

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

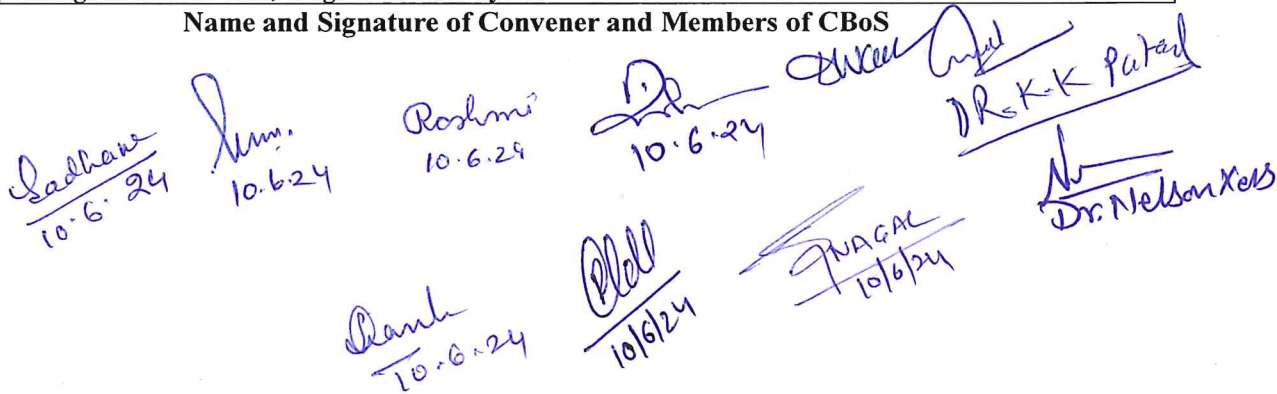
PART – A: Introduction	
Program: Bachelor in Life Science (Honors/ Honors with Research)	Semester - VIII
	Session: 2024-25
1 Course Code	MBSC-08 T
2 Course Title	Environmental Microbiology and Microbial Ecology
3 Course Type	DSC
4 Prerequisite (If Any)	As per Program
5 Course Learning Outcomes (CLO)	At the end of this course the student will able to – <ul style="list-style-type: none"> ➤ relate different types of environments and their habitats ➤ explain the extremophiles ➤ identify the role microorganisms in solid/liquid waste management ➤ compare beneficial and harmful microbial interactions ➤ examine biogeochemical cycles and their importance
6 Credit Value	03 Credits Credit = 15 Hours - Learning & Observation
7 Total Marks	Max. Marks: 100 Minimum Passing marks: 40

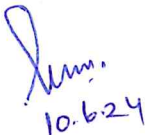

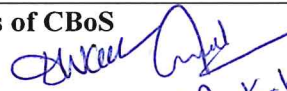

PART – B: Content of the Course

Total No. of Teaching-Learning Periods (01 Hr. per period) - 45 Periods (45 Hours)

Unit	Topics (Course contents)	No. of Period
I	Microorganisms of different habitats: Terrestrial Environment - Soil profile and soil microflora; Aquatic Environment - Microflora of fresh water and marine habitats; Air Atmosphere - Aeromicroflora and dispersal of microbes; Animal Environment - Microbes in/on human body (microbiomics) & animal (ruminants) body; Extreme Habitats - Extremophiles, Microbes thriving at high & low temperatures, pH, high hydrostatic & osmotic pressures, salinity and low nutrient levels.	12
II	Waste management: Sources and types of solid waste, Methods of solid waste disposal (Composting and sanitary landfill). Composition of Liquid waste, strength of sewage (BOD and COD), Primary, secondary (oxidation ponds, trickling filter, activated sludge process and septic tank) and tertiary sewage treatment	11
III	Ecosystems: Structure, types and roll of microorganisms in ecosystems. Biological Interaction: Microbe–Microbe Interactions: Mutualism, Synergism, Commensalism, Competition, Amensalism, Parasitism, Predation; Biocontrol agents; Microbe–Plant Interactions: Roots, Aerial Plant surfaces.	11
IV	Biogeochemical Cycles: Carbon cycle - Microbial degradation of cellulose, hemicelluloses, lignin and chitin; Nitrogen cycle - Biological Nitrogen fixation (symbiotic/nonsymbiotic), ammonification, nitrification, denitrification and nitrate reduction; Phosphorus cycle - Phosphate immobilization and solubilisation; Sulphur cycle - Microbes involved in sulphur cycle.	11
Key Words	Terrestrial Microflora, Aquatic Microflora, Aeromicroflora, Extremophiles, Waste management, Biological Interactions, Biogeochemical Cycles	

Name and Signature of Convener and Members of CBoS



 Sadhane 10.6.24
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 Roshmi 10.6.24
  10.6.24
 
 DR. K. K. Patil
  Dr. Nelson Kees

Part – C: Learning Resources		
Text Books, Reference Books and Others		
Text Books Recommended:		
<ol style="list-style-type: none"> 1. Text book of Microbiology; R.P. Singh, Kalyani publication. 2. General microbiology; Vol. I and Vol. II, Power and Dagainawala, Himalaya Publication. 3. Microbiology; Pelczar, MJ Chan ECS and Krieg NR, McGraw-Hill. 		
Reference Books:		
<ol style="list-style-type: none"> 1. Prescott's Microbiology. Wiley J M, Sherwood L M and Woolverton C J. 2. Microbiology; Tortora, Funke, Case. Pearson Benjamin Cummings. 3. Microbial Ecology; Alexander, M John. Wiley & Sons, Inc., New York. 		
Online Resources – e-Resources/ e-Books and e- learning portals		
<ul style="list-style-type: none"> • https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMB2101.pdf • https://kamarajcollege.ac.in/wp-content/uploads/Core-IX-Environmental-Microbiology.pdf • https://nou.edu.ng/coursewarecontent/BIO320_0.pdf • https://content.e-bookshelf.de/media/reading/L-12090079-7c15e330d2.pdf • https://booksite.elsevier.com/samplechapters/9780123705198/Sample_Chapters/01~Front_Matter.pdf 		
Part – D: Assessment and Evaluation		
Suggested Continuous Evaluation Methods:		
Maximum Marks:		100 Marks
Continuous Internal Assessment (CIA):		30 Marks
End Semester Exam (ESE):		70 Marks
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test / Quiz – (2): 20+20 Assignment/ Seminar – 10 Total Marks – 30	Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 30 Marks
End Semester Exam (ESE):	Two Section – A & B	
	Section A: Q1. Objective 10 X 1 = 10 Mark; Q2. Short answer type – 5X4= 20 Marks Section B: Descriptive answer type qts., 1 out of 2 from each unit – 4X10 = 40 Marks	

Name and Signature of Convener and Members of CBoS

Sadhana
10.6.24

Shy.
10.6.24

Rashmi
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10/6/24

[Signature]
Dr. Nelson

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DR. K K Poted

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART – A: Introduction			
Program: Bachelor in Life Science (Honors/ Honors with Research)		Semester VIII	
		Session: 2024-25	
1	Course Code	MBSC-08 P	
2	Course Title	Lab. Course - MBSC-08	
3	Course Type	Laboratory Course	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course the student will able to – <ul style="list-style-type: none"> ➤ define ecological factors affecting microbial growth ➤ compare diversity of microorganisms in different habitats ➤ explain microbiological quality of water ➤ identify microbial interactions 	
6	Credit Value	1 Credit	Credit = 30 Hours. Laboratory or Field learning/ Training
7	Total Marks	Max. Marks: 50	Min. Passing marks: 20
PART – B: Content of the Course			
Total No. of learning-Training/ Performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./ Field Training/ Experiment contents of Course	1. Analysis of soil for pH, moisture content 2. Isolation of microbes (bacteria & fungi) from rhizosphere and rhizoplane 3. Assessment of microbiological quality of water by presumptive test/MPN test 4. Confirmed and Completed tests for faecal coliforms 5. Determination of BOD of wastewater sample 6. Study of biological interactions (Competition, Parasitism) 7. Isolation of Rhizobium from root nodules. 8. Study the Effect of salt concentration/ pH on growth of microbes 9. Demonstration of Winogradsky's Column Preparation		30
Key Words	Soil microflora, Water microflora, Aeromicroflora, Extremophiles, microbial interactions		
PART – C: Learning Resources			
Text Books, Reference Books and Others			
Text Books Recommended:			
1. Laboratory Manual of Microbiology and Biotechnology; Aneja K. R 2. Practical Microbiology, R. C. Dubey and D. K. Maheshwari. 3. Laboratory Manual in Microbiology. By P. Gunasekaran.			
Online Resources:			
<ul style="list-style-type: none"> • https://books.google.co.in/books?id=Wh9OTbicsfUC&printsec=age&q&f=false • https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SMB2101.pdf 			
PART – D: Assessment and Evaluation			
Suggested Continuous Evaluation Methods:			
Maximum Marks:		50 Marks	
Continuous Internal Assessment (CIA):		15 Marks	
End Semester Exam (ESE):		35 Marks	
Continuous Internal Assessment (CIA): (By Course Teacher)	Internal Test/ Quiz – (2):	10 & 10	Better Marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 15 Marks
	Assignment/ Seminar + Attendance:	05	
	Total Marks:	15	
End Semester Exam (ESE):	Laboratory/ Field Skill Performance: On spot Assessment		Managed by course teacher as per lab. status
	A. Performed the Task based on lab. work –		
	20 Marks		
	B. Spotting based on tools & technology (written) -		
	10 Marks		
	Viva-voce (based on principle/ technology) –		
	05 Marks		

Name and Signature of Convener and Members of CBoS

Convener: *[Signature]* 10.6.24
 Member 1: *[Signature]* 10.6.24
 Member 2: *[Signature]* 10.6.24
 Member 3: *[Signature]* 10.6.24
 Member 4: *[Signature]* 10.6.24
 Member 5: *[Signature]* 10.6.24
 Member 6: *[Signature]* 10.6.24