

DEPARTMENT OF INDUSTRIAL MICROBIOLOGY

INDUSTRIAL MICROBIOLOGY PROGRAM OUTCOMES, PROGRAM SPECIFIC OUTCOMES, COURSE OUTCOMES:

INDUSTRIAL MICROBIOLOGY PROGRAM OUTCOMES:

PO1- Students will learn and inculcate the knowledge of using specific logic as they explore a wide range of contemporary subjects spanning various aspects of basic microbiology such as fundamentals of industrial microbiology, basic microbial techniques, food microbiology etc.

PO2- Students will appreciate the biological diversity of microbial forms.

PO3- Able to describe / explain the processes used by microorganisms for their replication, survival and interaction with their environment, hosts, and host populations.

PO4- Analyze and become aware of the important role of microorganisms which play in maintenance of a clean and healthy environment.

PO5- Acquire and demonstrate proficiency in good laboratory practices in a microbiological laboratory.

PO6- Understand the various biotechnological applications of microorganisms industrially on large scale.

PO7- Grasp and become familiar with scientific methodology, hypothesis generation and testing, design and execution of experiments.

PO8- Develop strong oral and written communication skills through the effective presentation results as well as through seminars.

PROGRAM SPECIFIC OUTCOMES:

PSO1- Understand the nature and relevance of various microbes to the surrounding environment including human life and mother nature becomes part of this branch of science.

PSO2- Integrate in students knowledge about the ultrastructure of bacteria and other microbes by developing the skills of handling of microscope.

PSO3- Students imbibe the knowledge of various scientists in microbiology and scope of various branches.

PSO4- Build a foundation and sound knowledge base of microbiological principles among future citizens of the country.

PSO5- Create career opportunities for the graduate students in manufacturing industry and research institutes at technical level.

COURSE OUTCOMES :

CLASS BSC I SEM -1

S.NO	PAPER CODE	PAPER NAME	COURSE OUTCOMES
1	IMB PAPER-101	FUNDAMENTALS OF MICROBIOLOGY	CO1- Describe diversity of microorganisms and contributions of scientists. CO2 –Classify the various microorganisms on the basis of taxonomic ranks. CO3- Explain the applied branches of microbiology and industrial importance of microbes. CO4- Describe the nutrition and culture techniques, medium and preservation of microbes.
2	IMB PAPER-102	MICROBIAL BIOCHEMISTRY	CO1- Determine the chemical processes that take place in microbes like bacteria, fungi, algae, protozoa. CO2- Understand the basic aspects of bioenergetics. CO3- Classify the various biomolecules like carbohydrates, proteins, lipids, nucleic acids. CO4- Imparts knowledge about types and functions of biomolecules. CO5- Role of enzymes secreted by microbes in daily life.

CLASS-BSC I SEM -2

S.NO	PAPER CODE	PAPER NAME	COURSE OUTCOMES
1	IMB PAPER-201	BASIC MICROBIAL TECHNIQUES	<p>CO1- Understand fundamental aseptic techniques, microscopy, micrometry.</p> <p>CO2 – Describe the microscopic enumeration of microorganisms.</p> <p>CO3- Analyze the various chromatographic techniques through experimental approach.</p> <p>CO4- Explain the basic instruments related to measurement of optical density like colorimeter, spectrophotometer etc.</p> <p>CO5- Understand the concept of fermenters and their types.</p>
2	IMB PAPER-202	MICROBIAL PHYSIOLOGY	<p>CO1- Study the microbial cell structures, growth and metabolism.</p> <p>CO2- Different models of cell membrane, biochemical properties and functions are understood.</p> <p>CO3- Types of cellular transport are demonstrated.</p> <p>CO4- Imparts knowledge about various respiratory pathways of microbes .</p> <p>CO5- Classify photosystems of bacteria.</p>

CLASS –BSC II SEM -3

S.NO	PAPER CODE	PAPER NAME	COURSE OUTCOMES
1	IMB PAPER-301	MICROBIAL GENETICS	<p>CO1- Understand the mechanisms of heritable information in microbes.</p> <p>CO2 – Imparts knowledge about molecular techniques used to modify genes and proteins..</p> <p>CO3- Describe manipulations of bacteria, archae for fundamental research.</p> <p>CO4- Explain the mechanisms of gene expression, mutation, recombination and extrachromosomal inheritance in bacteria.</p>
2	IMB PAPER-302	ENVIRONMENTAL MICROBIOLOGY I	<p>CO1- Develop analysis and synthesis skills to use the properties of microbes to solve environmental problems.</p> <p>CO2- Explain soil as dynamic ecosystem.</p> <p>CO3- Designed to environmental concepts like biogeochemical cycles, distribution of microbes in air and water.</p> <p>CO4- Imparts knowledge about liquid solid impingement devices to collect harmful bacteria.</p> <p>CO5- Fresh water and marine microbiology.</p>

CLASS BSC-II SEM-4

S.NO	PAPER CODE	PAPER NAME	COURSE OUTCOMES
1	IMB PAPER-401	FOOD MICROBIOLOGY	CO1- Gain knowledge about important pathogens and spoilage microorganisms in food. CO2 – Aseptic handling , use of physical and chemical preservation of food. CO3- Describe important food borne diseases with symptoms and control. CO4- Microbiological production of food through various microbes like beer, wine and understand prebiotics and probiotics.
2	IMB PAPER-402	ENVIRONMENTAL MICROBIOLOGY II	CO1- Analyze the concept of microbiology of domestic and waste water. CO2- Aware of water borne diseases. CO3- Solid waste processing and disposal, effect on public health and microbial pathogens in municipal waste . CO4- Imparts knowledge of biodegradation of environmental pollutants through important microbes like methanogens.

CLASS BSC-III SEM-5

S.NO	PAPER CODE	PAPER NAME	COURSE OUTCOMES
1	IMB PAPER-501	AGRICULTURAL MICROBIOLOGY	CO1- Gain knowledge about plant associated microbes and plant and animal diseases. CO2 – Imparts awareness about microbiology of soil fertility, such as microbial degradation of organic matter and soil nutrient transformations. CO3- Classification of plant diseases. CO4- Classify biopesticides and discuss major commercial biopesticides based on fungi, bacteria and viruses.
2	IMB PAPER-502	FERMENTATION TECHNOLOGY & IPR	CO1-Concept of Fermentation technology includes its history and scope, important industrial microbes selection and improvement. CO2- Microbial growth kinetics, fermentation media and their sterilization concepts. CO3- Aware of basic design of fermenters and their important types like stirred tank, airlift and column . CO4- Imparts knowledge of Intellectual property rights, laws regarding microbes and industrial designs of fermenters.

CLASS BSC III -SEM-6

S.NO	PAPER CODE	PAPER NAME	COURSE OUTCOMES
1	IMB PAPER-601	MICROBIAL BIOFERTILIZERS	CO1- Describe about the importance of biofertilizers. CO2 – Identify bacterial, algal and fungal biofertilizer. CO3- Concept of rizosphere and isolation of rizosphere microflora. CO4- Assess the quality control of biofertilizers.
2	IMB PAPER-602	MCROBIAL BIOTECHNOLOGY	CO1- Analyze the concept of microbes are used to manufacture components of food and consumer products. CO2- Aware of biologics and biomaterials using recombinant DNA . CO3- Understand the concept of genetic engineering and restriction enzymes. CO4- Imparts knowledge of the use of bacteria to produce antibiotics and other pharmaceuticals, the use of yeast to produce food and beverages, and the use of fungi to decompose organic matter in landfills.