

DEPARTMENT OF MICROBIOLOGY
M.Sc. Microbiology (Five - Year) Programme

19IMBT14: Basic Microbiology – I

Course Outcomes:

- CO1: Understand the history and recent developments in Microbiology
- CO2: Understand the principle and operation of different types of microscopes and their applications.
- CO3: Understand staining reactions and structure of bacteria
- CO4: Gain knowledge about different methods of sterilization
- CO5: Explain the media types and pure culture techniques.

19IMBT24: Basic Microbiology – II

Course Outcomes:

- CO1: Differentiate prokaryotic and eukaryotic cells.
- CO2: Understand the ultra-structure of the bacteria.
- CO3: Describe the characteristics of Archaeobacteria, Eubacteria and Cyanobacteria
- CO4: Gain knowledge about isolation and preservation of microorganisms.
- CO5: Gain knowledge about the antimicrobial drugs.

19IMBP26: Practical - 1 (Basic Microbiology I & II)

Course Outcomes:

- CO1: Understand the sterilization methods and media preparation.
- CO2: Perform the pure culture techniques.
- CO3: Enumerate bacteria and yeast.
- CO4: Understand the staining methods and slide culture techniques.

19IMBT33: Microbial Taxonomy

Course Outcomes:

- CO1: Understand the techniques used for the classification and Taxonomy of microorganisms.
- CO2: Compare different groups of bacteria.
- CO3: Understand the virus structure, classification, and cultivation.
- CO4: Understand the morphology, cytology and classification of fungi.

19IMBP34: Practical 2 (Microbial Taxonomy)

Course Outcomes:

- CO1: Identify the morphological characters of different bacteria.
- CO2: Identify the yeast and filamentous fungi.
- CO3: Identify the protozoa, algae and viruses.

19IMBT43: Microbial Physiology

Course Outcomes:

- CO1: Understand the structure and function of microbial cell.
- CO2: Analyze the microbial growth and factors affecting growth.
- CO3: Explain the autotrophs and microbial pigments.
- CO4: Explain microbial metabolism.
- CO5: Gain knowledge about cell division and dormancy.

19IMBP45: Practical 3 (Microbial Physiology)

Course Outcomes:

CO1: Analyze the effect of various parameters on the growth of bacteria - Carbon and nitrogen sources, pH, Temperature and Pesticides.
CO2: Study the bacterial growth by turbidity measurement.

19IMBT51: Immunology

Course Outcomes:

CO1: Illustrate the cell types and organs involved in the process of immune response.
CO2: Understand the properties of antigens and antibodies.
CO3: Evaluate antigen - antibody interactions.
CO4: Describe the adverse effects of the immune system including autoimmunity and hypersensitivity
CO5: Understand immune hematology and transplantation immunology.

19IMBT52: Medical Microbiology

Course Outcomes:

CO1: Demonstrate the Microbial virulence Mechanisms and host response to infections.
CO2: Describe the basic morphology, biochemical properties of pathogenic microorganisms.
CO3: Describe the life cycle, pathogenicity and diagnosis of viral diseases.
CO4: Understand the basis of fungal diseases.
CO5: Understand the importance of protozoan diseases.

19IMBT53: Microbial Genetics and Molecular Biology

Course Outcomes:

CO1: Explain recombination methods.
CO2: Understand the central dogma of molecular biology and the genome of prokaryotic and eukaryotic microorganisms.
CO3: Explain about replication and mutation in bacteria.
CO4: Understand the mechanism of transcription.
CO5: Develop an understanding of operon concept.

19IMBT54: SOIL, Agricultural and Environmental MICROBIOLOGY

Course Outcomes:

CO1: Understand the interactions of microorganisms in soil.
CO2: Gain knowledge about biogeochemical cycles.
CO3: Understand plant diseases and their management.
CO4: Explain the significance of air Microflora and airborne diseases.
CO5: Gain knowledge about water pollution and waste water treatments.

19IMBP55: PRACTICAL 4

(Immunology, Medical Microbiology, Microbial Genetics and Molecular Biology, Soil, Agriculture & Environmental Microbiology)

Course Outcomes:

CO1: Analyze blood grouping and other serological tests.
CO2: Identify and describe various human pathogenic bacteria and fungi.
CO3: Analyze mutation studies and other genetic experiments.
CO4: Apply methods for the isolation of important soil microbes.
CO5: Analyze water pollution levels.

19IMBT61: Industrial Microbiology**Course Outcomes:**

- CO1: Develop skills associated with screening of industrially important strains.
- CO2: Develop media for various industrial fermentation.
- CO3: Understand the principles of fermentor design and types of fermentation.
- CO4: Explain about microbial production of foods.
- CO5: Gain the knowledge about the downstream processing.

19IMBT 62: Genetic Engineering**Course Outcomes:**

- CO1: Understand the basic steps in gene cloning enzymes involved in gene cloning.
- CO2: Get knowledge about cloning vectors.
- CO3: Compare the different methods of gene transfer.
- CO4: Describe methods for screening of recombinants.
- CO5: Appreciate the hazards and safety aspects of genetic engineering.

19IMBT63 11: IPR, Biosafety & Bioethics**Course Outcomes:**

- CO1: Understand the concepts, criteria and importance of IPR and patents.
- CO2: Understand agreements, treaties and recent amendments.
- CO3: Explain logics and concepts of patents.
- CO4: Follow Biosafety practices in a Laboratory.
- CO5: Understand the principles of bioethics.

19IMBT64: Food and Dairy Microbiology**Course Outcomes:**

- CO1: Understand the types of microorganisms in food.
- CO2: Gain knowledge about fermented food.
- CO3: Acquire knowledge about contaminations and spoilage of various food products.
- CO4: Explain food borne diseases.
- CO5: Demonstrate food preservation methods.

19IMBP65: Practical 5**(Industrial Microbiology, Genetic Engineering, IPR, BIO Safety & Bioethics, Food and Dairy Microbiology)****Course Outcomes:**

- CO1: Produce industrially important products through fermentation.
- CO2: Perform genetic engineering techniques.
- CO3: Identify spoilage organisms from different food samples.
- CO4: Perform sterility checking.
- CO5: Isolate lactic acid bacteria from different sources.

19IMBT71: General Microbiology**Course Outcomes:**

- CO1: Gain knowledge about the Classification of microorganisms.
- CO2: Appreciate the principles and applications of microscopes.
- CO3: Understand the structural features of bacteria, Protozoa, Algae, Fungi and Viruses.
- CO4: Understand the metabolism of microorganisms.
- CO5: Understand the microbial diversity in extreme environments

19IMBT72: Pharmaceutical Chemistry & Pharmaceutical Microbiology

Course Outcomes:

- CO1: Gain a strong knowledge on Volumetric Analysis.
- CO2: Acquire knowledge about photometric methods and Microbial transformations.
- CO3: Apply the Concepts of pharmaceuticals and biopharmaceuticals.
- CO4: Understand about the bacterial mechanism and action of antibiotics.
- CO5: Apply the Quality Assurance, good laboratory practices in microbiology laboratory.

19IMBT73: Immunology & Immuno Technology**Course Outcomes:**

- CO1: Understand the functional organization of the immune system.
- CO2: Evaluate the interactions between Antigen and Antibodies.
- CO3: Analyze the basis of Immunological disorders.
- CO4: Appreciate the guidelines and methods for sample collection and processing.
- CO5: Understand serological methods for diagnosis of infections.

19IMBP 75: PRACTICAL 6**(General Microbiology, Pharmaceutical Chemistry & Pharmaceutical Microbiology, Immunology & Immunotechnology)****Course Outcomes:**

- CO1: Understand the sterilization methods and media preparation.
- CO2: Enumerate bacterial and yeast cells
- CO3: Detect microbial contaminations in pharmaceutical products.
- CO4: Determine antimicrobial activity of chemical compounds.
- CO5: Perform various immunological experiments.

19IMBT81: Bioprocess Technology**Course Outcomes:**

- CO1: Develop an understanding of various aspects of bioprocess technology.
- CO2: Understand the principles of fermentor design and types.
- CO3: Gain knowledge about mass transfer in bioreactors.
- CO4: Evaluate nanotechnology and microbial production of therapeutic compounds.
- CO5: Understand various downstream processing techniques.

19IMBT82: Bacteriology & Virology**Course Outcomes:**

- CO1: Understand host parasite relationships.
- CO2: Evaluate the causes, prevention and management of diseases caused by Gram positive bacteria.
- CO3: Analyze the causes, prevention and management of diseases caused by Gram negative bacteria.
- CO4: Understand properties and classification of Viruses.
- CO5: Gain an insight into viruses and the life cycle and pathogenicity, prevention and treatment of viral diseases.

19IMBT83: Mycology & Parasitology**Course Outcomes:**

- CO1: Gain knowledge about mycology and classification of fungi.
- CO2: Understand the etiology diagnosis and management of the different fungal infections.

CO3: Evaluate the Life cycle and pathogenicity of the most important parasitic protozoa.

CO4: Analyze life cycle and pathogenicity of helminthes.

CO5: Understand common lab techniques used in the identification of parasites.

19IMBP86: Practical 7 (Bioprocess Technology, Bacteriology & Virology, Mycology & Parasitology)

Course Outcomes:

CO1: Produce microbial metabolites by fermentation.

CO2: Identify pathogens from clinical samples.

CO3: Identify the fungi from clinical samples.

CO4: Identify the Parasites, eggs & Larvae from Processed samples

19IMBT91: Molecular Biology & Recombinant DNA Technology

Course Outcomes:

CO1: Understand DNA structure and Protein interactions.

CO2: Appreciate the hierarchical organization of DNA and DNA replication.

CO3: Gain an insight into the mechanism of transcription and translation and regulation of gene expression.

CO4: Evaluate the strategies in gene cloning.

CO5: Appreciate the applications of rDNA technology.

19IMBT92: Biofuel & Bioenergy

Course Outcomes:

CO1: Acquire knowledge about classification of biofuels.

CO2: Evaluate the utilization of alternative feed stock for biogas and biofuel production.

CO3: Analyze renewable and non – renewable energy sources and energy management.

CO4: Develop an understanding of utilization of biomass for energy production.

CO5: Understand bioelectricity generation from microbes.

19IMBT93: Microbial Inoculants and Mushroom Technology

Course Outcomes:

CO1: Appreciate the importance of microbial inoculants and biofertilizers in agriculture.

CO2: Understand the cultivation and production methods for biofertilizers.

CO3: Differentiate types of mushrooms cultivated around the world.

CO4: Understand the cultivation of different types of mushroom

19IMBT94: Bioinstrumentation & Research Methodology

Course Outcomes:

CO1: Appreciate the working principles and applications of Microscopy.

CO2: Understand principles and applications of spectroscopy, centrifugation.

CO3: Evaluate the various types & applications of chromatography and electrophoresis.

CO4: Understand the methodology of doing research.

CO5: Understand the mechanics of thesis writing.

19IMBP95: PRACTICAL 8

(molecular Biology & Recombinant Dna Technology, Biofuel & Bioenergy, Microbial Inoculants and Mushroom Technology, Bioinstrumentation & Research Methodology)

Course Outcomes:

- CO1: Isolate genomic and plasmid DNA and undertake Molecular biology experiments.
- CO2: Quantify biogas and analyze biogas slurry.
- CO3: Cultivate Mushrooms.
- CO4: Undertake biomass briquetting uses coir pith, groundnut cake and bagasse.

19IMBT101: Medical Diagnostic Technology**Course Outcomes:**

- CO1: Understand laboratory safety precautions, quality assurance and disposal of waste.
- CO2: Understand pathological analysis of clinical specimens.
- CO3: Know about blood grouping and analysis.
- CO4: Perform tissue fixation and staining.

19IMBT102: Applied Microbiology**Course Outcomes:**

- CO1: Understand the nature of soil microbial interactions.
- CO2: Gain knowledge about Interactions between plant and microbes.
- CO3: Analyze the cause of various plant diseases and the principles of organic farming.
- CO4: Understand the impact of air and water contamination and evaluate air and water quality.
- CO5: Understand waste types and Bioremediation

19IMBP103 - Practical 9

(Medical Diagnostic Technology & Applied Microbiology)

Course Outcomes:

- CO1: Enumerate soil microorganisms.
- CO2: Identify free – living nitrogen fixing bacteria and symbiotic N₂ fixing bacteria from soil.
- CO3: Screen phosphate solubilizers from soil.
- CO4: Enumerate airborne microorganisms.
- CO5: Perform diagnostic techniques in microbiology.

Department Electives**19IMBE16.1: Techniques in Microbiology****Course Outcomes:**

- CO1: Understand the basic principles, types and application of microscopes.
- CO2: Develop skills on samples preparation by using analytical methods.
- CO3: Gain knowledge about types of instruments and its applications in Microbiology.

19IMBE16.2: Phycology and Mycology**Course Outcomes:**

- CO1: Know about the classification & characteristics of Algae and Fungi.
- CO2: Know about the economic importance of Algae & Fungi.

CO3: Gain knowledge about the Algae and fungal products.

19IMBE16.3: Biological Science

Course Outcomes:

CO1: Understand fundamentals of biological science.

CO2: Understand the Classification & General characteristics of Angiosperm and invertebrates.

CO3: Gain knowledge about the Significance of Experimental plants and animals.

19IMBE36.1: Public Health Microbiology

Course Outcomes:

CO1: Describe the basic concepts of public health hygiene.

CO2: Investigate the outbreaks of communicable diseases.

CO3: Give awareness about Prevention of disease and promoting health among populations.

19IMBE36.2: Virology

Course Outcomes:

CO1: Study the nature of pathogenic viruses.

CO2: Unravel the mechanisms by which viruses infect cells and cause disease.

CO3: Impart the knowledge regarding the diagnostics clinical aspects.

19IMBE36.3: Rhizosphere Biology

Course Outcomes:

CO1: Learn about the morphology and general characteristics of algae.

CO2: Describe the commercial production of fuels, microbial enzymes from microalgae.

CO3: Know about different molecular approaches involved microalgae to enhance its application.

19IMBE56.2: Commercial Biotechnology and IPR

Course Outcomes:

CO1: Gain knowledge about the Industrially important microorganisms & nutritional requirements.

CO2: Know about the Commercialization methods of Microbial products.

CO3: Know about Legal protection & IPR.

19IMBE56.3: Microbiome Science

Course Outcomes:

CO1: Know about types of Microbiome.

CO2: Gain knowledge about microbiome data analysis.

CO3: Acquire knowledge about role of Microbiome in various diseases.

19IMBE85.1: Entrepreneurship and Management for Microbiology

Course Outcomes:

CO1: Explain bio entrepreneurship and describe its components and forms.

CO2: Gain knowledge about institutions and schemes of government of India.

CO3: Understand the required skills for entrepreneurs.

CO4: Gain knowledge about composting methods.

CO5: Explain methods of production of Teaching kits and Diagnostic kits.

19IMBE 85.2: Bioremediation

Course Outcomes:

- CO1: Understand the principles of bioremediation.
- CO2: Understand the biodegradation process.
- CO3: Evaluate various types of bioreactors.
- CO4: Understand Bioremediation in fresh and marine water system.
- CO5: Understand **the degradation of xenobiotics**.

19IMBE 85.3: Microbial Nanotechnology

Course Outcomes:

- CO1: Understand the nanotechnology concepts.
- CO2: Gain knowledge about Microbial nanotechnology & its applications.
- CO3: Acquire knowledge about preparation of nano biomaterials.
- CO4: Understand the nano scale applications in biology and medicine.
- CO5: Gain knowledge about implications of Nanotechnology.

19IMBE 96.1: Microbial Diversity and Extremophiles

Course Outcomes:

- CO1: Know about a Microbial Biodiversity.
- CO2: Gain knowledge about Characteristics, classification and applications of Extremophiles.
- CO3: Understand the Alkalophiles and Acidophiles.
- CO4:** Understand about the halophilic and basophilic microorganisms and its importance.
- CO5:** Get knowledge about Space Microbiology.

19IMBE 96.2: Environmental Microbial Technology

Course Outcomes:

- CO1: Demonstrate an understanding of key concepts in ecosystems.
- CO2: know the microorganisms responsible for water pollution.
- CO3: Understand the various assessment techniques of air quality.
- CO4: Describe about different sewage treatment methods employed in waste water treatment.
- CO5: Learn about the global environmental problems.

19IMBE 96.3: Vermitechnology

Course Outcomes:

- CO1: Gain knowledge about major types of soil.
- CO2: Understand the characteristics of soil.
- CO3: Describe the role of earthworms in soil.
- CO4: To know the production methods for composting.
- CO5: Develop an understanding of utilization of earthworms for vermicompost production.

Ancillary Courses Offered to Other Departments

19IMBA15: Microbiology – I

Course Outcomes:

- CO1: Understand the history and recent developments in Microbiology.
- CO2: Understand the principle and operation of different types of microscopes and their applications.
- CO3: Understand staining reactions and structure of bacteria.
- CO4: Gain knowledge about different methods of sterilization.
- CO5: Explain the media types and pure culture techniques.

19IMBA26: Microbiology- II

Course Outcomes:

- CO1: Differentiate prokaryotic and eukaryotic cells.

- CO2: Understand the ultra-structure of the bacteria.
- CO3: Describe the characteristics of Archaeobacteria, Eubacteria and Cyanobacteria.
- CO4: Gain knowledge about isolation and preservation of microorganisms.
- CO5: Gain knowledge about the antimicrobial drugs.

19IMBP27: Ancillary Practical – I – Microbiology

Course Outcomes:

- CO1: Understand the sterilization methods and media preparation.
- CO2: Perform the pure culture techniques.
- CO3: Enumerate bacteria and yeast.
- CO4: Understand the staining methods and slide culture techniques.

Interdepartmental Elective Courses (IDE) offered to Other Departments

19IMBX 515.1: Microbiology

Course Outcomes:

- CO1: Classify microbes and understand their ultra structure.
- CO2: Understand the Growth and Culture of Microorganisms.
- CO3: Analyze the various metabolic pathways and cycles in microbes.
- CO4: Evaluate the sources of microorganisms in food, microbial fermentation of foods and antibiotic resistance.

DEPARTMENT OF MICROBIOLOGY

M.Sc. Microbiology (Two-Year) Programme

19MIBC101: General Microbiology

Course Outcomes:

- CO1: Gain knowledge about the Classification of microorganisms.
- CO2: Appreciate the principles and applications of microscopes.
- CO3: Understand the structural features of bacteria, Protozoa, Algae, Fungi and Viruses.
- CO4: Understand the metabolism of microorganisms.
- CO5: Understand the microbial diversity in extreme environments

19MIBC102: Pharmaceutical Chemistry & Pharmaceutical Microbiology

Course Outcomes:

- CO1: Gain a strong knowledge on Volumetric Analysis.
- CO2: Acquire knowledge about photometric methods and Microbial transformations.
- CO3: Apply the Concepts of pharmaceuticals and biopharmaceuticals.
- CO4: Understand about the bacterial mechanism and action of antibiotics.
- CO5: Apply the Quality Assurance, good laboratory practices in microbiology laboratory.

19MIBC103: Immunology & Immuno Technology

Course Outcomes:

- CO1: Understand the functional organization of the immune system.
- CO2: Evaluate the interactions between Antigen and Antibodies.
- CO3: Analyze the basis of Immunological disorders.
- CO4: Appreciate the guidelines and methods for sample collection and processing.
- CO5: Understand serological methods for diagnosis of infections.

19MIBP104: Practical I

(General Microbiology, Pharmaceutical Chemistry & Pharmaceutical Microbiology, Immunology & Immunotechnology)

Course Outcomes:

CO1: Understand the sterilization methods and media preparation.

CO2: Enumerate bacterial and yeast cells

CO3: Detect microbial contaminations in pharmaceutical products.

CO4: Determine antimicrobial activity of chemical compounds.

CO5: Perform various immunological experiments.

19MIBC201: Bioprocess Technology

Course Outcomes:

CO1: Develop an understanding of various aspects of bioprocess technology.

CO2: Understand the principles of fermentor design and types.

CO3: Gain knowledge about mass transfer in bioreactors.

CO4: Evaluate nanotechnology and microbial production of therapeutic compounds.

CO5: Understand various downstream processing techniques.

19MIBC202: Bacteriology & Virology

Course Outcomes:

CO1: Demonstrate host parasite relationships.

CO2: Evaluate the causes, prevention and management of diseases caused by Gram positive bacteria.

CO3: Analyze the causes, prevention and management of diseases caused by Gram negative bacteria.

CO4: Understand properties and classification of Viruses.

CO5: Gain an insight into viruses and the life cycle and pathogenicity, prevention and treatment of viral diseases.

19MIBC203: Mycology & Parasitology

Course Outcomes:

CO1: Gain knowledge about mycology and classification of fungi.

CO2: Understand the etiology diagnosis and management of the different fungal infections.

CO3: Evaluate the Life cycle and pathogenicity of the most important parasitic protozoa.

CO4: Analyze life cycle and pathogenicity of helminths.

CO5: Understand common lab techniques used in the identification of parasites.

19MIBP204: PRACTICAL II

(Bioprocess Technology, Bacteriology & Virology, Mycology & Parasitology)

Course Outcomes:

CO1: Produce microbial metabolites by fermentation.

CO2: Identify pathogens from clinical samples.

CO3: Identify the fungi from clinical samples.

CO4: Identify the Parasites, eggs & Larvae from Processed samples

19MIBC301: MOLECULAR BIOLOGY & RECOMBINANT DNA TECHNOLOGY

Course Outcomes:

CO1: Understand DNA structure and Protein interactions.

CO2: Appreciate the hierarchical organization of DNA and DNA replication.

CO3: Gain an insight into the mechanism of transcription and translation and regulation of gene expression.

CO4: Evaluate the strategies in gene cloning.

CO5: Appreciate the applications of rDNA technology.

19MIBC302: BIOFUEL & BIOENERGY

Course Outcomes:

CO1: Acquire knowledge about classification of biofuels.

CO2: Evaluate the utilization of alternative feed stock for biogas and biofuel production.

CO3: Analyze renewable and non – renewable energy sources and energy management.

CO4: Develop an understanding of utilization of biomass for energy production.

CO5: Understand bioelectricity generation from microbes.

19MIBC303 - CORE 11: MICROBIAL INOCULANTS AND MUSHROOM TECHNOLOGY

Course Outcomes:

CO1: Appreciate the importance of microbial inoculants and biofertilizers in agriculture.

CO2: Understand the cultivation and production methods for biofertilizers.

CO3: Differentiate types of mushrooms cultivated around the world.

CO4: Understand the cultivation of different types of mushroom.

19MIBC304: BIOINSTRUMENTATION & RESEARCH METHODOLOGY

Course Outcomes:

CO1: Appreciate the working principles and applications of Microscopy.

CO2: Understand principles and applications of spectroscopy, centrifugation.

CO3: Evaluate the various types & applications of chromatography and electrophoresis.

CO4: Understand the methodology of doing research.

CO5: Understand the mechanics of thesis writing.

19MIBP305: PRACTICAL III

(Molecular Biology & Recombinant Dna Technology, Biofuel & Bioenergy, Microbial Inoculants And Mushroom Technology, Bioinstrumentation & Research Methodology)

Course Outcomes:

CO1: Isolate genomic and plasmid DNA and undertake Molecular biology e-periments.

CO2: Quantify biogas and analyse biogas slurry.

CO3: Cultivate Mushrooms

CO4: Undertake biomass briquetting uses coirpith, groundnut cake and bagasse.

19MIBC401: Medical Diagnostic Technology

CO1: Understand laboratory safety precautions, quality assurance and disposal of waste.

CO2: Understand pathological analysis of clinical specimens

CO3: know about blood grouping and analysis

CO4: Perform tissue fixation and staining

19MIBC402: Applied Microbiology

Course Outcomes:

CO1: Understand the nature of soil microbial interactions.

CO2: Gain knowledge about Interactions between plant and microbes.

CO3: Analyze the cause of various plant diseases and the principles of organic farming.

CO4: Understand the impact of air and water contamination and evaluate air and water quality.

CO5: Understand waste types and Bioremediation.

19MIBP403: Practical IV

(MEDICAL Diagnostic Technology & Applied Microbiology)

Course Outcomes:

CO1: Enumerate soil microorganisms.

CO2: Identify free – living nitrogen fixing bacteria and symbiotic N₂ fixing bacteria from soil.

CO3: Screen phosphate solubilizers from soil.

CO4: Enumerate airborne microorganisms.

CO5: Perform diagnostic techniques in microbiology

19MIBE 215.1: Entrepreneurship and Management FOR MICROBIOLOGY

Course Outcomes:

CO1: Gain knowledge about institutions and schemes of government of India.

CO2: Understand the required skills for entrepreneurs

CO3: Gain knowledge about composting methods.

CO4: Evaluate methods of production of Teaching kits and Diagnostic kits.

19MIBE 215.2: Bioremediation

Course Outcomes:

CO1: Understand the principles of bioremediation.

CO2: Understand the biodegradation process.

CO3: Evaluate various types of bioreactors

CO4: Understand Bioremediation in fresh and marine water system.

CO5: Understand the degradation of xenobiotics.

19MIBE 215.3: Microbial Nanotechnology

Course Outcomes:

CO1: Understand the nanotechnology concepts

CO2: Gain knowledge about Microbial nanotechnology & its applications.

CO3: Acquire knowledge about preparation of nanobiomaterials .

CO4: Understand the nanoscale applications in biology and medicine.

CO5: Gain knowledge about implications of Nanotechnology

19MIBE 215.4: Food and Dairy Microbiology

Course Outcomes:

CO1: Understand the types of microorganisms in food

CO2: Gain knowledge about fermented food

CO3: Acquire knowledge about contaminations and spoilage of various food products.

CO4: Evaluate foodborne diseases.

CO5: Demonstrate food preservation methods.

19MIBE 315.1: Microbial Diversity and Extremophiles

Course Outcomes:

CO1: Understand the Microbial diversity

CO2: Understand the characteristics of microorganisms in extremes

CO3: Acquire knowledge about space Microbiology

19MIBE 315.2: Environmental Microbial Technology

Course Outcomes:

- CO1:** Demonstrate an understanding of key concepts in ecosystems
- CO2:** know the microorganisms responsible for water pollution
- CO3:** Understand the various assessment techniques of air quality
- CO4:** Describe about different sewage treatment methods employed in waste water treatment
- CO5:** Learn about the global environmental problems

19MIBE 315.3: Vermitechnology

Course Outcomes:

- CO1:** Gain knowledge about major types of soil
- CO2:** Understand the characteristics of soil
- CO3:** Describe the role of earthworms in soil
- CO4:** To know the production methods for composting
- CO5:** Develop an understanding of utilization of earthworms for vermicompost Production

19MIBE 315.4: IPR, Biosafety & Bioethics

Course Outcomes:

- CO1:** Understand the concepts, criteria and importance of IPR and patents.
- CO2:** Understand agreements, treaties and recent amendments.
- CO3:** Explain logics and concepts of patents.
- CO4:** Follow Biosafety practices in a Laboratory.
- CO5:** Understand the principles of bioethics.

19MIBX315.1: Microbiology

Course Outcomes:

- CO1:** Classify microbes and understand their ultra structure.
- CO2:** Understand the Growth and Culture of Microorganisms.
- CO3:** Analyze the various metabolic pathways and cycles in microbes.
- CO4:** Evaluate the sources of microorganisms in food, microbial fermentation of foods and antibiotic resistance.