Title of the Course: MEDICAL MICROBIOLOGY AND EPIDEMIOLOGY [T]

Course Code: MIC-627

Number of Credits: 3, Theory

Contact hours: 45

Effective from Academic Year: 2022-23

Prerequisites	Knowledge of microorganisms, pathogens and various infectious diseases.	
Objective:	• To understand the mechanism of pathogenesis leading to development of disease in the host. • To relate the pathogen, host and environment in terms of its varied existence and interactions, leading to various epidemiological events.	
Content:		
1.		
1.1	Pathogenicity, virulence and virulence factor – historical perspective and definitions, course of infectious diseases, damage-response curve and classes of pathogen, growth of pathogen in host.	**(05)**
1.2	Pili, flagella, biofilm, quorum-sensing, iron scavenging, aggressins/impedins against host defence.	**(03)**
1.3	Host susceptibility, pre-disposing factor (nutritional, socio-economical, occupational, therapy, genetical), factors affecting immune systems; Receptors for pathogen – GalNacbeta1-4 gal moiety exposed on asialylated glycolipids, TLRs, regulation of host cell apoptosis; establishment of latent infection; TB, Streptococcal Pneumonia, Amoebic and Bacillary dysentery.	**(07)**
2.		
2.1	Exotoxins – Type III secretion system, AB – type toxins, examples (Tetanospasmin, diphtheria toxin, pertusis toxin), bifunctional toxins, cytotoxins and cytolysins. Endotoxin – structure, biosynthesis, assay, pathophysiological effects, excessive inflammatory response, endotoxin neutralizing compound, antagonists of LPS.	**(08)**
2.2	Diagnostics – Sample type and handling of samples, selective enrichment, classical methods (review) of culturing and identification of pathogens, staining methods for demonstration of pathogen in situ (direct staining, fluorescent antibody staining), Applications of Molecular diagnosis and Typing: LPS (chemotyping), phage, pyocin, antimicrobial, serotyping, Restriction mapping, RFLP, PFGE, PCR.	**(03)**
2.3	Cystic fibrosis, Spongiform encephalopathy.	**(04)**
3.		
3.1	Spatial, temporal and social distributions of communicable	**(09)**

	diseases, transmissibility of infections, cross-sectional studies, case-control studies, cohort studies, Models for Developing Epidemiological Theory, modeling tools, Rates and risks, Population dynamics, Epidemiological Statistics Relating Exposure and Disease, Simple Epidemic Processes, Vaccine effect measures, Multistage chronic diseases, Joint effects of multiple exposure variables.	
3.2	Community acquired infection, infections in immuno-compromised patients, Nosocomial infections, catheter associated infections, infections in patients with debilitating diseases, neo-natal infections; Vector borne diseases – vectors for transmission of infectious diseases, epidemiological cycles of vector borne diseases, control measures.	**(06)**
Pedagogy:	Lectures/tutorials/assignments/Moodle/videos/web resources	
References/ Readings	Centers for Disease Control and Prevention, Department of Health & Human Services, USA https://www.cdc.gov/ Chakraborty, P. and Pal, N.K., Manual of Practical Microbiology and Parasitology. New Central Book Agency, India. (2018) Chakraborty, P. Textbook of Medical Parasitology. New Central Book Agency, India (2016) Davis, B.D. et al., Microbiology. Harper and Row. (1972) Gillespie, S.H. and Hawkey, P.M., Principles and Practice of Clinical Bacteriology. Wiley. (2006) National Centre for Disease Control, Ministry of Health & Family welfare, GOI https://ncdc.gov.in/ Online Tuberculosis Information System (OTIS) Data, Centers for Disease Control and Prevention, Department of Health & Human Services, USA https://wonder.cdc.gov/tb.html Parija, SC, Textbook of Microbiology & Immunology. Elsevier Health Sciences. (2016) Rafi, MD, Textbook of biochemistry for Medical Students, Universities Press, India (2020) Riedel, S., Hobden, J.A. , Miller, S., Morse, S.A., Mietzner, T.A. et al. Jawetz, Melnick, & Adelberg's Medical Microbiology, McGraw-Hill Education. (2019). Struthers, J.K. and Westran, R.P., Clinical Bacteriology. CRC Press. (2003) Topley, W.W.C., Wilson, G.S., Parker, M.T., & Collier, L.H. , Topley and Wilson's Principles of Bacteriology, Virology and Immunity: v. 1-4, Hodder Arnold (1990) World Health organization, South-East Asia https://www.who.int/southeastasia	
Course Outcomes	• To identify the various virulence and pathogenicity factors of microbial pathogens. • To correlate the various pathological events during the progression of an infectious disease. • To apply the various diagnostics techniques involved in	

	identification of pathogenic agent. ● To categorize the strategies/methods required to combat the spread of pathogens under various circumstances.	