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

Microbiology

Amended upto AC-50/2024, Dated 27/11/2024

Amended History

1. Approved as per BOM 57/2019 [Resolution no. 3.1.1.13], Dated 26/04/2019.
2. Amended upto BOM 62/2020 [Resolution No. 3.2.2.1, Resolution No. 3.2.2.11], Dated 16/09/2020.
3. Amended upto BOM 63/2021 [Resolution No. 4.4.1.2.i], Dated 17/02/2021.
4. Amended upto AC-41/2021 [Resolution No. 4.15], 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. 5.14], dated 28/04/2023
7. Amended as per Resolution No. 5.12 of AC-48/2023, dated 12/12/2023.
8. Amended as per [Resolution No. 4.12, Annexure 43]of AC-49/2024, dated 25/04/ 2024.
9. Amended as per [Resolution No. 4.42] of AC-50/2024, dated 27/11/2024.

IInd MBBS CBME Curriculum

Microbiology

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

List of Lectures (70 Hrs):

No	COMPETENCY The student should be able to		Lectures	No of Hrs
Topic: General Microbiology and Immunity Number of competencies: (11) Number of procedures that require certification : (01)				
MI 1.1	Describe the different causative agents of Infectious diseases+A208the methods used in their detection	L	1. history of Microbiology 2. Bacterial Morphology 3. Physiology and Metabolism of bacteria 4. Culture Methods 5. General Virology 6. General Parasitology 7.General Mycology	7Hrs
MI1.3	Describe the epidemiological basis of common infectious diseases	L	8. Infection	1 Hr
MI1.4	Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice	L	9. Sterilisation 10. Disinfection	2 Hrs
MI1.6	Describe the mechanisms of drug resistance, and the methods of antimicrobial susceptibility testing and monitoring of antimicrobial therapy	L	11. Bacterial Genetics 1 12. Bacterial Genetics 2	2 Hrs
MI1.7	Describe the immunological mechanisms in health	L	13. Immunity 14. Antigen 15. Antibody 16. Complement	4 Hrs
MI1.8	Describe the mechanisms of immunity and response of	L	17. Structure and Function of Immune System 18. AMI and CMI	2 Hr

	the host immune system to infections			
MI1.9	Discuss the immunological basis of vaccines and describe the Universal Immunisation schedule	L	19. Immunoprophylaxis	1 Hr
MI1.10	Describe the immunological mechanisms in immunological disorder (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in detection.	L	20. Hypersensitivity 21. Autoimmunity	2 Hrs
MI1.1 1	Describe the immunological mechanisms of transplantation and tumor immunity	L	22. Transplantation 23. Tumour Immunity and IDD	2 Hrs
	TOTAL		**23**	**23 Hrs**
Topic: CVS and Blood Number of competencies: (7) Number of procedures that require certification : (NIL)				
MI2.1	Describe the etiologic agents in rheumatic fever and their diagnosis	L	1. Streptococcus, 2.Pneumococcus and Enterococcus	2hrs
MI2.2	Describe the classification etio-pathogenesis, clinical features and discuss the diagnostic modalities of Infective endocarditis	L		
MI2.4	List the common microbial agents causing anemia. Describe the morphology, mode of infection and discuss the pathogenesis, clinical course diagnosis and prevention and treatment of the common microbial agents causing Anemia	L	3.Dengue and Chickungunya	1 hr
MI2.5	Describe the etio-pathogenesis and discuss the clinical evolution and the laboratory diagnosis of kalaazar, malaria, filariasis and other common parasites prevalent in India	L	4. Trypanosoma 5. Filaria 6. Leishmania (Kala Azar)	3 hrs
MI2.7	Describe the epidemiology, the etio- pathogenesis, evolution complications, opportunistic infections,	L	7. HIV	1 hr

	diagnosis, prevention and the principles of management of HIV			
	TOTAL		**7**	**7 Hrs**
Topic: Gastrointestinal and hepatobiliary system that require certification : (NIL)			**Number of competencies: (8)**	**Number of procedures**
MI3. 1	Enumerate the microbial agents causing diarrhea and dysentery. Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of these agents	L	1. E.coli, Proteus, Klebseilla 2. Vibrio 3. E.histolytica 4. Taenia 5. Ascaris, Hookworm Trichuris, E Vermicularis, Strongyloides	5 hrs
MI3. 3	Describe the enteric fever pathogens and discuss the evolution of the clinical course and the laboratory diagnosis of the diseases caused by them	L	6. Enteric Fever and Non typhoidal salmonella	1 hr
MI3. 5	Enumerate the causative agents of food poisoning and discuss the pathogenesis, clinical course and laboratory diagnosis	L		
MI3 .6	Describe the etio-pathogenesis of Acid peptic disease (APD) and the clinical course. Discuss the diagnosis and management of the causative agent of APD	L	7. H.pylori, campylobacter and Cl.difficile	1 hr
MI3. 7	Describe the epidemiology, the etio-pathogenesis and discuss the viral markers in the evolution of Viral hepatitis. Discuss the modalities in the diagnosis and prevention of viral hepatitis	L	8. Hepatitis	1hr
	TOTAL		**8**	**8 hrs**
Topic: Musculoskeletal system skin and soft tissue infections that require certification : (NIL)			**Number of competencies: (3)**	**Number of procedures**
MI4.1	Enumerate the microbial agents causing anaerobic infections. Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of anaerobic infections	L	1. Cl.perfringens 2. Cl.tetani and Cl.botulinum	2 hrs

MI4.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of bone & joint infections	L	3. Staphylococcus	1 hr
MI4.3	Describe the etio-pathogenesis of infections of skin and soft tissue and discuss the clinical course and the laboratory diagnosis	L	4. M leprosy 5. Dermatophytes 6. Actinomycetes	3 hrs
	TOTAL		**6**	**6 hrs**
Topic: Central Nervous System infections Number of competencies: (3) Number of procedures that require certification : (NIL)				
MI5.1	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of meningitis	L	1. H.influenzae 2. Cryptococcus and Mucor 3. Toxoplasma	3 hrs
MI5.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of encephalitis	L	4. polio virus 5. Rabies Virus	2hrs
	TOTAL		**5**	**5 hr**
Topic: Respiratory tract infections Number of competencies: (3) Number of procedures that require certification : (02)				
MI6.1	Describe the etio-pathogenesis, laboratory diagnosis and prevention of Infections of upper and lower respiratory tract	L	1. C.Diptheria 2. M.Tb 3. Atypical Mycobacteria 4. Bordatella 5. Mycoplasma and Chlamydia 6. Orthomyxo virus 7. Paramyxovirus	7 hrs
	TOTAL		**7**	**7 hr**
Topic: Genitourinary & Sexually transmitted infections Number of competencies: (3) Number of procedures that require certification : (NIL)				
MI7.1	Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system	L	1. Gonococci and NGU 2.Herpes and CMV	2 hrs
MI7.2	Describe the etio-pathogenesis and discuss the laboratory diagnosis of sexually transmitted infections. Recommend preventive measures	L	3. T pallidum	1 hr
MI7.3	Describe the etio-pathogenesis, clinical	L	4. UTI	1 hr

	features, the appropriate method for specimen collection, and discuss the laboratory diagnosis of Urinary tract infections			
	TOTAL		**4**	**4 hr**
Topic: Zoonotic diseases and miscellaneous Number of competencies: (16) Number of procedures that require certification : (01)				
MI8.1	Enumerate the microbial agents and their vectors causing Zoonotic diseases. Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention	L	1. Yersinia 2. Leptospira and Borrelia 3. E. granulosus	3 hrs
MI8.2	Describe the etio-pathogenesis of opportunistic infections (OI) and discuss the factors contributing to the occurrence of OI, and the laboratory diagnosis	L	4. Candida 5. Histoplasma and Other dimorphic fungi	2 hrs
MI8.3	Describe the role of oncogenic viruses in the evolution of virus associated malignancy	L	6. Oncogenic Viruses and emerging and re emerging infections	1hr
MI8.4	Describe the etiologic agents of emerging Infectious diseases. Discuss the clinical course and diagnosis	L		
MI8.5	Define Healthcare Associated Infections (HAI) and enumerate the types. Discuss the factors that contribute to the development of HAI and the methods for prevention	L	7. Pseudomonas and HAI and its control	1hr
MI8.6	Describe the basics of Infection control	L		
MI8.8	Describe the methods used and significance of assessing the microbial contamination of food, water and air	L	8. Microbiology of Food, water and Air	1 hr
MI8.9	Discuss the appropriate method of collection of samples in the performance of laboratory tests in the	L	9. Collection of Sample	1 hr

	detection of microbial agents causing infectious diseases			
MI8.12	Discuss confidentiality pertaining to patient identity in laboratory results	L	10. National Health Programs in the prevention of common infectious disease and Bioethics: Universal Safety Principles	1hr
MI8.16	Describe the National Health Programs in the prevention of common infectious disease (for information purpose only as taught in CM)	L		
	TOTAL		**10**	**10 hrs**

System wise Total of Lectures:

Sr No	Systems	No of Lecture	Hrs
1	Gen Microbiology and Immunulogy	23	23
2.	CVS and Hematology	7	7
3.	GIT and Hepatobiliary	8	8
4.	Musculoskeletal and Skin soft tissue	6	6
5.	Central Nervous system	5	5
6.	Respiratory System	7	7
7.	Genitourinary and Sexually transmitted Infections	4	4
8.	Zoonotic and Miscelleneous	10	10
	TOTAL	**70**	**70 Hrs**

LIST of SGTs/ Sem/ Integrated/ DOAP: (110 Hrs)

No	COMPETENCY The student should be able to	SGT/Sem/Case/Integrated	No of Hrs	Practical DOAP	No of Hrs
Topic: General Microbiology and Immunity Number of competencies: (11) Number of procedures that require certification : (01)					
MI 1.1	Describe the different causative agents of Infectious diseases+A208the methods used in their detection	1. Culture Medias (SG) 2. Biochemicals (SG)	2 hrs		
MI1.2	Perform and identify the different causative agents of Infectious diseases by Gram Stain, ZN stain and stool routine microscopy	-		1. Diagnostic Microbiology 1 2. Morphology of Bacteria 3. Microscopy 4. Gram staining 5. ZN Staining	10 hrs
MI1.4	Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice			6.Sterilisation and Disinfection	2 hrs
MI1.5	Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice	3. Disinfection (Lab, OT, OPD) (Integrated)	1 hr		
MI1.6	Describe the mechanisms of drug resistance, and the methods of antimicrobial susceptibility testing and monitoring of antimicrobial therapy	4. Bacteriophage (Sem) 5.Minimisation of Drug Resistance and antibiotic Policy (SG)	2 hrs	7 .Diagnostic Microbiology 2 and Gram Staining 8. ZN Staining (repeat)	4hrs
MI1.7	Describe the immunological mechanisms in health			9. Serological Reactions 1 10. Serological reactions 2	4 hrs
MI1.8	Describe the mechanisms of immunity and response of the host immune system to infections				
	TOTAL	**5**	**5 Hrs**	**10**	**20hrs**

Topic: CVS and Blood certification : (NIL)		**Number of competencies: (7)**		**Number of procedures that require**	
MI2.1	Describe the etiologic agents in rheumatic fever and their diagnosis	1. Causative agents of Rheumatic Fever and its diagnosis (Integrated)	1 hr		
MI2.2	Describe the classification etio-pathogenesis, clinical features and discuss the diagnostic modalities of Infective endocarditis	2. classification etio-pathogenesis, clinical features and discuss the diagnostic modalities of Infective endocarditis (Sem)	1 hr		
MI2.3	Identify the microbial agents causing Rheumatic Heart Disease & infective Endocarditis			1. Streptococcus, Pneumococcus and Enterococcus	2hrs
MI2.4	List the common microbial agents causing anemia. Describe the morphology, mode of infection and discuss the pathogenesis, clinical course diagnosis and prevention and treatment of the common microbial agents causing Anemia	3. Rickettsia (SG)	1hr		
MI2.5	Describe the etio-pathogenesis and discuss the clinical evolution and the laboratory diagnosis of kalaazar, malaria, filariasis and other common parasites prevalent in India	4. Integrated : Malaria	2 hrs		
MI2.6	Identify the causative agent of malaria and filariasis			2. Blood protozoa	2 hrs
MI2.7	Describe the epidemiology, the etio- pathogenesis, evolution complications, opportunistic infections, diagnosis, prevention and the principles of management of HIV	5.Integrated: HIV	2 hrs		
	TOTAL	**5**	**7 Hrs**	**2**	**4hrs**
Topic: Gastrointestinal and hepatobiliary system		**Number of competencies: (8)**		**Number of procedures that require certification : (NIL)**	

MI3. 1	Enumerate the microbial agents causing diarrhea and dysentery. Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of these agents	1. Shigella (SG) 2. Isospora , Cryptospora (Sem) 3. Giardia (Sem)	3hrs	1. Enterobacteriacai e (E coli, Proteus, Klebseilla) 2. Vibrio and Shigella 3. Intestinal Nematodes and Stool Examination	6 hrs
MI3. 2	Identify the common etiologic agents of diarrhea and dysentery			4. Intestinal Protozoa and Stool Examination	2hrs
MI3 .4	Identify the different modalities for diagnosis of enteric fever. Choose the appropriate test related to the duration of illness			5. Salmonella	2hrs
MI3. 5	Enumerate the causative agents of food poisoning and discuss the pathogenesis, clinical course and laboratory diagnosis	4. Food Poisoning (Integrated)	2hr		
MI3. 7	Describe the epidemiology, the etio-pathogenesis and discuss the viral markers in the evolution of Viral hepatitis. Discuss the modalities in the diagnosis and prevention of viral hepatitis	5. Liver Fluke (SG) 6. Integrated: Hepatitis	2hrs		
MI3 .8	Choose the appropriate laboratory test in the diagnosis of viral hepatitis with emphasis on viral markers			6. Diagnostic tests used in Virology	2hrs
	TOTAL	**6**	**7Hrs**	**6**	**12 hrs**
Topic: Musculoskeletal system skin and soft tissue infections Number of competencies: (3) Number of procedures that require certification : (NIL)					
MI4.1	Enumerate the microbial agents causing anaerobic infections. Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of anaerobic infections	1. Non sporing anaerobes (SG)	1hr	1.Clostridia and Non sporing anaerobes	2 hrs

MI4.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of bone & joint infections			2. Staphylococcus	2 hrs
MI4.3	Describe the etio-pathogenesis of infections of skin and soft tissue and discuss the clinical course and the laboratory diagnosis	2. Pox Virus (Sem) 3.Mycetoma and S/c Mycosis (Integrated) 4. B anthracis (Integrated)	3hrs	3. Mycology 4. M leprae 5. Bacillus	6 hrs
	TOTAL	**4**	**4hrs**	**5**	**10 hrs**
Topic: Central Nervous System infections Number of competencies: (3) Number of procedures that require certification : (NIL)					
MI5.1	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of meningitis	1. Meningococcus and Meningitis (Integrated)	1hr		
MI5.2	Describe the etiopathogenesis, clinical course and discuss the laboratory diagnosis of encephalitis	2. Slow Viral Diseases (SEM)	1hr		
MI5.3	Identify the microbial agents causing meningitis			1. Microbial agents causing Meningitis (Meningococcus)	2 hrs
	TOTAL	**2**	**2hrs**	**1**	**2 hrs**
Topic: Respiratory tract infections Number of competencies: (3) Number of procedures that require certification : (02)					
MI6.1	Describe the etio-pathogenesis, laboratory diagnosis and prevention of Infections of upper and lower respiratory tract	1. Tuberculosis (Integrated) 2. Lung fluke (SEM) 3. Legionella (SEM) 4. Aspergillus (SG) 5. Other opportunistic fungi (SG) 6. Adenovirus (SEM)	6hrs		
MI6.2	Identify the common etiologic agents of upper respiratory tract infections (Gram Stain)			1. C diphtheria and Gram staining 2. Bordatella and Hemophillus 3. M tuberculosis and ZN staining	6 hrs
MI6.3	Identify the common etiologic agents of lower respiratory tract infections (Gram Stain & Acid fast				

	stain)				
	TOTAL	**6**	**6hrs**	**3**	**6 hrs**
Topic: Genitourinary & Sexually transmitted infections Number of competencies: (3) Number of procedures that require certification : (NIL)					
MI7.1	Describe the etio-pathogenesis and discuss the laboratory diagnosis of infections of genitourinary system	1. T vaginalis (SEM)	1hr	1.Gonococcus	2hrs
MI7.2	Describe the etio-pathogenesis and discuss the laboratory diagnosis of sexually transmitted infections. Recommend preventive measures	2. STDs (Integrated)	1hr	2. Spirochaetes	2 hrs
MI7.3	Describe the etio-pathogenesis, clinical features, the appropriate method for specimen collection, and discuss the laboratory diagnosis of Urinary tract infections	3. UTI (SEM)	1hr		
	TOTAL	**3**	**3hrs**	**2**	**4hrs**
Topic: Zoonotic diseases and miscellaneous Number of competencies: (16) Number of procedures that require certification : (01)					
MI8.1	Enumerate the microbial agents and their vectors causing Zoonotic diseases. Describe the morphology, mode of transmission, pathogenesis and discuss the clinical course laboratory diagnosis and prevention	1. Zoonosis and Brucella (SG)	1hr	1. Yersinia and Brucella	2 hrs
MI8.4	Describe the etiologic agents of emerging Infectious diseases. Discuss the clinical course and diagnosis	2. Emerging and Re-emerging infections (Integration) 3. Misc bacteria (SEM)	2 hr		
MI8.5	Define Healthcare Associated Infections (HAI) and enumerate the types. Discuss the factors that contribute to the development of HAI and the	4. HAI (SEM) 5. Integrated: PUO	1hrs 2 hrs		

	methods for prevention				
MI8.6	Describe the basics of Infection control	6. Infection Control (Integration)	1hrs		
MI8.7	Demonstrate Infection control practices and use of Personal Protective Equipments (PPE)			2. Pseudomonas and HAI and PPE	2 hrs
MI8.8	Describe the methods used and significance of assessing the microbial contamination of food, water and air				
MI8.9	Discuss the appropriate method of collection of samples in the performance of laboratory tests in the detection of microbial agents causing infectious diseases	7. Biomedical waste Disposal (SG)	1Hrs		
MI8.10	Demonstrate the appropriate method of collection of samples in the performance of laboratory tests in the detection of microbial agents causing Infectious diseases			3. Collection of samples and Medical Entomology	2 hrs
MI8.11	Demonstrate respect for patient samples sent to the laboratory for performance of laboratory tests in the detection of microbial agents causing Infectious diseases	8. confidentiality pertaining to patient identity in laboratory results (SG)	1hr		
MI8.12	Discuss confidentiality pertaining to patient identity in laboratory results				
MI8.13	Choose the appropriate laboratory test in the diagnosis of the infectious disease	9. Appropriate laboratory test in the diagnosis of the infectious disease (SEM)	1hr		
MI8.15	Choose and Interpret the results of the laboratory tests used in diagnosis of the infectious disease	10. Molecular tests (SG) 11. Serological Reactions (SG)	1hr 1hr		
	TOTAL	**11**	**12 hrs**	**3**	**6hrs**

Pandemic Module in Microbiology

Pandemic Module 2.1	**Hours already allotted in Syllabus**
Infection Control: Part II Air borne precautions Contact Precautions Infection Control Committee	**MI 8.6:** Describe the basics of Infection control • 1Hr- Lecture (Interactive session) • 1 Hr- Integrated session (Debriefing and Feedback) **MI 8.8:** Describe the methods used and significance of assessing the microbial contamination of food, water and air • 1 Hr – Lecture (Case discussion)) **MI 6.3:** Identify the common etiologic agents of lower respiratory tract infections • 2hr DOAP Bordatella and Heamophillus (Visit to Isolation ward/ Video/ Photos of Isolation ward)
Pandemic Module 2.3	**Hours already allotted in Syllabus**
Sample Collection, Microbial diagnosis, Serologic testsand their performanceparameters	**MI 8.9:** Discuss the appropriate method of collection of samples in the performance of laboratory tests in the • 1 Hr lecture (Interactive session) • 1 SGT **MI 8.10**: Demonstrate the appropriate method of collection of samples in the performance of laboratory tests in the detection of microbial agents causing Infectious diseases • 2Hrs DOAP (Sample collection and Visit to lab)

	MI8.15 and MI 8.13: Choose and Interpret the results of the laboratory tests used in diagnosis of the infectious disease • 2 hrs SGT (small group activity) • 1 hr Seminar (Discussion and closure)

System wise Total SGTs/ Sem/ Integrated/ DOAP:

Sr No	Systems	No of SGT/ Seminars/	Hrs	DOAP session/Practicals	Hrs
1	Gen Microbiology and Immunulogy	5	5	10	20
2.	CVS and Hematology	5	7	2	4
3.	GIT and Hepatobiliary	6	7	6	12
4.	Musculoskeletal and Skin soft tissue	4	4	5	10
5.	Central Nervous system	2	2	1	2
6.	Respiratory System	6	6	3	6
7.	Genitourinary and Sexually transmitted Infections	3	3	2	4
8.	Zoonotic and Miscelleneous	11	12	3	6
	TOTAL	42	**46 Hrs**	32	**64 Hrs**
	GRAND TOTAL	**110 hrs**			

L: Lecture **SG:** Small Group **CD:** Case Discussion **SEM:** Seminar **DOAP**: Demonstarte, Observe, Assess and Perform

SDL (Self Directed Learning):

Sr No	Topics	No of Hrs
1	ELISA test	1hr
2	Widal test	1hr
3	Needle stick Injury	1Hr
4	Hand Hygiene	1Hr
5	MRSA Surveillance	1hr
6	Antibiotic Sensitivity testing	1hr
7	Antimicrobial agents	1hr
8	Viral Vaccines	1hr
9	Malarial Vaccines	1hr
10	Free living amoeba	1hr
	Total	**10 Hrs**

Resolution No. 4.12 of Academic Council (AC-49/2024): Resolved to approve the change in MBBS Microbiology assessment Pattern (University and IA) to be applicable for batch admitted in academic year 2023-24 onwards [ANNEXURE-43].

Annexure-43 of AC-49/2024

Summary of Changes

1. Redistribution of topics in Paper 1 and Paper 2 (Musculoskeletal system shifted from Paper 1 to Paper 2 for University and Prelim exams)
2. Weightage of MCQs changed accordingly.
3. New AETCOM Modules added to portion in Paper 1 and Paper 2 (As given in New NMC Guidelines)
4. AETCOM short note made compulsory (no option given) in both papers.
5. Internal assessment calculation pattern changed as per new NMC guidelines.

(Changes are Highlighted in Yellow colour)

Mahatma Gandhi Mission Medical College (Kamothe, Aurangabad, Sanpada)
Department of Microbiology
Revised (March 2024) Examination Assessment Pattern

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 Universityexamination
- Respective colleges/ departments will conduct internal assessment examinations andmaintain records of thesame.

Format of question paperTime – 3 hrs.

Preliminary &University

Applicable from Admission Batch Aug 2023

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

Portion:

Paper 1	General Microbiology, Immunology, CVS& Blood, GI &Hepatobiliary, Aetcom module 2.2
Paper 2	CNS infections, Respiratory Tract Infections, Genitourinary Infections & STIs, Musculoskeletal skin and subcutatneous infections, Zoonotic &Miscelleneous, Aetcom module 2.3, 2.5,

Theory Paper Pattern and Marks Distribution: (3hrs)

Paper	Section	Type and Number of Questions	Marks alloted	Total Marks
Paper 1	Section A	MCQs (20) Gen Micro and Immuno-7 CVS & Blood-7 GI and Hepatobiliary-6	20 X1mk each= 20Mks	20
	Section B	SAQs (4/5)	4X 6Mks each =24Mks	40

		(1 SAQ from Aetcom compulsory question) LAQs (1/2) (Atleast 1 LAQ clinical Based)	6 Mks 1X 10Mks each=10Mks	
	Section C	SAQs (5/6) LAQs (1/2) (Atleast 1 LAQ clinical Based)	5X 6Mks each =30Mks 1X 10Mks each=10Mks	40
TOTAL				**100**

Paper	**Section**	**Type and Number of Questions**	**Marks alloted**	**Total Marks**
Paper 2	Section A	MCQs (20) CNS-4 Resp Tract-4 Genitourinary and STIs-4 Zoonotic and Misc-4 Musculoskeletal, skin and subcut-4	20 X1mk each= 20Mks	20
	Section B	SAQs (4/5) (1 SAQ from Aetcom compulsory question) LAQs (1/2) (Atleast 1 LAQ clinical Based)	4X 6Mks each =24Mks 6 Mks 1X 10Mks each=10Mks	40
	Section C	SAQs (5/6) LAQs (1/2)	5X 6Mks each =30Mks 1X 10Mks each=10Mks	40

		(Atleast 1 LAQ clinical Based)		
			TOTAL	**100**

Practicals Pattern and Marks Distribution:

Grams Staining	10Mks
ZN Staining	10Mks
Stool examination	10 Mks
Spots	10 Mks
Clinical Case	20Mks
OSPE (Wearing and removing Gloves/ Hand washing)	10 Mks
Viva 1	15Mks
Viva 2	15Mks
TOTAL	100Mks

INTERNAL EXAMS

There will be 2 Internal Exams besides prelims
There will be only one theory paper for both Internal Exams.
Prelims will be exactly like University exam

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:
General Microbiology , Immunology, CVS and Blood infections (Except Malaria and HIV)

2nd Internal Exam:
HIV, Malaria, Gastrointestinal and Hepatobiliary infections, Respiratory tract Infections

Prelims:

Paper 1	General Microbiology, Immunology, CVS& Blood, GI &Hepatobiliary, Aetcom module 2.2
Paper 2	CNS infections, Respiratory Tract Infections, Genitourinary Infections &STIs,, Musculoskeletal skin and subcutatneous infections, Zoonotic &Miscelleneous, Aetcom module 2.3, 2.5

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 (4/5) (1 SAQ from Aetcom compulsory question)	4X 6Mks each =24Mks 6 Mks	40

		LAQs (1/2) (Atleast 1 LAQ clinical Based)	1X 10Mks each=10Mks	
	Section C	SAQs (5/6) LAQs (1/2) (Atleast 1 LAQ clinical Based)	5X 6Mks each =30Mks 1X 10Mks each=10Mks	40
TOTAL				**100**

Practicals Pattern and Marks Distribution:

Grams Staining	15Mks
ZN Staining	15 Mks
Spots	10 Mks
Clinical Case (1)	20Mks
OSPE (wearing and removing gloves/ hand washing)	10Mks
Viva	30Mks
Total	**100Mks**

INTERNAL ASSESSMENT

THEORY IA CALCULATION

Name of Institute:

DEPARTMENT OF Microbiology

Faculty : MBBS | Year/Phase- II

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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**	**IS**	**30**	**IS**	**lS**	**IS**	10	500

Professor & **Head**

Department of Name of Institute

PRACTICAL IA CALCULATION:

Name of Institute :												
Department of /Microbiology												
Faculty • MBBS	Year/Phase- II									Date : dd/mm/yyyy		
			Formalivc Asscssmcnl			Continuous Intcrnal Asscssnwnt (Practical)						
S.No.	Roll No.	Name of Studenl	**lit PCT P111ctlcal/Flnt W1nlLe■\'lq Eumlutloa**	**211d PCT Pnctlcal /SeeolldW1nl Le■vt■a Eumlutloa**	**Prellms P111ctkII**	**Log book (ISO)**				**Journal** *(Record book/ Portfolio)*	**Attendance (Practical)**	Tolal
						Certifiable skill based competencies (Through OSPE/OSCE/Spo1s/Exercise/ Olher)	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.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

A. Text Books :

Sr. No.	Name of the Book	Author
1	Textbook of Medical Microbiology	Prof C.P. Baveja
2	A Textbook of Microbiology	Apoorba Shastri
3	Textbook of Medical Microbiology	Rajesh Bhatia & Itchpujani
4	Textbook of Medical Parasitology	C K Jayaram Panikar
5	Medical Parasitology	C.P.Baveja V.Baveja
6	Textbook of Medical Parasitology	S C Parija

B. Reference Books :

Sr. No.	Name of the Book	Author
1	Textbook of Microbiology	R. Ananthanarayan C K Jayaram Panikar
2	A Textbook of Microbiology	P. Chakraborty
3	A textbook of Microbiology	Surinder Kumar
4	Textbook of Parasitology	Damle and Karyakarte
5	A Textbook of Parasitology	Dr.K.D. Chatterjee.
6	Practical Microbiology	Dr. Anuradha De
7	A textbook of Bioethics for Healthcare Professionals	Princy Palatty
8	Bioethics	Dr Chaudhary
9	MCQs in Microbiology	Dr Shilpa Nair

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-D].

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

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

राष्ट्रीय आयुर्विज्ञान आयोग

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

Microbiology, Navi Mumbai

CBME UG CURRICULUM (II-MBBS)

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

List of Lectures (70 Hrs):

No	COMPETENCY The student should be able to		Lectures	No of Hrs
Topic: General Microbiology and Immunity Number of competencies: (11) Number of procedures that require certification : (01)				
MI 1.1	Describe the different causative agents of Infectious diseases+A208the methods used in their detection	L	1. history of Microbiology 2. Bacterial Morphology 3. Physiology and Metabolism of bacteria 4. Culture Methods 5. General Virology 6. General Parasitology 7.General Mycology	7Hrs
MI 1.3	Describe the epidemiological basis of common infectious diseases	L	8. Infection	1 Hr
MI 1.4	Classify and describe the different methods of sterilization and disinfection. Discuss the application of the different methods in the laboratory, in clinical and surgical practice	L	9. Sterilisation 10. Disinfection	2 Hrs
MI 1.6	Describe the mechanisms of drug resistance, and the methods of antimicrobial susceptibility testing and monitoring of antimicrobial therapy	L	11.Bacterial Genetics 1 12. Bacterial Genetics 2	2 Hrs
MI 1.7	Describe the immunological mechanisms in health	L	13. Immunity 14. Antigen 15. Antibody 16. Complement	4 Hrs
MI 1.8	Describe the mechanisms of immunity and response of the host immune system to infections	L	17. CMI 18. AMI	2 Hrs
MI 1.9	Discuss the immunological basis of vaccines and describe the Universal Immunisation schedule	L	19. Immunoprophylaxis	1 Hr
MI 1.10	Describe the immunological mechanisms in immunological disorder (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in detection.	L	20.Hypersensitivity 21. Autoimmunity and Immunodeficiency	2 Hrs
MI 1.11	Describe the immunological mechanisms of transplantation and tumor immunity	L	22. Transplantation 23. Tumour Immunity	2 Hrs
	TOTAL		23	23 Hrs
Topic: CVS and Blood Number of competencies: (7) Number of procedures that require certification : (NIL)				
MI 2.1	Describe the etiologic agents in rheumatic fever and their diagnosis	L	1. Streptococcus, 2.Pneumococcus and Enterococcus	2hrs

MGM Medical college and Hospital (Kamothe and Aurangabad Campus)

Summary of changes made in Microbiology Syllabus for MBBS Admission Batch Nov 2022

	Previous Syllabus		**Revised Syllabus**		**No of hours increased**
No of hours for DOAP	**110**		**140**		
MI 2.3	**1. Streptococcus, Pneumococcus and Enterococcus**	2 hrs	1.Streptococcus, Pneumococcus and Enterococcus 2.Grams staining	4 Hrs	2
MI 3.1	1. Enterobacteriacaie (E coli, Proteus, Klebseilla) 2. Vibrio and Shigella 3. Intestinal Nematodes and Stool Examination	**6 hrs**	1. Enterobacteriacaie (E coli, Proteus, Klebseilla) 2. Vibrio and Shigella 3. Intestinal Nematodes 4. Stool Examination	**8 Hrs**	**2**
MI 3.2	1.Intestinal Protozoa and Stool Examination	**2 hrs**	1.Intestinal Protozoa 2.Stool Examination	**4 hrs**	**2**
MI 3.5	-	**-**	1. stool examination	**2 Hrs**	**2**
MI 4.1	1.Clostridia and Non sporing anaerobes	**2 hrs**	1.Clostridia and Non sporing anaerobes 2.ZN staining	**4 hrs**	**2**
MI 6.1	**-**	**-**	**1.ZN Staining**	**2 hrs**	**2**
MI 7.1	1.Gonococcus	**2 Hrs**	1. Gonococcus 2.Grams staining	**4 Hrs**	**2**
MI 8.1	1.Yersinia and Brucella	**2 Hrs**	1.Yersinia and Brucella 2.Grams staining 3.ZN staining	**6 Hrs**	**4**
MI 8.7	1. Pseudomonas 2. HAI and PPE(hand hygiene)	**2 hrs**	1.Pseudomonas 2. HAI and PPE (hand hygiene-1st) 3. HAI and PPE (glove wearing) 4.Hand Hygiene 5.Glove wearing 6.Grams Staining	**12 hrs**	**10**
MI 8.10	1.Collection of samples and Medical Entomology	**2 hrs**	1. Collection of samples and Medical Entomology 2. Stool examination	**4 hrs**	**2**
TOTAL					**30 Hrs**

Pandemic Module- 10 Hrs included in syllabus

Skill sessions- 4 hrs included in syllabus to be accommodated in surplus hours

Resolution No. 4.42 of Academic Council (AC-50/2024): Resolved to adopt the new CBME Guidelines dated 12.9.2024 for the MBBS admission batch 2024. **[ANNEXURE-58]**

BOS Microbiology Sept 2024

Annexure- 4: Adoption of Guidelines for CBME curriculum dated 12.9.24 for Microbiology

Salient Features in Microbiology (Admission Batch 2024)

(MGM- Kamothe, Sambhaji Nagar, Sanpada, Nerul)

A. Subject goals

At the end of Microbiology teaching-learning activities learner should be able to:

i. Comprehend the immunological mechanisms in health and disease.

ii. Comprehend the of role of microbial agents in health and disease.

iii. Correlate the natural history, mechanisms and clinical manifestations of infectious diseases as they relate to the properties of microbial agents.

iv. Comprehend the principles and application of infection control measures.

v. Comprehend the basis of choice of laboratory diagnostic tests and their interpretation.

vi. Comprehend the principles of antimicrobial therapy and the control and prevention of infectious diseases.

vii. Comprehend the mechanisms of antimicrobial resistance (AMR) and its prevention along with concept and application of the antimicrobial stewardship program.

viii. Demonstrate the knowledge of outbreak investigation and its control.

ix. Describe commensals, opportunistic and pathogenic organisms and explain host parasite relationship.

x. Describe the characteristics (morphology, cultural characteristics, resistance, virulence factors, incubation period, mode of transmission etc.) of different microorganisms.

xi. Explain the various defense mechanisms of the host against the microorganisms which can cause human infection.

xii. Describe the laboratory diagnosis of microorganisms causing human infections and disease.

xiii. Describe the prophylaxis for the particular infecting microorganisms.

xiv. Operate routine and sophisticated instruments in the laboratory.

xv. Demonstrate respect for patient samples, confidentiality pertaining to patient identity in laboratory results and effective communication skills in patient care.

B. Distribution of Microbiology subject Hours and Competencies

Subjects	Large group teaching	SGT/ Practicals/ Tutorials/ Seminars	Clinical Postings*	SDL	Total
Microbiology	75	143	-	10	228

SGT: Small group teaching SDL: Self-directed learning

Number	COMPETENCY The student should be able to	Predominant Domain K/S/A/C	Level K/KH/S H/P	Core (Y/N)	Suggested Teaching Learning method	Suggested Assessment method	Number required to certify P
MICROBIOLOGY (Topics = 11, Competencies = 74)							
Topic 1: General Microbiology, Ethics & Communication		**Number of competencies: (13)**			**Number of competencies that require certification: (02)**		
MI 1.1	Discuss notable historical events, scientific developments and contributions of key scientists in the evolution of medical microbiology. Discuss the role of microbes in health and disease	K	K	N	LGT	Written assessment, Viva Voce	-
MI 1.2	Describe basic morphology, physiology/characteristics, classification and common infections /diseases caused by bacteria, viruses, fungi and parasites.	K	KH	Y	LGT	Written assessment, Viva Voce	
MI 1.3	Describe the basic principles of molecular biology and the concept and significance of studying molecular genetics. Discuss molecular techniques applied to disease diagnosis in clinical microbiology.	K	KH	Y	LGT	Written assessment, Viva Voce	
MI 1.4	Describe the laboratory methods used to detect causative agents of infectious diseases.	K	KH	Y	LGT	Written assessment, Viva Voce	
MI 1.5	Discuss the appropriate method of collecting and transporting samples to detect microbial agents, including instructions to be given to patients before sample collection.	K	KH	Y	LGT/ SGT	Written assessment, Viva Voce	
MI 1.6	Demonstrate the appropriate method of collection and transport of samples for the detection of microbial agents including instructions to be given to patients before sample collection.	S	SH	Y	DOAP, Role play	Practical exercises /OSPE	3
MI 1.7	Discuss the attitude & behaviors that portray respect & demonstrate respect for patient samples sent to the laboratory for performance of laboratory tests in the detection of microbial agents causing Infectious diseases	A	SH	Y	SGT, Role play	Observation, Viva Voce, Scenario based questions	

MI 1.8	Discuss and demonstrate effective communication skills with patients, relatives and clinicians during sample collection and pre/posttest counseling	C	SH	Y	Role play	OSPE, Observation, Scenario based questions	
MI 1.9	Discuss & demonstrate confidentiality pertaining to patient identity in laboratory results	A	SH	Y	SGT, Role play	Scenario based questions, Viva Voce	
MI 1.10	Perform Gram stain, ZN stain, and routine stool examination to identify the different causative agents of infectious diseases from the clinical specimen	S	P	Y	DOAP	Practicals/OSPE	3 for each procedure
MI 1.11	Describe the epidemiological basis of infectious diseases and their application.	K	KH	Y	LGT	Written assessment, Viva Voce	
MI 1.12	Classify and describe the different methods of sterilization and disinfection. Discuss the mechanism of action, application and quality control of different methods in the laboratory and in clinical and surgical practices.	K	KH	Y	LGT SGT	Written assessment, Case discussion exercise, Case based MCQ, Viva Voce	
MI 1.13	Choose the most appropriate method of sterilization and disinfection to be used in specific situations in the laboratory, in clinical and surgical practice.	K	KH	Y	SGT, Case discussion	Written assessment/Viva voce/	
	Topic 2 : Basic Immunology & Immunological disorders	**Number of competencies: (08)**			**Number of competencies that require certification: (NIL)**		
MI 2.1	Explain the role of immunological mechanisms in health and disease (innate and acquired immunity).	K	KH	Y	LGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.2	Describe the structure and functions of immune system and its components (antigens, antibodies and complement systems).	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.3	Describe the host immune responses in Microbial infections (humoral and cellular immune response).	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.4	Explain the immune response in different types of infections (bacterial, mycobacterial, viral, fungal and parasitic infections)	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	

MI 2.5	Discuss the principles and applications of laboratory tests used in diagnostic microbiology based on the host's immune response.	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.6	Discuss the immunological basis of disease prevention through active and passive immune prophylaxis. Discuss the importance of herd immunity in prevention and control of infectious disease in community.	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.7	Describe the immunological mechanisms in immunological disorders (hypersensitivity, autoimmune disorders and immunodeficiency states) and discuss the laboratory methods used in their detection.	K	KH	Y	LGT SGT	Written assessment, Case based MCQ, Viva Voce	
MI 2.8	Describe the immunological mechanisms involved in transplantation, tumour immunity and their applications in disease management.	K	KH	N	LGT, SDL`	MCQ, Viva Voce	
Topic 3: CVS and Blood		**Number of competencies: (13)**			**Number of competencies that require certification: (1)**		
MI 3.1	Describe the etiopathogenesis, clinical features, complications/sequelae and laboratory diagnosis of rheumatic fever.	K	KH	Y	LGT SGT, Case-based discussion	Written/ Viva voce	
MI3.2	Describe the classification etio-pathogenesis, clinical features of Infective endocarditis (IE).	K	KH	Y	LGT, SGT, Case based discussion	Written/ Viva voce	
MI 3.3	Discuss the diagnostic modalities of IE available with special emphasis on concept of sepsis and blood culture collection & processing.	K	KH	Y	LGT, SGT , Case based discussion	Written/ Viva voce	2
MI 3.4	Diagnose a clinically suspected case of rheumatic fever/IE based on the findings of various microscopic, serological and culture investigations.	K	KH	Y	LGT, SGT, Case based discussion	Case based exercise, Case based MCQ, Viva voce	
MI 3.5	Define & describe types of Pyrexia of unknown origin (PUO). Discuss the etiopathogenesis and diagnostic modalities available to rule out infective causes of PUO.	K	KH	Y	LGT, SDL, SGT , Case-based discussion	Written assessment/ Viva voce	
MI 3.6	Classify & describe the enteric fever pathogens. Discuss the evolution of the clinical course, pathogenesis, complications, laboratory diagnosis and prevention of enteric fever.	K	KH	Y	LGT. SGT, Case-based discussion	Case based exercise, Written assessment, Case based MCQ, Viva voce	

MI 3.7	Choose the most appropriate laboratory test in a suspected case of enteric fever based on the duration of illness and in a suspected case of carrier.	K	KH	Y	Interpretational exercises (Practicals)	Case based exercise, Case based MCQ, interpretational exercise, Viva Voce	
MI 3.8	Read and interpret the results of various laboratory investigations in a suspected case of enteric fever with special emphasis on serological test results.	K	KH	Y	Interpretational exercises (Practicals)	Case discussion exercise, Case based MCQ, interpretation exercise, Viva Voce	
MI 3.9	Enumerate the common infective causes of anaemia and describe the mechanisms involved in causing anaemia by them.	K	KH	Y	LGT	Written assessment	
MI 3.10	Describe the morphology, life cycle, pathogenesis, laboratory diagnosis, prevention and control of the common parasites causing anaemia.	K	KH	Y	LGT	Written assessment, Case based exercise, Case based MCQ, Viva Voce	
MI 3.11	Describe the morphology, life cycle, pathogenesis, clinical presentation, laboratory diagnosis and prevention of hemoparasites commonly prevalent in India (e.g. causing kala-azar, malaria, filariasis etc.)	K	KH	Y	LGT, SGT, SDL	Written assessment, Case discussion exercise, Case based MCQ, Viva Voce	
MI 3.12	Differentiate agents of malignant malaria from agents of benign malaria reported in peripheral blood smear examination/ serology and explain its clinical significance.	K,	KH	Y	Case-based discussion with reports (Practicals)	Interpretational exercise, Case based exercise, Case based MCQ, Viva Voce	
MI 3.13	Describe the epidemiology, the etio- pathogenesis, evolution complications, opportunistic infections, diagnosis, prevention and the principles of management of HIV	K	KH	Y	LGT, SDL	Written assessment, Case based MCQ, Viva Voce	
Topic 4: Gastrointestinal and Hepatobiliary system Number of competencies:(09) Number of competencies that require certification:(01)							
MI 4.1	Define and differentiate between diarrhea, dysentery and food poisoning. Enumerate the microbial agents causing them.	K	KH	Y	LGT	Written assessment, Case based MCQ, Viva Voce	

MI 4.2	Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of bacterial, viral, parasitic and fungal agents causing diarrhoea.	K	KH	Y	LGT	Written assessment, Case based MCQ, Viva Voce	
MI 4.3	Describe the epidemiology, morphology, pathogenesis, clinical features and diagnostic modalities of bacterial, viral, parasitic and fungal agents causing dysentery	K	KH	Y	LGT with case discussions	Written assessment, Case based MCQ, Viva Voce	
MI 4.4	Identify the common etiologic agents of diarrhoea and dysentery by stool microscopic examination.	S	SH	Y	DOAP (Practicals)	Interpretational exercises /practical exercise	3
MI 4.5	Enumerate the bacterial, viral, parasitic and fungal agents of food poisoning and discuss their pathogenesis, clinical course and laboratory diagnosis.	K	KH	Y	LGT with case discussion , SGT	Written assessment, Case based MCQ, Viva Voce	
MI 4.6	Describe the infective aetiology, pathogenesis and clinical course of Acid peptic disease (APD) and Discuss the laboratory diagnosis and management of the causative agent of APD.	K	KH	Y	LGT with case discussion, SDL	Written assessment, Case based MCQ, Viva Voce	
MI 4.7	Describe the epidemiology, etiopathogenesis, clinical features and complications of viral hepatitis.	K	KH	Y	LGT with case / clinical report discussion	Written assessment, Case based MCQ, Viva Voce	
MI 4.8	Discuss the modalities in laboratory diagnosis, with special emphasis on viral markers and preventive strategies for viral hepatitis caused by hepatitis viruses.	K	KH	Y	LGT with case / clinical report discussion	Written assessment, Case based MCQ, Viva Voce	
MI 4.9	Suggest the most appropriate laboratory test based on history and clinical presentation in a suspected case of viral hepatitis and interpret the type and progress of viral hepatitis based on the laboratory report of viral markers in a case of infection by hepatitis virus.	K	KH	Y	SDL, SGT with case / clinical report discussion	Written assessment, Case based MCQ, Viva Voce	
	Topic 5: Musculoskeletal system, Skin and Soft tissue infections	**Number of competencies: (05)**			**Number of competencies that require certification: (NIL)**		
MI 5.1	Enumerate the microbial agents causing anaerobic infections. Describe the pathogenesis, clinical course and the laboratory diagnosis of anaerobic infections.	K	KH	Y	LGT with case discussion	Written assessment, Case based MCQ, Viva Voce	
MI 5.2	Explain the etiopathogenesis, clinical course & laboratory diagnosis of bone & joint infections caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion	Written assessment, Case based MCQ, Viva Voce	

MI 5.3	Explain the etiopathogenesis, clinical course and the laboratory diagnosis of skin and soft tissue infections caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 5.4	Differentiate between infective and non-infective lesions in the skin. Enlist microbes causing systemic disease with involvement of skin.	K	KH	N	LGT	Written assessment, Viva voce	
MI 5.5	Describe the etiopathogenesis, clinical course, complications and laboratory diagnosis of mycobacterial infections involving skin & soft tissue with special emphasis on sample collection from/of skin	K	KH	Y	LGT, SGT, SDL	Written assessment	
Topic 6 : Central Nervous System infections		**Number of competencies: (03)**			**Number of competencies that require certification: (NIL)**		
MI 6.1	Enumerate the microbial agents causing meningitis. Explain the pathogenesis, clinical course and laboratory diagnosis of meningitis caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 6.2	Enumerate the microbial agents causing encephalitis Explain the pathogenesis, clinical course and laboratory diagnosis of encephalitis caused by bacterial, fungal, viral and parasitic agents.	K	KH	Y	LGT with case discussion SGT, SDL	Written assessment, Case based MCQ, Viva Voce	
MI 6.3	Identify the microbial agents causing meningitis from a Gram stained given smear. Read & Interpret the microscopic findings and culture report of CSF to diagnose a case of bacterial, viral, fungal or parasitic infection in CNS	K	KH	Y	SGT	Written assessment, Case based MCQ, Viva Voce, OSCE	
Topic 7: Respiratory tract infections		**Number of competencies: (05)**			**Number of competencies/ skills that require certification: (02)**		
MI 7.1	Explain the etiopathogenesis, laboratory diagnosis and prevention of Infections of the upper respiratory tract caused by bacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 7.2	Explain the etiopathogenesis, laboratory diagnosis and prevention of Infections of the lower respiratory tract caused by bacterial, mycobacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT with case discussion SGT	Written assessment, Case based MCQ, Viva Voce	
MI 7.3	Enlist & identify the etiological agents of lower respiratory infection in specific situations like age, immune status, community-acquired pneumonia, hospital-acquired pneumonia etc	K	KH	Y	LGT with case discussion , SGT	Written assessment, Case based MCQ, Viva Voce	
MI 7.4	Identify the common etiologic agents of upper respiratory tract infections in a Gram Stain/ Albert stained smear of throat swab and correlate with the clinical findings provided.	S	P	Y	DOAP Practicals	OSPE, Clinical case based exercises	3

MI 7.5	Identify the common etiologic agents of lower respiratory tract infections in a provided Gram Stained & Acid fast stained smear of sputum/BAL/tracheal aspirate and correlate with the clinical findings provided	S	P	Y	DOAP Practicals	OSPE, Clinical case based exercises	3
	Topic:8 Genitourinary and Sexually Transmitted Infections	**Number of competencies: (04)**			**Number of competencies that require certification: (NIL)**		
MI 8.1	Describe the etiopathogenesis and discuss the laboratory diagnosis of common bacterial, viral, fungal and parasitic infections of the genito-urinary system	K	KH	Y	LGT/ SGT	Written assessment, Viva voce	-
MI 8.2	Enlist common sexually transmitted infections (STI). Explain the pathogenesis, laboratory diagnosis and prevention of common bacterial and viral sexually transmitted infections.	K	KH	Y	LGT/ SGT	Written assessment, Viva Voce	
MI 8.	Explain the concept and utility of Syndromic management of STI.	K	KH	Y	SDL/ SGT	Written assessment, Viva voce	
MI 8.4	Explain etiopathogenesis, clinical course, and the appropriate method for specimen collection, and discuss the laboratory diagnosis of different clinical and epidemiological types of urinary tract infections.	K	KH	Y	LGT/ SGT	Written assessment, Viva voce	
	Topic 9: Zoonotic diseases and Miscellaneous	**Number of competencies: (06)**			**Number of competencies that require certification: (NIL)**		
MI 9.1	Define and classify Zoonotic infections. Explain etio-pathogenesis, vectors, clinical course, transmission, risk factors, laboratory diagnosis, and preventive & control strategies of different zoonotic infections caused by bacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT/ SGT	Written assessment, Viva voce	
MI 9.2	Describe the etiopathogenesis and laboratory diagnosis of opportunistic infections(OI) along with factors predisposing to the development of OI by bacterial, viral, fungal and parasitic agents.	K	KH	Y	LGT, SGT	Written assessment, Viva voce	
MI 9.3	Choose the most suitable microbiological investigation in a given clinical situation and Interpret the results of the laboratory tests for the diagnosis of the infectious disease	K	SH	Y	Case based exercise, SGT	Cased based exercises, Case based MCQ	
MI 9.4	Describe the etiopathogenesis of infective causes of malignancy and explain the mechanisms used by oncogenic viruses in the development of virus-associated malignancies, along with their preventive measures.	K	KH	Y	LGT SGT	Written assessment, Viva voce	

MI 9.5	Describe the concept of emerging & re-emerging Infectious diseases. Explain the factors responsible for emergence and re-emergence of these disease and strategies for their prevention and control.	K	KH	Y	LGT, small group discussion, SDL	Written assessment, Viva voce	
MI 9.6	Describe the National Health Programs in the prevention of common infectious diseases and discuss the National reference centres for disease diagnosis and control	K	K	N	LGT	Written assessment, Viva voce	
	Topic 10: Healthcare-associated infections (HAI)	**Number of competencies: (05)**			**Number of competencies that require certification: (01)**		
MI 10.1	Enumerate different causative agents and the types of Healthcare-Associated Infections (HAI). Define HAI and describe the chain of transmission and its role in preventing HAI.	K	K	Y	LGTs, SGT	Written assessment, Viva voce	
MI 10.2	Describe the standard & transmission based precautions for infection control and the role of the hospital infection control committee (HICC) in the prevention of HAI.	K	KH	Y	LGTs, SGT	MCQ, viva voce	
MI 10.3	Demonstrate hand washing, donning- doffing of PPE and segregation of Biomedical waste	S	SH	Y	DOAP, Role-play, SGT, Practicals	OSPE, Direct Observation with checklist	3 each
MI 10.4	Describe the methods used and significance of assessing the microbial contamination of food, water and air (in hospital surveillance)	K	KH	N	Interactive LGTs	Written assessment, MCQ, Viva Voce	
MI 10.5	Describe the commonly detected drug-resistant microbes in HAI. Explain the mechanism of evolution, spread, and control of antimicrobial drug resistance in hospitalized patients.	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce	
	Topic 11: Antimicrobial resistance (AMR) & Antimicrobial Stewardship (AMSP)	**Number of competencies: (03)**			**Number of competencies that require certification: (Nil)**		
MI 11.1	Describe the genotypic & phenotypic mechanisms of antimicrobial drug resistance and the methods of antimicrobial susceptibility testing, along with interpretation of the antimicrobial susceptibility testing report	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce, Interpretational exercise	-
MI 11.2	Explain intrinsic & acquired drug resistance along with the antimicrobial spectrum of important human pathogens and its application in clinical therapy.	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce	-
MI 11.3	Explain the concept and application of the antimicrobial stewardship program including rational antimicrobial prescription and your role in its implementation.	K	KH	Y	LGT, SGT	Written assessment, MCQ, Viva Voce	-

AETCOM PhaseII		
Paper	**Module number**	**Hours**
Microbiology Paper 1	2.1	5 Hrs
Microbiology Paper 2	2.8	6 Hrs

C. Marks distribution for Microbiology for University Annual Examinations

Phase-IIMBBS	**Theory**	**Practicals**
Microbiology-2 papers	Paper 1-100	100
	Paper 2-100	

Criteria for passing in a subject: A candidate shall obtain a cumulative 50% marks in University conducted examination including theory and practical and not less than 40% separately in Theory and in Practical in order to be declared as passed in that subject. **In subjects that have two papers, the learner must secure a minimum** 40% marks in aggregate (both theory papers together).

Annexure 11- Phase II Alignment

	Pathology	**Microbiology**	**Pharmacology**
1st month	Gen. Path	Gen. Micro, Communication and Ethics(14 competencies)	Gen. Pharm
2nd month	Gen. Path	Gen. Micro, Communication and Ethics(14 competencies)	Gen. Pharm
3rd month	Inflammation Immunology HIV	Immunology and Immunological Disorders (8 competencies)	(ANS/PNS) NSAIDs
4th month	Immunology	Immunology and Immunological Disorders	Immunosuppressants CVS
	CVS	CVS & Bloodstream infections (1.5 months)	
1st Internal Assessment			
5th month	CVS Hematology	CVS & Bloodstream infections (1.5 months)	CVS Blood
6th month	Respiratory System (2-3 weeks)	Respiratory System (2.5 weeks) Tb	Chemo
7th month	Respiratory system	CNS 1.5 weeks	Respiratory System TB (7 hours) CNS 4weeks
	CNS 2 hours Kidney		
2nd Internal Assessment			
8th month	Kidney Genito-urinary 2 weeks	Genito-urinary and STI 2 wks GIT Hepatobiliary	Chemotherapy
9th month	GIT Hepatobiliary	GIT Hepatobiliary	GIT
10th month	Bone Breast Skin, eye, joints Endocrine	Musculoskeletal system, Skin and Soft Tissue Infections (2 weeks) Zoonotic & Miscellaneous Infections (2 weeks) HAI and Antimicrobial Stewardship Hospital Infection Control	Drugs on skin, ocular Endocrine
3rd Internal Assessment/ Pre University			
11th month	**Phase 2 University Exam**		

E. Internal Assessment (IA): (Out of 100 for Theory and 100 for Practical)

Internal assessment shall be based on day-to-day assessment. It shall relate to different ways in which learners participate in the learning process including assignments, preparation for seminar, clinical case presentation, preparation of clinical case for discussion, clinical case study/ problem solving exercise, participation in project for health care in the community.

F. ATTENDANCE CRITERIA

- There shall be a minimum of 75% attendance in theory and 80% attendance in practical /clinical for eligibility to appear for the examinations in that subject.
- There shall be a minimum of 75% attendance in AETCOM
- Learners who do not have at least 75% attendance in the electives will not be eligible for the Third Professional - Part II examination/ NEXT.
- The student will be allowed remedial measures only if attendance is more than 60% for each component.

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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