

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: B.Sc. Industrial Microbiology

Paper- Major / Minor

(S2INMB2T)

Physiology and Biochemistry of Microbes

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
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

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	40	60	100 (Min. Passing Marks: 35)
Practical	2	40	60	100 (Min. Passing Marks: 35)
Total	6			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)

John Massey
11/09/25

St. Louis, Mo., Aug. 10, 1861.

Content of the Course

Theory

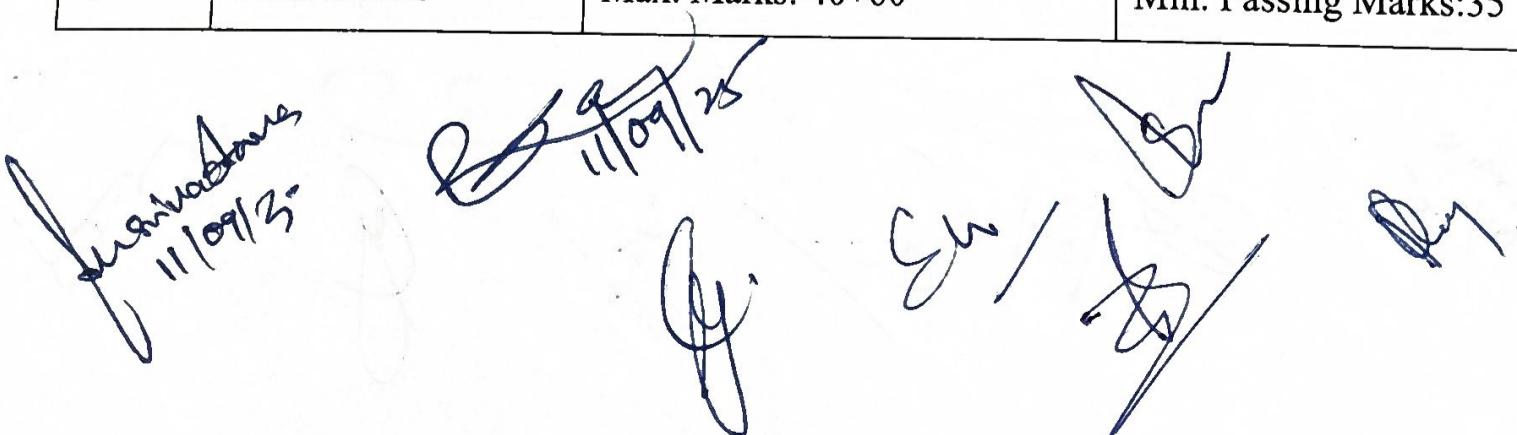
No. of Lectures (in hours per week): 2 Hrs. per week

Total No. of Lectures: 60 Hrs.

Maximum Marks: 60

Syllabus of Theory Paper (Major/ Minor)

Part A Introduction Program: Diploma Class: B.Sc. Year: IV Semester Session: 2025-2026 Subject: INDUSTRIAL MICROBIOLOGY			
1	Course Code		S2INMB2T
2	Course Title		Physiology and Biochemistry of Microbes
3	Course Type (Core Course / Elective/ Generic Elective/ Vocational/....)		Major/ Minor
4	Pre-requisite (if any)		To study this course, a student must have had the subject Biology in class/ 12 th / certificate/.
5	Course Learning Outcomes (CLO)		On completion of this course: 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. CO 2-The students will be able to understand the biochemical pathways of synthesis and degradation of these molecules. CO 3-The students will be able to classify various types of enzymes and explain enzyme kinetics. CO 4- The students will be able to explain the transport of different metabolites generated, with application in industrial processes. CO 5- The students will have comprehensive knowledge of the microbial physiology and biochemistry.
6	Credit Value		4
7	Total Marks	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): L-T-P:		
Unit	Topics	No. of Lectures
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
5	Microbial photosynthesis, photosynthetic apparatus in pro and eukaryotes, anoxygenic and oxygenic photosynthesis (Cyanobacteria and Algae). Light and dark reactions. Microbial respiration: Anaerobic and Aerobic mode of respiration, glycolysis, homo and hetero fermentative pathways. Energy transduction in archaeabacterial membrane	12

Keywords/Tags: Microbial biochemistry, physiology.


 A cluster of handwritten signatures and initials in blue ink. At the top left, a signature with the date '11/09/25' is written diagonally. To its right is a signature with '11/09/25' written vertically. Below these are several other signatures and initials, including 'G.', 'Dey', and 'S.'.

Part C-Learning Resources

Text Books, Reference Books, Other Resources

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/>

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:	Total marks: 60
University Exam:	
Any remarks/ suggestions:	

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

Information (if any) in this format

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11/09/23
Suz /
J. Dey