



# SARDAR BHAGWAN SINGH UNIVERSITY

## DEPARTMENT OF MICROBIOLOGY

### SYLLABUS

#### UNIT – I: Microbiology: History and Development

Discovery of Microorganisms; Golden Era of Microbiology; Emergence of Modern Microbiology; Microbial Evolution; Microbial Diversity; Microbial Taxonomy and Phylogeny: Bacteria, Protists, Fungi; History and Developments of Chemotherapeutics; Emergence of Medical Microbiology; History of Immunology; Viruses: History, Introduction and Types.

#### UNIT – II: Methods in Microbiology

Microscopy and Micrometry; Growth media and its classification; Staining techniques; Cell biomass and number measurement; Instrumentations: Autoclave, Oven, Incubator, Laminar air flow hood; Control of Microorganisms by Physical and Chemical Agents; Biophysical and molecular techniques: PCR, Electrophoresis, Chromatography, DNA/RNA isolation, Spectroscopy; Molecular identification of Microorganisms.

#### UNIT – III: Fundamentals of Cell Biology and Biochemistry

Cellular structure and function; Biomolecules: Structure & Classification; Enzymes; Microbial Nutrition and Growth; Thermodynamics; Microbial Metabolism and physiology; Microbial Photosynthesis; Cell signaling; Immunology: Innate and Acquired; Cancer Biology; Autoimmunity; Microbial Diseases and Epidemiology; Clinical Microbiology

#### UNIT – IV: Molecular Biology and Microbial Genetics

DNA Replication; Gene expression and Variation; Mutation: DNA damage & repair, Recombination; Gene Transfer mechanism: Transformation, Conjugation, Transduction; Microbial Genomics: Functional & Comparative and Proteomics; Environmental Genomics

#### UNIT – V: Applied Microbiology

Environmental Microbiology: Biogeochemical Cycling, Marine ecosystem, Fresh water ecosystem; Terrestrial ecosystem; Plant Microbe Interaction; Waste Management; Industrial Fermentation; Food Microbiology: Food spoilage, Preservation, Production, Regulations; Pharmaceutical Microbiology: Drug development, Quality Control and Assurance, Drug plants and Anti-microbial Activity; Air Microbiology: Air-borne Transmission, Air quality monitoring.