

M.Sc Microbiology Entrance Exam Syllabus

- **Microbial Diversity:** Diversity of Microbial World, Archaeobacteria and Eubacteria, Gram positive and Gram-negative bacteria. Study of Fungi, Algae, Protozoans and viruses. Microbial growth phases, measurement of growth, bacterial sporulation and germination, binary fission.
- **Sterilization:** –Autoclave, Incubator, BOD Incubator, Hot Air Oven, pH Meter, spectrophotometer, Colony Counter, Centrifuge Machine and Laminar Air Flow. Sterilization of culture media, glassware and heat sensitive material.
- **Biochemistry of Microbes-** Carbohydrates, Proteins, Lipids, Nucleic acids, Enzymology. Growth kinetics in Batch, Fed batch and continuous cultures.
- **Fermentation processes:** Microbial culture for fermentation processes. Media preparation, inoculum development; strain improvement. Processes involved in fermentation; Scale Up and Scale Down processes. Fermentation products. Large scale fermentation of acetone, butanol and ethanol (ABE) and alcoholic Beverages -Beer and Wines; Vitamins -B12 and Riboflavin; Antibiotics-Penicillin and Streptomycin; Organic acids-Citric acid, Acetic acid and Lactic acid; Amino acids.
- **Food preservation methods.** High temperatures, drying, food additives, chemicals and radiation. Preservation of milk, meat, fish, fruits and vegetables; Food hygiene maintenance. Modern technologies in food preservation, Packaging material. Microbial quality control of food. Milk products: Cheese and Yogurt; Microbial transformation products: Steroids.
- **Microbe interactions:** Mutualism, synergism, commensalism, competition, amensalism, parasitism, predation; Microbe-Plant interaction: positive-negative interaction; Microbe-Animal interaction: positive-negative interaction; Microorganism of rhizosphere, rhizoplane and phylloplane, mycorrhiza (types and its applications).
- **Biogeochemical cycling-** Nitrogen, Sulphur, Carbon and Phosphorus cycling. Microbial Bioremediation and Bioleaching.
- **Solid waste management:** Source and type of solid waste, method of solid waste disposal. **Biofertilizer:** Bacterial, Fungal, Phosphate solubiliser, BGA & associative, Industrial biomass production; Mode of application; Advantages and Disadvantages. Mycorrhiza (types and its applications).
- **Biopesticides and Biodegradation:** Types of biopesticides; Integrated pest management (IPM); Mode of action; Factor influencing; Applications, advantages & disadvantages. Biodegradation of Xenobiotics, Bioaccumulation, Biodeterioration.
- **Food borne diseases food poisoning:** *Staphylococcus aureus*, *Clostridium botulinum*, *Vibrio cholerae*, *Escherichia coli* and *Salmonella* infections. Toxins of food borne pathogenic bacteria and fungi.
- **Immunology:** Innate and Acquired immunity, Organs and Cells of Immune system. Antigen, Immunogens, Antibody and MHC. Antigen Characteristics, Types of Antigens, Adjuvants, Immunogenicity and Antigenicity, Classes of immunoglobulin-structure and function, Major Histocompatibility Complex: Types-structure. History of

Medical Microbiology. Normal Microflora of human body: skin, mouth, alimentary canal and gintourinary tract. Antibiotics and Chemotherapeutics.

- **DNA Replication in Prokaryotes and Eukaryotes.** Protein Synthesis, Mechanisms of Genetic Exchange, Transformation; Conjugation; Transduction, Complementation. Plasmids in prokaryotes and eukaryotes. Types, Plasmid replication and partitioning, host range, plasmid incompatibility, plasmid amplification, regulation of plasmid copy number, curing of plasmids.