

Department of Microbiology
University of Pune

Syllabus for PET Paper II (Microbiology)

- 1) **General Microbiology:** Bacterial cytology, Systematics of Bacteria, Molecular Taxonomy, Yeast and Fungi Microbial Growth, Bacteriophages: T, lambda and M13, Viruses: General features; HIV, Polio, Plant viruses: tobacco mosaic virus, cauliflower mosaic virus.
- 2) **Basic Biochemistry:** Biomolecules as compounds of carbon with a variety of functional groups, polar, nonpolar compounds, pH and buffers, Biochemistry of proteins, nucleic acids, lipids and carbohydrates.
- 3) **Microbial Metabolism and Physiology:** Enzymes, Enzyme kinetics, Regulatory enzymes, Biological membranes and transport, Principles of bioenergetics, Oxidative phosphorylation, Glycolysis, gluconeogenesis, and the pentose phosphate pathway, Citric acid cycle and its role in metabolism, Principles of metabolic regulation.
- 4) **Molecular Biology and Genetics:** Basic concepts in genetics, DNA Structure Function, DNA Mutation and Repair, Extrachromosomal genetic elements, Transcription, Translation, Recombinant DNA technology, Operon regulation, Transcription enhancers and attenuators, Transgenic plants and animals.
- 5) **Medical Microbiology and Immunology:** Virulence, Cell adhesion, New emerging pathogens, Antimicrobial agents and chemotherapy, Basic concepts in immunology, Humoral and cellular immunity, Diversity of TCR and BCR, Monoclonal antibodies and their applications.
- 6) **Applied and Environmental Microbiology:** Basic concepts in fermentation technology, Downstream processing, Biocontrol agents, Biosensors, Genetically engineered microorganisms.
- 7) **Advanced Biological and Molecular Techniques:** Chromatographic techniques, Immunological techniques, Electrophoretic techniques, Spectroscopic techniques, polymerase chain reaction, DNA and Protein Sequencing, Blotting and hybridization.