



SANTOSH
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Curriculum for M.Sc. Medical Microbiology



Programme Objectives:

- 1) Establish functioning Microbiology laboratory in the hospitals and community specially in field of Bacteriology, Immunology, Serology, Mycology, Parasitology, Virology ,TB lab and HIC lab.
- 2) To provide the basic knowledge and diagnostic skill in field of microbiology through field activity etc
- 3) To train the students about calibration, maintenance of equipments and instruments used in microbiology to provide quality results.
- 4) To train the students for working principle and various troubleshooting condition during working in lab.
- 5) Able to perform various microbiological tests and interpret it correctly.
- 6) Able to Collect the information from available microbiology resources and increase knowledge in field with use of technology and library.
- 7) Able to do good research in microbiology field and appropriate data collection with analysis also with presentation of research work.
- 8) Able to teach the undergraduate allied health sciences students to improve theoretical and practical knowledge and skills.
- 9) At the end of program have good knowledge, skills, attitude by self directed learning.
- 10) Able to work in team so can learn management of various situation in medical field
- 11) Able to plan, execute and analyze the Research results, and can pursue later on for higher studies as PhD.
- 12) To train the students about basic knowledge of Hospital infection control program, Biomedical waste management and molecular biology in health care facility.

Sem.	Course code	Course type	Title of the Course	Hours per Week				Course Credit
				L*	T*	P*	Total	
I	Office Use	DSCC-I	Anatomy	4			4	4
I	Office Use	DSCC-II	Physiology	4			4	4
I	Office Use	DSEC-I	Biomedical waste management	3			3	3
I	Office Use	DSCP-I	Anatomy -P			4	4	2
I	Office Use	DSCP-II	Physiology-P			4	4	2
I	Office Use	DSEP-I	Biomedical waste management			4	4	2
I	Office Use	CP-I	Clinical Practice – Hospital/RHTC/UHTC				8	--
I	Office Use	TLR-I	Seminar/ journal club /Group Discussion				3	--
TOTAL							34	17
II	Office Use	DSCC-III	Biochemistry	4			4	4
II	Office Use	DSCC-IV	General Microbiology	4			4	4
II	Office Use	DSEC-II	Health care associated infections	3			3	3
II	Office Use	DSCP-III	Biochemistry-P			4	4	2
II	Office Use	DSCP-IV	General Microbiology -p			4	4	2
II	Office Use	DSEP-II	Health care associated infections	4			4	2
II	Office Use	CP-II	Clinical Practice- Hospital lab/RHTC/UHTC				8	--
II	Office Use	TLR-II	Seminar/ journal club /Group Discussion				3	--
TOTAL							34	17
III	Office Use	DSCC-V	Pharmacology	4			4	4
III	Office Use	DSCC-VI	Immunology	4			4	4
III	Office Use	DSEC-III	Genomics	3			3	3
III	Office Use	GEC-I	Biostatistics, General psychology, yoga and stress management, introduction to entrepreneurship (LINCOIN UNI.), Basic of aviation science (ANY ONE ONLY)				3	3

III	Office Use	DSCP-V	Pharmacology- P			4	4	2
III	Office Use	DSCP-VI	Immunology-P				4	2
III	Office Use	DSEP-III	Genomics			4	4	2
III	Office Use	PD-I	Project Work / Dissertation- DRC/RAC				4	--
III	Office Use	CP-III	Clinical Practice- Hospital lab/RHTC/UHTC				4	--
TOTAL							34	20
IV	Office Use	DSCC-VII	Systemic Bacteriology	4			4	4
IV	Office Use	DSCC-VIII	Mycology	4			4	4
IV	Office Use	DSEC-IV		-			3	3
IV	Office Use	GEC-II	Biostatistics, General psychology, yoga and stress management, introduction to entrepreneurship (LINCOIN UNI.), Basic of aviation science (ANY ONE ONLY)				3	3
IV	Office Use	DSCP-VII	Systemic Bacteriology-P			4	4	2
IV	Office Use	DSCP-VIII	Mycology-P			4	4	2
IV	Office Use	DSEP-IV					4	2
IV	Office Use	PD-I	Project Work / Dissertation				4	--
IV	Office Use	CP-IV	Clinical Practice				4	--
TOTAL							34	20
V	Office Use	DSCC-IX	Parasitology	4			4	4
V	Office Use	DSCC-X	Virology	4			4	4
V	Office Use	DSEC-V					3	3
V	Office Use	SEC-I	<SWAYAM / MOOCS / NPTEL / Institution offered courses- Basic of computer and IT skills, Big data analysis, Personality development etc (Any one)				2	2
V	Office Use	GEC-III	Biostatistics, General psychology, yoga and stress management, introduction to entrepreneurship (LINCOIN UNI.), Basic of aviation science (ANY ONE ONLY)				3	3
V	Office Use	DSCP-IX	Parasitology-P			4	4	2

V	Office Use	DSCP-X	Virology-P			4	4	2
V	Office Use	DSEP-V					4	2
V	Office Use	PD-I	Project Work / Dissertation				6	--
TOTAL							34	22
VI	Office Use	DSCC-XI	Applied Microbiology	4			4	4
VI	Office Use	DSCC-XII	Title of Core Paper to be filled				4	4
VI	Office Use	DSEC-VI					3	3
VI	Office Use	SEC-II	<SWAYAM / MOOCS / NPTEL / Institution offered Skill courses> BLS & ACLS [AHA Certified]				2	2
VI	Office Use	GEC-IV	Biostatistics, General psychology, yoga and stress management, introduction to entrepreneurship (LINCOIN UNI.), Basic of aviation science (ANY ONE ONLY)				3	3
VI	Office Use	DSCP-XI	Applied Microbiology-P			4	4	2
VI	Office Use	DSCP-XII	<Related to the Core Course opted>				4	2
VI	Office Use	DSEP-VI					4	2
VI	Office Use	PD-I	Project Work / Dissertation				6	12
TOTAL							34	34

L* - Lecture

T* - Tutorial

P* - Practical

DSCC – Discipline Specific Core Course - A Total of 12 Core courses required to be identified

DSCP – Discipline Specific Core Practical - Practical component of the respective Core Courses of the programme

DSEC – Discipline Specific Elective Course - A Pool of 8 - 10 Courses are to be identified and submitted with the Syllabi [These courses will be opted by the students of your discipline only]

DSEP – Discipline Specific Elective Practical - Practical component of the respective Elective Course selected by the students

GEC – Generic Elective Course - A pool of 6 papers required to be identified and submitted with the Syllabi [These courses will be opted by the students of Other Programme]



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SYLLABUS- SECOND SEMESTER

Title of the course : GENERAL MICROBIOLOGY Total Hours: 120 hours

Theory- 60 hours

Practical- 60 hours

Course Objectives:

Course Type: DSCC / DSEC / GEC

1. To have knowledge of basic microbiological concepts of General Microbiology
2. To have knowledge of various microscopic techniques & staining procedures
3. To have knowledge of various sterilization and disinfection techniques, culture media and culture techniques
4. To have knowledge of structure of microbes bacteria, fungus, virus and parasites
5. To have knowledge of microbiology of hospital environment, air, milk and water
6. To have knowledge of bacterial genetics
7. To have knowledge of antimicrobial susceptibility testing and Drug resistance

Lecture

Hours-60 hours

Unit – 1: History of Microbiology, Biosafety and various containment levels, Microscopy, sterilization, Disinfection
Hours: 10

Unit – 2: Morphology of Bacteria , fungus, parasites and viruses , Growth and nutrition of Bacteria, Normal flora of human body, Bacterial metabolism and classification of Bacteria, fungus, viruses and parasites
Hours-10

Unit – 3: Culture media, Culture techniques, Identification of Bacteria Biochemical test, Laboratory diagnosis of Bacteria, Fungus, parasites and viruses
Hours: 10

Unit – 4: Epidemiology of infectious diseases, Microbial Pathogenicity, Bacterial toxins, Bacteriocins, Plasmids and Bacteriophages
Hours: 10

Unit – 5: Microbiology of hospital Environment, microbiology of air, milk and water
Hours: 10

Practical-**Hours-60 hours**

S,no	Topic	Hours (total- 60 hours)
1	Microscopy- care, maintenance and use of microscope	02
2	Staining techniques- Gram stain, AFB stain, Albert stain, KOH mount, India Ink	10
3	Collection and transport of specimens	04
4	Media preparation- Blood agar, MacConkey agar, CLED, MHA SDA etc	06
5	Plating of clinical samples on media for isolation, identification and quantification	04
6	Preparation of reagents and its quality control -oxidase, catalase test	04
7	Operation of autoclave, hot air oven, distillation plant and seitz filter and its maintenance	06
8	Washing of glasswares and sterilization	02
9	Care and maintenance of various laboratory instruments and equipments	04
10	Aseptic practices in lab and safety precaution	02
11	Test for motility- Hanging drop	02
12	Preparation of antibiotic disc and antibiotic sensitivity testing- Kirby Bauer method, E TEST etc	06
13	Bacteriological examination of water	02
14	Bacteriological examination of air	01

15	Bacteriological examination of milk	01
16	Anaerobic culture techniques	02
17	Maintenance and preservation of stock cultures	02
	Total	60 hours

Learning Outcomes: Students must know at the end

1. Contribution of Antony von Leeuwenhoek, Robert Koch, Louis Pasteur, Joseph Lister,
2. Definition of Sterilization, disinfection and asepsis, Physical and chemical methods, Hot air oven and Autoclave and its controls, Filtration and Radiation as other physical method of sterilization techniques,
3. Disinfectants used in health care settings and Spaulding classification of Disinfectants and Disinfectants testing
4. List of types, composition of culture media along with differences between enriched, enrichment, selective, differential media, indicator media along with their examples
5. Principles, methods and use of various anaerobic culture media and techniques for anaerobic culture of bacteria
6. Principles, interpretation and examples of various biochemical tests as positive and negative tests for various bacteria
7. Definition of saprophytes, parasite, commensals, pathogen, Types of infection and their definition, Carrier, modes of transmission and their examples, Difference between exotoxin and endotoxin
8. Bacteriocins, plasmids and Bacteriophage
9. Test usually employed for water bacteriology, bacteriological examination of milk and settle plate culture and slit sampler method used for bacteriology of air
10. Different HAIs- modes of transmission, common HAIs and associated organisms, Diagnosis, control and prevention of HAIs.
11. Types of mutation, principles and uses of various methods of gene transfer, resistance transfer factor and role in drug resistance, Difference between mutational and transferable drug resistance, Principles and application of genetic engineering, DNA probes, PCR, Gene therapy and its importance
12. List of Antimicrobial sensitivity tests, Diffusion and Dilution method, Kirby bauer and Stokes disc diffusion method, Modified Stokes disc diffusion method, E test, MIC and MBC

References:

1. Essential of Medical Microbiology, Second Edition, Apurba S Sastry, Sandhya Bhatt
2. Text book of Microbiology, 6th edition, Dr.C. P.Baveja

Unit-5: Transplantation and tumor immunity, HLA typing and MHC

Hours-10

Unit-6 Vaccine and immunoprophylaxis , Immunohematology

Hours-10

Practical-

Hours-60 hours

S.no	Topic	Hours (60)
1	Collection of blood by venipuncture, separation of serum and Plasma, storage	10
2	RA test	02
3	CRP test	02
4	Widal test	04
6	RPR test	04
7	ASO test	02
8	Point of care test- Tri dot, ICT	06
9	ELISA- HIV, HCV, HBsAg	10
10	HIV, HBsAg, HCV test	04
11	Dengue test	04
12	Malaria card test	04
13	Syphilis card test	04
14	Covid antigen test	02
15	Agarose gel electrophoresis	02
	Total	60 hours

Learning Outcomes: Students must know at the end

- 1) Innate and Acquired immunity, Herd immunity and its role, Active and Passive immunity
- 2) Types of antigen, Forssman and superantigen

- 3) Definition, structure of immunoglobulin and properties of IgM, IgG, IgA, IgE and IgD
- 4) Precipitation and agglutination reaction, Difference between both and their use-RA, CRP, Widal, ASO, RPR, VDRL etc
- 5) Principle of RIA, CLIA, ELISA, IFT etc and their uses
- 6) Components of complement, steps in classical and alternate pathway, Biological activity of complement and complement deficiency syndrome
- 7) Tcells and Bcells properties and their role, Killer cells Cluster differentiation CD
- 8) HLA antigen and HLA complex
- 9) Primary and secondary humoral response, principle, techniques and application of monoclonal antibody, Cytokines and their function, immunological tolerance
- 10) Primary and secondary immune deficiency diseases
- 11) Different types of Hypersensitivity reactions Type-I, Type II, Type-III and Type-IV mechanism and their examples, Difference between immediate and delayed type of Hypersensitivity reaction
- 12) Types of transplant, Histocompatibility antigen, Graft versus and Host reaction, Immunosurveillance
- 13) Rh blood group system, infectious agent transmitted by blood

References:

- 1) Essential of Medical Microbiology, Second Edition, Apurba S Sastry, Sandhya Bhatt
- 2) Text book of Microbiology ,6th edition, Dr. C. P. Baveja
- 3) Konneman Diagnostic Microbiology
- 4) Text book of Immunology by KUBY
- 5) Indian journal of medical microbiology



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SYLLABUS- FOURTH SEMESTER

Title of the course : Systemic Bacteriology Total Hours: 120 hours

Lecture(Theory)- 60 hours

Practical- 60 hours

Course Objectives:

Course Type: DSCC / DSEC / GEC

- 1) To teach basic microbiological concepts related to Systemic Bacteriology
- 2) To teach individual Bacterial pathogen its morphology, virulence factor, pathogenesis, clinical presentation special emphasis on laboratory diagnosis and treatment.
- 3) To teach about Gram positive cocci including Staphylococcus and Streptococcus genus
- 4) To teach about Gram negative cocci including Neisseria, Morexella
- 5) To teach about Gram positive bacilli Corynebacterium, Bacillus, Anaerobes (clostridium and nonsporing anaerobes), Mycobacteria (M. tuberculosis and non tubercular mycobacteria and M. leprae) and miscellaneous GPB
- 6) To teach about Gram negative bacilli Enterobacteriaceae -I E. coli, Klebsiella, Proteus and others, Enterobacteriaceae -II Salmonella, Shigella, Vibrio, Pseudomonas, Hemophilus, Bordetella, Brucella and miscellaneous Campylobacter. H. pylori, Bacterial vaginosis
- 7) Other group of bacteria spirochetes, Rickettsia, Chlamydia, Mycoplasma and Ureaplasma

LECTURE-

Hours-60 hours

Unit – 1: Gram positive cocci-Staphylococcus, Streptococcus, Enterococcus and Pneumococcus Hours: 10

Unit – 2: Gram Negative cocci- Neisseria N. gonorrhoeae, N. meningitidis, Morexella Hours-10

Unit- 3: Gram Positive Bacilli – Corynebacterium, Bacillus, Anaerobes (clostridium and nonsporing anaerobes), Mycobacteria (M. tuberculosis, M. leprae,

Nontuberculous mycobacteria), Miscellaneous- Actinomycetes, Listeria, Erysipelothrix Hours : 15

Unit – 4: Gram negative Bacilli- Enterobacteriaceae -I E. coli, Klebsiella, Proteus and others, Enterobacteriaceae -II Salmonella, Shigella, Vibrio, Pseudomonas, Hemophilus, Bordetella, Brucella and miscellaneous Campylobacter. H. pylori, Bacterial vaginosis Hours- 15

Unit – 5: Other group of bacteria spirochetes, Rickettsia, Chlamydia, Mycoplasma, Bartonella Hours- 10

Practical-

Hours-60 hours

S.no	Topic	Hours (60)
1	Collection of samples urine pus sputum, aspirates etc	10
2	Processing of samples – Culture and AST	10
3	Gram positive cocci- Staphylococcus, Streptococcus- S. pyogenes, Enterococcus, Pneumococcus	10
4	Gram Negative cocci- Neisseria	06
5	Gram positive bacilli- C. diphtheriae, Clostridium species	06
6	Gram negative bacilli- E. coli, Klebsiella, Proteus, Salmonella, Pseudomonas	12
7	Spirochetes	06
	Total	60 hours

Learning Outcomes: Students must know at the end

- 1) Morphology, culture character, toxin and enzymes diseases caused by Staphylococcus aureus, laboratory diagnosis of infection caused by S. aureus, CONS, Meningococci and MRSA
- 2) Classification, morphology, culture character, toxin and enzymes, infections caused by S. pyogenes, nonsuppurative complication and lab diagnosis of S. pyogenes
- 3) Group B streptococci, Morphology, culture characteristics, infection caused by pneumococcus and laboratory diagnosis, Pneumococcal vaccine

- 4) Morphology, culture character, toxin and enzymes diseases caused by Staphylococcus aureus, laboratory diagnosis of infection caused by Neisseria gonorrhoeae and N. meningococcus
- 5) Morphology, culture character, toxin and enzymes diseases, laboratory diagnosis of infection caused by C. diphtheriae, DPT vaccine and Antidiphtheric serum, Schick test
- 6) Morphology, culture character of B. anthracis, Lab diagnosis of Anthrax
- 7) Morphology, culture character, toxin and enzymes diseases caused by various clostridium species C. perfringens, C. tetani, C. botulinum along with lab diagnosis Nagler reaction
- 8) Nonsporing anaerobes
- 9) Classification, Morphology, culture character, toxin and enzymes diseases, infection caused by various bacteria, laboratory diagnosis of infection caused by E. coli (Diarrhoeal E. coli, Klebsiella, Proteus, Salmonella (Enteric fever), Phage typing, UTI etc.
- 10) Morphology, culture character, toxin and enzymes diseases caused by Vibrio cholerae, lab diagnosis, Halophilic vibrio, Non agglutinating vibrio etc.
- 11) Morphology, culture character, toxin and enzymes diseases caused & lab diagnosis of P. aeruginosa
- 12) Morphology, culture character, toxin and enzymes diseases caused & lab diagnosis of B. pertussis,
- 13) Morphology, culture character, toxin and enzymes diseases caused & lab diagnosis of H. influenzae, Satellitism
- 14) Morphology, culture character, diseases caused & lab diagnosis of M. tuberculosis, M. leprae and NTM, Koch phenomenon, BCG vaccine
- 15) Morphology, diseases caused & lab diagnosis of T. pallidum, VDRL, RPR
- 16) Miscellaneous bacteria

References:

- 1) Essential of Medical Microbiology, Second Edition, Apurba S Sastry, Sandhya Bhatt
- 2) Text book of Microbiology ,6th edition, Dr. C. P.Baveja
- 3) Konneman Diagnostic Microbiology
- 4) Text book of Microbiology by Ananthnarayan
- 5) Practical Medical Microbiology by Mackie and McCartney
- 6) Indian journal of medical microbiology

SYLLABUS- FOURTH SEMESTER

Title of the course : Mycology

Total Hours: 120 hours

Lecture(Theory)- 60 hours

Practical- 60 hours

Course Objectives:

Course Type: DSCC / DSEC / GEC

1. To teach basic microbiological concepts related to Mycology
2. To teach basic knowledge about fungi morphology, classification, reproduction, laboratory diagnosis, classification of fungal diseases, opportunistic mycosis and other clinical presentation such as otomycosis, Keratomycosis and Mycotic poisoning

LECTURE-

Hours-60 hours

Unit – 1: General character, classification, morphology, reproduction, isolation and identification of fungi, Tissue reaction to fungi, Lab diagnosis of fungal infections, Classification of fungal diseases

hours 10

Unit – 2: Superficial mycosis- Tinea versicolor, Tinea nigra, Piedra, Dermatophytes hours 10

Unit–3: Subcutaneous mycosis Mycetoma, Chromomycosis, Sporotrichosis, Rhinosporidiosis hours 10

Unit-4: Systemicmycosis
Histoplasma,Blastomyces,Paracoccidioides,Coccidioides,Cryptococcus 15
hours

Unit – 5: Opportunistic mycosis- candida, Aspergillus, Mucormycosis, Pencillois, Pneumocystis, other clinical condition, Otomycosis, Keratomycosis, Mycotic poisoning 15 hours

Practical-**Hours-60 hours**

S.no	Topic	Hours- 60
1	General introduction to mycology	05
2	KOH MOUNT	05
3	LPCB	05
4	Media preparation SDA, Dermatophyte media, Corn meal agar etc	10
5	Slide culture technique	05
6	Gram stain – candida	05
7	Germ tube test	05
8	India ink for Cryptococcus	05
9	LPCB- Aspergillus, Mucor, Rhizopus, Penicillium etc	15
	Total	60 hours

Learning Outcomes: Students must know at the end

- 1) Definition, classification, lab diagnosis of fungal infections,
- 2) Causative agent of Ectothrix and endothrix, dermatophytes, mycetoma, dimorphic fungi, systemic mycosis
- 3) Histoplasmosis, Rhinosporidiosis, Cryptococcosis, Diseases caused by *C. albicans*, Aspergillosis, Mucormycosis, Zygomycosis, Penicillium Otomycosis, Mycotic keratitis, Mycotoxicosis etc.

References:

- 1) Essential of Medical Microbiology, Second Edition, Apurba S Sastry, Sandhya Bhatt
- 2) Text book of Microbiology ,6th edition, Dr. C. P. Baveja
- 3) Konneman Diagnostic Microbiology
- 4) Text book of Mycology Jagdish chander

5) Indian journal of medical microbiology

SYLLABUS FIFTH SEMESTER

Title of the course **Parasitology**

Total Hours: 120 hours

Lecture(Theory)- 60 hours

Practical- 60 hours

Course Objectives:

Course Type: **DSCC / DSEC / GEC**

1. To teach basic microbiological concepts related to Parasitology
2. To teach basic knowledge of Parasite, host parasite relationship, Classification Morphology, life cycle, pathogenesis, clinical presentation, laboratory diagnosis and treatment of common parasitic infection Protozoan and Helminths.

LECTURE-

Hours-60 hours

Unit-1 Introduction to Parasitology, classification of parasites, 15 Hours

Unit-2; Protozoan Parasite-

Entamoeba, Free living amoeba, Giardia, Trichomonas, Plasmodium, Leishmania, Cryptosporidium, Cystoisospora, Cyclospora, B, coli etc. 15 hours

Unit-3 - Platyhelminths

Cestodes -Tenia, D.latum, Echinococcus, Hymenolepis nana, Dipylidium etc
Trematodes- Schistosoma, Fasciola, Fasciolepis etc 15 hours

Unit -4 Nematodes

Trichuris trichura, Trichinella, Ascaris lumbricoides, Ancylostoma, Nector, Filarial worms, Dracunculus etc. 15 hours

PRACTICAL

HOURS 60 hours

Sno	Topic	Hours
1	Stool collection, transport and processing for ova and cyst	10

2	Concentration techniques for stool samples- saline flotation and Formal ether concentration method	10
3	Stool examination for normal stool finding	05
4	Stool for ova and cyst examination- EH, Giardia, Coccidian parasite, tenia, Hnana, Ascaris, Trichuris, Ancylostoma, Enterobius etc.	10
5	Peripheral smear Giemsa stain Thick and Thin smear examination for Plasmodium	05
6	Peripheral smear examination- Microfilaria	10
7	LD bodies slide/ Coccidian parasite slide	10
	Total	60 hours

Learning Outcomes: Students must know at the end

- 1) Common definition in parasitology, classification, Morphology, epidemiology, life cycle. clinical presentation of protozoan, cestodes, trematodes and nematodes
- 2) lab diagnosis of medically important parasites such protozoan, cestodes, trematodes and nematodes

References

- 1) Text Book of Medical Parasitology Dr, S C Parija
- 2) Text Book of Parasitology 13th ed K. D. Chatterjee
- 3) Text book of Parasitology D. R. Arora
- 4) Practical Medical Microbiology by Mackie and Mc Cartney

SYLLABUS FIFTH SEMESTER

Title of the course : VIROLOGY

Total Hours: 120 hours

Lecture (Theory)- 60 hours

Practical- 60 hours

Course Objectives:

Course Type: **DSCC** / DSEC / GEC

- 1) To teach basic microbiological concepts related to Virology.
- 2) As it is the emerging field knowledge about newer viruses, epidemiology, clinical presentations along with their diagnosis and treatment is necessary to be included in virology
- 3) To teach students Characteristics, Structure, Classification, Pathogenesis, Clinical Presentation and lab diagnosis and treatment of medically important viruses.

LECTURE-

Hours-60 hours

Unit-1: General properties of virus- Morphology, Nomenclature and classification Viral replication, virus genetic modification, virus host interaction, Lab diagnosis, treatment and immunoprophylaxis

Unit-2: DNA Virus: Herpes virus (Herpes simplex virus, Varicella zoster virus, Cytomegalovirus, Epstein Barr virus and others)

Unit-3: Other DNA virus- Parvoviridae, Papilloma viridae, Polyomaviridae, Poxviridae, Adenoviridae, and Bacteriophage)

Unit-3: RNA virus: Myxovirus and Rubella virus (Orthomyxovirus (Influenza virus), Paramyxovirus virus (Parainfluenza, Mumps, Measles, Respiratory syncytial virus, Nipah virus and others)

Unit-4: RNA virus: Picornavirus (Polio virus, Coxsackievirus), Arbovirus (Chikungunya, Dengue, Japanese encephalitis, yellow fever, Zika virus, Kyassanur forest disease virus etc), Rhabdovirus (Rabies), HIV and other retrovirus

Unit-5 : Miscellaneous viruses- Rodent borne (Hanta virus, Arenavirus), Filovirus (Ebola, Marburg), Corona virus, Slow virus, Rota virus and other gastroenteritis and Bornavirus

Unit -6: Other Group – Hepatitis viruses, Oncogenic viruses

Practical-**Hours-60 hours**

S.no	Topic	Hours
1	Isolation of virus- Animal inoculation	10
2	Isolation of virus- Egg inoculation	10
3	Isolation of virus- Tissue culture	10
4	Preparation of glassware for tissue culture (Washing sterilizations)	05
5	Preparation of media like Hanks, MEM	05
6	Serological tests HIV, HBsAg, HCV, Dengue, Covid Ag etc.	15
7	Lyophilization	05
	Total	60 hours

Learning Outcomes: Students must know at the end

- 1) Morphology, classification, lab diagnosis of viral infection, immunoprophylaxis, list of DNA virus and RNA virus
- 2) Morphology, classification, infection caused by HSV-1 AND HSV-2 virus, EB virus, cytomegalovirus
- 3) Morphology, classification, lab diagnosis of Adeno, Pox, Papilloma, Polyoma virus
- 4) Morphology, classification, lab diagnosis of various RNA virus such as Influenza, Parainfluenza, Arbo virus, Rabies virus, and important vaccine for prophylaxis.
- 5) IMPORTANT OTHER VIRUS- Zika Nipah, Corona virus, Oncogenic virus, Hepatitis, HIV virus

References:

- 1) Essential of Medical Microbiology, Second Edition, Apurba S Sastry, Sandhya Bhatt
- 2) Text book of Microbiology, 6th edition, Dr.C. P.Baveja
- 3) Konneman Diagnostic Microbiology
- 4) Practical Medical Microbiology by Mackie and McCartney
- 5) Text book of Microbiology by Ananthnarayan
- 6) Indian journal of medical microbiology

SYLLABUS SIXTH SEMESTER

Title of the course : APPLIED MICROBIOLOGY

Total Hours: 120 hours

Lecture (Theory)- 60 hours

Practical- 60 hours

Course Objectives:

Course Type: **DSCC** / DSEC / GEC

- 1) To teach the details microbial concepts correlation in clinical field so need of moving form bench to clinical settings,
- 2) To teach the basic knowledge of HAI and its surveillance in health care facility, emerging and reemerging infections
- 3) To teach the important molecular techniques.

LECTURE

HOURS-60 hours

Unit-1: Quality management & Quality control in Microbiology

Total quality management including quality assurance & quality control

Accreditation of medical lab

Laboratory safety

Unit-2: Molecular Biology and Recent advances in diagnostic Microbiology-Molecular diagnostic method – Genetic engineering, DNA probes, PCR, Genetically modified organisms, Gene therapy, CRISPER, NGS, MALDI-TOF, GENEEXPERT etc, Molecular detection of organisms

Unit-3 Infective syndrome- Sore throat and Pneumonia, Urinary tract infection, Diarrhoeal diseases, Bacterimia, Septicemia and infective endocarditis, Pyrexia of unknown origin, Sexually transmitted infection, Wound infection

Unit-4 Emerging and reemerging infections, Vehicles and vectors, Biological warfare, Zoonotic diseases, laboratory acquired infections

Unit-5 Hospital acquired infections, Major HAI types and its surveillance, Biomedical waste management, Needle stick injury prevention and management, Environmental surveillance

PRACTICAL**HOURS-60 hours**

S.no	Topic	Hours
1	Visit to Blood Bank Sterility check	04
2	Visit to OT-OT STERILIZATIO	04
3	Visit to CSSD- Autoclave ,ETO sterilization and sterility check	04
4	Visit to ICU- infection control practices in ICU	04
5	Visit to Biomedical waste management department- Segregation of waste	04
6	Molecular techniques- BSL 2 Lab	04
7	ELISA- Immunology lab	08
8	HCV PCR- BSL-2 LAB	10
9	Donning and Doffing of PPE	06
10	Covid 19 test-Antigen, RT PCR	06
11	True nat TB test	06

COURSE OUTCOMES

1. To must know the clinical implication of microbiology
2. To must have knowledge of HAI
3. To must have knowledge of quality control and its assessment
4. To must have basic idea of molecular biology and automation

REFERENCES-

1. References:

- 1) Essential of Medical Microbiology, Second Edition, Apurba S Sastry, Sandhya Bhatt
- 2) Text book of Microbiology ,6th edition, Dr. C. P. Baveja
- 3) Konneman Diagnostic Microbiology
- 4) Practical Medical Microbiology by Mackie and McCartney
- 5) Text book of Microbiology by Ananthnarayan
- 6) Indian journal of medical microbiology
