

- **Department of Microbiology**

- **Course Outcomes:**

- **F Y B Sc**

MB-111: Elementary Microbiology	<p>Students should understand:</p> <ul style="list-style-type: none"> • Get an idea about the historical events in microbiology. • Understand the diversity in microbiology. • Know the scope of Microbiology. • Understand the taxonomic classification of microorganisms
MB-112: Microscopy and Basic Biochemistry	<ul style="list-style-type: none"> • Know parts of microscope, type and its principal • Get the theoretical concepts of related stain • Understand different methods of staining techniques • Understand nutritional requirements of bacterial.
MB-113: Basic Techniques in Microbiology I	<p>Students should understand:</p> <ul style="list-style-type: none"> • Develop basic skill in aseptic techniques • Understand various accessories for microbiology practicals • Perform various staining techniques • Cultivate bacteria with different cultivation technique
MB-121: Cell Biology of Microorganism	<ul style="list-style-type: none"> • Understand concepts of growth and reproduction of bacteria • Know anatomy of prokaryotic cell • Know structural detail of eukaryotic cell • Understood various parts of cell and its importance
MB-122: Methods in Microbiology	<ul style="list-style-type: none"> • Acquainted with various sterilization techniques • Use various method to control microbes. • Gather theoretical background of microbial cultivation • Understand various specialized techniques such as pasteurization
MB-123: Basic Techniques in Microbiology II	<ul style="list-style-type: none"> • Perform various biochemical test • Stain the bacteria with differential staining techniques • Understand the effect of various environmental factors • Get familiar with various instrumentation

- **S Y B Sc**

MB-231: Fundamental Biochemistry	<ul style="list-style-type: none"> • Develop fundamental knowledge about various biomolecules • Understand the basic concepts related to enzymes • Know various biochemical pathway • Understand the concept of microbial metabolism
MB-232: Microscopy and Microbial Ecology	<ul style="list-style-type: none"> • Understand Principle, working, ray diagram and application of advance microscopes • Know concepts related with of microbial interaction • Get an idea regarding microbes and their relation with environment • Understand the enumeration technique for microbes
MB-233: Practical course in Microbiology-I	<p>Students should understand,</p> <ul style="list-style-type: none"> • Detect microbial enzymes • Detection of biomolecules, • Understand symbiotic interaction • Check portability of water, microflora of air.

MB-241: Genetics and Immunology	<ul style="list-style-type: none"> • Understand concept of genes and chromosomes • Familiar with concept of mutations • Know the concepts of spontaneous mutations • Understand basics of immunology
MB-242: Basic Microbial Biotechnology	<ul style="list-style-type: none"> • Aware of screening of bacteria • Understand fermentation process • Implement techniques of continuous culture • Know various downstream processing
MB-244: Practical course in Microbiology I	<ul style="list-style-type: none"> • Develop skill to stain parts of bacterial cell • Detect fermentation product • Isolate mutants • Screen bacteria for organic acid and antibiotics .

• **TY B Sc.**

MB-351: Microbial genetics	<ul style="list-style-type: none"> • Concept of central dogma of molecular biology • Process of DNA replication transcription, translation • Viral genetics • Various method used for genetic recombination
MB-352: Fermentation Technology	<ul style="list-style-type: none"> • Bioreactors • Industrial sterilization • Strain improvement • Scale up and large scale production
MB-353: Microbial Metabolism	<ul style="list-style-type: none"> • Concept of bioenergetics • Anabolism and catabolism with examples • Laws of thermodynamics • Bacterial photosynthesis
MB-354: Medical Microbiology	<ul style="list-style-type: none"> • Various concepts of medical microbiology • Role of international organizations such as CDC and WHO • Anatomy of human system • Various chemotherapeutic agent and their mode of action
MB-355: Immunology	<ul style="list-style-type: none"> • Concept related to cells and organs related to immune system • Immune response and immune mechanism • Immunological disorders • Concepts related to Immunodeficiency
MB-356: Applied Microbiology	<ul style="list-style-type: none"> • Milk microbiology- technique used in milk industry, • Food microbiology – technique used in food industries, • Microbial food poisoning • Concepts related to geo-microbiology and nanotechnology
MB-361: Molecular Biology	<p>Students should understand,</p> <ul style="list-style-type: none"> • Concept of gene regulation • Principals and applications of various molecular techniques

	<ul style="list-style-type: none"> • Concept, methods and application of r-DNA technology • Gene library and gene mapping •
MB-362: Pharmaceutical Microbiology	<p>Student should understand,</p> <ul style="list-style-type: none"> • Quality control and assurance, • Concepts of GMP and GLP regulations • Standard protocols in pharmaceutical industry - IP, BP, USP and EP, • Pharmaceutical audit and testing procedures for fermentation process
MB-363: Enzymology	<p>Students should understand,</p> <ul style="list-style-type: none"> • Vitamin as cofactor, its role metabolism, • Regulation of enzyme • Various methods used for enzyme purification • Enzyme assays
MB-364: Clinical Microbiology	<ul style="list-style-type: none"> • Various viral disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis • Various bacterial disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis • Various fungal disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis • Various protozoal disease, their causative agent, mode of infection, epidemiology, treatment, lab diagnosis, prophylaxis
MB-365: Diagnostic Immunology	<ul style="list-style-type: none"> • Various antigen antibody reaction, • Different immunological techniques • Concepts related to transplantation, • Concept of tumor immunology, type of tumors, immune mechanisms against tumors
MB-366: Environmental Microbiology	<ul style="list-style-type: none"> • Concepts related to Plant pathology • Various plant pathogens and disease • Soil microbiology and xenobiotics • Microbial waste treatment methods.
MB-357: Techniques in Diagnostic Microbiology –I	<ul style="list-style-type: none"> • Isolate and identify microorganism form laboratory sample • Perform MIC of antibiotics • ELISA test for disease diagnosis • Immuno-diffusion techniques
MB-358: Techniques in Industrial Microbiology –I	<ul style="list-style-type: none"> • Techniques used in industrial production of alcohol • Phenol coefficient test • Evaluation of sterilization techniques • Temperature relation with microorganism- TDT, TDP
MB-359: Techniques in Applied Microbiology –I	<ul style="list-style-type: none"> • Various techniques to estimate size of microbes • Isolation of bacteriophage and endophytic microorganism • Check quality of milk

	<ul style="list-style-type: none"> • Awareness of material safety Data sheet.
MB-367: Techniques in Diagnostic Microbiology –II	<ul style="list-style-type: none"> • Isolate and identify microorganism from laboratory sample. • Antibiotics sensitivity and resistance test. • Detection of parasite. • Handling of blood and body fluids.
MB-368: Techniques in Industrial Microbiology –II	<ul style="list-style-type: none"> • Techniques used in industries –Citric acid fermentation. • UV-survival curve. • Enzyme production and determination of its activity. • Validation techniques of instruments and immobilization process.
MB-369: Techniques in Applied Microbiology -II	<ul style="list-style-type: none"> • Various methods used in agriculturally important microbes • Tests in waste water treatment • Antimicrobial action of plant extract