



# JAI HIND COLLEGE

Basantsing Institute of Science & J. T. Lalvani College of Commerce.  
and Sheila Gopal Raheja College of Management.

**Autonomous**

**Program Name: Bachelor of Science (B.Sc in Microbiology)**

## PROGRAM OBJECTIVES:

PO1: To acquire, retain and apply knowledge relevant to the diverse areas in Microbiology.

PO2: To train them in thinking rationally, communicate scientific concepts and demonstrate competency in Microbiology techniques.

PO3: To Develop skills of observation and draw logical conclusions from experiments.

PO4: Imbibe ethical and moral values to become good global citizens.

PO5: To Develop curiosity about various aspects in Microbiology and explore the subject to creatively solve problems.

PO6: To Nurture capability and confidence in students so they can be future leaders.

PO7: To Engage in the varied disciplines of Microbiology through research and internship activities.

PO8: To make students aware of verbal or non-verbal methods and tools of communication to present/convey scientific ideas and opinions.

PO9: To sensitize them in developing social consciousness and environmental awareness.

PO10: To help them in understanding the importance of lifelong learning and inculcate soft skills which will help them to achieve it.

## COURSE OUTCOMES:

CO1: To interrelate the different groups of microorganisms and their importance. Analyze and apply the importance of staining methods to visualize microorganisms and its significance. Evaluate the effective methods for microbial control and its importance.

CO2: To design Outline general properties, structure, biological and economic importance various groups of microorganisms and describe various culturing and preservation methods of microorganisms. Enlist the different methods of sterilization and their applications.

CO3: To analyze microbial diversity and their roles in various environments. Connect theoretical knowledge of microbiology with practical applications and an understanding the relevance of microbiological techniques in various scientific and industrial contexts.

CO4: To differentiate Understanding the principles of inheritance of genetic traits and solve problems based on Mendelian genetics, and ability to carry out pedigree analysis for genetic traits, cell metabolism and the molecular mechanism involved in it.

CO5: To revise their knowledge of various bioanalytical techniques and their applications in Microbiology. Interpretation of Research papers, improved ability to search, understand and interpret research data and understanding of use biostatistics in research.

CO6: To Comprehend the relation of microbes with the environment and their influence. Deeper understanding of principles of food spoilage and its impact on human health. Learn and apply bioprocessing techniques for large-scale cultivation of microorganisms in industrial fermenters.

CO7: To Evaluate wastewater quality and its acceptable standards. Practical knowledge of determination of various parameters important for microbial control and preservation in foods. Analysis and presentation of scientific data using Biostatistics.

CO8: To implement Knowledge of cellular structure and organization in eukaryotes. Learn and apply bioprocessing techniques for large-scale cultivation of microorganisms in industrial fermenters. Utilize bioinformatics tools for the analysis of microbial genomes. Interpret genomic data to gain insights into microbial genetics.

CO9: To analyze principles of microbial pathogenesis, including the mechanisms by which bacteria, viruses, fungi, and parasites cause diseases in humans. Comprehend the basic principles of immunology, including the structure and function of the immune system. Understand the cellular and molecular components of innate and adaptive immunity.

CO10: To apply fundamental biochemical principles and concepts applicable to microorganisms. Investigate the biosynthesis of cellular components, including nucleic acids, proteins, lipids, and cell wall components. Understand the regulatory mechanisms controlling biosynthetic pathways.

CO11: Gain proficiency in the principles and practices of fermentation technology for the production of various industrial products, including antibiotics, enzymes, biofuels, and organic acids. Acquire

knowledge of downstream processing techniques for the isolation, purification, and recovery of microbial products from fermentation broths and understand the safety and ethical aspects involved in fermentation technology.

CO12: To monitor the chemical composition of food components, including proteins, lipids, carbohydrates, vitamins, and minerals. Comprehend the reactions and changes that occur during food processing. Explore and understand various food processing methods, such as thermal processing, drying, freezing, and fermentation.

CO13: To judge the effect of gene mutations and its detection techniques. Understanding of detection and diagnosis of infectious diseases and demonstrating the ability to interpret results. Enhanced ability to analyze clinical case studies, interpret laboratory findings, and prepare comprehensive reports, enhancing their ability to communicate scientific information.

CO14: To analyze metabolic pathways, enzyme kinetics and assays. Practical application of microbial strain improvement experiments, applying mutagenesis or genetic engineering to enhance microbial strains for improved fermentation performance and better ability in troubleshooting common issues in fermentation technology.

CO15: To Demonstrate skills in culturing microorganisms for specific food production purposes, such as the production of yogurt or cheese. Understand and apply various packaging techniques to ensure the safety and shelf life of food products. age in fermentation processes for the production of fermented foods, including monitoring microbial activity and controlling fermentation conditions.