

Janardan Bhagat Shikshan Prasarak Sanstha's
CHANGU KANA THAKUR

Arts, Commerce and Science College, New Panvel (Autonomous)

Re-accredited A++ Grade by NAAC (Fourth Cycle – CGPA - 3.52)

'College with Potential for Excellence' Status Awarded by UGC

'Best College Award' by University of Mumbai

Microbiology
Course Outcomes

Syllabus implemented from the Academic Year 2025-26

Course Code: USC3MI1

Course Title: Introduction to Microbial Biochemistry

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Classify biomolecules based on structure
CO-2	Describe the structure of DNA
CO-3	Explain the role of ATP in biological processes.
CO-4	Distinguish between catabolism and anabolism.
CO-5	Classify enzymes based on the type of reaction they catalyze.

Course Code: USc3Mi2

Course Title: Applied Microbiology

Course Type: Major

No. of Credits: 2+1

Course Outcomes (Cos)

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Apply practical skills for screening of organisms.
CO-2	Describe the fermenter & fermentation process.
CO-3	Understand various treatment process of waste water
CO-4	Apply practical skills to determine portability of drinking water.
CO-5	Explain the role of microorganisms in dairy & food industries.

Course Code : USC3MI3

Course Title : Indian Knowledge System: Microbiology

Course Type: IKS (Major 3) Sem III

No. of Credits: 2

CO.No	COs Statement	
	After completing the Bachelor of Science Program, students will be able to-	
CO1	Interpret the microbial basis of fermentation in Indian traditional food systems and its health benefits.	BTL: Understand
CO2	Examine the effectiveness of ancient water purification methods in controlling microbial contamination..	BTL: Evaluate
CO3	Demonstrate traditional food fermentation techniques and assess their microbial impact.	BTL: Apply
CO4	Apply knowledge of traditional antimicrobial agents (<i>Neem, Turmeric, Tulsi</i>) to develop eco-friendly microbial control solutions..	BTL: Apply
CO5	Assess the scientific validity of traditional Indian microbiological practices through modern microbiological research.	BTL: Evaluate

Course Code: USC3IFM

Course Title: Industrial and Food Microbiology

Course Outcomes		
After the completion of course, the learner will be able to		
CO1	Explain fermentation process and fermenters	BTL: Understand
CO2	Demonstrate skills to screen microbes for potential products	BTL: Apply
CO3	Apply knowledge to prepare fermented foods	BTL: Apply

Course Code: UCM3MiOE1

Course Title: HUMAN MICROBIAL DISEASE MANAGEMENT

CO No.	COs Statement
	After completing the course, students will be able to-
CO-1	Describe the terminologies used in health and diseases.
CO-2	Explain the basic concept of microbial infection and its prevention.
CO-3	Identify sources of infection and mode of transmission.
CO-4	Justify the benefits of prophylaxis using vaccination.
CO-5	Explore global health challenges, emerging infectious diseases, and antimicrobial resistance.

Course Code: USC4 MI1

Course Title: Introduction to the Bioinformatics and Biostatistics

Course Type: Major

No. of Credits: 2

CO.No	COs Statement	
	After completing the Bachelor of Science Program, students will be able to-	
CO1	Interpret the microbial basis of fermentation in Indian traditional food systems and its health benefits.	BTL: Understand
CO2	Examine the effectiveness of ancient water purification methods in controlling microbial contamination..	BTL: Evaluate
CO3	Demonstrate traditional food fermentation techniques and assess their microbial impact.	BTL: Apply
CO4	Apply knowledge of traditional antimicrobial agents (<i>Neem, Turmeric, Tulsi</i>) to develop eco-friendly microbial control solutions..	BTL: Apply
CO5	Assess the scientific validity of traditional Indian microbiological practices through modern microbiological research.	BTL: Evaluate

Course Code: USC4 MI2

Course Title: Introduction to Medical Microbiology and immunology

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Apply practical skills for identifying organism.
CO-2	Describe the mechanism of infectious organism in causing disease.
CO-3	Understand role of immune system in protection against pathogen.
CO-4	Explain epidemiological terminologies.
CO-5	Gain insights of various diagnostic methods.
CO-6	Understand public health control measures during pandemic & epidemic.

Course Code: USc4Mi2

Course Title: Introduction to Medical Microbiology and immunology

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Apply practical skills for identifying organism.
CO-2	Describe the mechanism of infectious organism in causing disease.
CO-3	Understand role of immune system in protection against pathogen.
CO-4	Explain epidemiological terminologies.
CO-5	Gain insights of various diagnostic methods.
CO-6	Understand public health control measures during pandemic & epidemic.

Course Code: USC4MMI

Course Title: Medical Microbiology and Immunology

Course Outcomes		
After the completion of course, the learner will be able to		
CO1	Explain details of normal microbial flora of human body	BTL: Understand
CO2	Construct knowledge on transmission and control of diseases	BTL: Create
CO3	Summarize details of immune system of human	BTL: Understand

Course Code: UCM4MiOE1

Course Title: MICROBIAL PRODUCTS AND THEIR COMMERCIAL ASPECTS

CO No.	COs Statement
	After completing the course, students will be able to-
CO-1	Classify Different Types of Microbial Products
CO-2	Explain the Production Methods for Microbial Products
CO-3	Describe the Role of Microbial Products in Sustainable Development
CO-4	Investigate Case Studies of Microbial Product Commercialization
CO-5	Apply Knowledge of Marketing and Distribution Strategies for Microbial Products

Course Code: USc5Mi1

Course Title: Microbial Genetics and Medical Microbiology

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Understand fundamental principles of central dogma of life.
CO-2	Describe the basic principles of genetic exchange.
CO-3	Explain the correlation of mutation with phenotypic expression of cell.
CO-4	Understand modern alternatives to Koch's Postulates, Genetic modification and pathogen evolution.
CO-5	Explain the correlation these virulence factors with the pathogenesis and clinical features of the disease.
CO-6	Distinguish the mode of transmission, diagnosis, prophylaxis and treatment of various diseases.

T. Y. B. Sc. Minor

Course Code: USC5MIN

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Recall and describe the structural organization of chromosomes
CO-2	Identify different types of DNA structures (e.g., B-DNA, Z-DNA).
CO-3	Distinguish between anabolism and catabolism
CO-4	Explain the mechanism of enzyme action and factors influencing it

Course Code: SEC 3BF

Course Title: Skill Enhancement Course in Biofertilizer

Course Type: Minor

No. of Credits: 2

CO1	Explain the isolation and role of various soil bacteria in bio-fertilizer production.	BTL: Understand
CO2	Design production steps and specific requirements for each bio-fertilizer.	BTL: Create
CO3	Analyze the efficiency of biofertilizers	BTL: Analyze

Course Code: USC5VSC

Course Title: Essential Skills in Microbiology

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Demonstrate Proficiency in Microbiological Techniques
CO-2	Apply Molecular Biology Methods
CO-3	Execute Biochemical Procedures
CO-4	Utilize Biophysical Techniques

Course Code: USC5MIE1

Semester: V

Course Title: Introduction to Biotechnology

Course Type: Elective

No. of Credits: 04

(03 Theory & 01 Practical)

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Explain principle and application of molecular techniques in biotechnology
CO-2	Describe gene transfer techniques and application in animals
CO-3	Apply knowledge to synthesize industrially important products

Course Structure

Course Code: USc6Mi1

Course Title: Virology and Immunology

CO No.	COs Statement
	After completing the Bachelor of Science Program, students will be able to-
CO-1	Understand the basic structure and life cycle of different viruses and their cultivation.
CO-2	Describe the basic knowledge on Prions, Virioids and cancer causing viruses.
CO-3	Understand the about general structure, life cycle and classification of viruses
CO-4	Explain the the importance of cytokines, MHC, APCs, and its mechanism in formation of adaptive immunity.
CO-5	Explain the the mechanism of antigen –antibody reactions and it application in diagnosis of various infections
CO-6	Distinguish the structure & functions of immunoglobulin and its role in immune response.

Course Code: USc6Mi2 Paper 2

Course Title: Intermediary Metabolism and Industrial Products

Course Type: Major

Paper 2

No. of Credits: 4

CO. No	COs Statement	
	After completing the Bachelor of Science Program, students will be able to-	
CO1	Describe the enzymatic processes involved in protein and nucleotide degradation.	BTL: Remembering
CO2	Explain the mechanisms of enzyme activity regulation, including allosteric inhibition and covalent modification.	BTL: Understanding
CO3	Explain the principles and processes involved in the production of various traditional fermented products	BTL: Understanding
CO4	Explain strain development, biosynthesis, production methods, and recovery processes for industrial products.	BTL: Apply

Course Code: USC6MIE1

Semester: VI

Course Title: Applied Biotechnology

Course Type: Elective

No. of Credits: 04

(03 Theory & 01 Practical)

CO No.	COs Statement	
	After completing the Bachelor of Science Program, students will be able to-	
CO-1	Explain genetic engineering techniques in plants	
CO-2	Apply knowledge of molecular techniques in diagnostics	
CO-3	Describe the role of nucleic acids and proteins in therapeutics	

Course Code: USC6MIM

Course Title: Introduction to Medical and Industrial Microbiology

CO No.	COs Statement
CO-1	Describe the basic concept of host defense against pathogens.
CO-2	Analyze microbial factors contributing to infection, including adherence, invasion, and the role of virulence factors.
CO-3	Explain the methods used for isolating industrially important microorganisms.
CO-4	Explain the production processes of selected primary and secondary metabolites.

