

**Academic Year 2021-22**

**B.P.H.E. Society's  
Ahmednagar College, Ahmednagar  
Internal Quality Assurance Cell  
CO, PO, and PSO Attainment Sheet**

**Department Name** MICROBIOLOGY

**Program Name** B.Sc.

**Program Outcomes(PO)**

<b>PO1</b>	Impart basic knowledge of the respective subject from all
<b>PO2</b>	Students are to be trained to apply this knowledge in day-to-day
<b>PO3</b>	To enrich students' knowledge and train them in the pure microbial sciences
<b>PO4</b>	To introduce the concepts of application and research in Microbiology
<b>PO5</b>	To inculcate sense of scientific responsibilities and social and environment awareness
<b>PO6</b>	To help students build-up a progressive and successful career
<b>PO7</b>	
<b>PO8</b>	
<b>PO9</b>	
<b>PO10</b>	
<b>PO11</b>	
<b>PO12</b>	

**Program Specific Outcome(PSO)**

<b>PSO1</b>	At first year of under-graduation, students will be provided the basic information that includes –
<b>PSO2</b>	At second year under-graduation includes paper on principles of taxonomy and classification of major
<b>PSO3</b>	At third year under-graduation, The six theory papers will deal with broad areas of microbiology. Five such

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Class		F.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 111			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Introduction to Microbial World		CO1	1	0	0	0	0	1	2	0	0
Semester No	1		CO2	1	0	1	1	1	1	2	0	0
Teacher Name	Vishal Tungikar		CO3	2	1	2	1	0	1	2	0	0
Course Outcomes			CO4	2	3	2	2	1	3	2	0	0
	CO1	Understand history of microbiology	CO5									
	CO2	Acquire knowledge of different Eras of Microbiology and become acquainted with Nobel laureates in Life Sciences of 21st Century	Average	1.50	1.00	1.25	1.00	0.50	1.50	2.00	0.00	0.00
	CO3	Gain knowledge about different types of Microorganism with their differentiating characters										
	CO4	Understand beneficial and harmful effects of microorganisms in different fields of Microbiology										
	CO5											

Class		F.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 112			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Basic Techniques in Microbiology		CO1	3	2	2	1	1	1	2	0	0
Semester No	1		CO2	2	3	2	2	1	1	2	0	0
Teacher Name	Zarina Sayyed		CO3	3	2	1	1	1	1	2	0	0
Course Outcomes			CO4	2	3	1	2	2	1	2	0	0
	CO1	Get knowledge of Modern SI units	CO5									
	CO2	Understand Principles and Working of different types of Microscopes	Average	2.50	2.50	1.50	1.50	1.25	1.00	2.00	0.00	0.00
	CO3	Gain knowledge of different types of staining techniques and role of fixatives, mordants, decolourisers and accentuators in staining										
	CO4	Understand the concept of sterilization and disinfection										
	CO5											

Class		F.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 113			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Based on theory paper I (MB 111) and Paper II (MB 112)		CO1	1	1	1	2	1	1	2	0	0
Semester No	1		CO2	2	1	1	1	1	1	2	0	0
Teacher Name	Uday Ramdasi		CO3	2	1	2	2	1	1	2	0	0
Course Outcomes			CO4	1	1	2	1	0	1	2	0	0
	CO1	To become aware of safety issues and laboratory practices on Microbiology lab	CO5	2	3	3	2	1	1	2	0	0
	CO2	To get introduced with the microbiology lab and instruments of routine use along with glassware and the way to handle them prepare them for sterilization	Average	1.60	1.40	1.80	1.60	0.80	1.00	2.00	0.00	0.00
	CO3	To get acquainted with microscopes and its working through observation of basic samples										
	CO4	Get understanding of basic staining techniques for microorganisms that are routinely used										
	CO5	To understand the efficiency of the disinfectants										

Class		F.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 121			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Bacterial Cell and Biochemistry		CO1	1	2	2	1	1	1	2	0	0
Semester No	2		CO2	2	2	2	2	1	1	2	0	0
Teacher Name	Vishal Tungikar		CO3	3	2	2	2	1	1	2	0	0
Course Outcomes			CO4	1	1	2	2	1	1	2	0	0
	CO1	Understand structure, chemical composition and functions of the components in bacterial cell	CO5									
	CO2	Comprehend chemical basis of Microbiology	Average	1.75	1.75	2.00	1.75	1.00	1.00	2.00	0.00	0.00
	CO3	Learn structure, organization and functions of carbohydrates, lipids, proteins & nucleic acids										
	CO4	Be familiar with classification of bacteria (Bergey's Manual and Systemic Bacteriology) and Viruses (ICTV Nomenclature)										
	CO5											

Class		F.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 122			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Microbial Cultivation and Growth		CO1	3	2	2	2	1	1	2	0	0

Semester No	2	CO2	2	2	2	2	1	1	2	0	0	
Teacher Name	Zarina Sayyed	CO3	1	1	1	2	2	1	2	0	0	
Course Outcomes		CO4	2	1	1	1	1	1	2	0	0	
	CO1	Gain knowledge of cultivation of microorganisms: Nutritional classification, Design and Preparation of media	CO5	3	2	2	2	1	1	2	0	0
	CO2	Comprehend isolation and maintenance of bacteria, algae, fungi, actinomycetes and viruses	Average	2.20	1.60	1.60	1.80	1.20	1.00	2.00	0.00	0.00
	CO3	Understand the Role of National Biodiversity Authority for culture collection centres										
	CO4	Become acquainted with Bacterial growth kinetics, Growth curve, Generation time and Diauxic growth										
	CO5	Learn different methods of enumeration of bacterial growth with factors affecting bacterial growth.										

Class	F.Y..B.Sc.	Course Outcomes	Program Outcomes						PSOs			
Subject Code	MB 123		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Practical Course based on MB 121 and MB 122	CO1	2	2	1	2	1	2	3	0	0	
Semester No	2	CO2	3	2	2	2	1	2	3	0	0	
Teacher Name	Uday Ramdasi	CO3	2	1	3	2	1	2	3	0	0	
Course Outcomes		CO4	1	3	1	1	2	2	3	0	0	
	CO1	To get acquainted with the different types of media and their preparation used for microbial cultivation	CO5	1	0	1	1	1	2	3	0	0
	CO2	To know the staining techniques used for special microbial organelles	Average	1.80	1.60	1.60	1.60	1.20	2.00	3.00	0.00	0.00
	CO3	To practically understand and use the basic methods for isolation of microorganisms along with their enumeration and methods to preserve them										
	CO4	To understand the presence of normal flora on skin										
	CO5	To understand the effect of different physical parameters on microbial growth										

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Class		S. Y. B. Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code		MB 231		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name		Medical Microbiology and Immunology	CO1	1	1	2	2	2	1	0	2	0
Semester No		3	CO2	1	1	2	2	1	1	0	2	0
Teacher Name		Vishal Tungikar	CO3	1	2	2	2	2	1	0	2	0
Course Outcomes			CO4	1	2	2	2	2	1	0	2	0
	CO1	Understanding the concept of epidemiology with respect to terms like Incubation period, Viability, Susceptibility, Pathogenicity, Virulence, Pathogenesis, Lab diagnosis, Epidemic, Sporadic, Endemic and Pandemic.	CO5	1	1	2	2	2	1	0	2	0
	CO2	Acquainted with human pathogens such as Escherichia coli, Staphylococcus aureus and Fungi like Yeast- Candida as well as Dermatophytes.	Average	1.00	1.40	2.00	2.00	1.80	1.00	0.00	2.00	0.00
	CO3	Principles of Chemotherapy are introduced based on Selective toxicity, Bioavailability, MIC, MBC, LD50. Accustomed with the terms Antagonism and synergism in drug administration., Antibiotic sensitivity, Antibiotic misuse/antibiotic overuse and Concept of drug resistance (e.g., MRSA, ESBL)										
	CO4	Comprehend the term immunity with its types. Get knowledge of haematopoiesis, Antigens and antibodies, Immunohematology, Inheritance of ABH antigens, Medico legal applications of blood groups										
	CO5	Acquainted with Active and Passive immunization										

Class		S. Y. B. Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code		MB 232		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name		Bacterial Physiology and Fermentation Technology	CO1	2	1	1	1	1	1	0	2	0
Semester No		3	CO2	2	1	2	2	1	1	0	2	0

Teacher Name	Zarina Sayyed	CO3	2	1	1	2	1	1	0	2	0
Course Outcomes		CO4	2	1	1	1	1	1	0	2	0
CO1	Acquainted with the term Enzymes, its nomenclature and classification and models for catalysis	CO5	2	1	1	2	1	2	0	2	0
CO2	Understand the effect of pH, temperature, substrate concentration, enzyme concentration, activators and inhibitors on enzymes	Average	2.00	1.00	1.20	1.60	1.00	1.20	0.00	2.00	0.00
CO3	Understanding the concept of Bacterial Physiology with reference to metabolism, catabolism, anabolism, respiration and fermentation										
CO4	Comprehend the different metabolic pathways with structures										
CO5	Acquainted with design of a fermenter, fermentation parameters, use of media for industrial fermentations. Understand the sources of contamination during fermentations										

Class	S.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 233		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Practical Course based on MB- 231 and MB-232	CO1	2	1	2	2	1	2	0	3	0
Semester No	3	CO2	1	3	1	1	1	3	0	3	0
Teacher Name	Avinash Gawade	CO3	3	3	3	3	2	3	0	3	0
Course Outcomes		CO4	2	1	3	3	2	3	0	3	0
CO1	To get acquainted with the techniques used for measurement of dimensions of microscopic objects	CO5	3	1	3	3	2	3	0	3	0
CO2	To understand the blood grouping technique	Average	2.20	1.80	2.40	2.40	1.60	2.80	0.00	3.00	0.00
CO3	Learn to isolate the microorganisms from clinical samples using different morphological methods, selective media and biochemical characterization										
CO4	Design the identification keys for microbial identification and use of biochemical methods										
CO5	To carry out screening of industrially important microbes from different sources										

Class	S.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 241		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Bacterial Genetics	CO1	1	1	2	2	1	1	0	2	0
Semester No	4	CO2	1	2	2	2	1	1	0	2	0
Teacher Name	Vishal Tungikar	CO3	1	2	2	2	1	0	0	2	0
Course Outcomes		CO4	1	1	2	2	1	1	0	2	0

	CO1	Understanding the different experimental evidence for nucleic acid as genetic material	CO5	1	0	2	2	1	1	0	2	0
	CO2	Comprehend the different types of nucleic acids, Structure of DNA and Prokaryotic DNA replication.	Average	1.00	1.20	2.00	2.00	1.00	0.80	0.00	2.00	0.00
	CO3	Understand the different models and modes of DNA replication with its basic rules of DNA replication										
	CO4	Get knowledge of Gene expressions, Mutations and reversions										
	CO5	Acquainted with Plasmid genetics										

Class		S.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 242			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Air, Water and Soil Microbiology		CO1	2	2	2	1	2	3	0	2	0
Semester No	4		CO2	2	2	2	1	2	3	0	2	0
Teacher Name	Zarina Sayyed		CO3	2	2	1	1	2	2	0	2	0
Course Outcomes			CO4	2	1	1	1	2	1	0	2	0
	CO1	The course will help them to get knowledge of the Air Microbiology, methods of air sampling, different types of air samplers, air sanitation and airborne infections.	CO5									
	CO2	Deals with water microbiology including bacteriological analysis of water, methods of water purification, water borne infections and bacteriological standards of water quality.	Average	2.00	1.75	1.50	1.00	2.00	2.25	0.00	2.00	0.00
	CO3	Understand Soil Microbiology, rhizosphere, composting and humus formation, biofertilizers, biocontrol agents and microbial interactions.										
	CO4	Acquire knowledge of carbon and nitrogen cycles with role of microorganisms.										
	CO5											

Class		S.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 243			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Practical Course based on MB-241 and MB-242		CO1	2	1	2	2	1	3	0	3	0
Semester No	4		CO2	2	2	2	2	3	3	0	3	0
Teacher Name	Avinash Gawade		CO3	2	3	2	2	3	3	0	3	0
Course Outcomes			CO4	2	1	3	3	1	2	0	3	0
	CO1	To understand microscopic structures through staining and observation	CO5	2	3	2	2	2	3	0	3	0
	CO2	To understand air flora using air samplers, diversity index and settling velocity	Average	2.00	2.00	2.20	2.20	2.00	2.80	0.00	3.00	0.00
	CO3	Microbial quality of drinking water through its analysis by different techniques										

	CO4	To study microbial mutants and their isolation through experiment
	CO5	Methods for Enrichment, Isolation, Preparation and Application of Bioinoculants



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Class		T. Y. B. Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code		MB 351		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name		Medical Microbiology I	CO1	2	3	2	2	2	3	0	0	3
Semester No		5	CO2	2	3	2	2	2	3	0	0	3
Teacher Name		Avinash Gawade	CO3	1	3	1	3	2	3	0	0	3
Course Outcomes			CO4	2	3	2	2	3	3	0	0	3
	CO1	Understand the human anatomy, pathogens associated with diseases. Acquire knowledge of principles underlying establishment of pathogens in human body.	CO5	2	3	2	2	3	3	0	0	3
	CO2	Comprehend of pathogenesis of specific pathogens causing microbial diseases.	Average	1.80	3.00	1.80	2.20	2.40	3.00	0.00	0.00	3.00
	CO3	Assess epidemiological patterns of microbial disease transmission as various modes, intensity at local and global level.										
	CO4	Gain Knowledge principles of chemotherapy of microbial diseases and development of drug resistance among pathogens and strategies to mitigate.										
	CO5	Develop identification systems for microbial disease diagnosis, disease treatment and prevention measures. □										

Class		T. Y. B. Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code		MB 352		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name		Immunology I	CO1	2	1	1	1	2	1	0	0	3
Semester No		5	CO2	2	2	1	1	2	1	0	0	3
Teacher Name		Abhijit Aher	CO3	2	2	2	2	1	3	0	0	3
Course Outcomes			CO4	2	1	1	2	2	1	0	0	3
	CO1	Understand immune system structure, composition, function and comparison of different types of immunity.	CO5	2	2	2	2	1	3	0	0	3
	CO2	Acquire knowledge about antigens, Recognition of pathogens; antigen processing and presentation; Immunity to infection and pathological consequences of immunodeficiencies.	Average	2.00	1.60	1.40	1.60	1.60	1.80	0.00	0.00	3.00

	CO3	To learn the applications of Immunology in monoclonal antibodies, vaccines production and Immunotherapy.
	CO4	Understand abnormal working of Immune system in hypersensitivity, auto immune diseases, immune tolerance and transplantation immunology.
	CO5	To develop strategies for Diagnosis of diseases based on antigen and antibody reactions with emphasis on prevailing communicable diseases.

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs			
Subject Code	Subject Name	Semester No		Teacher Name	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
MB 353	Enzymology I	5	Zarina Sayyed	CO1	2	1	1	1	2	1	0	0	3
				CO2	2	1	1	2	1	1	0	0	3
				CO3	2	1	1	1	1	1	0	0	3
Course Outcomes				CO4									
	CO1	To understand methods of active site determination, role of enzymes and its cofactors in microbial physiology.		CO5									
	CO2	To learn to perform enzyme assay, purification and quantification of enzymes activity, enzyme kinetics in terms of initial, final velocity, mathematical expression of enzyme kinetic parameters.		Average	2.00	1.00	1.00	1.33	1.33	1.00	0.00	0.00	3.00
	CO3	To correlate regulation of metabolism at enzymatic levels and apply, methodology for commercial applications of enzymes											
	CO4												
	CO5												

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs			
Subject Code	Subject Name	Semester No		Teacher Name	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
MB 354	Genetics	5	Vishal Tungikar	CO1	1	1	2	2	1	1	0	0	3
				CO2	1	1	2	2	1	1	0	0	3
				CO3	1	1	2	2	1	1	0	0	3
Course Outcomes				CO4									
	CO1	To exhibit a knowledge base in Genetics and Molecular Biology.		CO5									
	CO2	To understand the central dogma of Molecular Biology		Average	1.00	1.00	2.00	2.00	1.00	1.00	0.00	0.00	3.00
	CO3	To construct genetic map of bacteria and fungi											
	CO4												
	CO5												

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 355			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Fermentation Technology I		CO1	2	1	1	2	2	3	0	0	3
Semester No	5		CO2	3	1	3	3	2	3	0	0	3
Teacher Name	Avinash Gawade		CO3	2	1	1	2	2	3	0	0	3
Course Outcomes			CO4	2	1	2	2	2	3	0	0	3
	CO1	To impart technical understanding of commercial fermentations.	CO5	2	3	1	2	2	3	0	0	3
	CO2	To apply classical, advanced strain improvement and isolation techniques for fermentation processes.	Average	2.20	1.40	1.60	2.20	2.00	3.00	0.00	0.00	3.00
	CO3	To optimize and sterilize media used in fermentation industry for commercially economical and efficient fermentations.										
	CO4	To recover the product using suitable methods and ensuring quality of the finished product by quality assurance tests.										
	CO5	To acquaint fermentation economics, process patentability, process validation.										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 356			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Agricultural Microbiology		CO1	2	3	2	3	3	2	0	0	3
Semester No	5		CO2	2	2	3	3	2	3	0	0	3
Teacher Name	Uday Ramdasi		CO3	2	3	3	3	2	3	0	0	3
Course Outcomes			CO4	2	2	2	2	2	2	0	0	3
	CO1	To understand plant growth improvement with respect to disease resistance, environment tolerance.	CO5	2	1	2	3	1	3	0	0	3
	CO2	To correlate stages of plant disease development, epidemiology, symptom based classification, control methods.	Average	2.00	2.20	2.40	2.80	2.00	2.60	0.00	0.00	3.00
	CO3	To understand the importance of microorganisms in sustainable agriculture, biotechnological application of bio films, edible vaccines.										
	CO4	To correlate Soil Micro biome and Role of microorganisms in soil health										
	CO5	To determine the use of Microorganisms as tools in plant genetic engineering.										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 357			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Practical Course based on MB 351 and MB 352		CO1	1	1	1	2	2	3	0	0	3
Semester No	5		CO2	1	2	2	2	2	3	0	0	3
Teacher Name	Vishal Tungikar		CO3	1	1	2	2	1	3	0	0	3
Course Outcomes			CO4	1	1	2	2	2	3	0	0	3
	CO1	To understand the features of clinical samples and their analysis	CO5	1	1	2	2	1	3	0	0	3

	CO2	To get acquainted with Isolation, identification of following pathogens from clinical samples	Average	1.00	1.20	1.80	2.00	1.60	3.00	0.00	0.00	3.00
	CO3	To study different agglutination tests										
	CO4	To carry out epidemiological survey										
	CO5	To study the hematological parameters through hemogram										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 358			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Practical Course based on MB 353 and MB 354		CO1	2	1	1	2	1	2	0	0	3
Semester No	5		CO2	2	2	2	2	1	2	0	0	3
Teacher Name	Zarina Sayyed		CO3	2	1	1	2	1	2	0	0	3
Course Outcomes			CO4	2	1	1	2	0	2	0	0	3
	CO1	To study the spectrophotometry through molar extinction coefficients, buffer preparation	CO5	2	0	1	2	1	2	0	0	3
	CO2	To carry out qualitative test and quantitative analysis of for carbohydrate and protein estimation	Average	2.00	1.00	1.20	2.00	0.80	2.00	0.00	0.00	3.00
	CO3	To carry out separation of sugars and amino acids by chromatographic techniques										
	CO4	To study bacterial DNA through its isolation and estimation										
	CO5	Study of bacterial gene transfer through conjugation and eukaryotic chromosome through staining technique										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 359			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Practical Course based on MB 355 and MB 356		CO1	2	1	2	2	1	3	0	0	3
Semester No	5		CO2	2	1	1	2	2	3	0	0	3
Teacher Name	Avinash Gawade		CO3	2	3	2	2	2	3	0	0	3
Course Outcomes			CO4	2	3	3	3	2	3	0	0	3
	CO1	To check the sterility of pharmaceutical preparation	CO5	2	3	2	2	2	3	0	0	3
	CO2	To quantitate the antibiotic from the pharmaceutical sample	Average	2.00	2.20	2.00	2.20	1.80	3.00	0.00	0.00	3.00
	CO3	To quantitate the sensitivity of pathogens by MIC, MBC										
	CO4	To study plant pathogen by their isolation and identification from different sources, preparation of digital record of plant diseases										
	CO5	Preparation of bioinoculant formulation, testing their efficacy, characterization										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 3510			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3

Subject Name	Marine Microbiology	CO1	2	1	1	2	1	1	0	0	3	
Semester No	5	CO2	2	1	1	1	1	1	0	0	3	
Teacher Name	Zarina Sayyed	CO3	2	1	1	2	1	2	0	0	3	
Course Outcomes		CO4	2	1	1	2	2	2	0	0	3	
	CO1	To impart the awareness of unseen and unexplored niche of marine ecosystem of microbes.	CO5	2	1	1	1	1	2	0	0	3
	CO2	To acquire advances in the knowledge of marine microbes and marine ecology	Average	2.00	1.00	1.00	1.60	1.20	1.60	0.00	0.00	3.00
	CO3	To learn the field research on marine processes and laboratory research on microorganisms.										
	CO4	To comprehend the role of marine microbes in bioremediation and bioprospecting.										
	CO5	To avail career opportunities in marine education, industry and research.										

Class	T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs			
Subject Code	MB 3511		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Dairy Microbiology	CO1	2	2	1	2	2	3	0	0	3	
Semester No	5	CO2	2	2	2	2	2	3	0	0	3	
Teacher Name	Uday Ramdasi	CO3	2	2	2	2	1	3	0	0	3	
Course Outcomes		CO4	2	3	2	2	2	3	0	0	3	
	CO1	To understand prospects of dairying at commercial marketing.	CO5									
	CO2	To acquire skills of processing of milk and dairy products.	Average	2.00	2.25	1.75	2.00	1.75	3.00	0.00	0.00	3.00
	CO3	To assess quality control in dairy industry.										
	CO4	To comprehend production of dairy products of commercial significance with emphasis to local and global market demand.										
	CO5											

Class	T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 361		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Medical Microbiology II	CO1	3	3	2	2	2	3	0	0	3
Semester No	6	CO2	3	2	2	3	2	3	0	0	3
Teacher Name	Avinash Gawade	CO3	3	2	2	3	2	3	0	0	3
Course Outcomes		CO4	3	2	2	3	2	3	0	0	3
	CO1	To understand the action of various antibiotics against different types of pathogens, their features and resistance and prevention	CO5								

	CO2	To study various fungal pathogens and their characters	Average	3.00	2.25	2.00	2.75	2.00	3.00	0.00	0.00	3.00
	CO3	To study various viral pathogens and their features										
	CO4	To study various protozoal pathogens and their features										
	CO5											

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 362			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Immunology II		CO1	2	1	1	1	1	1	0	0	3
Semester No	6		CO2	2	1	1	2	1	1	0	0	3
Teacher Name	Abhijit Aher		CO3	2	2	1	1	2	1	0	0	3
Course Outcomes			CO4	1	2	1	1	2	1	0	0	3
	CO1	To study different types of cytokines and their properties	CO5	2	1	1	1	1	1	0	0	3
	CO2	To understand properties of adaptive and acquired immune responses	Average	1.80	1.40	1.00	1.20	1.40	1.00	0.00	0.00	3.00
	CO3	To understand hypersensitivity and its role in disorders										
	CO4	To comprehend autoimmunity and related disorders										
	CO5	To understand immunodeficiency and disorders										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 363			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Metabolism		CO1	2	1	1	1	1	1	0	0	3
Semester No	6		CO2	2	1	1	1	1	1	0	0	3
Teacher Name	Zarina Sayyed		CO3	2	0	1	2	1	1	0	0	3
Course Outcomes			CO4									
	CO1	To learn mechanisms of transport of solutes across the membrane	CO5									
	CO2	To get acquainted with mechanism of biosynthesis and degradation of biomolecules.	Average	2.00	0.67	1.00	1.33	1.00	1.00	0.00	0.00	3.00
	CO3	To comprehend basic concept of autotrophic mode of metabolism of prokaryotes										
	CO4											
	CO5											

Class	T.Y.B.Sc.	Course	Program Outcomes						PSOs		
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Subject Code	MB 364	Outcomes	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Molecular Biology	CO1	1	1	2	2	1	1	0	0	3	
Semester No	6	CO2	1	1	2	2	1	1	0	0	3	
Teacher Name	Vishal Tungikar	CO3	1	1	2	2	1	2	0	0	3	
Course Outcomes		CO4										
	CO1	To get introduced to concept of recombination and bacteriophage Genetics	CO5									
	CO2	To understand the concept cloning in bacteria	Average	1.00	1.00	2.00	2.00	1.00	1.33	0.00	0.00	3.00
	CO3	To demonstrate the knowledge of common and advanced laboratory practices in Molecular Biology										
	CO4											
	CO5											

Class	T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs			
Subject Code	MB 365		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Fermentation Technology II	CO1	2	1	2	2	1	3	0	0	3	
Semester No	6	CO2										
Teacher Name	Avinash Gawade	CO3										
Course Outcomes		CO4										
	CO1	To comprehend the large-scale productions of commercially significant fermentation products of classical and recent significance.	CO5									
	CO2		Average	2.00	1.00	2.00	2.00	1.00	3.00	0.00	0.00	3.00
	CO3											
	CO4											
	CO5											

Class	T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs			
Subject Code	MB 366		PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Food Microbiology	CO1	2	3	2	2	3	3	0	0	3	
Semester No	6	CO2	3	2	2	2	2	3	0	0	3	
Teacher Name	Uday Ramdasi	CO3	2	2	2	1	1	1	0	0	3	
Course Outcomes		CO4	2	3	2	2	3	3	0	0	3	
	CO1	To describe food safety problems and solutions in India and global scale.	CO5	2	3	2	2	3	3	0	0	3

	CO2	Identify and classify types of microorganisms in food processing and compare their Characteristics and behaviour	Average	2.20	2.60	2.00	1.80	2.40	2.60	0.00	0.00	3.00
	CO3	To learn food classification based on their perishability, intrinsic and extrinsic factors affecting the growth of microbes in foods, role of microorganisms in food fermentation.										
	CO4	To acquire knowledge about food spoilage, food borne diseases, predisposition and preventive and control measures.										
	CO5	To apply principles of sanitation, heat treatment, irradiation, modified atmosphere, antimicrobial preservatives and combination of method (hurdle concept) to control microbial growth with emphasis on HACCP guidelines.										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 367			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Practical course based on MB 361 and MB 362		CO1	2	2	2	2	1	2	0	0	3
Semester No	6		CO2	1	1	1	2	1	2	0	0	3
Teacher Name	Vishal Tungikar		CO3	1	1	2	2	2	2	0	0	3
Course Outcomes			CO4	1	2	2	2	2	2	0	0	3
	CO1	To study the microscopic features of various pathogens	CO5	1	1	2	2	1	2	0	0	3
	CO2	Study of pathogens through their isolation and study of Koch's postulates	Average	1.20	1.40	1.80	2.00	1.40	2.00	0.00	0.00	3.00
	CO3	Antibiotic sensitivity testing of the bacterial pathogens										
	CO4	Understanding immunohematological and immunoprecipitation techniques										
	CO5	Understanding ELISA and egg inoculation techniques										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 368			PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3
Subject Name	Practical course based on MB 363 and MB 364		CO1	2	1	1	2	1	2	0	0	3
Semester No	6		CO2	2	1	1	2	1	2	0	0	3
Teacher Name	Zarina Sayyed		CO3	2	1	1	2	1	2	0	0	3
Course Outcomes			CO4	2	0	1	1	1	1	0	0	3
	CO1	To get acquainted with various biochemical parameters of blood	CO5	1	1	1	1	1	1	0	0	3
	CO2	To understand Enzyme production, purification, quantification and Immobilization	Average	1.80	0.80	1.00	1.60	1.00	1.60	0.00	0.00	3.00
	CO3	Studying bacterial viruses through Enrichment, Isolation and Enumeration of Bacteriophages										
	CO4	To isolate Plasmid DNA and Agarose Gel Electrophoresis										
	CO5	To understand mitosis and its stages in onion root tip										



Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 369	PO1		PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Practical course based on MB 365 and MB 366		CO1	2	2	1	2	1	3	0	0	3
Semester No	6		CO2	2	2	2	2	1	3	0	0	3
Teacher Name	Avinash Gawade		CO3	2	3	2	2	2	3	0	0	3
Course Outcomes			CO4	2	3	1	1	1	3	0	0	3
	CO1	To get acquainted with lab Scale production of the fermentation products	CO5	2	1	1	1	1	3	0	0	3
	CO2	To study solid state fermentation for the production of various fermentation products	Average	2.00	2.20	1.40	1.60	1.20	3.00	0.00	0.00	3.00
	CO3	To study probiotic organisms and their features										
	CO4	To determine various functional and quantitative parameters of the food analysis along with HACCP guidelines										
	CO5	To study SOPs of pharmaceutical industry										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 3610	PO1		PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Waste Management		CO1	1	2	2	2	2	2	0	0	3
Semester No	6		CO2	1	2	2	2	2	2	0	0	3
Teacher Name	Vishal Tunngikar		CO3	1	2	2	2	2	2	0	0	3
Course Outcomes			CO4	1	2	2	2	2	1	0	0	3
	CO1	To understand waste management and its practicable applicability.	CO5	1	2	2	2	2	2	0	0	3
	CO2	To assess the magnitude and influence of hazardous content of waste, pollution of waters and waste water treatment technologies.	Average	1.00	2.00	2.00	2.00	2.00	1.80	0.00	0.00	3.00
	CO3	To learn the design and working of treatment plants and methods used for liquid and solid waste treatment.										
	CO4	To impart the understanding of kinetics of biological systems used in waste treatment.										
	CO5	To learn the standards of waste management and competent authorities involved at National and international level.										

Class		T.Y.B.Sc.	Course Outcomes	Program Outcomes						PSOs		
Subject Code	MB 3611	PO1		PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	
Subject Name	Nanotechnology		CO1	2	0	1	2	1	2	0	0	3
Semester No	6		CO2	2	1	1	1	1	1	0	0	3
Teacher Name	John George Phillips		CO3	3	1	3	3	2	2	0	0	3
Course Outcomes			CO4	3	1	2	1	1	2	0	0	3
	CO1	To understand design, development and application of Nanomaterials and their application in Nanodevices.	CO5									

	CO2	To learn fundamentals of nanotechnology as to Synthesis and characterization techniques of nanoparticles.	Average	2.50	0.75	1.75	1.75	1.25	1.75	0.00	0.00	3.00
	CO3	To acquire knowledge of applications of nanomaterials in different disciplines of human life.										
	CO4	To compare the merits of using nanotechnology with existing technologies.										
	CO5											

**CO-PO Mapping**

		Course	PO1	PO2	PO3	PO4	PO5	PO6
FY	FY	1 MB 111	1.50	1.00	1.25	1.00	0.50	1.50
		2 MB 112	2.50	2.50	1.50	1.50	1.25	1.00
		3 MB 113	1.60	1.40	1.80	1.60	0.80	1.00
		4 MB 121	1.75	1.75	2.00	1.75	1.00	1.00
		5 MB 122	2.20	1.60	1.60	1.80	1.20	1.00
		6 MB 123	1.80	1.60	1.60	1.60	1.20	2.00
SY	SY	1 MB 231	1.00	1.40	2.00	2.00	1.80	1.00
		2 MB 232	2.00	1.00	1.20	1.60	1.00	1.20
		3 MB 233	2.20	1.80	2.40	2.40	1.60	2.80
		4 MB 241	1.00	1.20	2.00	2.00	1.00	0.80
		5 MB 242	2.00	1.75	1.50	1.00	2.00	2.25
		6 MB 243	2.00	2.00	2.20	2.20	2.00	2.80
TY	TY	1 MB 351	1.80	3.00	1.80	2.20	2.40	3.00
		2 MB 352	2.00	1.60	1.40	1.60	1.60	1.80
		3 MB 353	2.00	1.00	1.00	1.33	1.33	1.00
		4 MB 354	1.00	1.00	2.00	2.00	1.00	1.00
		5 MB 355	2.20	1.40	1.60	2.20	2.00	3.00
		6 MB 356	2.00	2.20	2.40	2.80	2.00	2.60
		7 MB 357	1.00	1.20	1.80	2.00	1.60	3.00
		8 MB 358	2.00	1.00	1.20	2.00	0.80	2.00
		9 MB 359	2.00	2.20	2.00	2.20	1.80	3.00
		10 MB 3510	2.00	1.00	1.00	1.60	1.20	1.60
		11 MB 3511	2.00	2.25	1.75	2.00	1.75	3.00
		12 MB 361	3.00	2.25	2.00	2.75	2.00	3.00
		13 MB 362	1.80	1.40	1.00	1.20	1.40	1.00
		14 MB 363	2.00	0.67	1.00	1.33	1.00	1.00
		15 MB 364	1.00	1.00	2.00	2.00	1.00	1.33
16 MB 365	2.00	1.00	2.00	2.00	1.00	3.00		
17 MB 366	2.20	2.60	2.00	1.80	2.40	2.60		
18 MB 367	1.20	1.40	1.80	2.00	1.40	2.00		
19 MB 368	1.80	0.80	1.00	1.60	1.00	1.60		
20 MB 369	2.00	2.20	1.40	1.60	1.20	3.00		
21 MB 3610	1.00	2.00	2.00	2.00	2.00	1.80		
22 MB 3611	2.50	0.75	1.75	1.75	1.25	1.75		

**CO-PO ATTAINMENT**

PO1	PO2	PO3	PO4	PO5	PO6
1.5	1	1.25	1	0.5	1.5
1.7	1.7	1.02	1.02	0.85	0.68
0.832	0.728	0.936	0.832	0.416	0.52
0.35	0.35	0.4	0.35	0.2	0.2
0.44	0.32	0.32	0.36	0.24	0.2
1.032	0.917333	0.917333333	0.917333	0.688	1.146667
0.893333	1.250667	1.786666667	1.786667	1.608	0.893333
1.36	0.68	0.816	1.088	0.68	0.816
0.674667	0.552	0.736	0.736	0.490667	0.858667
0.413333	0.496	0.826666667	0.826667	0.413333	0.330667
0.4	0.35	0.3	0.2	0.4	0.45
0.4	0.4	0.44	0.44	0.4	0.56
1.8	3	1.8	2.2	2.4	3
1.36	1.088	0.952	1.088	1.088	1.224
2	1	1	1.333333	1.333333	1
1	1	2	2	1	1
1.496	0.952	1.088	1.496	1.36	2.04
2	2.2	2.4	2.8	2	2.6
1	1.2	1.8	2	1.6	3
2	1	1.2	2	0.8	2
1.04	1.144	1.04	1.144	0.936	1.56
1.04	0.52	0.52	0.832	0.624	0.832
1.04	1.17	0.91	1.04	0.91	1.56
1.24	0.93	0.826666667	1.136667	0.826667	1.24
0.936	0.728	0.52	0.624	0.728	0.52
0.826667	0.275556	0.413333333	0.551111	0.413333	0.413333
0.2	0.2	0.4	0.4	0.2	0.266667
1.04	0.52	1.04	1.04	0.52	1.56
1.144	1.352	1.04	0.936	1.248	1.352
0.368	0.429333	0.552	0.613333	0.429333	0.613333
1.224	0.544	0.68	1.088	0.68	1.088
1.04	1.144	0.728	0.832	0.624	1.56
0.52	1.04	1.04	1.04	1.04	0.936
0.9	0.27	0.63	0.63	0.45	0.63

**Percentage CO-PO ATTAINMENT**

PO1	PO2	PO3	PO4	PO5	PO6
100	100	100	100	100	100
68	68	68	68	68	68
52	52	52	52	52	52
20	20	20	20	20	20
20	20	20	20	20	20
57.33333	57.33333	57.33333	57.33333	57.33333	57.33333
89.33333	89.33333	89.33333	89.33333	89.33333	89.33333
68	68	68	68	68	68
30.66667	30.66667	30.66667	30.66667	30.66667	30.66667
41.33333	41.33333	41.33333	41.33333	41.33333	41.33333
20	20	20	20	20	20
20	20	20	20	20	20
100	100	100	100	100	100
68	68	68	68	68	68
100	100	100	100	100	100
100	100	100	100	100	100
68	68	68	68	68	68
100	100	100	100	100	100
100	100	100	100	100	100
52	52	52	52	52	52
52	52	52	52	52	52
52	52	52	52	52	52
41.33333	41.33333	41.33333	41.33333	41.33333	41.33333
52	52	52	52	52	52
41.33333	41.33333	41.33333	41.33333	41.33333	41.33333
20	20	20	20	20	20
52	52	52	52	52	52
52	52	52	52	52	52
30.66667	30.66667	30.66667	30.66667	30.66667	30.66667
68	68	68	68	68	68
52	52	52	52	52	52
52	52	52	52	52	52
36	36	36	36	36	36

**CO-PSO MAPPING**

	Course	PSO1	PSO2	PSO3
1	MB 111	2.00	0.00	0.00
2	MB 112	2.00	0.00	0.00
3	MB 113	2.00	0.00	0.00
4	MB 121	2.00	0.00	0.00
5	MB 122	2.00	0.00	0.00
6	MB 123	3.00	0.00	0.00
1	MB 231	0.00	2.00	0.00
2	MB 232	0.00	2.00	0.00
3	MB 233	0.00	3.00	0.00
4	MB 241	0.00	2.00	0.00
5	MB 242	0.00	2.00	0.00
6	MB 243	0.00	3.00	0.00
1	MB 351	0.00	0.00	3.00
2	MB 352	0.00	0.00	3.00
3	MB 353	0.00	0.00	3.00
4	MB 354	0.00	0.00	3.00
5	MB 355	0.00	0.00	3.00
6	MB 356	0.00	0.00	3.00
7	MB 357	0.00	0.00	3.00
8	MB 358	0.00	0.00	3.00
9	MB 359	0.00	0.00	3.00
10	MB 3510	0.00	0.00	3.00
11	MB 3511	0.00	0.00	3.00
12	MB 361	0.00	0.00	3.00
13	MB 362	0.00	0.00	3.00
14	MB 363	0.00	0.00	3.00
15	MB 364	0.00	0.00	3.00
16	MB 365	0.00	0.00	3.00
17	MB 366	0.00	0.00	3.00
18	MB 367	0.00	0.00	3.00
19	MB 368	0.00	0.00	3.00
20	MB 369	0.00	0.00	3.00
21	MB 3610	0.00	0.00	3.00
22	MB 3611	0.00	0.00	3.00

**CO-PSO ATTAINMENT**

	Course	PSO1	PSO2	PSO3
	MB 111	2	0	0
	MB 112	1.36	0	0
	MB 113	1.04	0	0
	MB 121	0.4	0	0
	MB 122	0.4	0	0
	MB 123	1.72	0	0
	MB 231	0	1.786667	0
	MB 232	0	1.36	0
	MB 233	0	0.92	0
	MB 241	0	0.826667	0
	MB 242	0	0.4	0
	MB 243	0	0.6	0
	MB 351	0	0	3
	MB 352	0	0	2.04
	MB 353	0	0	3
	MB 354	0	0	3
	MB 355	0	0	2.04
	MB 356	0	0	3
	MB 357	0	0	3
	MB 358	0	0	3
	MB 359	0	0	1.56
	MB 3510	0	0	1.56
	MB 3511	0	0	1.56
	MB 361	0	0	1.24
	MB 362	0	0	1.56
	MB 363	0	0	1.24
	MB 364	0	0	0.6
	MB 365	0	0	1.56
	MB 366	0	0	1.56
	MB 367	0	0	0.92
	MB 368	0	0	2.04
	MB 369	0	0	1.56
	MB 3610	0	0	1.56
	MB 3611	0	0	1.08

**Percentage CO-PSO ATTAINMENT**

	Course	PSO1	PSO2	PSO3
	MB 111	100	#DIV/0!	#DIV/0!
	MB 112	68	#DIV/0!	#DIV/0!
	MB 113	52	#DIV/0!	#DIV/0!
	MB 121	20	#DIV/0!	#DIV/0!
	MB 122	20	#DIV/0!	#DIV/0!
	MB 123	57.33333	#DIV/0!	#DIV/0!
	MB 231	#DIV/0!	89.33333	#DIV/0!
	MB 232	#DIV/0!	68	#DIV/0!
	MB 233	#DIV/0!	30.66667	#DIV/0!
	MB 241	#DIV/0!	41.33333	#DIV/0!
	MB 242	#DIV/0!	20	#DIV/0!
	MB 243	#DIV/0!	20	#DIV/0!
	MB 351	#DIV/0!	#DIV/0!	100
	MB 352	#DIV/0!	#DIV/0!	68
	MB 353	#DIV/0!	#DIV/0!	100
	MB 354	#DIV/0!	#DIV/0!	100
	MB 355	#DIV/0!	#DIV/0!	68
	MB 356	#DIV/0!	#DIV/0!	100
	MB 357	#DIV/0!	#DIV/0!	100
	MB 358	#DIV/0!	#DIV/0!	100
	MB 359	#DIV/0!	#DIV/0!	52
	MB 3510	#DIV/0!	#DIV/0!	52
	MB 3511	#DIV/0!	#DIV/0!	52
	MB 361	#DIV/0!	#DIV/0!	41.33333
	MB 362	#DIV/0!	#DIV/0!	52
	MB 363	#DIV/0!	#DIV/0!	41.33333
	MB 364	#DIV/0!	#DIV/0!	20
	MB 365	#DIV/0!	#DIV/0!	52
	MB 366	#DIV/0!	#DIV/0!	52
	MB 367	#DIV/0!	#DIV/0!	30.66667
	MB 368	#DIV/0!	#DIV/0!	68
	MB 369	#DIV/0!	#DIV/0!	52
	MB 3610	#DIV/0!	#DIV/0!	52
	MB 3611	#DIV/0!	#DIV/0!	36

FY
SY
TY