Second MBBS (from October 2020)
Subject: Microbiology Theory / Practical

Based on Medical Council of India, Competency based Undergraduate curriculum for the Indian Medical Graduate, 2018. (Vol. 1; page nos. 205-227)

1. Total Teaching hours : **190**
2. A. Lectures(hours): **70**
   B. Self-directed learning (hours):- **10**
   C. Clinical Postings (Hours): NA
   D. Small group teachings/tutorials/Integrated teaching / Practical's (hours)**: 110**

Competency Nos.	Topics and Subtopics
MI1.1	Introduction to Microbiology and historical aspects. Introduction to bacteria, viruses & Bacteriophages, fungi, parasites, host parasite relationship, normal flora.
MI1.2	Morphology of bacteria, microscopy, Gram staining, Z-N staining, stool examination- routine microscopy
MI1.3	Types of infection, source/ reservoir of infection, modes of transmission, pathogenicity, definition of prevalence, incidence, types of infectious diseases (endemic, epidemic, pandemic, sporadic)
MI1.4	Methods of sterilization and disinfection, their application in the laboratory, clinical and surgical practice, demonstration of working of autoclave
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
MI1.6	Mechanism of drug resistance, methods of antibiotic susceptibility testing, definition of MIC, MBC, break points, interpretation of antibiotic susceptibility test report, antimicrobial audit/use, antibiotic policy, antimicrobial stewardship.
MI1.7	Immunity
MI1.8	Antigen, antibodies, immune response and complement, antigen antibody reactions
MI1.9	Vaccines, universal vaccination program, immunoprophylaxis, immunotherapy

Competency Nos.	Topics and Subtopics
MI1.10	Hypersensitivity, autoimmune disorders and immunodeficiency states, laboratory methods used in their detection
MI1.11	Immunological mechanisms of transplantation and tumor immunity
MI2.1	Rheumatic Heart Disease-definition, etiological agent, pathogenesis, clinical features and laboratory diagnosis. Streptococci
MI2.2	Infective endocarditis- classification, etiological agents, pathogenesis, clinical features and laboratory diagnosis. Streptococcus viridans, Streptococcus mutans, HACEK
MI2.3	Blood collection for culture, throat swab collection, blood culture, ASO test, interpretation of the test
MI2.4	Anemia-definition, etiological agents, pathogenesis, clinical features and laboratory diagnosis. Hookworm, Trichuris trichiura,
MI2.5	Kala azar, malaria, filariasis and other common parasites prevalent in India - *Schistosomes, Fasciolopsis buski, Paragonimus westermani,*
MI2.6	Peripheral smear staining for malaria, Identify the slide for filarial
MI2.7	HIV- epidemiology, the etio- pathogenesis, evolution, complications, opportunistic infections, diagnosis, prevention and the principles of management of HIV
MI3.1	Microbial agents causing diarrhea and dysentery- epidemiology, morphology, pathogenesis, clinical features and laboratory diagnosis of Shigella, Campylobacter, Vibrio, salmonella, E. hystolytica, Giardia, B. coli, H. nana, Taenia , Intestinal nematodes, Norwalk virus and Rota virus, Coronavirus
MI3.2	Stool examination-routine microscopy, hanging drop preparation,
MI3.3	Septicemia, Enteric fever and Food poisoning Salmonella -Morphology, pathogenesis, clinical features, laboratory diagnosis.
MI3.4	Blood culture, Widal test, Stool culture, Clot culture, Interpretation of the reports
MI3.5	Food poisoning- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Staphylococci, Cl. botulinum, Bacillus cereus
MI3.6	Acid peptic disease (APD)- etio-pathogenesis, clinical course laboratory diagnosis and management H. pylori
MI3.7	Viral hepatitis- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Hepatitis A, B, C, D, E, Cytomegalovirus, Epstein-Barr virus, HSV, VZV, Measles, Rubella
MI3.8	Serological tests for the laboratory diagnosis of viral hepatitis, viral markers, interpretation of reports

Competency Nos.	Topics and Subtopics
MI4.1	Anaerobic infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Spore bearing and non-spore bearing anaerobes, Clostridia
MI4.2	Bone and joint infections- etio-pathogenesis, clinical features and laboratory diagnosis. Prosthetic joint infections, Staphylococci, Acinetobacter
MI4.3	Skin and soft tissue infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Superficial, cutaneous and sub-cutaneous fungal infections, Mycetoma, Leprosy, Herpes.
MI5.1	Meningitis- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Meningococci, Leisteria, H. influenzae, Cryptococcus neoformans
MI5.2	Encephalitis- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Primary amoebic meningo-encephalitis, viral encephalitis, Japanese encephalitis, Rabies, Aseptic meningitis -ECHO viruses
MI5.3	laboratory diagnosis of meningitis, interpretation of laboratory reports
MI6.1	Upper respiratory tract infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Orthomyxo virus, Paramyxo virus, Adenovirus, Rhinovirus, Diphtheria, Bordetella and Lower respiratory tract infections-etiological agents, pathogenesis, clinical features and laboratory diagnosis Streptococcus pneumonia, Mycobaterium tuberculosis,
MI6.2	Gram staining- Interpretation of results
MI6.3	Z-N staining and Fluorescent staining- Interpretation of results
MI7.1	Genitourinary infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Non-gonococcal urethritis, Trichomoniasis, . Bacterial vaginosis
MI7.2	Sexually transmitted infections- etiological agents, pathogenesis, clinical features and laboratory diagnosis. Syphilis, Gonorrhea, Herpes, Calymmatobacterium, HPV, Molluscum contagiosum
MI7.3	Urinary tract infections- etiological agents, pathogenesis, significant bacteruria , clinical features and laboratory diagnosis. E. coli, Klebsiella, Proteus
MI8.1	Zoonotic diseases- etiological agents, mode of transmission, pathogenesis, clinical features laboratory diagnosis and prevention-Brucella, Yesinia, Leptospira, Anthrax and Arbo viruses, Hydatid disease
MI8.2	Opportunistic infections- etio-pathogenesis, factors contributing to the occurrence of OI, laboratory diagnosis - Toxoplasma, Pneumocystis jiroveci, Cryptospora, Isospora,
MI8.3	Oncogenic viruses in the evolution of virus associated malignancy

Competency Nos.	Topics and Subtopics
MI8.5	Healthcare Associated Infections (HAI)- definition, types, factors that contribute to the development of HAI and the methods for prevention- Pseudomonas, MOTT, Antibiotic associated diarrhea
MI8.6	Hand hygiene, bio medical waste management, environmental hygiene, use of equipments, respiratory hygiene and cough etiquette, PEP, spill management, vaccination
MI8.7	Infection control practices and use of Personal Protective Equipments (PPE)
MI8.8	Microbiology of food, water and air
MI8.9	Methods of sample collection and transport
MI8.10	Collection and transport of specimens
MI8.11	Respect for patient samples sent to the laboratory for performance of laboratory tests
MI8.12	Confidentiality pertaining to patient identity in laboratory results
MI8.13	Appropriate laboratory test in the diagnosis of the infectious disease
MI8.14	Confidentiality pertaining to patient identity in laboratory results
MI8.15	Interpret the results of the laboratory tests used in diagnosis of the infectious disease
MI8.16	National Health Programs in the prevention of common infectious diseases- Vector borne diseases control program, Revised National Tuberculosis Control Program (RNTCP), National AIDS Control Program, National Leprosy Eradication Program, Pulse Polio Program- Poliovirus
Miscellaneous topics - may be covered in theory or SGT	Burkholderia, Mycoplasma, Borrelia, Actinomyses & Nocardia, Rickettsia, Bortonella, Ehrlichia, Chlamydiae, Ebola virus, Slow viruses

AETCOM Module no.	Topics and Subtopics
2.5	Bioethics-patient autonomy and decision making
2.6	Bioethics-patient autonomy and decision making
2.7	Bioethics-patient autonomy and decision making

Revision

Paper wise distribution of topics for Prelim & MUHS Annual Examination
Year: Second MBBS Subject: MICROBIOLOGY

Paper	Section	Topics
I	A	MCQs on all topics of the paper I
		General Microbiology and Immunity
		CVS and Blood
		Gastrointestinal and hepatobiliary system
		AETCOM Module No- 2.5,2.6 and 2.7
II	A	MCQs on all topics of the paper II
		Musculoskeletal system, skin and soft tissue infection
		Central nervous system infections
		Respiratory tract infections
		Genitourinary and sexually transmitted infections
		Zoonotic diseases and miscellaneous

Second MBBS
Internal Assessment
Subject: Microbiology
Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Phase	I-Exam (After 3 months , Jan)			II-Exam (After 7 months, May)			Prelims (July)		
	Theory	Practical (Including 10 Marks for Journal & Log Book)	Total Marks	Theory	Practical Including 10 Marks for Journal & Log Book	Total Marks	Theory	Practical	Total Marks
Second MBBS	50	50	100	50	50	100	Paper 1 -100 Paper 2 -100	100	300

1. There will be 3 internal assessment examinations in Microbiology. The structure of the internal assessment theory examinations should be similar to the structure of University examinations.
2. It is mandatory for the students to appear for all the internal assessment examinations.
3. First internal assessment examination will be held in January, second internal assessment examination will be held in May and third internal assessment examination will be held in July.
4. A student who has not taken minimum required number of tests for Internal Assessment each in theory and practical will not be eligible for University examinations.
5. There will be only one additional examination for absent students (due to genuine reason) after approval by the Institutional Grievances Committee. It should be taken after preliminary examination and before submission of internal assessment marks to the University.
6. Internal assessment marks for theory will be out of 300 and practical will be out of 200.

7. Reduce total theory internal assessment to 40 marks and total practical internal assessment to 40 marks. Students must secure at least 50% marks of the total marks (combined in theory and practical; not less than 40 % marks in theory and practical separately) to be eligible for appearing University examination
8. **Conversion Formula for calculation of marks in internal assessment examinations**

	First IA	**Second IA**	**Third IA (Prelim)**	**Total**	**Internal assessment marks: Conversion formula (out of 40)**	**Eligibility to appear for final University examination (after conversion out of 40) (40% separately in Theory & Practical, 50% Combined)**	
Theory	50	50	200	300	Total marks obtained 7.5	16 (Minimum)	Total of Theory + Practical Must be 40.
Practical	50	50	100	200	Total marks obtained 05	16 (Minimum)	

While preparing Final Marks of Internal Assessment, the rounding-off marks shall done as illustrated in following table

Internal Assessment Marks	**Final rounded marks**
15.01 to 15.49	15
15.50 to 15.99	16

9. Internal assessment marks will reflect as separate head of passing at the summative examination.
10. Internal assessment marks will not to be added to marks of the University examinations and will be shown separately in mark list.

Second MBBS Practical Mark's Structure
Internal Assessment Examinations
(Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards)

Subject : MICROBIOLOGY Practical										
Seat No.	I Term					II Term				
	Gram Stain	P.S. for M.P.	Journal/Log book	Viva	Total	Z-N stain	Stool - Routine microscopy	Journal/Log book	Viva	Total
Max. Marks	10	10	10	20	50	10	10	10	20	50

Second MBBS Practical Mark's Structure (Prelim)

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Subject: MICROBIOLOGY										
Practical							Oral/Viva			Total
Seat No.	Gram/ Z-N staining	P.S. for M.P./ Stool –routine microscopy	Use of PPE/ Hand hygiene	Interpretation of reports	Journal/ Log book	Total	Viva-I	Viva-II	Total	Practical & Oral (F + I)
Max. Marks	15	15	10	20	10	70	15	15	30	100

Second MBBS Practical Mark's Structure (M.U.H.S Examination)

Applicable w.e.f October 2020 onwards examination for batches admitted from June 2019 onwards

Subject: MICROBIOLOGY										
Practical							Oral/Viva			Total
Seat No.	Gram/ Z-N staining	P.S. for M.P./ Stool –routine microscopy	Use of PPE/ Hand hygiene	Interpretation of reports	Journal/ Log book	Total	Viva-I	Viva-II	Total	Practical & Oral (F + I)
	A	B	C	D	E	F	G	H	I	J
Max. Marks	15	15	10	20	10	70	15	15	30	100

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**Second MBBS** *(applicable w.e.f. September 2021 & onwards examinations)*						2. Subject Code	:		
3. Subject (PSP)	:	**MICROBIOLOGY**									
(TT)	:										
4. Paper :	:	**I**	5. Total Marks	:	**100**	6. Total Time	:	**3 Hrs.**	7. Remu. (Rs)	:	Rs. 300
									8. Remu. (Rs)	:	Rs. 350/-
9. Web Pattern	:	[ ]	10. Web Skeleton	:	[ ]	11. Web Syllabus	:	[ ]	12. Web Old QP	:	[ ]

Instructions:

SECTION "A" MCQ

1) *Put ☒ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B" (40 Marks)

2.	Short Answer Questions	(AETCOM 2.5, 2.6, 2.7) (compulsory)	(7x1=07)
	a)		
3.	Short Answer Questions	(Answer Any 3 out of 4)	(7x3=21)
	a) b) c) d)		
4.	Structured Long Answer Questions	(Compulsory)	(12x1=12)
	a)		
5.	Short Answer Questions	(Answer Any 4 out of 5)	(7x4=28)
	a) b) c) d) e)		
6.	Structured Long Answer Questions	(Compulsory)	(12x1=12)
	a)		

MAHARASHTRA UNIVERSITY OF HEALTH SCIENCES, NASHIK
FORMAT / SKELETON OF QUESTION PAPER

1. Course and Year	:	**Second MBBS** *(applicable w.e.f. September 2021& onwards examinations)*							2. Subject Code	:	
3. Subject (PSP)	:	**MICROBIOLOGY**									
(TT)	:										
4. Paper :	:	**II**	5. Total Marks	:	**100**	6. Total Time	:	**3** Hrs.	7. Remu. (Rs)	:	Rs. 300/-
									8. Remu. (Rs)	:	Rs. 350/-
9. Web Pattern	:	[ ]	10. Web Skeleton	:	[ ]	11. Web Syllabus	:	[ ]	12. Web Old QP	:	[ ]

Instructions:

SECTION "A" MCQ

1) *Put ☒ in the appropriate box below the question number once only.*
2) *Use blue ball point pen only.*
3) *Each question carries **One mark.***
4) *Students will not be allotted mark if he/she overwrites strikes or put white ink on the cross once marked.*

SECTION "A" MCQ (20 Marks)

1. Multiple Choice Questions (Total 20 MCQ of One mark each) (20 x1 = 20)

a) b) c) d) e) f) g) h) i) j)

k) l) m) n) o) p) q) r) s) t)

SECTION "B"

Instructions:

1) *Use **blue/black** ball point pen only.*
2) ***Do not** write anything on the **blank portion of the question paper**. If written anything, such type of act will be considered as an attempt to resort to unfair means.*
3) ***All** questions are **compulsory**.*
4) *The number to the **right** indicates **full** marks.*
5) *Draw diagrams **wherever** necessary.*
6) *Distribution of syllabus in Question Paper is only meant to cover entire syllabus within the stipulated frame. The Question paper pattern is a mere guideline. Questions can be asked from any paper's syllabus into any question paper. Students cannot claim that the Question is out of syllabus. As It is only for the placement sake, the distribution has been done.*
7) *Use a common answerbook for all sections.*

SECTION "B"

2. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)
a) b) c) d) e)

3. Structured Long Answer Questions (Compulsory) (12x1=12)
a)

4. Short Answer Questions (Answer Any 4 out of 5) (7x4=28)
a) b) c) d) e)

5. Structured Long Answer Questions (Compulsory) .(12x1=12)
a)

Competency Based Medical Education

Year: Second MBBS

Subject: Microbiology

Learning Resource Material

Books recommended:

1. Textbook of Microbiology – R. Ananthanarayan C. K. Jayaram Panikar
2. A Textbook of Microbiology – P. Chakraborty
3. Textbook of Medical Microbiology – Rajesh Bhatia & Itchpujani
4. Textbook of Medical Microbiology – Arora and Arora
5. Textbook of Medical Parasitology – C. K. Jayaram Panikar
6. Textbook of Medical Parasitology – Arora and Arora
7. Textbook of Medical Parasitology – S.C.Parija
8. Microbiology in clinical practice – D. C. Shanson
9. A Textbook of Parasitology – Dr. R.P. Karyakarte and Dr. A.S. Damle
10. Essentials of Medical Microbiology – Apurba shashtry

Reference books:

1. Mackie McCartney practical Medical Microbiology- Colle JG, Fraser AG
2. Principles of Bacteriology, Virology & Immunology vol. 1, 2, 3, 4, 5- Topley Wilsons
3. Medical Mycology (Emmons)- Kwon – Chung
4. Review of Medical Microbiology (Lange)- Jawetz
5. Immunology- Weir DM
6. Medical Microbiology- David Greenwood, Richard Stack, John Pentherer
7. Parasitology- KD Chatterjee
8. Medical virology- Timbury MC
9. Mackie McCartney Medical, Microbiology vol.1- Duguid JP
10. Microbial infections- Marmion BP, Swain RHA
11. Bailey & Scott's Diagnostic Microbiology
12. Textbook of Mycology – Jagdish Chander

Maharashtra University of Health Sciences
Nashik

MICROBIOLOGY LOGBOOK

For

PHASE II MBBS STUDENTS

AS PER

COMPETENCY BASED CURRICULUM

First Edition: 2020

Preface

The Medical Council of India has revised the undergraduate medical education curriculum so that the Indian Medical Graduate (IMG) is able to recognize **"Health for all"** as a national goal. He/she should also be able to fulfil his/her societal obligations. The revised curriculum has specified the competencies that a student must attain and clearly defined teaching learning strategies for the same. With this goal in mind, early clinical exposure, integrated teaching, skill development, AETCOM and self-directed learning have been introduced. There would be emphasis on communication skills, basic clinical skills and professionalism. There is a paradigm shift from the traditional didactic classroom-based teaching to learning environments where there is emphasis on learning by exploring, questioning, applying, discussing, analysing, reflecting, collaborating and doing. The recognition of this need is enshrined by a greatly enhanced allocation of time to these methods and also the assessment techniques. With this view in mind the log book has been designed as per the guidelines of competency Based curriculum.

Name of the College

_____

_____

Admission Year : _____

CERTIFICATE

This is to certify that,

Mr/Ms._____

Roll No. _____ has satisfactorily attended/completed all assignments mentioned in this logbook as per the guidelines prescribed by Medical Council of India, for Phase II MBBS Competency Based Curriculum in the subject of Microbiology.

Date: ___/___/_____

Place: _____

Teacher-in-Charge

Professor and Head

Department of Microbiology

Instructions

1) This logbook is prepared as per the guidelines of MCI for implementation of Competency based curriculum for Phase II MBBS students in the subject of Microbiology.
2) Students are instructed to keep their logbook entries up to date.
3) Students are expected to write minimum 1 reflections on Self-Directed Learning (SDL).
4) Students also have to write reflections on AETCOM Modules – 2.5, 2.6 and 2.7.
5) Reflections should be structured using the following guiding questions:

- What happened? (What did you learn from this experience)
- So what? (What are the applications of this learning)
- What next? (What knowledge or skills do you need to develop so that you can handle **this type of situation?)**

6) The logbook assessment will be based on multiple factors like

- Attendance
- Active participation in the sessions,
- Timely completions
- Quality of write up of reflections
- Overall presentation

INDEX

Sr. No	Description	Page No's	Status	Signature of Teacher
			Complete/ Incomplete	
1	Self-Directed Learning, skill assessment, participation in Group discussions			
2	*AETCOM Module No. 2.5, 2.6, 2.7			
3	Attendance Records			
4	Records of Internal Assessment			

*AETCOM – Competencies for IMG, 2018, Medical Council of India.

Section 1. Self-Directed Learning, skill assessment, participation in Group discussions

Sr. No	Self-Directed Learning, skill assessment, participation in Group discussions	Date	Signature of Teacher

Sr. No	Self-Directed Learning, skill assessment, participation in Group discussions	Date	Signature of Teacher

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on Self-directed learning Experience

Topic: **Date:**

Signature of Teacher-in- charge

Section 2

Reflection on AETCOM Module – 2.5

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM Module – 2.6

Topic: **Date:**

Signature of Teacher-in- charge

Reflection on AETCOM Module - 2.7

Topic: **Date:**

Signature of Teacher-in- charge

Section 3

Section 3A: Attendance Record of the Student

S. No	Term	Theory (%)	Practical (%)	Signature of student	Signature of Teacher
A	I Term				
B	II Term				
C	III Term				
D	Overall attendance				

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

SECTION 3B: Details of attending extra classes [For poor attendance (if any)]

S. No	Date	Period	Total hours	Signature of Student	Signature of Teacher
Total hours					

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.

Section 4
Records of Internal Assessment Examinations

Sr. No	Exam no	Theory	Practical including Viva	Signature of student	Signature of Teacher
1	I Internal Assessment	/50	/50		
2	II Internal Assessment	/50	/50		
3	III Internal Assessment	/200	/100		
4	Internal assessment (1+2+3)	/100	/100		
5	Betterment exam (If Any)	/200	/100		
6	Final Internal Assessment	/100	/100		

Note: Above information is for the benefit of students and parents. In case of any discrepancy departmental record will be treated as final.