Calculate the dosage of drugs using appropriate formulae for an individual patient, including children, elderly and patient with renal dysfunction. **(Pediatrics and Medicine)**	Dose modification in special conditions- children Dose modification in special conditions- elderly Dose modification in special conditions- patient with renal dysfunction	1
PH1.20	Describe the effects of acute and chronic ethanol intake **(Psychiatry)**	Ethyl and methyl alcohol	1
PH1.21	Describe the symptoms and management of methanol and ethanol poisonings **(Medicine)**	Management of methanol and ethanol poisonings	1

PH1.22	Describe drugs of abuse (dependence, addiction, stimulants, depressants, psychedelics, drugs used for criminal offences)	CNS stimulants and Cognition Enhancers	1
PH1.23	Describe the process and mechanism of drug deaddiction **(Psychiatry, Medicine)**	Principles of Deaddiction	1
PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock **(Medicine)**	Rx of Shock	
PH1.31	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in the management of dyslipidemias **(Medicine)**	Hypolipidemic agents	1
PH1.32	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of drugs used in bronchial asthma and COPD **(Respiratory Medicine)**	Bronchial asthma	1
PH1.33	Describe the mechanism of action, types, doses, side effects, indications and contraindications of the drugs used in cough (antitussives, expectorants/ mucolytics) **(Respiratory Medicine)**	Drugs for Cough	1
PH1.34	Describe the mechanism/s of action, types, doses, side effects, indications and contraindications of the drugs used as below: 6. Acid-peptic disease and GERD 7. Antiemetics and prokinetics 3.Antidiarrhoeals 4 .Laxatives 8. Inflammatory Bowel Disease	Anti diarrhoeals and Inflammatory Bowel Disease Irritable Bowel Disorders, biliary and pancreatic diseases	1
		Laxatives	1

	Irritable Bowel Disorders, biliary and pancreatic diseases **(Medicine)**		
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program **(Microbiology, Pediatrics, Medicine)**	Antibiotic stewardship program	1
PH5.1	Communicate with the patient with empathy and ethics on all aspects of drug use **(Medicine)**	Bioethics-I	1
		Bioethics-II	1
PH1.45	Describe the dugs used in MDR and XDR Tuberculosis **(Respiratory Medicine, Microbiology)**	Tuberculosis	1
PH1.47	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of the drugs used in malaria, KALA-AZAR, amebiasis and intestinal helminthiasis **(General Medicine, Microbiology)**	Malaria	1
PH1.36	Describe the mechanism of action, types, doses, side effects, indications and contraindications of drugs used in endocrine disorders (diabetes mellitus, thyroid disorders and osteoporosis) **(Medicine)**	Diabetes Mellitus	1
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program **(Microbiology, Pediatrics, Medicine)**	Typhoid	1
PH1.43	Describe and discuss the rational use of antimicrobials including antibiotic stewardship program **(Microbiology, Pediatrics, Medicine)**	Meningitis	1

PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock	Hypertension	1
PH1.27	Describe the mechanisms of action, types, doses, side effects, indications and contraindications of antihypertensive drugs and drugs used in shock	Myocardial Infarction	1
		Total Hours	21
	Topics for Practical//Tutorials/Integrated Learning /Seminars / Small group teaching	Grand total hours	138

Pandemic Management Topics in Pharmacology

Module	Broad areas	Competencies under which covered
2.5	Therapeutic strategies including new drug development	**PH1.64** Describe overview of drug development, Phases of clinical trials and Good Clinical Practice **Learning Experience** i. Exploratory and interactive theory session- 1 hour ii. **Small Group Discussion**- 2 hours Suggested Topics for discussion- New Drug Development – Challenges and Solutions – Urgency in procedures – Need for monitoring. iii. **Visit to a pharmaceutical firm/ pharmacy lab** to show various stages of drug development or an ADR monitoring exercise in clinical wards - 2 hours. (since it is not present in many cities - an appropriate video followed by discussion)- 2 hours iv. Discussion and closure – 1 hour **Total Extra hours needed to cover Pandemic Module: 3 Hours**

Self-Directed Learning Topics

Number	COMPETENCY/Systems	Self Directed Learning Topics	Hours
1	Ph. 1.1 General consideration of sympathetic system	Introduction to Sympathetic system	**2**
2	Ph 1.14 General consideration of parasympathetic system	Introduction to parasympathetic system	**2**
3	Ph 1.20 Acute and Chronic alcohol intake	Acute and Chronic alcohol intake	**2**
4	Ph 1.22 Drug abuse	Drug abuse	**2**
5	Ph 1.34 inflammatory Bowel disease, Irritable bowel disorders, Billiary and pancreatic diseases	Inflammatory Bowel disease, Irritable bowel disorders, Billiary and pancreatic diseases	**2**
6	Ph. 1.32 Management of bronchial asthma	Management of bronchial asthma	**2**
Total Hours: 12 hours			

Resolution No. 3.2.2.1 of BOM-62/2020: Resolved to approve the restructured Formative and Summative assessment pattern for 2nd MBBS Para-Clinical disciplines (Microbiology , Pathology , Pharmacology and FMT) which is in line with Competency Based Medical Education (CBME) curriculum guidelines as mandated by MCI. **[Annexure-46A, 46 B, 46C, 46D]**

Resolution No. 4.9 of Academic Council (AC-49/2024): Resolved to approve the changes in the CBME second professional teaching hours, Phase-II MBBS 2022-23 (late admission batch 2022) **[ANNEXURE-40A, 40B & 40C].**

Format for Internal assessment examinations

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

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

Format for Internal assessment examinations

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

Format of question paper

Time – 3 hrs. : _____

Preliminary / University examination

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

Unit I & II **–**1 paper **= 100 marks**

Each paper –

- **Section A** –MCQ – 20 X 1 mark = **20 Marks**
- **Section B** –
    - Answer any 5 out of 6 SAQ = **30 Marks**
    - Any one out of 2 LAQ (Structure LAQ to be made) = **10 marks**

➢ **Note: 1 AETCOM SAQ**

- **Section C** –
    - Any 5 out of 6 SAQ = **30 marks**
    - Any one out of 2 LAQ (Structure LAQ to be made) = **10 marks**

➢ **Note: At least 1 LAQ should be there clinically based.**

Format of question paper

Time – 3 hrs. **Preliminary &University**

Applicable from 2020-21 Batch onwards

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

Portion:

Paper 1	General Pharmacology including drug – drug interactions, Autonomic Nervous System, Cardiovascular System including drugs affecting Coagulation and those acting on the Kidneys; Haematinics; Agents used in Gastro – Intestinal Disorders; Ocular Pharmacology; Drug use at extremes of age, in pregnancy & in organ dysfunction; Diagnostic & Chelating agents; Environmental & Occupational Pollutants; Vitamins AETCOM Module 2.2
Paper 2	Neuro – Psychiatric Pharmacology including Antiinflammatory – Analgesics and Addiction & its management; Pharmacology in Surgery (Particularly per – operative management), Chemotherapy including Cancer Chemotherapy; Endocrinology; Dermatology ; Miscellaneous topics I (Lipid – derived autacoids; Nitric Oxide; Allergy – Histamines & Antihistamines including anti – vertigo, Anti Asthmatics; Anti – tussive agents; Immunomodulators, Vaccines & sera; Drugs acting on the uterus) AETCOM Module 2.7

Theory Paper Pattern and Marks Distribution:

Paper	Section	Type and Number of Questions	Marks alloted	Total Marks
Paper 1	Section A	MCQs (20)	20 X1mk each= 20Mks	20
	Section B	SAQs (5/6) (1 SAQ compulsory from AETCOM) LAQs (1/2) (Atleast 1 LAQ clinical Based)	5X 6 Mks each = 30 Mks 1X 10 Mks each=10 Mks	40
	Section C	SAQs (5/6)	5X 6 Mks each =30 Mks	40

		LAQs (1/2) (Atleast 1 LAQ clinical Based)	 1X 10 Mks each=10 Mks	
			TOTAL	**100**
Paper 2	Section A	MCQs (20)	20 X1mk each= 20Mks	20
	Section B	SAQs (5/6) (1 SAQ compulsory from AETCOM) LAQs (1/2) (Atleast 1 LAQ clinical Based)	5X 6 Mks each =30 Mks 1X 10 Mks each=10 Mks	40
	Section C	SAQs (5/6) LAQs (1/2) (Atleast 1 LAQ clinical Based)	5X 6 Mks each =30 Mks 1X 10 Mks each=10 Mks	40
			TOTAL	**100**

CBME II MBBS Pharmacology

Blue Print of MCQs Topic vise weightage for Preliminary and University Examination

Paper – I

Sr. No	Topics	No of MCQ
1	General Pharmacology	3
2	ANS	4
3	CVS	4
4	Blood	3
5	Kidney	1
6	GIT	3
7	Ocular drugs, Chelating agents, Vitamins	2
	Total	20

Paper – II

Sr. No	Topics	No of MCQ
1	CNS and Autocoids	6
2	Chemotherapy	7
3	RS	1
4	Endocrines	4
5	Uterus , Skin, and Immuno- Pharmacology	2
	Total	20

CBME PATTERN OF PRACTICALS EXAM AND MARKS DISTRIBUTION:

Summative and Formative (Prelim Exam/University Exam) in Pharmacology for 2nd MBBS

EXERCISE:- 1 – CLINICAL PHARMACY **Marks 20**

A) Pharmacy preparation and viva Marks 10

B) Clinical Pharmacokinetics Marks 5

C) Dosage form **(Dosage form exercises will be included as One OSPE station)** Marks 5

Resolution No. 5.11 of Academic Council (AC-46/2023): Resolved to approve inclusion of OSPE under Clinical Pharmacy head of 2nd MBBS Pharmacology Formative and Summative assessment [ANNEXURE-15].

EXERCISE: - II – CLINICAL PHARMACOLOGY **Marks 30**

A) Prescription writing – a) Single drug therapy Marks 4

- b) Complete drug therapy Marks 6

B) Criticism – a) Criticize, Correct and Re-write (CCR) Marks 5

b) Fixed Dose Combination (FDC) Marks 5

C) ADR identification/ADR Reporting/ P Drug list Marks 10

Resolution No. 5.16 of Academic Council (AC-46/2023):
i) Resolved to approve inclusion of ADR Reporting/Identification and P-Drug list in place of spots under Clinical pharmacology head of 2nd MBBS pharmacology formative & summative assessment. [ANNEXURE-20]

EXERCISE: - III –EXPERIMENTAL PHARMACOLOGY **Marks 10**

A)Drug administration through various routes using mannequins Marks 5

B)Effect of drugs on blood pressure using various graphs Marks 5

Resolution No. 5.16 of Academic Council (AC-46/2023): ii) Resolved to approve inclusion of OSPE (drug administration through various routes using mannequins and effect of drug on blood pressure using various graphs) under experimental pharmacology head of 2nd MBBS pharmacology formative & summative assessment [ANNEXURE-20].

EXERCISE: - IV – COMMUNICATION PHARMACOLOGY **Marks 10**

One OSPE Stations of 10 Marks from following topics

- Prescription Communication
- Ethics-Legal drug storage
- Use of devise
- Drug adherence-compliance
- Drug dependence/OTC
- Interaction with Medical representative

OSPE

- **Time**: 5 minutes
- **No of stations:** 1 station
- **Level of assessment:** Psychomotor / cognitive / Soft skill
- **Marks:** 10 marks
- Individual check list will be used for assessment

VIVA – VOCE Marks 30

- Viva 1-15 Marks
- Viva 2-15 Marks

TOTAL PRACTICAL MARKS (PRACTICAL &VIVA) Marks 100

INTERNAL EXAMS

There will be 2 Internal Exams besides prelims

There will be only one theory paper for both Internal Exams.

1st Internal Exam: End of January (Theory 100Mks, Practicals 100Mks)

2nd Internal Exam: End of April (Theory 100 Mks, Practicals 100Mks)

Portion for Internal Exams:

1st Internal Exam:

1. **Topics: -** General Pharmacology, ANS, Including skeletal muscle relaxants, Autocoids, CVS, Drugs acting on kidney

2nd Internal Exam:

Topics: - Drugs affecting blood and blood formation, GIT, Chemotherapy, RS

Prelims:

Paper 1	General Pharmacology including drug – drug interactions; Autonomic Nervous System; Cardiovascular System including drugs affecting Coagulation and those acting on the Kidneys; Haematinics; Agents used in Gastro – Intestinal Disorders; Ocular Pharmacology; Drug use at extremes of age, in pregnancy & in organ dysfunction; Diagnostic & Chelating agents; Environmental & Occupational Pollutants; Vitamins AETCOM Module 2.2
Paper 2	Neuro Psychiatric Pharmacology including Antiinflammatory – Analgesics and Addiction & its management; Pharmacology in Surgery (Particularly peri – operative management); Chemotherapy including Cancer Chemotherapy; Endocrinology; Dermatology ; Miscellaneous topics I (Lipid – derived autacoids; Nitric Oxide; Allergy – Histamines & Antihistamines including anti – vertigo, Anti Asthmatics; Anti – tussive agents; Immunomodulators; Vaccines & sera; Drugs acting on the uterus) AETCOM Module 2.7

1St and 2nd Internal Exams: (Time 3hrs)

Theory Paper Pattern and Marks Distribution:

Paper	Section	Type and Number of Questions	Marks alloted	Total Marks
1 theory Paper only	Section A	MCQs (20)	20 X1mk each= 20Mks	20
	Section B	SAQs (5/6) (1 SAQ compulsory from AETCOM) LAQs (1/2) (Atleast 1 LAQ clinical Based)	5X 6 Mks each =30 Mks 1X 10 Mks each=10 Mks	40
	Section C	SAQs (5/6) LAQs (1/2) (Atleast 1 LAQ clinical Based)	5X 6 Mks each =30 Mks 1X 10 Mks each=10 Mks	40
			TOTAL	**100**

Practicals Pattern and Marks Distribution:

CBME PATTERN OF PRACTICALS EXAM AND MARKS DISTRIBUTION:

***Resolution No. 4.19 of AC-41/2021**
Annexure 38

1st Internal Assessment Exam in Pharmacology for 2nd MBBS

EXERCISE:- 1 – CLINICAL PHARMACY	**Marks 20**
A) Pharmacy preparation and viva	Marks 10
B) Clinical Pharmacokinetics	Marks 5
C) Dosage form	Marks 5
EXERCISE: - II – CLINICAL PHARMACOLOGY	**Marks 40**
A) Prescription writing – a) Single drug therapy	Marks 4
- b) Complete drug therapy	Marks 6
B) Fixed Dose Combination (FDC)	Marks 10
C) Spots	Marks 20
(4 x 5 M = 20 Marks)	
EXERCISE: - III – EXPERIMENTAL PHARMACOLOGY	**Marks 10**
A) Pharmacodynamics	Marks 5
B) Screening Technique	Marks 5
VIVA – VOCE	Marks 30
Total	**100 Marks**

Formative (2nd Internal Assessment) in Pharmacology for 2nd MBBS

EXERCISE:- 1 – CLINICAL PHARMACY	**Marks 20**
A) Pharmacy preparation and viva	Marks 10
B) Clinical Pharmacokinetics	Marks 5
C) Dosage form	Marks 5
EXERCISE: - II – CLINICAL PHARMACOLOGY	**Marks 30**
A) Prescription writing – a) Single drug therapy	Marks 4
- b) Complete drug therapy	Marks 6
B) Criticism – a) Criticize, Correct and Re-write (CCR)	Marks 5
b) Fixed Dose Combination (FDC)	Marks 5
C) ADR identification/ADR Reporting/ P Drug list	Marks 10

Resolution No. 5.16 of Academic Council (AC-46/2023):
i) Resolved to approve inclusion of ADR Reporting/Identification and P-Drug list in place of spots under Clinical pharmacology head of 2nd MBBS pharmacology formative & summative assessment.

EXERCISE: - III – EXPERIMENTAL PHARMACOLOGY **Marks 10**

A) Pharmacodynamics Marks 5

B) Screening Technique Marks 5

EXERCISE: - IV – COMMUNICATION PHARMACOLOGY **Marks 10**

One OSPE Stations of 10 Marks from following topics

- Prescription Communication
- Ethics-Legal drug storage
- Use of devise
- Drug adherence-compliance
- Drug dependence/OTC
- Interaction with Medical representative

OSPE

- **Time**: 5 minutes
- **No of stations:** 1 station
- **Level of assessment:** Psychomotor / cognitive / Soft skill
- **Marks:** 10 marks
- Individual check list will be used for assessment

VIVA – VOCE Marks 30

- Viva 1-15 Marks
- Viva 2-15 Marks

TOTAL PRACTICAL MARKS (PRACTICAL &VIVA) Marks 100

Internal assessment calculation

Sr. No.	Criteria	Theory	Practical
1.	*All internal assessment examinations including preliminary examination	80	60
2.	Day to Day assessment		
	➢ Day to Day assessment (PBL/ One line questions/ MCQ)	20	-
	➢ Day to Day assessment (Viva/ Seminars/ OSPE/ SDL)	-	20
3.	Logbook + Journals (Journal + AETCOM logbook)	-	20
Total		**100**	**100**

***Internal assessment examinations marks conversion to internal assessment marks - Theory** – Total 400 marks of Internal exams including Prelims will be converted to 80

Practical – Total 300 marks of Internal exams including Prelims will be converted to 60

Total Marks on Final Marksheet for the subject of Pharmacology will be

Theory	200 Mks
Practical	100 Mks
IA	200 Mks
TOTAL	**500 Mks**

Resolution No.3.1.2.3 of BOM-59/2019: The updated list of Text books and Reference books for 2nd MBBS (Microbiology, Pharmacology, Pathology, FMT) are approved. **[Annexure-8]**

(To be merged with syllabus i.e. Annexure-69 of BOM-57/2019 dt.26/04/2019)

Recommended books

Text Books

1- Pharmacology and Pharmacotherapeutics by R.S. Satoskar, Nirmala K. Rege, Rakhi K Tripathi, S.D. Bhandarkar- Elsevier Publication
2- Essentials of Medical Pharmacology by K. D. Tripathi. Jaypee Brothers Medical Publishers, New Delhi
3- Sharma & Sharma's Principal of Pharmacology by H.L. Sharma and K.K. Sharma. Paras Medical Publisher New delhi

Practicals-

- Manual of Practical Pharmacology for MBBS by - Dr. Mukta N Chowta, Dr. Ashok Shenoy, Dr. Ashwin Kamath, Avichal Publishing Company , New Delhi

Reference Book-

1- Basic and Clinical Pharmacology by- Bertram G Katzung. Mc Graw Hill Education (India) Private Ltd. Chennai. Latest addition
2- Rang and Dale's Pharmacology by- H.P. Rang, J.M. Ritter, R.J. Flower, G. Handerson. Elsevier Health Sciences London
3- Goodman & Gillman's Pharmacological basis of therapeutics by- Laurence L. Brunton, Randa Hilal Dandan, Bjorn C. Knollmann. Mc Graw Hill Education New Delhi.

MGM Medical College, Navi Mumbai
Department of Pathology

Annexure 1(c)

Name of the Board of Studies (Para-Clinical) to be held on 21st Sep 2022

(1) Item Number :- 1

New pattern: Day to Day assessment pattern for internal assessment calculations according to NMC for pathology, Microbiology and Pharmacology

Sr. No.	Criteria	Theory	Practical
1.	*All internal assessment examinations including preliminary examination	80	60
2.	Day to Day assessment		
	➢ **Day to Day assessment : Theory tests/ Seminars/ Quizzes)**	20	-
	➢ **Day to Day assessment : Practical/ clinical tests, OSPE, and Directly observed Procedural Skills (DOPS)**	-	20
3.	Logbook + Journals (Journal + AETCOM logbook)	-	20
Total		**100**	**100**

***Internal assessment examinations marks conversion to internal assessment marks - Theory** – Total 400 marks of internal exams including Prelims will be converted to 80

Practical – Total 300 marks of internal exams including Prelims will be converted to 60

4. Approved the changes in CBME Second professional teaching hours in Phase II MBBS 2022-23 (late admission batch 2022) as per Resolution No. 5.12 of AC-48/2023, dated 12/12/2023 [ANNEXURE-21-A, 21-H & 21-E].

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राष्ट्रीय आयुर्विज्ञान आयोग

Annexure-21A of AC-48/2023

National Medical Commission
(Undergraduate Medical Education Board)

No. U.11026/02/2022-UGMEB/ **Dated the 7th Dec 2022**

CIRCULAR

Academic Cell of Undergraduate Medical Education Board(UGMEB) hereby issues updated phase-wise academic calendar and curriculum for 2022-23 batch of MBBS. The details may kindly be seen as **Annexure.**

2. All Deans/Principals of medical colleges and Registrar/ Vice-Chancellors of concerned universities may implement the same for MBBS batch admitted during the academic session 2022-23.

3. This issues with the approval of the President, UGMEB.

Encl : A/a.

7/12/2022

(Shambhu Sharan Kumar)
Director, UGMEB

(i) All Dean/Principal of medical colleges
(ii) All Registrar/Chancellor of medical universities
(iii) DMMP(NMC) to upload on NMC's website

ACADEMIC CALENDER AND CURRICULUM FOR MBBS 2022-23 BATCH

Academic calendar for Phase-I of MBBS, 2022-23 batch

Date	:	15th Nov 2022 to 15th Dec 2023
Time allotted	:	13 months (approx. 57 weeks)
Time available	:	Approx. **42 weeks** (excluding 15 weeks)
		(Prelim/University Exam & Results -10 weeks +
		Vacation -3 weeks +
		Public Holidays -2 weeks)

42 wks x 39 hrs = 1638 hrs available hours for Teaching Learning

Academic calendar for Phase-II of MBBS 2022-23 batch

Date	:	16th Dec 2023 to 15th Jan 2025
Time allotted	:	13 months (approx. 57 weeks)
Time available	:	Approx. **42 weeks** (excluding 15 weeks)
		(Prelim/University Exam & Results -10 weeks +
		Vacation -3 weeks +
		Public Holidays -2 weeks)

Time available in hours: **(39 hours/week)** = **1638 hours.**

Academic calendar for Phase-III of MBBS 2022-23 batch

Date	:	16th Jan 2025 to 30th Nov 2025
Time allotted	:	10.5 months (approx. 46 weeks)
Time available	:	Approx. **35 weeks** (excluding 11 weeks)
		(Prelim/University Exam & Result - 6 weeks +
		Vacation -3 weeks +
		Public Holiday -2 weeks)

Time available in hours: **(39 hours/week)** = **35 X 39 = 1365 hrs**

Academic calendar for Phase-IV of MBBS 2022-23 batch

Date	:	1st Dec 2025 to 15th May 2027
Time allotted	:	17.5 months (approx.78 weeks)
Time available	:	Approx. **57 weeks** (excluding 21 weeks)
		(Prelim/University Exam & Result - 16 weeks +
		Vacation - 3 weeks +
		Public holiday - 2 weeks)

Time available in hours: **(39 hours/week)** = **57 X 39 = 2223 hrs**

TOTAL TIME IN HOURS : 6864

Clinical postings	:	**132 weeks**
Total	:	**176 weeks**

Electives:

Block - 1 of 15 days may be offered **in Final MBBS part 1,**

Subjects: Anatomy/ Physiology/ Biochemistry/Pathology/ Blood Banking/ Microbiology/ Pharmacology/ Forensic Medicine and Toxicology.

Block - 2 of 15 days may be offered **in Final MBBS part 2,**

Subjects: Gen. Medicine and allied, Gen. Surgery and allied.

KEY CHANGES FROM GMER 2019:

1. Theory sessions of Dermatology, Radiology, Psychiatry, Anesthesiology, Respiratory Medicine shifted to final phase.
2. Theory sessions of Otorhinolaryngology and Ophthalmology reduced and remaining sessions shifted to final phase.
3. Clinical posting of Otorhinolaryngology as well as Ophthalmology from Phase-II of MBBS has been shifted to Phase-III part I and part II
4. Newer elements of Pandemic Module, and Family Adoption Programme in Community Medicine included.
5. No postings during electives.
6. Clinical Postings have been re-scheduled to facilitate learning and help students cope up with introduction of common national exit test.
7. No supplementary batches. Supplementary exams to be conducted by the end of one (1) month of results of regular exams. Results be declared within a fortnight of the end of last exam.

These changes are proposed to ensure:

1. Ease of rotation of students in the posting and ensure minimum number of students in each posting.
2. Provide increased hours and shifting posting to final year in some allied subjects based on feedback by faculty from these departments.

TIME TABLE – CURRICULUM : II MBBS, PHASE 2

Subjects	Lectures	Small Group Learning(tutorials/seminars)/Integrated learning (Hours)	Clinical Postings (Hours)*	Self Directed Learning (Hours)	Total
Pathology	80	158	-	17	255
Pharmacology	80	158	-	17	255
Microbiology	70	140	-	10	220
Community Medicine (+ Family adoption Program)	20	023	(27)	10	80 (43+10+27)
Forensic Medicine and Toxicology	15	28	-	5	48
Clinical Subjects	75**	-	**585***	-	**660**
Attitude, Ethics & Communication Module (AETCOM)	-	29	-	8	37
Sports and extracurricular activities	-	-	-	20	20
Pandemic module					28
Total	340		612		**1603**
Surplus hours					**35**
Final total	**340**	**536**	**612**	**87**	**1638##**

Surplus hours can be given to FAP/second year subjects needing more teaching hours, Skill lab training/ artificial intelligence and information technology in pre-clinical and para-clinical subjects.

Includes 28 hrs of Pandemic module and 35 hrs of Surplus

Annexure Item 3

1. **Item:** Restructuring the 2nd MBBS syllabus in line with Competency based medical education (CBME) guidelines by MCI

- MCI has proposed the following teaching hours for 2nd Professional YR (MBBS) subjects

Subjects	Lectures (Hours)	Small Group Teaching / Tutorials / Integrated Learning /Seminars / Practical (Hours)	Clinical Postings (Hours)	Self directed learning (Hours)	Total (Hours)
Pathology	80	138		12	**230**
Pharmacology	80	138		12	**230**
Microbiology	70	110		10	**190**
Community Medicine	20	30		10	**60**
Forensic Medicine and Toxicology	15	30		5	**50**
Clinical Subjects	75		540		**615**
Professional Development including Ethics (AETCOM etc.)		29		8	**37**
Sports and Extracurricular activities					**28**
Formative assessment and term examinations					**?**
Total					**1440**

CBME UG CURRICULUM (II-MBBS)

Microbiology

Lectures	SGT/ SEM/ CD/ DOAP/ Integration	SDL	TOTAL
70 hrs	110 hrs	10 hrs	190 hrs

Pharmacology

Lectures	Practical//Tutorials/Integrated Learning /Seminars / Small group teaching	SDL	TOTAL
82 hrs	140 hrs	12 hrs	234 hrs

Pathology

Lectures	Practical//Tutorials/Integrated Learning /Seminars / Small group teaching	SDL	TOTAL
80 hrs	138 hrs	12 hrs	230 hrs

Forensic Medicine

Lectures	Practical//Tutorials /Seminars / Small group teaching	SDL	TOTAL
10 hrs	32 hrs	-	42 hrs

~~Annexure 1(e)~~ Pharmacology

Annexure-21E of AC-48/2023

Total Extra Hours: 25

Split-Up of Increase in Hours

S. No	Items	No of Teaching Hours
1	**Self-Directed Learning (SDL)** • Drug Schedules (1 Hour) • Pharmacovigilance and ADR Reporting (1 Hour) • Basics of Research Methodology (3 Hours)	5
2	**Pharmacology Exercises at CAL Lab (SGL)** • Experimental graphs and Phenomenon's (3 Hour) • Drug Screening Techniques (3 Hour)	6
3	**Clinical Pharmacology and P Drug Exercises (SGL)** • Rational Pharmacotherapy Exercises (2 Hour) • Criticism of Prescription format (2 Hour)	4
5	**Exercises related to Drug Museum (SGL)** • Drug Dosage forms (2 Hour) • History of Medicine (2 Hour) • Identification of common ADRs (2 Hour)	6
6	**OSPE Stations** • Communication Pharmacology	4

SGL: Small Group Learning, **SDL:** Self Directed Learning

S. No	Items	No of Teaching Hours
1	Pandemic Module	6

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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