M.Sc. Biotechnology

Integrated course on credit based choice system

First & Second semesters are common for students of both stream. Third semester onwards they choose the stream by choosing respective papers

SEMESTER- I

Paper- I: General tools and Techniques

Paper- II: Biomolecules and metabolism

Paper- III: Cell biology and Molecular genetics

Paper- IV: Bioinformatics and Biostatistics

SEMESTER- II

Paper- I: Molecular Biology

Paper- II: Immunology and Enzymology

Paper-III: Environmental Biotechnology

Paper- IV: Fermentation Technology

SEMESTER- III BIOTECHNOLOGY

Paper I: Plant Biotechnology

Paper II: Agriculture Biotechnology

Paper III: Genetic engineering and rDNA Technology

Paper IV: Advanced Biotechnology

SEMESTER- IV BIOTECHNOLOGY

Paper I: medical and pharmaceutical biotechnology

Paper II: animal biotechnology

Paper III & Paper IV: industrial training: three months

SEMESTER-III MICROBIOLOGY

Paper I: Introduction to Microbiology

Paper II: Introduction to Virology

Paper III: Microbial Physiology and Genetics

Paper IV: Microbial Ecology

SEMESTER- IV MICROBIOLOGY

Paper I: Medical Microbiology

Paper II: Agriculture Microbiology

Paper III & Paper IV: Industrial training: three months

SEMESTER- I

PAPER- I: GENERAL TOOLS AND TECHNIQUES

Unit I: Laboratory Instrumentation; Structure, principle and working of Laminar airflow bench, autoclave, incubator, balance, pH meter, water bath, hot air oven, colony counter, inoculation instruments, glassware, etc. Laboratory safety measures. Specimen collection. Standard operating procedures.

Unit II: Aseptic techniques: Principles of sterilization, Brief idea of various methods of sterilization; Physical, chemical, disinfectants, membrane filtration, pasteurization, tyndallization etc. Definition and classification of compounds used for sterilization, antibiotics and antimicrobials. Evaluation of effectiveness of antimicrobial/antiseptic compounds.

Unit III: Microscopy: Types, principle, components, working, specimen preparation and applications of Light, Bright field, Dark field, Phase contrast, Electron (SEM,TEM), Scanning tunneling, Fluorescence, Nomarsky differential interference contrast, Confocal, Atomic force microscopes.

Unit IV: Chromatography: General Principles, process and applications of Paper and Thin Layer Chromatography, GLC, HPLC, Absorption, Ion Exchange, Gel filtration, Affinity

chromatography. Radioactive tracer technique, autoradiography, Gamma and Scintillation counters. Brief idea of NMR, IR. GC-MS.

Unit V: Centrifugation: Types of centrifuges. Principles, working and applications of Preparative, Analytical, Microcentrifuge, Refrigerated ultracentrifuge etc. Colorimeter and spectrophotometer; principle, working and application. Solvent extraction..