Syllabus for Ph.D. Clinical Microbiology

Unit I

Basics of Microbiology: Golden era of microbiology, common nutrient requirements and nutritional types of microbes, culture media and its types, growth curve, continuous culture and synchronous growth, influence of environmental factors on growth, aerobic & anaerobic cultures

UNIT II

Sterilization & disinfection: introduction, physical and chemical agents of sterilization/disinfection, minimum inhibitory concentration, minimum bactericidal concentration, testing of disinfectants, biosafety in microbiology lab.

Unit III

Fungus associated diseases: mode of infection, pathogenesis and laboratory diagnosis of aspergillosis, candidiasis, cryptococcosis and pneumocystis

Bacteria associated diseases: mode of infection, pathogenesis and laboratory diagnosis of *Staphylococcus aureus, Streptococcus pneumoniae, Clostridium*spp, *Escherichia coli, Pseudomonas aeruginosa*and *Mycobacterium tuberculosis*

Virus associated diseases: mode of infection, pathogenesis and laboratory diagnosis of HIV, hepatitis A and B, influenza virus, dengue virus and corona virus.

Unit IV

Immunology: Innate and adaptive immunity, cells and organs of immune system, antigen, antibody, antibody diversity, antigen – antibody reactions, MHC molecules, antigen processing and presentation, cytokines, B and T cell activation, humoral and cell mediated effector responses, complement system, tolerance and autoimmunity

Unit V

Molecular biology and rDNA technology: structure and functions of nucleic acids, central dogma of life, isolation, amplification, purification and storage of nucleic acids, vectors, enzymes used in rDNA technology, cloning methodologies, expression of recombinant proteins and sequencing techniques

Unit VI

Analytical techniques:principle, instrumentation, types and applications of microscopy, centrifugation, chromatography, electrophoresis, spectrophotometry, FTIR, X-ray Diffraction, NMR and Surface plasmon resonance