

Academic Year 2020-21

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

Department Name MICROBIOLOGY

Program Name M.Sc.

Program Outcomes(PO)

PO1	To enrich students' knowledge and train them in the pure microbial sciences
PO2	To introduce the concepts of mathematics in biology
PO3	To inculcate research aptitude
PO4	To inculcate sense of scientific responsibilities and social and environment awareness
PO5	To help students build-up a progressive and successful career in Microbiology
PO6	
PO7	
PO8	
PO9	
PO10	
PO11	
PO12	

Program Specific Outcome(PSO)

PSO1	To get students familiarized to versatile tools and techniques employed in Molecular Biology. They are introduced to the concepts of Clinical Biology.
PSO2	Inculcate research aptitude and carry out academic and applied research
PSO3	Gain an insight on Clinical microbiology, Pharmaceutical microbiology, Molecular biology, Microbial Virus Technology, Advances in Microbial Technology, Industrial waste water treatment and industrial production of vaccines.

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Class		M.Sc. I	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBCT 111			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Microbial Systematics		CO1	2	2	1	1	1	0	1	0
Semester No	1		CO2	2	0	1	1	1	0	1	0
Teacher Name	Jessica Ghodke		CO3	2	0	2	1	2	2	2	0
Course Outcomes			CO4	2	0	2	1	2	2	2	1
	CO1	Students will be able to apply mathematical tools for estimation of the total number of species and for measuring indices of diversity.	CO5	2	1	1	1	1	2	1	0
	CO2	Students will be able to identify, classify fungi into 6 classes based on morphological characterization.	Average	2.00	0.60	1.40	1.00	1.40	1.20	1.40	0.20
	CO3	Students will be able to conceptualize, understand and use molecular methods for identifying unculturable bacteria									
	CO4	Students will be able to execute the methods of extraction of total bacterial DNA.									
	CO5	Students will be able to understand Neo-Darwinism and its importance in prokaryote evolution along with spontaneous mutation controversy, know the types and levels of mutations and molecular clocks.									

Class		M.Sc.I	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBCT 112			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Quantitative Biology		CO1	1	3	3	2	3	0	3	1
Semester No	1		CO2	1	3	3	1	3	0	3	1
Teacher Name	Avinash Gawade		CO3	1	3	3	2	3	0	3	1
Course Outcomes			CO4	1	3	3	1	3	0	2	0
	CO1	Students will be able to determine Mean, mode, median, percentile and standard deviation	CO5	1	3	2	1	3	0	2	0
	CO2	Students will understand the concepts of null hypothesis, alternate hypothesis, significance level, type I and type II errors.	Average	1.00	3.00	2.80	1.40	3.00	0.00	2.60	0.60

	CO3	Students will learn to apply statistical tools for calculating degrees of freedom, two population means, t -tests and z test.
	CO4	Students will be able to learn non-parametric tests (Run test, Sign test, Wilcoxon's signed rank test, Mann-Whitney test).
	CO5	Students will be able to examine measures of skewness; measures of kurtosis and able to calculate regression and correlation. Students will learn to implement and interpret F-test, ANOVA, Survey design, Factorial design (Plackett Burman method, DOE).

Class		M.Sc.I	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBCT 113			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Biochemistry and Metabolism		CO1	2	2	2	1	2	1	2	0
Semester No	1		CO2	2	2	3	1	3	3	3	1
Teacher Name	Uday Ramdasi		CO3	2	1	2	1	2	1	2	1
Course Outcomes			CO4	2	1	1	1	1	2	1	1
	CO1	Students will be able to describe protein chemistry, structural features of amino acids and classify amino acids	CO5	2	1	3	1	2	1	1	1
	CO2	Students will be able to demonstrate PCR and sequencing methods of DNA & RNA.	Average	2.00	1.40	2.20	1.00	2.00	1.60	1.80	0.80
	CO3	Students will recite the organization of Cytoskeleton, Endoplasmic reticulum, Golgi complex and other organelles with their functions.									
	CO4	Students will conceptualize principles of developmental biology, conserved nature of development, concepts of commitment and morphological gradient. Students will learn life cycle of Drosophila, Arabidopsis and Xenopus to understand the Molecular mechanisms									
	CO5	Students will be able to determine the mechanisms of protein trafficking in cell compartments.									

Class		M.Sc.I	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBCP 114			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Biochemical Techniques		CO1	2	1	2	2	2	1	2	2
Semester No	1		CO2	2	2	2	1	2	2	2	1
Teacher Name	Jessica Ghodke		CO3	2	2	2	1	3	3	2	2
Course Outcomes			CO4	2	1	1	1	1	1	2	1

Class		M.Sc.I	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBCT 121			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Instrumentation and Molecular Biophysics		CO1	2	2	2	1	3	3	2	3
Semester No	2		CO2	2	2	2	1	3	3	2	3
Teacher Name	Abhijit Aher		CO3	2	2	2	1	3	3	2	3
Course Outcomes			CO4								
	CO1	Students will understand the concepts of Instrumentation and Molecular Biophysics	CO5								
	CO2	Students will be able to understand both fundamentals and applications of the instruments that are routinely used for the characterization of biomolecules.	Average	2.00	2.00	2.00	1.00	3.00	3.00	2.00	3.00
	CO3	Students will understand the concept and applications of instruments									
	CO4										
	CO5										

Class		M.Sc.I	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBCT 122			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Molecular Biology		CO1	3	0	1	1	3	3	2	2
Semester No	2		CO2	3	1	2	0	2	2	2	1
Teacher Name	Zahra Bahlooli		CO3	2	1	1	1	2	2	2	2
Course Outcomes			CO4	3	0	1	0	1	2	2	1
	CO1	Students will learn RNA processing & Molecular Techniques	CO5	2	0	2	1	2	2	2	1
	CO2	Students will understand the process of Eukaryotic RNA Processing, Nuclear export of mRNA, types of regulatory, noncoding RNA and Pi RNA	Average	2.60	0.40	1.40	0.60	2.00	2.20	2.00	1.40
	CO3	Students will be able to describe different tools for Genetic engineering									
	CO4	Students will understand the concept of Genome projects, deciphering genetic code, construction of genomes									
	CO5	Students will learn the Molecular diagnostics like protein arrays, microarrays, immunoassays and applications									

Class	M.Sc.I	Course Outcomes	Program Outcomes					PSOs		
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Class		M.Sc.II	Course Outcomes	Program Outcomes					PSOs			
Subject Code	Subject Name	Semester No		Teacher Name	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
MBCT 231	Immunology	3	Jessica Ghodke	CO1	2	1	0	1	1	1	2	2
				CO2	2	0	1	1	1	1	2	3
				CO3	2	0	2	1	1	1	3	2
				CO4								
				CO5								
				Average	2.00	0.33	1.00	1.00	1.00	1.00	2.33	2.33
	CO1	Students will understand the concepts of Immunology										
	CO2	They will be able to understand the different effector mechanisms of host immune response										
	CO3	This course will elucidate the concepts of signal transduction pathways to students										
	CO4											
	CO5											

Class		M.Sc.II	Course Outcomes	Program Outcomes					PSOs			
Subject Code	Subject Name	Semester No		Teacher Name	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
MBCT 232	Molecular Biology	3	Vishal Tungikar	CO1	3	2	3	1	2	3	3	2
				CO2	3	0	2	0	1	2	2	2
				CO3	3	0	2	3	2	3	1	2
				CO4								
				CO5								
				Average	3.00	0.67	2.33	1.33	1.67	2.67	2.00	2.00
	CO1	The concepts of Molecular Biology will be familiar to students										
	CO2	Students will be able to understand the concept of Metabolomics.										
	CO3	Detail knowledge about the concept and applications of transgenic plants and transgenic animals will be gained.										
	CO4											
	CO5											

Class	M.Sc. II	Course	Program Outcomes	PSOs
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Subject Code	MBCT 233	Outcomes	PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Clinical Microbiology	CO1	3	0	2	2	2	3	2	3
Semester No	3	CO2	3	1	3	2	3	3	3	1
Teacher Name	Uday Ramdasi	CO3	2	0	1	2	2	1	1	2
Course Outcomes		CO4								
	CO1	The concepts of medical microbiology and medically important micro-organisms will add on to students knowledge.	CO5							
	CO2	Pupil will get to know about knowledge of morphology, cultural characteristics, biochemical tests, epidemiology, laboratory diagnosis etc of bacterial pathogens	Average	2.67	0.33	2.00	2.00	2.33	2.33	2.00
	CO3	They will also understand the basics and applications of various chemotherapeutic agents and their mode of action								
	CO4									
	CO5									

Class	M.Sc.II	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBCP 234		PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Practicals based on Immunology, Molecular Biology and Clinical Microbiology	CO1	1	1	2	1	3	3	2	3
Semester No	3	CO2	2	1	3	1	3	3	3	3
Teacher Name	Jessica Ghodke	CO3	2	1	3	2	3	3	3	3
Course Outcomes		CO4								
	CO1	Familiarity about techniques Immunology will be increased among students	CO5							
	CO2	They will learn about Molecular Biology techniques	Average	1.67	1.00	2.67	1.33	3.00	3.00	2.67
	CO3	Students will be acquainted with techniques in Clinical Microbiology								
	CO4									
	CO5									

Class	M.Sc.II	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBET 236		PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Bioremediation and Biomass Utilization	CO1	2	1	2	2	3	2	1	2
Semester No	3	CO2	2	1	2	2	3	2	1	2
Teacher Name	Zarina Khuddus	CO3	2	1	2	2	3	2	1	2
Course Outcomes		CO4								
	CO1	Students will develop an interest in the field of bioremediation	CO5							
	CO2	They understand the concepts of biomass utilization	Average	2.00	1.00	2.00	2.00	3.00	2.00	1.00
	CO3	The ideology behind concepts and use of microbial degradation will be clear to them								

	CO4	
	CO5	

Class		M.Sc.II	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBEP 244			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Practicals based on Quality Assurance and Validation in Pharmaceutical Industry and Development of Anti Infectives from plants		CO1	2	1	1	1	3	0	1	2
Semester No	4		CO2	2	1	1	1	3	0	1	2
Teacher Name	Zarina Sayyed		CO3	2	1	1	2	3	0	1	2
Course Outcomes			CO4								
	CO1	Students will have knowledge of Quality Assurance in the Pharmaceutical Industry	CO5								
	CO2	Understanding about validation processes in the Pharmaceutical Industry will become easy.	Average	2.00	1.00	1.00	1.33	3.00	0.00	1.00	2.00
	CO3	They will be acquainted with the knowledge of development of anti- infectives from plants									
	CO4										
	CO5										

Class		M.Sc.II	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBET 245			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Advances in Microbial Technology		CO1	2	1	3	1	3	2	3	2
Semester No	4		CO2	3	0	3	2	3	2	2	2
Teacher Name	Jessica Ghodke		CO3	1	1	3	1	3	2	2	2
Course Outcomes			CO4								
	CO1	Students will learn about Advances in Microbial Technology	CO5								
	CO2	They will get to know applications of animal cell culture technology	Average	2.00	0.67	3.00	1.33	3.00	2.00	2.33	2.00
	CO3	Students will be accustomed with the latest techniques and their applications.									
	CO4										
	CO5										

Class		M.Sc.II	Course Outcomes	Program Outcomes					PSOs		
Subject Code	MBEP 245			PO1	PO2	PO3	PO4	PO5	PSO1	PSO2	PSO3
Subject Name	Practicals based on Advances in Microbial Technology		CO1	2	1	1	1	2	0	2	2
Semester No	4		CO2	2	0	1	1	2	0	1	2
Teacher Name	Jessica Ghodke		CO3	2	0	1	1	2	0	1	2

CO-PO Mapping

		Course	PO1	PO2	PO3	PO4	PO5
FY	FY	1 MBCT 111	2.00	0.60	1.40	1.00	1.40
		2 MBCT 112	1.00	3.00	2.80	1.40	3.00
		3 MBCT 113	2.00	1.40	2.20	1.00	2.00
		4 MBCP 114	2.00	1.60	1.80	1.20	2.20
		5 MBET 115	2.00	0.00	1.50	0.50	1.50
		6 MBEP 115	2.00	0.00	1.50	0.50	1.50
		7 MBCT 121	2.00	2.00	2.00	1.00	3.00
		8 MBCT 122	2.60	0.40	1.40	0.60	2.00
		9 MBCT 123	2.00	1.75	2.00	0.75	2.00
		10 MBCP 124	2.00	1.20	2.00	1.20	1.80
		11 MBET 125	2.40	1.00	1.80	1.60	1.80
		12 MBEP 125	2.00	1.50	2.25	1.00	2.75
SY	SY	1 MBCT 231	2.00	0.33	1.00	1.00	1.00
		2 MBCT 232	3.00	0.67	2.33	1.33	1.67
		3 MBCT 233	2.67	0.33	2.00	2.00	2.33
		4 MBCP 234	1.67	1.00	2.67	1.33	3.00
		5 MBET 236	2.00	1.00	2.00	2.00	3.00
		6 MBEP 236	2.00	1.00	2.00	2.00	3.00
		7 MBCT 241	1.67	1.00	2.00	1.00	1.67
		8 MBCT 242	2.33	1.00	1.00	1.00	2.33
		9 MBCT 243	3.00	3.00	3.00	3.00	3.00
		10 MBET 244	2.00	1.00	1.33	1.00	3.00
		11 MBEP 244	2.00	1.00	1.00	1.33	3.00
		12 MBET 245	2.00	0.67	3.00	1.33	3.00
13 MBEP 245	2.00	0.33	1.00	1.00	2.00		

CO-PO ATTAINMENT

PO1	PO2	PO3	PO4	PO5
1.573333	0.472	1.101333	0.786667	1.101333
1	3	2.8	1.4	3
1.36	0.952	1.496	0.68	1.36
2	1.6	1.8	1.2	2.2
2	0	1.5	0.5	1.5
2	0	1.5	0.5	1.5
2	2	2	1	3
1.768	0.272	0.952	0.408	1.36
2	1.75	2	0.75	2
1.04	0.624	1.04	0.624	0.936
2.4	1	1.8	1.6	1.8
1.573333	1.18	1.77	0.786667	2.163333
2	0.333333	1	1	1
3	0.666667	2.333333	1.333333	1.666667
2.666667	0.333333	2	2	2.333333
1.4	0.84	2.24	1.12	2.52
1.04	0.52	1.04	1.04	1.56
1.36	0.68	1.36	1.36	2.04
1.666667	1	2	1	1.666667
2.333333	1	1	1	2.333333
0.6	0.6	0.6	0.6	0.6
1.36	0.68	0.906667	0.68	2.04
1.36	0.68	0.68	0.906667	2.04
1.04	0.346667	1.56	0.693333	1.56
1.573333	0.262222	0.786667	0.786667	1.573333

CO-PO ATTAINMENT

PO1	PO2	PO3	PO4	PO5
78.66667	78.66667	78.66667	78.66667	78.66667
100	100	100	100	100
68	68	68	68	68
100	100	100	100	100
100	#DIV/0!	100	100	100
100	#DIV/0!	100	100	100
100	100	100	100	100
68	68	68	68	68
100	100	100	100	100
52	52	52	52	52
100	100	100	100	100
78.66667	78.66667	78.66667	78.66667	78.66667
100	100	100	100	100
100	100	100	100	100
100	100	100	100	100
84	84	84	84	84
52	52	52	52	52
68	68	68	68	68
100	100	100	100	100
100	100	100	100	100
20	20	20	20	20
68	68	68	68	68
68	68	68	68	68
52	52	52	52	52
78.66667	78.66667	78.66667	78.66667	78.66667

CO-PSO MAPPING

	Course	PSO1	PSO2	PSO3
1	MBCT 111	1.20	1.40	0.20
2	MBCT 112	0.00	2.60	0.60
3	MBCT 113	1.60	1.80	0.80
4	MBCP 114	1.60	2.00	1.40
5	MBET 115	1.00	1.50	1.00
6	MBEP 115	1.00	1.50	1.00
7	MBCT 121	3.00	2.00	3.00
8	MBCT 122	2.20	2.00	1.40
9	MBCT 123	1.50	1.50	1.50
10	MBCP 124	1.20	1.80	1.00
11	MBET 125	2.40	1.60	1.40
12	MBEP 125	2.75	2.00	1.50
1	MBCT 231	1.00	2.33	2.33
2	MBCT 232	2.67	2.00	2.00
3	MBCT 233	2.33	2.00	2.00
4	MBCP 234	3.00	2.67	3.00
5	MBET 236	2.00	1.00	2.00
6	MBEP 236	0.00	1.00	2.00
7	MBCT 241	2.00	1.00	2.00
8	MBCT 242	2.67	3.00	2.00
9	MBCT 243	3.00	3.00	3.00
10	MBET 244	1.00	1.00	2.00
11	MBEP 244	0.00	1.00	2.00
12	MBET 245	2.00	2.33	2.00
13	MBEP 245	0.00	1.33	2.00

CO-PSO ATTAINMENT

	Course	PSO1	PSO2	PSO3
	MBCT 111	0.944	1.101333	0.157333
	MBCT 112	0	2.6	0.6
	MBCT 113	1.088	1.224	0.544
	MBCP 114	1.6	2	1.4
	MBET 115	1	1.5	1
	MBEP 115	1	1.5	1
	MBCT 121	3	2	3
	MBCT 122	1.496	1.36	0.952
	MBCT 123	1.5	1.5	1.5
	MBCP 124	0.624	0.936	0.52
	MBET 125	2.4	1.6	1.4
	MBEP 125	2.163333	1.573333	1.18
	MBCT 231	1	2.333333	2.333333
	MBCT 232	2.666667	2	2
	MBCT 233	2.333333	2	2
	MBCP 234	2.52	2.24	2.52
	MBET 236	1.04	0.52	1.04
	MBEP 236	0	0.68	1.36
	MBCT 241	2	1	2
	MBCT 242	2.666667	3	2
	MBCT 243	0.6	0.6	0.6
	MBET 244	0.68	0.68	1.36
	MBEP 244	0	0.68	1.36
	MBET 245	1.04	1.213333	1.04
	MBEP 245	0	1.048889	1.573333

CO-PSO ATTAINMENT

	Course	PSO1	PSO2	PSO3
	MBCT 111	78.66667	78.66667	78.66667
	MBCT 112	#DIV/0!	100	100
	MBCT 113	68	68	68
	MBCP 114	100	100	100
	MBET 115	100	100	100
	MBEP 115	100	100	100
	MBCT 121	100	100	100
	MBCT 122	68	68	68
	MBCT 123	100	100	100
	MBCP 124	52	52	52
	MBET 125	100	100	100
	MBEP 125	78.66667	78.66667	78.66667
	MBCT 231	100	100	100
	MBCT 232	100	100	100
	MBCT 233	100	100	100
	MBCP 234	84	84	84
	MBET 236	52	52	52
	MBEP 236	#DIV/0!	68	68
	MBCT 241	100	100	100
	MBCT 242	100	100	100
	MBCT 243	20	20	20
	MBET 244	68	68	68
	MBEP 244	#DIV/0!	68	68
	MBET 245	52	52	52
	MBEP 245	#DIV/0!	78.66667	78.66667

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