

Sr. No.	Course Code	Course Title	Course Objective	Expected Outcome
1	MI 101	Introduction to Microbial world	This course is designed to enable students to acquire basic understanding of the microbiological world, its origin and structure to help the potential application of the unexplored and unidentified organisms in the industry	<ul style="list-style-type: none"> • Shall learn development of Microbiology as a new discipline of Biological Science • Develop an understanding of microbes their habitat and significance in genetic engineering • Techniques of pure culture study • The student would be able to develop an understanding of various staining techniques and microscopic methods to study bacteria
2	MI 103	Basic Bacteriology	The objective of this course is to provide an understanding of bacterial classification systems, the structure, behaviour and functioning of cell constituents of bacteria and principle of microbial control	<ul style="list-style-type: none"> • Shall learn about the morphology and structure of organisms, their nutrition, culturing conditions and growth characteristics • students will understand the concept of sterilization and disinfection in laboratory, industry and hospital environment
3	MI- 201	Microbial Physiology	This course is designed to enable students to acquire basic understanding of the major bio molecules, enzymes and nutrition. Bacterial growth, metabolism and	<ul style="list-style-type: none"> • Students Gain knowledge regarding Biomolecules and their significance • Understanding of structure, function, regulation, kinetics

			role of growth inhibitors	and inhibitors of various enzymes and mode of action chemotherapeutic agents
4	MI- 202	Soil and Water Microbiology	This course is designed to enable students to acquire basic understanding of soil microbiology and water microbiology, water born diseases caused by various microorganisms. To study the various analysis techniques for water contaminants.	<ul style="list-style-type: none"> • To acquire the knowledge for Soil microbial interaction and concept of soil fertility. • Water analysis and its purification. Gain knowledge about the various microorganisms harmful for potable water. • To study the various determination and purification processes of water and waste water
5	MI-204	Diversity of Bacteria	This course is designed to enable students to acquire basic knowledge origin and diversity of microbes, characteristics, taxonomy and phylogenetic concepts.	<ul style="list-style-type: none"> • Enabling the students to know and understand the basics of evolution and Phylogenetic relationships • Understanding the concepts of systematic classification and Taxonomic characterization of various bacteria
6	MI- 205	Food and Dairy Microbiology	The course imparts knowledge of production processes, techniques and utility of food, dairy and beverage products from microorganisms	<ul style="list-style-type: none"> • Development of awareness of commercial exploitation of microorganisms for various food products. • Enabling the students to understand and explore the use of microbes for the

				<p>benefit of mankind.</p> <ul style="list-style-type: none"> • Generation of knowledge of commercially important microbes and microbial products including milk, dairy, beverages and fermented foods. • Learn various standards, specifications and testing protocols involved in • food processing technologies like FSSAI , BIS and FDA regulations and HCCAP in food safety
7	MI-301	Molecular Genetics of Prokaryotes	This course is designed to enable students in understanding the basics of bacterial genetics	<ul style="list-style-type: none"> • Enabling the students to know and understand the basics, techniques and the applications of Molecular genetics in bacteria, mechanisms of gene transfer • Mutation and repair mechanisms
8	MI- 302	Bacterial Metabolism	This course is designed to enable students to acquire basic understanding of the metabolism and bimolecular interactions in the metabolic processes and also the study of various metabolic activities of the microbes. The enzymatic processes involved in metabolism	<ul style="list-style-type: none"> • Understand the concept of metabolism and various enzymatic reactions involved in metabolic fate of the microorganisms. Develop an understanding of the enzymes of microorganisms and their utility.
9	MI- 303	Principles of Immunology	This course is designed to enable	<ul style="list-style-type: none"> • Development of awareness

			<p>students to acquire understanding of the structure of immune system, its functions and also gives awareness of various immunodeficiency diseases. The awareness of the immune system will help them for further work in the field of vaccine production and also drug designing especially against immunodeficiency diseases</p>	<p>of structure and function of immune system</p> <ul style="list-style-type: none"> • Steps involved in monoclonal production and its use in vaccine production Gain knowledge on the immune system during healthy and diseased status, in immunological disorders (auto immune diseases, Hypersensitivities, immune deficiencies and also about transplant rejections) • Enables the student to pursue further studies on immunotherapy and drugs / vaccine production for various diseases
10	MI- 304	Bioprocess Technology	<p>The course imparts knowledge of production processes, infrastructure & techniques for manufacture of Biotechnology products from microorganisms, plants and animals and waste management from the manufacturing plants.</p>	<ul style="list-style-type: none"> • Development of awareness of various processing operational systems of Biotechnological industries • Enabling the students to monitor the various physical and chemical parameters during fermentation processes. • Generation of knowledge of Industrial products related to production aspects.
11	MI- 305	Agricultural Microbiology	<p>This course is designed to enable students to acquire the knowledge of</p>	<ul style="list-style-type: none"> • Students gain knowledge regarding best agricultural

			various aspects of soil microbiology, soil fertility and role of microbes as bio fertilizers and bio pesticides to overcome issues related to traditional agricultural practices.	practices by keeping soil flora as a measure of soil fertility/ soil health <ul style="list-style-type: none"> • Students can develop bio fertilizers and bio pesticides and integrated pest management approaches by developing transgenic crops
12	MI- 307	Genetic Engineering and Biotechnology	This course is designed to enable students in understanding the basics and applications of Genetic Engineering.	<ul style="list-style-type: none"> • Enabling the students to know and understand the basics, techniques and the applications of Molecular Cloning. • Acquiring knowledge on PCR, DNA sequencing and Mutations and Mutagenesis. • Understanding the Applications and Scope of Genetic Engineering. • Understanding the concepts of Regulatory aspects.
13	MI- 308	Virology and Mycology	The objective of this course is to provide an introduction to the viruses and fungi their types, salient features, classification, structure, reproduction transmission and pattern of infection and diseases	<ul style="list-style-type: none"> • Students acquire knowledge about viruses their types, host range and infection cycle in host • Also get knowledge about using bacteriophages as a tool for therapy specific diseases • General characteristics Importance of fungi in Human life, Fungi –

				<p>Taxonomy and Systematics</p> <ul style="list-style-type: none"> • Culture methods fungi, Diagnosis, Dimorphism Mycotoxins and fungal diseases in human animal and plants • Students can understand host responses to fungal infection-Immunity and role of antifungal agents
14	MI- 309	Medical Microbiology	<p>This course is designed to enable students to acquire basic knowledge of various infectious diseases caused by microbes, its route of transmission and also its control.</p>	<ul style="list-style-type: none"> • Gain knowledge on the symptoms, diagnosis and cure of infections and diseases caused by microbes • Enables the student to pursue further studies on medical microbiology, therapy and drugs /vaccine production for dreaded diseases
15	MI- 310	Fermentation Technology	<p>The course imparts knowledge of production processes, techniques and utility of different products produced by microorganisms in various areas including food, beverages, health & medicine, fuels, energy and environment.</p>	<ul style="list-style-type: none"> • Development of awareness of commercial exploitation of microorganisms. • Enabling the students to understand and explore the use of microbes for the benefit of mankind. • Generation of knowledge of commercially important microbes and microbial products and fermented foods.

16	MI- 311	Geomicrobiology	<p>The course focuses on interdisciplinary study of the interactions of microorganisms and earth materials (including soil, sediment, the atmosphere, the hydrosphere, minerals, and rocks). Microbes play a role on earth's surface in bio oxidation of metals and minerals, causing Acid mine drainage and role of microbes in fossil fuel generation</p>	<ul style="list-style-type: none"> • Students gain knowledge on metal microbes interaction • Various approaches like traditional and metagenomics to study microbial activities In Situ • Techniques of using microbes in bioleaching of precious metal from native ore • Also understand preventive measures of acid mine drainage and desulfurization of coal and fossil fuel formation process
----	---------	-----------------	---	---