

**St. Aloysius College (Auto.) Jabalpur**  
Reaccredited A++ by NAAC (CGPA 3.58/4.0)  
College with Potential or Excellence CPE  
DST-FIST supported and DBT Star College Scheme

**Faculty of Science**  
**Bachelor of Science (B.Sc.) IV Semester**  
**SUBJECT: Industrial Microbiology**

## (S2INMB21) Physiology and Biochemistry of Microbes

## Course Outcomes

Course Outcomes		Cognitive Level
CO. No.	Course Outcomes	
CO 1	On completion of this course, the students will be able to demonstrate a knowledge and understanding of the basic principle of biochemistry including important molecules their economic and scientific importance inside the cell.	U, A
CO 2	The students will be able to understand the biochemical pathways of synthesis and degradation of these molecules.	U
CO 3	The students will be able to classify various types of enzymes and explain enzyme kinetics.	U
CO 4	The students will be able to explain the transport of different metabolites generated, with application in industrial processes.	U
CO 5	The students will have comprehensive knowledge of the microbial physiology and biochemistry.	U, K

## **Credit and Marking Scheme**

Credit and Marking Scheme				
	Credits	Marks		Total Marks
		Internal	External	
Theory	3	40	60	100 (Min. Passing Marks: 35)
Practical	1	40	60	100 (Min. Passing Marks: 35)
Total	4			200

## Evaluation Scheme

		Marks	
		Internal	External
Theory	3 Internal Exams of 20 Marks (Best 2 will be taken)	1 External Exams (At the End of Semester)	
Practical	2 Internal Exams and Attendance of 40 Marks	1 External Exams (At the End of Semester)	

Attendance of 40 Marks	(At the End of Semester)
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## Content of the Course

### Theory

No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60 Hrs.

<b>Part A Introduction</b>			
Program: Diploma	Class: B.Sc.	Year: IV Semester	Session: 2025-2026
<b>Subject: INDUSTRIAL MICROBIOLOGY</b>			
1	<b>Course Code</b>		S2INMB2T
2	<b>Course Title</b>		Physiology and Biochemistry of Microbes
3	<b>Course Type (Core Course / Elective/ Generic Elective/ Vocational/.....)</b>		Elective
4	<b>Pre-requisite (if any)</b>		To study this course, a student must have had the subject Biology in class/ 12 <sup>th</sup> / certificate/.
5	<b>Course Learning Outcomes (CLO)</b>		<p>On completion of this course:</p> <p>CO 1- The students will be able to demonstrate a knowledge and understanding of the basic. Principle of biochemistry including important molecules their economic and scientific importance inside the cell.</p> <p>CO 2-The students will be able to understand the biochemical pathways of synthesis and degradation of these molecules.</p> <p>CO 3-The students will be able to classify various types of enzymes and explain enzyme kinetics.</p> <p>CO 4- The students will be able to explain the transport of different metabolites generated, with application in industrial processes.</p> <p>CO 5- The students will have comprehensive knowledge of the microbial physiology and biochemistry.</p>
6	<b>Credit Value</b>		03
7	<b>Total Marks</b>	Max. Marks: 40+60	Min. Passing Marks:35

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## **Part B- Content of the Course**

Total No. of Lectures - Tutorials-Practical (in hours per week):

Total No. of Lectures - Tutorials-Practical (in hours per week).		No. of Lectures
L-T-P:	Topics	
Unit		
1	Biochemistry of Microbes: Chemical composition of cell, molecules of living systems, pH and pK, Buffers. Structure and classification of carbohydrates, lipids, proteins, DNA and RNA.	12
2	Enzymes and their classification, Enzyme kinetics, allosteric enzymes, Michaelis Menten equation, coenzyme, isozyme, enzyme inhibition and regulation. Vitamins: classification and function.	12
3	Microbial growth, phases of growth, conditions of growth, measurement of growth, growth curves, generation time, Effect of temperature, pH, salinity and oxygen on growth. Bacterial sporulation and germination, binary fission.	12
4	Biosynthesis of bacterial cell wall, Difference in eubacterial and archaeabacterial cell wall, transport across membrane, Mechanism of flagellar and ciliary motion and its function. Physiological types of bacteria: Thermophiles, Halophiles, Acidophiles, Psychrophiles, Barophiles. Quorum sensing in bacteria	12

**Keywords/Tags:** Microbial biochemistry, physiology.

## Part C-Learning Resources

## Text Books, Reference Books, Other Resources

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**Suggested Readings:**

1. Lehninger. Principles of Biochemistry, Nelson and Cox
2. J. L. Jain. Biochemistry. S. Chand
3. A. G. Moat, J. W. Foster and M. P. Spector. Microbial Physiology. Wiley.
4. R. C. Dubey and D. K. Maheshwari. A Textbook of Microbiology. S. Chand
5. Reddy S. R. and Reddy S. M. Microbial Physiology. Scientific Publishers India.
6. Pelczar M. J., Chan E.C. S. and Krieg N. R. Microbiology. McGraw Hill Book Company

#### Suggested equivalent online courses:

<https://nptel.ac.in/courses/104/102/104102016/>

<https://nptel.ac.in/courses/104/102/104102010/>

## Part D-Assessment and Evaluation

### Suggested Continuous Evaluation Methods:

Maximum Marks: 100

Continuous Comprehensive Evaluation (CCE): 40 marks University Exam (UE) 60 marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE):	Total Marks: 40
External Assessment: University Exam:	Total marks: 60
Any remarks/ suggestions:	

**Note:** Please include the Tutorial related information (if any) in this format

*Assessments  
11/09/25*

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