अखिल भारतीय आयुर्विज्ञान संस्थान नागपुर
ALL INDIA INSTITUTE OFMEDICAL SCIENCES, NAGPUR
Address: Plot No2, Sector 20, MIHAN, Nagpur-441108
Department of Microbiology

Course Outcomes: II M B B S MICROBIOLOGY.

A MBBS student at the end of training in Microbiology will be able to:

1. Enlist pathogenic micro-organisms and describe the pathogenesis of the diseases produced by them
2. State the methods of laboratory diagnosis of the infective pathogens
3. Apply that knowledge in the diagnosis, treatment, prevention and control of communicable diseases caused by microorganisms.
4. State the infective and commensal micro-organisms of the human body and describe the host parasite relationship.
5. State or indicate the modes of transmission of pathogenic and opportunistic organisms and their sources, including insect vectors responsible for transmission of infection.
6. Describe the structure and function of the immune system and understand the serodiagnosis of various infections.
7. Describe immune mechanisms, types of immune response, normal and abnormal immune response in relation to hypersensitivity, autoimmunity, immunodeficiency disorders, and immunohematology.
8. Describe the immunoprophylaxis for prevention and management of various diseases
9. Acquire knowledge on suitable antimicrobial agents for treatment of infection, describe the different mechanisms of antimicrobial resistance and scope of immunotherapy
10. Apply methods of disinfection and sterilization to control and prevent hospital and community acquired infections
11. Recommend laboratory investigations regarding bacteriological examination of food, water, milk and Air.
12. Understand laboratory diagnosis of various infectious diseases including proper sample collection techniques and transport and laboratory work flow to be followed.
13. Understand the various emerging and re-emerging infectious diseases.

Curriculum: BROAD Plan:

Total number of teaching slots required for Department of Microbiology

Sr. No.	Modality	First term	Second term	Third term	Total
1	**Lectures**	33	47	30	110
2	**Tutorial**	5	5	5	15
3	**Integrated**	5	5	5	15
4	**SDL**	2	2	2	6
5	**Practical**	15	20	8	43
6	**Grand Total**	60	79	50	189

Curriculum for Microbiology:

Sr. No.	**Topic :** General Microbiology	Lecture topics	Lectures	Method	TUTORIAL	Practical	Integrated
1	Introduction to Microbiology	Historical background Microorganism as cause disease	1	Lecture &SGD		1	
2	Morphology and Physiology of Bacteria	Microscopy & Staining techniques Growth and multiplication of bacteria and nutrition	2	Lecture &SGD		4	
3	Sterilization and disinfection	Physical methods of sterilization Chemical methods of sterilization	2	Lecture &SGD	1	2	1
4	Growth requirement of bacteria	Culture media	1	Lecture &SGD		1	
5	Isolation of bacteria	Collection & transport of sample Culture methods Identification of bacteria	2	Lecture &SGD	1	4	
6	Genetics	Bacterial genetics Antimicrobial	3	Lecture &SGD	1	1	1

		resistance and susceptibility testing					
7	Microbial pathogenicity	Infection	1	Lecture &SGD			
8	Serodiagnosis of infectious diseases	Antigen – antibody reaction	2	Lecture &SGD	1	2	
9	Complement system	Complement	1	Lecture &SGD			
10	Introduction to Immunology	Immunity Antigen Antibody	3	Lecture &SGD	1		
11	Immune system	Structure and function of immune system Immune response	3	Lecture &SGD			1
12	Immune response	Hypersensitivity Autoimmunity	3	Lecture &SGD			1
13	Immunology	Immunodeficiency disorders	1	Lecture &SGD			
14	Immunology	Immunoprophylaxis Transplant and cancer immunology	2	Lecture &SGD		1	1
15	Systemic Bacteriology-Gram positive cocci	Staphylococcus Streptococcus and Enterococcus Pneumococcus	3	Lecture &SGD	1	2	1
16	Systemic Bacteriology-Gram negative cocci	Neisseria and Moraxella	1	Lecture &SGD		1	1
17	Systemic Bacteriology-Gram positive bacilli	Corynebacterium Bacillus Anaerobes I Anaerobes II Nonsporing Anaerobes Mycobacteria I Mycobacteria II M. leprae Miscellaneous Gram positive bacilli	9	Lecture &SGD	2	5	1
18	Systemic Bacteriology-Gram negative bacilli	Enterobacteriaceae I Enterobacteriaceae II Vibrio and aeromonas Pseudomonas and other Non fermenters Haemophilus and HACEK Group	9	Lecture &SGD	1	4	

		Bordetella Brucella Miscellaneous Gram negative bacilli I Miscellaneous Gram negative bacilli II					
19	Systemic Bacteriology – other group of bacteria	Spirochetes I Spirochetes II Rickettsiae, Coxiella and Bartonella I Rickettsiae, Coxiella and Bartonella II Chlamydia Mycoplasma and Ureaplasma	6	Lecture &SGD		1	
20	Parasitology	Introduction to Parasitology Laboratory diagnosis of parasitic infections	2	Lecture &SGD		1	
20	Protozoa	Intestinal protozoa I Intestinal protozoa II Free living amoeba Intestinal genital flagelletes	4	Lecture &SGD	1	1	
21	Haemoflagellates	Leishmania Trypanosomes	2	Lecture &SGD		1	1
22	Sporozoa	Malaria Toxoplasma	2	Lecture &SGD		1	
23	Sporozoa	Opportunistic sporozoa	1	Lecture &SGD			
24	Cestodes	Introduction to cestodes Taenia Echinococcus	2	Lecture &SGD		1	
25	Trematodes	Introduction Schistosomes Fasciola Other trematodes	2	Lecture &SGD		1	
	Nematodes	Introduction Intestinal Nematodes Tissue Nematodes Somatic nematodes of lower animals	4	Lecture &SGD		1	1
26	Virology	Introduction to virology Laboratory diagnosis of viral infections	2	Lecture &SGD		2	
27		Bacteriphage	1	Lecture &SGD			
28		Herpes viruses	1	Lecture &SGD			
29		Myxoviruses I	1	Lecture			

		(Orthomyxovirus)		&SGD			
30		Myxoviruses II (Paramyxovirus) and Rubella	1	Lecture &SGD			
		Picornavirus (Polio)	1	Lecture &SGD			
		Arbovirus I (Fever-arthritis)	1	Lecture &SGD	1		
		Arbovirus II (Fever Hemorrhagic)	1	Lecture &SGD			
31		Rhabdovirus	1				
32		HIV	2	Lecture &SGD		1	1
33		Hepatitis viruses	2	Lecture &SGD		1	1
34		Slow viruses and Prion disease	1	Lecture &SGD			
35		Oncogenic virus	1	Lecture &SGD			
36		Miscellaneous-I (Filovirus, Hantavirus, Lassa)	1	Lecture &SGD	1		
37	Mycology	General Mycology& Superficial Mycosis	1	Lecture &SGD		2	
		Subcutaneous Mycosis	1	Lecture &SGD			
		Systemic mycosis	1	Lecture &SGD		1	
		Opportunistic Mycosis	1	Lecture &SGD		1	
38	Syndromic Diagnosis	Urinary tract infections	1	Lecture &SGD			1
		Blood stream infections	1	Lecture &SGD			1
		Diarrheal diseases	1	Lecture &SGD			
		CNS inections (Meningitis,Encephalitis	1	Lecture &SGD	1		

		Respiratory tract infections (URTI,LRTI)	1	Lecture &SGD			
		FUO	1	Lecture &SGD	1		
		Sexually transmitted infections	1	Lecture &SGD	1		1
		Skin and soft tissue infections	1	Lecture &SGD			
39	Applied Microbiology	Zoonotic infections	1	Lecture &SGD			
		Emerging and Remerging Infections	1	Lecture &SGD			
		Hospital acquired infections and its prevention	1	Lecture &SGD			1
		Bacteriology of water , milk air	1	Lecture &SGD			

Microbiology curriculum: 2019-20 Batch

Batch	lectures	Practical	Tut	Integrated	SDL	Total classes/wk alloted	Total number of teaching slots required	Total Hrs needed
2118-19	72	22	12	12		5+1 alt wk		140
2119-20	110	43(2 Hrs)	15	15(2 Hrs)	6	-	189	247

Term-wise : List of Lectures

S N	Topic	L No	Lecture topics
1	General Microbiology	1 2 3 4	Introduction to Microbiology Introduction to Virology Introduction Mycology Introduction to Parasitology
2	Morphology and physiology of bacteria	5	Microscopy & Staining techniques Growth, multiplication and nutritionof bacteria
3	Sterilization and Disinfection	6 7	Physical methods of sterilization Chemical methods of sterilization and disinfection
4	Growth requirement and isolation of bacteria	8 9 10	Culture media Culture methods Identification of bacteria
5	Genetics	11 12 13	Bacterial genetics I Bacterial genetics I Antimicrobial resistance and susceptibility testing
6	Microbial pathogenecity	14	Infection
7	Immunology	15 16 17 18 19 20	Immunity Antigen Antibody Antigen -Antibody reaction I Antigen -Antibody reaction II Complement system
8	Immune System	21 22 23 24 25 26 27 28 29	Structure and function of immune system Immune response I Immune response II Hypersensitivity I Hypersensitivity II Autoimmunity Immunodeficiency diseases Imunoprophylaxis Transplant and Cancer immunology
9	Applied Microbiology	30	Sample collection and transport Biomedical waste management Bacteriology of water, air , milk and food Recent advances in diagnostic microbiology
10		31 32 33	
	Lectures First Term	**33**	
SECOND TERM			
11	Bacteriology - Gram positive cocci	34 35 36	Staphylococci Streptococci I Streptococci II
12	Gram Negative cocci	37	Neisseria and Moraxella
13	Gram positive bacteria	38	Corynebacterium

		39 40 41 42	Bacillus Clostridium Anaerobes Non sporing anaerobes & Miscellaneous Gram positive bacilli
14	Acid fast bacteria	43 44 45	Mycobacterium Tuberculosis Non tuberculous Mycobacteria M. Leprae
15	Enterobacteriaceae	46 47 48 49	Coliforms Salmonella Shigella Vibrio and aeromonas
16	Nonfermenters	50 51	Pseudomonas and other nonfermenters Miscellaneous Gram negative bacilli I
17	Gram negative bacilli	52 53 54 55 56	Haemophilus and HACEK Group Bordetella Brucella Miscellaneous Gram negative bacilli II
18	Gram negative bacilli	57 58 59 60 61	Spirochetes I Spirochetes II Rickettsiae Chlamydia Mycoplasma and Ureaplasma
19	Parasitology	62 63	Introduction to Parasitology Laboratory diagnosis of parasitic infections
20	Protozoa	64 65 66	Intestinal protozoa I Intestinal protozoa II Free living amoeba&Intestinal genital flagelletes
21	Haemoflagellates	67 68	Leishmania Trypanosomes
22	Sporozoa	69 70 71 72	Malaria I Malaria II Toxoplasma Opportunistic sporozoa
23	Cestodes	73 74	Introduction &Taenia , H. nana Echinococcus & other cestodes
24	Trematodes	75 76	Introduction&Schistosomes Hepatic & other trematodes
25	Nematodes	77 78 79 80	Introduction &Intestinal Nematodes I Intestinal Nematodes II Tissue Nematodes Somatic nematodes of lower animals
	Second Term	**47**	
THIRD TERM			

26	Virology	81 82	Introduction to virology Laboratory diagnosis of viral infections
		83	Bacteriphage
		84	Herpes viruses I Herpes viruses II & Adenovirus
		85	Myxoviruses I (Orthomyxovirus)
		86	Myxoviruses II (Paramyxovirus) and Rubella
		87	Picornavirus (Polio)
		88	Arbovirus I (Fever-arthritis)
		89	Arbovirus II (Fever Hemorrhagic)
		90	Rhabdovirus
		91	Hepatitis viruses I Heptitis viruses II
		92	HIV Laboratory diagnosis of HIV
		93	Slow viruses and Prion disease
		94	Oncogenic virus
		95	Miscallaneous viruses
27	Mycology	96	General Mycology&Superficial Mycosis
		97	Subcutaneous Mycosis
		98	Systemic Mycosis I
		99	Opportunistic Mycosis
28	Clinical Syndromes	100	Urinary tract infections
		101	Blood stream infections
		102	Diarrheal diseases and food poisoning
		103	CNS infections
		104	Respiratory tract infections
		105	Pyrexia of Unknown origin
		106	Sexually transmitted infections
		107	Skin and soft tissue infections
		108	Emerging and Remerging Infections
		109	Zoonotic infections
		110	Hospital acquired infections and its prevention
	Lectures in Third Term	**30**	

List of Practicals :

S. No	Name of exercise	Page No	Date	Remarks & Signature
First Term				
1	Introduction to Microbiology laboratory			
2	Microscopy			
3	Morphology of bacteria- I			
4	Morphology of bacteria- II			
5	Gram staining			
6	Albert Staining			
7	Sample Collection and transport			
8	Sterilization & disinfection			
9	Culture media			
10	Culture methods			
11	Identification of bacteria			
12	Antibiotic susceptibility testing			
Second Term				
13	Antigen antibody reactions			
14	Staphylococcus-I			
15	Streptococcus-I			
16	Streptococcus-II			
17	Neisseria			
18	Corynebacterium			
19	Mycobacterium tuberculosis and NTM			
20	Ziehl-Neelsen (ZN) Staining			
21	Mycobacterium leprae			
22	Anaerobes			
23	Enterobacteriaceae (E. coil, Klebsiella, Proteus)			
24	Salmonella			
25	Shigella			
26	Vibrio cholerae			
27	Pseudomonas and Hospital acquired infections			
28	Spirochaetes			
Third Term				
29	Laboratory diagnosis of viral infections			
30	Stool examination			
31	Entamoeba histolytica			

32	Giardia lamblia			
33	Leishmania			
34	Plasmodium			
35	Intestinal coccidian parasites			
36	Cestodes			
37	Trematodes			
38	Intestinal Nematodes			
39	Tissue Nematodes			
40	Introduction to mycology			
41	Immunoprophylaxis of infectious diseases			
42	Biomedical waste management			

Tutorial topics

Sr. Number	Topic
1	**First Term**
	Sterilization Disinfection
2	Isolation of Bacteria
3	Bacterial Genetics
4	Serodiagnosis of Infectious diseases
5	Immunology
	Second Term
6	Gram positive microorganisms
7	Gram posititve bacilli
8	Enterobacteriaceae
9	Mycobacteria
10	Protozoa
	Third Term
11	Viral haemorrhagic fever
12	Lab diagnosis of Sexually transmitted infections
13	Pyrexia of unknown origin & Blood culture
14	CNS infections and CSF examination
15	Emerging viral infections

Integration topics

Sr. no.	Topic	Integration with department	Type of integration
First Term			
1	Sterilization and disinfection	General Surgery	Vertical
2	Methods of antimicrobial susceptibility testing and monitoring of antimicrobial therapy and mechanisms of drug resistance	Pharmacology	Horizontal
3	Mechanisms of immunity and response of the host immune system to infections	Pediatrics, Pathology	Both
4	Immunological basis of vaccines and Universal Immunisation schedule.	Pediatrics	Vertical
5	Immunological mechanisms in immunological disorder (hypersensitivity, autoimmune disorders and immunodeficiency states) and the laboratory methods used in detection.	Pediatrics, Pathology	Vertical
Second Term			
6	Rheumatic Heart Disease & infective Endocarditis	General Medicine, Pathology	Both
7	Microbial agents causing anemia – their morphology, mode of infection and pathogenesis, clinical course, diagnosis and prevention and treatment.	General Medicine, Pathology	Both
8	Infections of genitourinary system	General Surgery	Vertical
9	Pulmonary and Extrapulmonary Tuberculosis	General Medicine, Pathology	Both
10	Sexually transmitted infections	Dermatology, Venereology & Leprosy, Obstetrics & Gynaecology	Vertical
Third Term			
11	Viral hepatitis with emphasis on viral markers	General Medicine, Pathology	Both
12	Opportunistic infections (OI)	General Medicine, Pathology	Both
13	Urinary tract infections	General Medicine	Vertical
14	Healthcare Associated Infections (HAI) and methods for prevention	General Medicine, Community Medicine	Vertical
15	Rheumatic fever and its diagnosis	General Medicine, Pathology	Both

Text books for Microbiology

1. Textbook of Microbiology , Ananthnarayan and Panikar
2. Essentials of Medical Microbiology ,Apurba Sastry , Sandhya Bhat
3. Parasitology (Protozoology and Helminthology) K.D. Chatterjee
4. Essentials of Medical Parasitology, Apurba sastry
5. Textbook of Microbiology C.P.Baveja
6. Textbook of Medical Microbiology P Chakrabourty
7. Textbook of Medical Parasitology Paniker
8. Textbook of Medical Parasitology SC Parija
9. Medical Parasitology Dr R Arora & Brijbala Arora

Reference books

1. Medical Microbiology ,Greenwood Slack, Peutherer
2. Jawetz, Melnick and Adelberg's Medical Microbiology .Geo F. Brooks, Stephen A. Morse, JanetS. Butel
3. Bailey's and Scott's Diagnostic Microbiology, Patricia M. Tille
4. Mackie & Mccartney Practical Medical Microbiology JG Collee, AG Frase (editior)
5. Textbook of Medical Mycology J C Chander
6. Textbook of Immunology, Janis kuby
7. Essentials Hospital infection control , Apurba Sastry Deepashri R