

Department of Microbiology

Program Outcomes (PO)

Upon completion of the programme, the student will attain the ability to:

- PO1:** Acquire comprehensive knowledge and basic concept of Microbiology and basic instrumentation techniques.
- PO2:** Developed skill knowledge in Research and development sectors.
- PO3:** Analyze a research problem, and identify and define the logical solution to it. Develop research temperament through dissertation work in a team.
- PO4:** Develop academically competent and motivated personnel, equipped with critical thinking and high moral and ethical values.
- PO5:** Pursue career in academics, pharma industry, biotech industry and other competitive examinations.

Program Specific Outcomes (PSO)

Upon completion of the programme, the student will attain the ability to:

- PSO1:** Understand basic concepts of diverse group of microorganisms like eubacteria, archea, fungi, viruses
- PSO2:** Acquire practical skills of standard microbiological techniques like pure culture technique, preservation and maintenance of microbial culture, assessment of food quality.
- PSO3:** Produce entrepreneurs who can develop sustainable solutions in mushroom cultivation and small scale biofertilizer production.
- PSO4:** Skill enhancement in plant tissue culture and basic molecular biology techniques.
- PSO5:** Practical skills on handling of basic biophysical instruments which will help in future.

PSO6: Pursue career in academics, competitive examinations (FCI, IFS, BIS), biotech industry and other pharma industry.

SEMESTER-I

MBIO CC101: Introduction to Microbiology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand Knowledge about contributions made by prominent scientists in this field

CO2: Comprehend Standard microbiological culture techniques

CO3: Apply Basic instrumentation in microbiology

CO4: Develop Knowledge about growth and nutritional requirement of microorganisms

SEMESTER-I

MBIO CC102 : Microbial Diversity

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand Characteristics features of different groups of microorganisms

CO2: Analysis types of classification of microorganisms

CO3: Apply General characteristics acellular and cellular microorganisms (bacteria, Fungi, Algae, viruses, protozoa, archaea)

CO4: Understand the Ultrastructure of bacterial cells and methods of reproduction.

CO5: Develop knowledge of Nature of viruses and different viruses of animals, plants and bacteria (bacteriophages)

SEMESTER-II

MBIO CC203 : Biochemistry

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the Concept of Bioenergetics.

CO2: Analysis the Carbohydrates: types, structure and its storage form

CO3: Develop knowledge on Lipids: Types, structure and function

CO4: Learn about Vitamins : types, function, deficiency disease

CO5: Gain Knowledge on Proteins : structure, function, enzyme kinetics and inhibition

SEMESTER-II

MBIO CC204 : Agricultural Microbiology (Theory)

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Study on microbial ecology and their interaction with environment.

CO2: Understand Plant microbe's interactions

CO3: Analysis Biofertilizers and biopesticides: their production techniques

CO4: Develop Production of biogas, biomethane and biohydrogen

CO5: Acquire a knowledge of GM Plants

SEMESTER-III

MBIO CC305 : Microbial Physiology And Metabolism (THEORY)

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the Growth characteristics of microorganisms inhabiting in extreme environment

CO2: Describe the mechanism of nutrient transport

CO3: Analysis the mechanism of energy generation in autotrophs, chemolithotrophs & heterotrophs

CO4: Acquire knowledge on mechanism of aerobic and anaerobic respiration mode

SEMESTER-III

MBIO CC306: Cell Biology (Theory)

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the structure of cell and function of various subcellular organelles

CO2: Demonstrate the protein sorting mechanism in ER, Golgi complex

CO3: Analysis the mechanism of cell signalling, cell cycle, cell division and cell death

CO4: Apply Practical skill of preparation of temporary and permanent slides for mitosis and meiosis.

SEMESTER-III

MBIO CC307: Molecular Biology (Theory)

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: The structure of the genetic material present in an organism i.e., DNA and RNA

CO2: Mechanism of replication, transcription and translation

CO3: The regulation of gene expression occurring in prokaryotes and eukaryotes

CO4: Practical skill in isolation of bacterial DNA and its visualization

SEMESTER IV

MBIO CC 408: Microbial Genetics

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand Genome organization and extrachromosomal DNA in prokaryotes and eukaryotes

CO2: Analysis the Molecular mechanisms that underlie mutations.

CO3: Develop knowledge on Mechanisms of genetic material exchange
(transformation, conjugation & transduction)

CO4: Apply Practical skill on study of auxotroph, mutagenic effect of mutagens and plasmid conformations.

SEMESTER-IV

MBIO CC409: Environmental Microbiology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Develop a better understanding of ecosystem and associated microflora

CO2: Analysis on idea of nutrient cycling with reference to C- cycle, N- cycle and other elements

CO3: Understand the Role of microorganisms in degradation of solid/liquid wastes

CO4: Apply Skills in isolation of *Rhizobium* & other microflora from rhizosphere & rhizoplane

SEMESTER-V

MBIO CC410: Food and Dairy Microbiology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the Role of microorganisms in food spoilage

CO2: Analysis the Methods of food preservation

CO3: Develop knowledge on Role of microorganisms in production of fermented foods and probiotics

CO4: Apply Testing of milk quality and microorganism associated with various spoiled foods

SEMESTER-V

MBIO CC511: Industrial Microbiology (Theory)

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the Methods of isolation of microorganisms from different sources

CO2: Analysis the Methods of preservation of industrially important microbes

CO3: Apply Knowledge of different types of fermentation process and bioreactors

CO4: Demonstrate the Knowledge of downstream processes and enzyme mobilization techniques

SEMESTER-V

MBIO CC512: Immunology (Theory)

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Gain Knowledge of various scientific contributions in the field of immunology

CO2: Understand Immune system and its response to pathogenic microorganisms

CO3: Develop Understanding of various immunological disorders

CO4: Apply Knowledge of various immunological techniques

SEMESTER-VI

MBIO CC613: Medical Microbiology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the Microbiota of human and host pathogen interaction

- CO2:** Analysis Disease caused by the pathogenic microorganisms and its diagnosis
- CO3:** Develop understanding of common bacterial, viral, fungal, parasitic diseases of human being and animals
- CO4:** Develop Knowledge of various therapeutical measures to combat microbial diseases

SEMESTER-VI

MBIO CC614: Recombinant DNA Technology (Theory)

COURSE OUTCOME

After completion of the course, the student will be able to:

- CO1:** Understand the Concept of RDT & its application in the production of therapeutic products
- CO2:** Analysis the Genetic engineering tools for manipulation of DNA
- CO3:** Develop knowledge on DNA isolation techniques, PCR and gel electrophoresis
- CO4:** Perform Demonstration of Bacterial Transformation and calculation of transformation efficiency.

SEMESTER-VI

MBIO DSE501: Biostatistics

COURSE OUTCOME

After completion of the course, the student will be able to:

- CO1:** Develop basic knowledge of mathematics as applied to biological phenomenon
- CO2:** Understand the basic concepts of statistics and their importance
- CO3:** Apply Various statistical techniques to prove the significance of biological experiment
- CO4:** Demonstrate knowledge on Standard Deviation, Coefficient of Variation, Correlation and regression.

SEMESTER-V

MBIO DSE502: Microbes in Sustainable Agriculture and Development

COURSE OUTCOME

After completion of the course, the student will be able to:

- CO1:** Understand the Multifarious roles of microorganisms in the field of sustainable agriculture
- CO2:** Develop Knowledge of various microbiological process of soil
- CO3:** Understand the Knowledge of controlling plant pathogens to combat plant diseases
- CO4:** Demonstrate the Application of biofertilizers and biopesticides in agricultural fields
- CO5:** Apply Practical skill of mushroom cultivation

SEMESTER-VI

MBIO DSE603: Instrumentation and Biotechniques

COURSE OUTCOME

After completion of the course, the student will be able to:

- CO1:** Understand the Instruments and its techniques to study microbes and its biomolecules
- CO2:** Develop depth Knowledge of observing microbial world through microscopy technique
- CO3:** Analysis the Biomolecule separation techniques: chromatography, gel electrophoresis, spectrophotometry
- CO4:** Apply Demonstration of column packing in any form of column chromatography

SEMESTER-VI

MBIO DSE604 : Project Work / Dissertation (6 Credits)

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Apply Experimental approach of various scientific phenomena

CO2: Enhance knowledge on research aptitude and designing experiments independently

CO3: Develop knowledge on Augmenting reading habit of research/review articles

CO4: Skilled knowledge on project work

SEMESTER-I

MBIO GE101: Introduction and Scope of Microbiology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the General characteristics of acellular (viruses) and cellular microorganisms (bacteria, fungi, algae, protozoa, archaea)

CO2: Classify bacteria into different groups and methods of reproduction.

CO3: Develop depth knowledge of the chemical nature of viruses and different types animals, plants and bacteria (bacteriophages)

CO4: Study the principle and applications of important instruments autoclave, incubator, hot air oven, light microscope, pH meter) used in the microbiology laboratory

SEMESTER-II

MBIO GE202: Bacteriology and Virology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the Ultrastructure of bacterial cells and their appendages.

CO2: Demonstrate the Methods of reproduction in bacteria.

CO3: Analysis Viruses: types (Plant virus, Animal virus and bacteriophage)

CO4: Study the morphological structures of viruses (DNA and RNA) and their important characters using electron micrographs

SEMESTER-II

MBIO GE202: Bacteriology and Virology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand the Ultrastructure of bacterial cells and their appendages.

CO2: Demonstrate the Methods of reproduction in bacteria.

CO3: Analysis Viruses: types (Plant virus, Animal virus and bacteriophage)

CO4: Study the morphological structures of viruses (DNA and RNA) and their important characters using electron micrographs

SEMESTER-III

MBIO GE303: Industrial And Food Microbiology

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Demonstrate the Use of microorganisms in fermentation industry

CO2: Understand the Different parameters essential for large scale production of industrial products

CO3: Develop depth knowledge on different methods of food preservation and food sanitation

CO4: Apply Laboratory skills in producing alcohol and enzymes using bacteria/yeast

SEMESTER-IV

MBIO GE404: Microbes in Environment

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand ecosystem and associated microflora

CO2: Develop understanding of microbial interactions with other organisms and among themselves

CO3: Demonstrate an idea of nutrient cycling with reference to carbon, nitrogen & other elements

CO4: Apply Skills in isolation of microbes from soil and potent enzymatic (cellulase, amylase) activity

SEMESTER-IV

MBIO SEC402: Biofertilizers and Biopesticides

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Understand N₂ fixation, phosphate solubilization & mycorrhizal interaction in maintaining soil fertility

CO2: Developed skill on potent microorganism to be used as biopesticides

CO3: Analysis Viral diseases, their causal agent, symptoms, prevention and control measures

CO4: Develop depth knowledge on Bioinsecticides

SEMESTER-I

Ability Enhancement Compulsory Courses (AECC) English

COURSE OUTCOME

After completion of the course, the student will be able to:

CO1: Communicate effectively using the techniques in the area of spoken as well as written communication.

CO2: Hone their LSRW skills within their communication.

CO3: Design and answer job interview questions

CO4: Demonstrate the ability to craft professional messages that are clear yet courteous.

HINAECC101– हिंदी-व्याकरण और सम्प्रेषण

परिणाम - 1. विभिन्न प्रतियोगी परीक्षाओं के लिए तैयार करना ।

२. सम्प्रेषण-क्षमता की वृद्धि करना ।

३. कार्यालयी-पत्र लेखन की क्षमता विकसित करना ।

४. हिंदी के व्याकरणिक एवं सैद्धांतिक स्वरूप की जानकारी हासिल करना ॥
