

**Optional Course: M. Sc Life Sciences, Semester IV**  
***Molecular Parasitology and Infectious Diseases* [2 credits]**  
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| S No | Topic   | Contact Hours |
|------|---|---------------|
| 1.   | Introduction to pathogens and Infectious diseases: nature of pathogens and modes of infection.  | 02            |
| 2.   | Cellular structure and genome organization of bacterial and parasitic pathogens   | 02            |
| 3.   | Host-Pathogen Interaction: pathogenesis, treatment / targets & resistance   |               |
| 3a.  | <p><b>Bacterial Infections:</b></p> <p>A. <b>Pulmonary: <i>Pneumonia</i></b>–atypical, chemically triggered/allergic/bacterial; <i>Streptococcus pneumoniae</i> –adherence and Invasion; pathogenesis, epidemics; vaccine; treatment. <b>Tuberculosis</b> –socioeconomic considerations, pathogenesis –virulence and immune factors; treatment; drug resistance; preventive measures.</p> <p>B. <b>Enteric: <i>Enteric pathogens</i></b>, Enteritis –causative agents; opportunistic infections, virulence and immune system; toxins; treatment. Definition; types of infection; epidemiology; prophylactic measures; treatment options.</p> <p>C. <b>Antibiotics</b>: definition; classification; targets &amp; action. Antibiotic resistance: social, environmental and global concern; causes; mechanisms –enzymes, traits, vertical OR horizontal inheritance; challenges &amp; opportunity.</p> <p>D. <b>Bacterial toxins &amp; toxinosis</b>: septic shock. Advanced diagnostics of bacterial infections.</p> | 12            |
| 3b.  | <p><b>Parasitic infections:</b></p> <p>A. Introduction of parasitic infectious diseases and classification. Sarcomastigophora (<i>Entamoeba</i>, <i>Leishmania</i> and <i>Trypanosoma</i>), Sporozoa (Apicomplexans e.g., <i>Plasmodium</i>, <i>Toxoplasma</i>); ciliophora (<i>Balantidium</i>)</p> <p>B. Specialized organelles: acidocalcisomes, apicoplast, apical organelles, hydrogenosomes, glycosomes</p> <p>C. Virulence factors in protozoan parasite, vaccine and drug targets, drug resistance mechanism.</p> <p>D. Molecular mechanisms involved during host-parasite interactions.</p> <p>E. Host immune response to parasitic infections, antigenic variation and immune evasion strategies.</p> <p>F. Recent advances in molecular analysis of host-parasite interactions.</p>  | 16            |

**References:**

1. General Microbiology, edition 6<sup>th</sup>, Roger Y Stanier
2. Prescott's Microbiology, tenth edition, Willey JM, Sherwood LM and Woolverton CJ, McGraw Hill, 2017
3. Molecular Parasitology: Protozoan parasites and their Molecules. Walochnik, J, Duchene M, 2016
4. Antimicrobial Drug Resistance : Mechanism of Drug Resistance Volume I (Infectious diseases): 2009, Douglas Mayer
5. Malaria: biology in the era of eradication , 2017, Dyann Fergusson Wirth, CSHL Press