Programme: M.Sc. (Microbiology)

Course Code: MIO 122

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

Number of Credits: 3

Effective from Academic Year: 2018-19

Prerequisites	Knowledge of microorganisms, pathogens and various infectious diseases.	
Objective:	Develops concepts in pathogenesis of various pathogens, its underlying mechanisms along with molecular interactions, leading to development of disease in the host. Develops principles of 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.	**(04)**
1.2	Pili, flagella, biofilm, quorum-sensing, iron scavenging, aggressins/impedins against host defence.	**(03)**
1.3	Host susceptibility, pre-disposing factor (nutritional, soci-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). Endotoxin – structure, biosynthesis, assay, pathophysiological effects, excessive inflammatory response, endotoxin neutralizing compound, antagonists of LPS.	**(06)**
2.2	Cystic fibrosis, Spongiform encephalopathy.	**(04)**
3.		
3.1	Spatial, temporal and social distributions of communicable 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.	**(07)**
3.2	Community acquired infection, infections in immunocompromised 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.	**(05)**

Pedagogy:	Lectures/tutorials/assignments/self-study/Moodle/videos/web resources	
References/ Readings	1. Davis, B.D. et al., Microbiology. Harper and Row. 2. Gillespie, S.H. and Hawkey, P.M., Principal and Practice of Clinical Bacteriology. Wiley. 3. Struthers, J.K. and Westran, R.P., Clinical Bacteriology. CRC Press. 4. Chakraborty, P. and Pal, N.K., Manual of Practical Microbiology and Parasitology. Calcutta New Central Book Agency.	
Learning Outcomes	1. Explain the various pathological events during the progression of an infectious disease. 2. Apply the principles of epidemiological sciences in studying the underlying mechanisms of spread of disease and controls required thereof to combat the spread of pathogens.	