Syllabus template MICROBIOLOGY SEMESTER VI

Semester: VI	
Course : Microbiology	
Paper code: C3MB230611T	**Credits: 4**
Hours/week : 4	
Category: Core/MDC/SEC/VAC : CORE (Major)	
Theory / Practical / Composite : Theory	
No of Modules : No Modules	

Course Overview: This course provides a comprehensive foundation in medical microbiology, covering pathogen identification, pathogenesis, and antimicrobial resistance. Students will learn this clinical science focusing on the study of pathogenic bacteria, viruses, fungi, and parasites, covering their, pathogenesis, diagnosis, and treatment of infectious diseases. The course combines theoretical knowledge with lab diagnostics—including microscopy, culture, and molecular techniques—to detect pathogens and manage infections.

Course Outcome:

1. **Remember** the concepts of microbial physiology and learn the normal microflora of human body and diversion of normal microflora to bacterial pathogenesis.
2. **Understand** the process of bacterial invasion and replication within host cells, and also bacterial interference with host cell signalling pathways.
3. **Apply** the knowledge on host pathogen interaction for shaping and instructing host immune responses.
4. **Analyse** the role of bacterial colonisation and development of infective dose
5. **Evaluate** the role of immune system in overcoming the progression of disease.
6. **Create** and develop new diagnostic kits based on the knowledge acquired on host pathogen interaction and normal flora.

Prerequisites: ***Basic knowledge about any prior course***

SYLLABUS

UNIT/Module	CONTENT	HOURS or NUMBER OF CLASSES	CO Mapping	COGNITIVE LEVEL
I.	Normal microflora of the human body Normal microflora of the human body: Establishment of normal microflora, normal microflora of skin, throat, gastrointestinal tract, urogenital tract. Benefits and drawbacks of normal microbiota.	**5 classes**	**CO1, CO2**	**K1,K2**
II.	Host pathogen interaction Terminologies: Infection, Pathogen, Pathogenicity, Virulence, Toxigenicity, Opportunistic infections, Adhesion, Colonisation,	**6 classes**	**CO2,CO3,CO4,CO5**	**K1,K2,K3,K4,K5**

	Invasion, Nosocomial infections, Iatrogenic infection. Toxigenesis-production of toxins, types and pathogenesis, Pathophysiologic effects of LPS. Evasion of host defence mechanisms, Transmission of infection, Carriers and their types.			
III.	Bacterial diseases Symptoms, development of pathogenesis, prophylaxis and control of: Respiratory Diseases: Streptococcus pyogenes and *Mycobacterium tuberculosis* Gastrointestinal Diseases: *Escherichia coli, Salmonella typhi, Vibrio cholera* and *Helicobacter pylori* Others - *Bacillus anthracis, Clostridium tetani* and *Treponema pallidum*.	**10 classes**	**CO4,CO5,CO6**	**K4,K5,K6**
IV.	Viral diseases Symptoms, pathogenesis, prophylaxis and control of: Polio, Herpes, Hepatitis, Rabies, Dengue, AIDS, Influenza and Ebola.	**4 classes**	**CO4,CO5,CO6**	**K4,K5,K6**
V.	Fungal diseases Brief description of mycoses with respect to symptoms, transmission, and prevention: Cutaneous mycoses: Tinea pedis (Athlete's foot); Systemic mycoses: Histoplasmosis; Opportunistic mycoses: Candidiasis	**4 classes**	**CO1,CO2,CO4**	**K1,K2,K4**
VI.	Protozoan diseases Symptoms, mode of transmission, prophylaxis and control of– Malaria and Kala-azar.	**3 classes**	**CO1,CO2,CO4**	**K1,K2,K4**
VII.	Antimicrobial agents and antibiotic resistance General characteristics and mode of action of: Antibacterial agents: Five modes of action with one example each: Inhibitor of nucleic acid	**8 classes**	**CO1,CO3,CO4,CO5**	**K1,K3,K4,K5**

	synthesis; Inhibitor of cell wall synthesis; Inhibitor of cell membrane function; Inhibitor of protein synthesis; Inhibitor of metabolism Antifungal agents: Mechanism of action of Amphotericin B, Griseofulvin Antiviral agents: Mechanism of action of Amantadine, Acyclovir, Azidothymidine Resistance to Antibiotics - MDR, XDR, MRSA, NDM-1, Combinatorial and futuristic therapy			

Text Books

1. Ananthanarayan R. and Paniker C.K.J. (2009) Textbook of Microbiology. 8th Edition, University Press Publication.
2. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A. and Mietzner T.A. (2013), Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition. McGraw Hill Publication.
3. Goering R., Dockrell H., Zuckerman M. and Wakelin D. (2007) Mims' Medical Microbiology. 4th Edition. Elsevier

Suggested readings

1. Madigan MT, Martinko JM, Dunlap PV and Clark DP. (2014). Brock Biology of Microorganisms. 14th edition. Pearson International Edition.
2. Willey JM, Sherwood LM and Woolverton CJ. (2013) Prescott, Harley and Klein's Microbiology. 9th Edition. McGraw Hill International.
3. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill Book Company.

Web Resources

1.
2.
3.
4.

Evaluation Theory CIA: 30 Semester Exam:70

Paper Structure for Theory Semester Exam Module :
Full marks 70 Short questions: 10 (each 2 marks) from 12 (10x2=20)
Long questions: 5 (each 10 marks) from 7 (5x10=50)

Course outcomes (COs) and Cognitive Level Mapping

COs	CO Description	Cognitive levels
CO1	**Remember** the concepts of microbial physiology and learn the normal microflora of human body and diversion of normal microflora to bacterial pathogenesis.	K1
CO2	**Understand** the process of bacterial invasion and replication within host cells, and also bacterial	K2

	interference with host cell signalling pathways.	
CO3	**Apply** the knowledge on host pathogen interaction for shaping and instructing host immune responses.	K3
CO4	**Analyse** the role of bacterial colonisation and development of infective dose	K4
CO5	**Evaluate** the role of immune system in overcoming the progression of disease.	K5
CO6	**Create** and develop new diagnostic kits based on the knowledge acquired on host pathogen interaction and normal flora.	K6