DEPARTMENT OF AGRICULTURAL MICROBIOLOGY
FACULTY OF AGRICULTURAL SCIENCES

A.M.U., Aligarh

Syllabus for Ph.D Admissions Test **2022-23 onwards**

Section – B

History and development of microbiology, cultural and biochemical properties of Chlamydia, Rickettsia, Mycoplasma, Actinomycetes and fungi. Life cycle and importance of protozoa and algae. General characteristic features of plants, animal and bacterial viruses. The bacterial cytology, classification and nomenclature of microorganism, diseases and resistance to disease in plant and animals: Common causative agent and their pathogenicity, methods of control of microorganisms. Soil microorganisms, biogeochemical cycling of elements including N, C, S and P. Microbial transformation of Iron, Manganese, Zinc, Copper and Potassium. Microbial interactions: symbiosis, synergism, commensalism, ammensalism, predation and parasitism, mycorrhizal associations, algal association with other microorganisms and plants. Foods and their composition. Food spoilage, microbial flora and spoilage of meat, fish, fish products, eggs, milk and milk products, fruits, vegetables, juices and bakery products. Single cell protein, food poisoning and food infections. Microbiology of air and aquatic environments including sea water, classification, structure and functions of carbohydrates, lipids and amino acids, proteins, nucleic acids and enzymes, fat soluble and water soluble vitamins. General concept of immune responses T and B cells, Antigens; Antibody: Basic and fine structure of immunoglobulins, Immunity, Hybridomas and monoclonal antibodies. Physiology and metabolism of bacteria, bacterial and plant photosynthesis, DNA replication in prokaryotic, bacterial variation and population genetics, mutation, site-directed mutagenesis. Genetic code, expression and regulation of bacterial gene, Lactose and tryptophan operons and protein synthesis. Molecular genetics of temperate and virulent bacteriophages, gene transfer in bacteria and application of tissue culture for plant improvement. Techniques of plant breeding and its application in plant biotechnology. Production of plant metabolites of medicinal and industrial applications. DNA cloning strategies in bacteria. General concept of microbial fermentation. Basic concept of cell and enzyme immobilization, Single Cell Protein. Microbial production of ethanol, citric acid, acetic acid. Fermentation of antibiotics (Penicillin and semisynthetic penicillin), enzymes (Amylases, Glucose isomers, Proteases, Penicillin acylases) and Vitamins (Riboflavin & Vit. B-12). Role of microbes and microbial enzymes in the fermentation of tea, coffee and cocoa and production of silage. Microbial fertilizers and biopesticides, Vermiculture and vermicomposting. Microbial communication: quorum sensing in bacteria.