

FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
DEPARTMENT OF MICROBIOLOGY
COURSE CURRICULUM

PART – A: Introduction			
Program: Bachelor in Life Science (Diploma/Degree/Honors)		Semester - III	
		Session: 2024-25	
1	Course Code	MBSE-01 T	
2	Course Title	Microbial Enzyme Technology	
3	Course Type	Discipline Specific Elective / (DSE)	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – <ul style="list-style-type: none"> ➤ learn the fundamentals of enzymes, enzyme-action and metabolic reactions ➤ explain the mechanism of enzyme action ➤ relate enzyme modifications ➤ identify the applications of enzymes in various fields ➤ attain knowledge about various biochemical techniques 	
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	Basic concept of enzymes: Nomenclature, classification, methods for determination of enzyme activity. Enzyme kinetics: Michaelis-Menten equation, effect of pH, substrate concentration, temperature and inhibitors. Iso-enzymes and allosteric enzymes. Enzyme inhibition-competitive and non-competitive inhibition.	12
II	Mechanism of enzyme action: Action of ribonuclease, chymotrypsin and trypsin. Coenzyme catalysis. Mechanism of action of thiamine pyrophosphate enzyme. Control and regulation of enzyme activity and feedback mechanisms. Metabolic compartmentalization in relation to enzyme, enzymes and secondary metabolites.	11
III	Enzyme engineering & applications of microbial enzymes: Chemical modification and site-directed mutagenesis structure & function relationship of industrially important enzymes. Microbial enzymes in textile, leather, wood industries and detergents.	11
IV	Biochemical techniques: Determination of molecular weights, purity, General methods of extraction-salting out, use of organic solvents; Purification; analysis of proteins - mass determination- GC-MS; structure determination-X-ray diffraction.	11
Key Words	Enzyme, Enzyme action, Enzyme inhibition, Enzyme engineering, Biochemical techniques,	

Name and Signature of Convener and Members of CBoS

Jan.
10.6.24

Rashmi
10.6.24

Dh
10.6.24

Shree

Anur
DR-KIC/24

Paul
10.6.24

Prasanna
10/6/24

Sadhana
10.06.24

Dr. Nelson Xes

Prab
10/6/24

Part – C: Learning Resources

Text Books, Reference Books and Others

Text Books Recommended:

1. A Text Book of Microbiology: R. C. Dubey & D. K. Maheshwari
2. A text book of Industrial Microbiology. 2nd edition. Panima Publishing Company, New Delhi.
3. Industrial Microbiology: Patel A H. (1996).1st edition. MacMillan India Limited Publishing Company Ltd. New Delhi, India.
4. Fundamentals of Biochemistry; Dr. J.L. Jain, Dr. Sanjay Jain, Nitin Jain, S. Chand Publication

Reference Books:

1. Principles of Biochemistry and molecular biology: Wilson & Walker
2. Lehninger Principles of Biochemistry, 8th Edition, David L. Nelson, Micheal M. Cox
3. Biotechnology: Crueger Wand Crueger A. (2000).

Online Resources – e-Resources/ e-Books and e- learning portals

- <https://www.britannica.com/science/enzyme>
- https://sist.sathyabama.ac.in/sist_coursematerial/uploads/SBB2204.pdf
- <https://www.khanacademy.org/science/ap-biology/cellular-energetics/environmental-impacts-on-enzyme-function/a/basics-of-enzyme-kinetics-graphs>
- <https://microbeonline.com/maldi-tof-ms-principle-applications-microbiology/>
- <https://www.technologynetworks.com/analysis/articles/gc-ms-principle-instrument-and-analyses-and-gc-msms-362513>

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	Better marks out of the two Test/ Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment/ Seminar – 10	
	Total Marks – 30	

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
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Name and Signature of Convener and Members of CBoS

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Dr. Nelson

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10/6/24
Dr. Rachana Choudhary

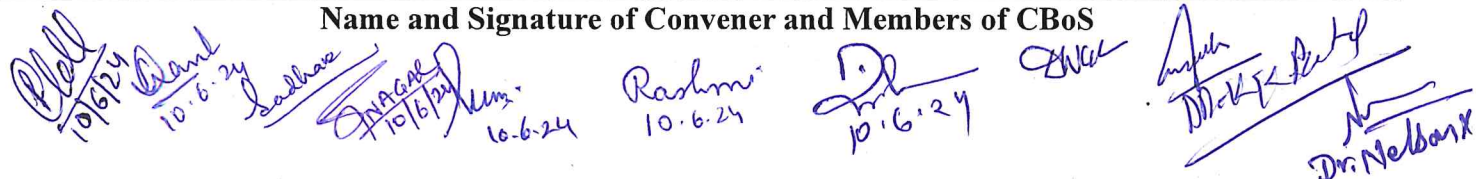
FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)

DEPARTMENT OF MICROBIOLOGY

COURSE CURRICULUM

PART – A: Introduction			
Program: Bachelor in Life Science (Diploma/Degree/Honors)		Semester - III	Session: 2024-25
1	Course Code	MBSE-01 P	
2	Course Title	Lab. Course - MBSE-01	
3	Course Type	Laboratory Course	
4	Prerequisite (If Any)	As per Program	
5	Course Learning Outcomes (CLO)	At the end of this course, the students will be able to – <ul style="list-style-type: none"> ➤ show the enzyme production by microorganisms ➤ demonstrate the actions of different enzymes ➤ determine various parameters of enzyme action ➤ examine various biochemical techniques used for enzyme technology 	
6	Credit Value	1 Credit	<i>Credit = 30 Hours. Laboratory or Field learning/ Training</i>
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. Screening of amylase producing microorganisms. 2. Demonstrations of enzyme activity: Phosphatase and Catalase 3. Determination of kinetic constant of enzyme: Amylase activity, Vmax. Km. 4. Effect of pH and temperature on amylase activity. 5. Effect of inhibitors on amylase activity. 6. Effect of UV absorption on proteins.		30
Key Words	Enzyme, Enzyme activity, Enzyme inhibition, Biochemical techniques		
PART – C: Learning Resources			
Text Books, Reference Books and Others			
Text Books Recommended:			
1. Laboratory Manual of Microbiology and Biotechnology. By 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=Wh9OTbjcsfUC&printsec=age&q&f=false • https://books.google.co.in/books/about/Practical_Microbiology.html?id=Wh9OTbjcsfUC&redir_esc=y 			
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		
	C. Viva-voce (based on principle/ technology) –		
	05 Marks		

Name and Signature of Convener and Members of CBoS



 10/6/24, 10.6.24, 10.6.24, Rashmi 10.6.24, 10.6.24, Dr. Nalbank