Core Course Outcome

Microbiology

Paper Name	Course Outcome
General Biochemistry and Microbial Metabolism	● Awareness on biomolecules, in the living system and their functions ● Information on Carbohydrate metabolism, Amino acid metabolism, Lipid metabolism, Nucleic acid metabolism ● Knowledge on Enzyme Nomenclature, Enzyme kinetics, Enzyme inhibition, Mechanism of Enzyme action; Enzyme purification techniques. Enzyme immobilization
Biophysics and Instrumentation	● Sufficient knowledge in principles and applications of bio instruments. ● Idea on application of bio-analytical techniques in advanced studies/research ● Information on meticulous handling and maintenance of instruments for various analytical works
Environmental and Sanitation Microbiology	● Knowledge on air and water microbiology ● Understand the role of microorganisms in solid waste management, bioremediation and bioleaching ● Awareness on the methods in water analysis and waste water treatment
Agricultural Microbiology and Plant Pathology	● Knowledge on soil microbes and their role in soil fertility and nutrient cycling ● Understanding the interactions of microorganisms with plants and animals ● Awareness on use of microbes as biofertilizers and biopesticides
Practical I	● Hands on expertise on Preparation of solution, buffers, estimation and identification of biomolecules ● Knowledge on enzyme activity analysis and purification of enzymes. ● Understanding of synthesis and quantitation of microbial metabolites
Practical II	● Understanding of Bioassays , microbial degradation of xenobiotics and microbial bioremediation techniques ● Study of air, water microflora and water potability testing ● Kniowledge on environmental impact of microbial flora as biocontrol agents, interaction with plants and animals etc
Principles of Genetics	● Awareness on Mendelian genetics, linkage, crossing over and Chromosomal aberrations ● Knowledge about Pedigree analysis and

	construction for the inheritance pattern of genetic diseases, Genetic Counselling etc ● Understanding on the techniques in Bacterial Genetics - Transformation, Transduction, Conjugation and Transposable elements
Food and Dairy Microbiology	● Better understanding of microbes in food spoilage ● Information regarding food preservation ● Expertise on techniques used in food industries
Industrial Microbiology	● Knowledge on upstream and downstream processes in fermentation ● Understanding on Kinetics of fermentation process and principles of bioprocess media formulations ● Expertise to work in fermentative production aspects of an industry
Immunology	● Information about immune system and its action ● Knowledge on immunodiagnostic methods ● Awareness on hypersensitivity, autoimmune diseases and cancer
Practical III	● Information about microbial techniques in Food and Dairy microbiology ● Awareness on Microbial analysis of food products ● Knowledge on concepts in practical Industrial microbiology
Medical Microbiology	● Knowledge on characteristics, pathogenicity, epidemiology, laboratory diagnosis and treatment of diseases caused by pathogenic bacteria, viruses, Fungi and Protozoa ● Awareness on emerging viral diseases and helminthic infections and control measures ● Information about antifungal, antiviral drugs and Antibiotics
Molecular biology	● Elaborate knowledge on nucleic acids ● Better understanding of gene expressions ● Thorough knowledge on Tumor viruses and oncogenes
Elective- Diagnostic microbiology	● Knowledge in diagnostic techniques for disease detection ● Information on Probe-Based Microbial Detection and Characterization of Molecular Amplification Products ● Understanding on modern techniques in Bacterial Identification, Diagnosis of Mycobacterium tuberculosis and Molecular Strain Typing
Elective- Cell Biology	● Knowledge in cell structure and their function. ● Awareness on Signal transduction, Cell death and cancer ● Information on Cell cycle and control points

Elective- Microbial Taxonomy	● Awareness on approaches and criteria in microbial classification and major classification systems with pioneers involved ● Information on major molecular techniques used in diagnosis and identification of microorganisms ● Brief Knowledge on Bergey's Manual of Systematic Bacteriology
Practical IV	● Practical knowledge in specimen collection and processing ● Technical expertise to work in clinical laboratory ● Ability to perform immunological and medical diagnosis to identify pathogens
Practical V	● Expertise in Study of mitotic and Meiosis ● Trained in isolation and estimation of nucleic acids ● Familiarity in rDNA technology
Biostatistics and Bioinformatics	● Demonstrate an understanding of the central concepts of modern statistical theory and their probabilistic foundation. ● Communicate the results of statistical analyses accurately and effectively and also helps to make use of statistical software. ● Understanding the key concepts of bioinformatics tools ● Application of the knowledge of biostatistics and bioinformatics in research and industry.
Elective- Microbial Biotechnology	● Expertise on production of microbial biofertilizers, Microbial Insecticides, single cell protein production and Commercial Products by Recombinant Microbes ● Knowledge on Petroleum microbiology - Microbial enhanced oil recovery, oil spill degradation by microorganisms, Microbial production of fuels- H2 and ethanol. ● Information on role of microbes in bioremediation, leaching of ores , mmicrobial production of biopolymers and biosurfactants.
Elective- Genetic engineering	● Information on cloning vehicles and Expression strategies for heterologous genes ● Knowledge on different types of PCR and techniques like DNA sequencing, nucleic acid microarrays, RNA interference, site directed mutagenesis & protein engineering ● Awareness on DNA introduction methods and Molecular markers in genome analysis
Elective- Biosafety, Bioethics and IPR	● Information on biosafety aspects of biotechnological processes, GMOs, Ethical aspects of GMOs, Potential environmental and socio-economical risks & benefits. ● Knowledge on Patenting research tools and the

	law ● Awareness on intellectual property and Patented research tools in Drug Discovery
Practical VI	● Expertise on use of Biological Databanks, Molecular visualization, BLAST and Multiple sequence alignment and interpretation of the results ● Information on Protein sequence analysis and Phylogenetic analysis using web tools ● Awareness on application of Biostatistics problems to research and clinical data
Dissertation	● Inculcation of Research aptitude among students ● Gaining of hands-on experience on research problems ● Opportunity to relate and reinforce theoretical knowledge obtained in the class room

Microbiology (PG)	**MB4C11**	**Biostatistics and bio informatics**	Demonstrate an understanding of the central concepts of modern statistical theory and their probabilistic foundation. Communicate the results of statistical analyses accurately and effectively and also helps to make use of statistical software.

Audit Course I: Ability Enhancement Course (AEC)

Audit Course II (PCC): Professional Competency Course (PCC)