

St. Aloysius' College Jabalpur, M.P. (Autonomous)  
 Reaccredited A++ by NAAC with CGPA 3.58/4.00, College with Potential for Excellence (CPE)  
 DST-FIST supported and DBT Star College Scheme  
 Department of Botany and Microbiology  
 Session 2025-26

## Faculty of Science

Bachelor of Science (B.Sc.)

### SUBJECT: INDUSTRIAL MICROBIOLOGY

B.Sc. II Semester

Core Paper - Major 2

### FUNDAMENTALS OF INDUSTRIAL MICROBIOLOGY

#### Course Outcomes

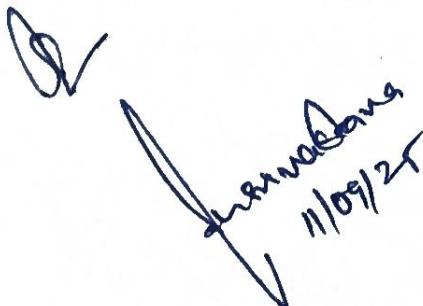
CO. No.	Course Outcomes	Cognitive Level
On completion of this course learners will able to:		
CO 1	be able to understand the history and development of Microbiology	U, R
CO 2	be able to describe the role and significance of microorganisms in societal welfare.	A
CO 3	be able to identify and classify the important microorganisms.	U
CO 4	be able to discover the contributions of important scientists in the field of Industrial Microbiology.	U, A

#### Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	4	30	70	100
Practical	2	30	70	100
Total	6		200	

#### Evaluation Scheme

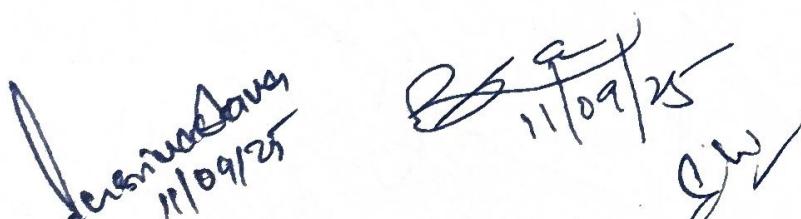
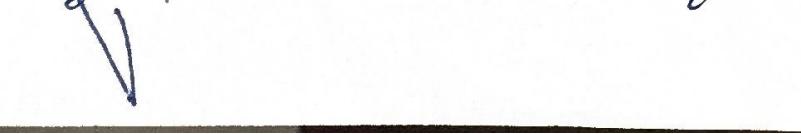
	Marks	
	Internal	External
Theory	3 Internal Exams of 15 Marks (two written test and one assignment) (Best 2 will be taken)	1 External Exams (At the End of Semester)
Practical	Quiz (10 marks), Assignment (15 marks), Attendance (5 marks)	1 External Exams (At the End of Semester)

11/01/25

**B.Sc. I Semester Industrial Microbiology**  
**Fundamentals of Industrial Microbiology**  
**Core Paper—Major 2**  
**Format for Syllabus of Theory Paper**

<b>Part A – Introduction</b>			<b>Session: 2025-26</b>
<b>Program: Certificate</b>	<b>Class: B.Sc.</b>	<b>Semester: II</b>	
<b>Subject: Industrial Microbiology</b>			
1	<b>Course Code</b>		
2	<b>Course Title</b>	<b>FUNDAMENTALS OF INDUSTRIAL MICROBIOLOGY</b>	
3	<b>Course Type (Core Course)</b>	<b>Core Course Major 2</b>	
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> .	
5	<b>Course Learning Outcome (CLO)</b>	On completion of this course, the learners will CO 1- be able to understand the history and development of Microbiology CO 2- be able to describe the role and significance of microorganisms in societal welfare. CO 3- be able to identify and classify the important microorganisms. CO 4- be able to discover the contributions of important scientists in the field of Microbiology.	
6	<b>Credit Value</b>	4	
7	<b>Total Marks</b>	Max. Marks: 30+10	Min. Passing Marks: 35
<b>Part B – Content of the Course</b>			
<b>Total No. of Lectures- Tutorials- Practical (in hours per week): 60 hrs</b>			
<b>L-T-P:</b>			
<b>Unit</b>	<b>Topic</b>		
1	Significant contributions by Indian sages and scientists to the understanding and development of microbiology. Context of microbiology in ancient texts (Sushruta and Charaka). Contribution of modern Indian scientists in advanced microbiological research. <b>Innovation- Women Microbiologist : HISTORY AND SCOPE</b> 1. Ruth Ella Moore 2. Dr. Gagandeep Kang 1.1 Development of Industrial Microbiology 1.2 Germ Theory of Disease 1.3 Scope and Application of Industrial Microbiology in human welfare. 1.4 Contribution of – A.V. Leeuwenhoek, Alexander Fleming, Louis Pasteur, Robert Koch, Edward Jenner, Joseph Lister. 1.5 Development of various Microbiological techniques and Golden Era of Industrial Microbiology. <b>Activity:</b> Organize a quiz on the topic.	<b>10 hrs</b>	
2	<b>MICROBIAL DIVERSITY: A</b> 2.1 Systems of Classification – Binomial Nomenclature, Whittaker's five kingdom, Carl Woese's three domain classification system and their utility. 2.2 VIRUS: Classification, General characteristics, Structure and Reproduction of viruses. 2.3 Viroids and Prions 2.4 Life cycle of RNA and DNA virus, Lytic cycle and Lysogeny <b>BACTERIA:</b> General characteristics, Classification, Ultra structure and Reproduction of bacteria 2.6 Role of bacteria in Industries.	<b>14 hrs</b>	


	Activity: Prepare Chart / Poster on the topic.	
3	<p><b>MICROBIAL DIVERSITY: B</b></p> <p>3.1 Bacteria with unusual properties: General characteristics, occurrence, reproduction and economic importance of the following:- <i>Cyanobacteria, Mycoplasma, Rickettsia and Actinomycetes.</i></p> <p>3.2 Beneficial and harmful microbes and their role in daily life</p> <p>3.3 Archaea- habit and general morphological characters</p> <p>3.4 Important Representative of Archaea- Methanogens and thermophiles.</p> <p><b>Activity:</b> Prepare models on the topic.</p>	14 hrs
4	<p><b>MICROBIAL DIVERSITY: C (EUKARYOTIC MICROORGANISMS)</b></p> <p>4.1 Morphological features, classification and characteristics of Myxomycetes (Slime Mould)</p> <p>4.2 Some microbiologically important Micro Fungi – <i>Rhizopus, Mucor, Neurospora, Aspergillus, Penicillium and Yeast.</i></p> <p>4.3 General account of Microbiologically important Algae.</p> <p>4.4 Role of Fungi in Medicines and in Industries.</p> <p><b>Activity:</b> Microbiology firm visit.</p>	12 hrs
5	<p><b>APPLICATIONS OF MICROBES IN INDUSTRIAL MICROBIOLOGY:</b></p> <p>5.1 Application in human therapeutics.</p> <p>5.2 Agriculture (Biofertilizers and Mycorrhizae)</p> <p>5.3 Environmental and Food Technology.</p> <p>5.4 Use of Prokaryotic and Eukaryotic microorganisms in Biotechnological applications.</p> <p>5.5 Genetically engineered microbes for Industrial application.</p> <p>5.6 Alternative source of Energy.</p> <p><b>Activity:</b> Organize Scientific presentation session.</p>	10 hrs

## Keywords/ Tags: History and diversity of micro-organisms

## Part C – Learning Resources

## **Text Books, Reference Books and Other books**

### **Suggested Readings:**

1. Microbiology-Pe lczar, chan and Kreig. I ngrahm.
2. General microbiology-Stainier,Ingharam, Wheelis and Painter.
3. Biology of Microorganism-Brook and Madigan.
4. Fundamental Principles of Bacteriology,-A.J.Salle. 5.1ntroduction to M icrobiology-I ngraham and Ingrahain.
5. Tools and techniques in Microbiology by Nath and Upadhyay.
6. Powar C.B. and H.F.Daginawa (2003).General Microbiology Vol.2; Himalaya Publishing House.
7. Dubey R.C. and D.K.Maheswari (2004). A text book of Microbiology, 1 st Edition; S.C.Chand and Company Ltd.
9. General Microbiology and Cell Structure. Mahima Golani. Yashraj Publications Indore.
10. Suksbmjeevanu in Vedas: The Forgotten Past of Microbiology in Indian Vedic Knowledge U Kuhad ,G Goel ,P K. Maurya , R C. Kuhad ,Indian J Microbiol [bttns://tloj.ore/10.1016/j.ijmicrobiol.2009.09.011](https://doi.org/10.1016/j.ijmicrobiol.2009.09.011)
11. Vedic Microbiology: A Scientific Approach, R.C.DUBEY

**Suggested equivalent online courses:**

**BASIC MICROBIOLOGY** <http://nptel.ac.in/courses/102/103/102103015>

## **Part D – Assessment and Evaluation**

### **Suggested Continuous Evaluation Methods:**

Be  
J. Hernandez  
1/09/25  
B. S. a  
1/09/25  
G. S.  
J. G.  
D. G.

Maximum Marks: 100

Continuous Comprehensive Evaluation (CCE): 30 Marks University Exam (UE): 70 Marks

<b>Internal Assessment:</b> Continuous Comprehensive Evaluation (CCE):	Class Test Assignment/ Presentation	15 15	
Main Exam	<b>Section (A): Objective type Questions</b> <b>Section (B): Short answer type Questions</b> <b>Section (C): Long answer type Questions</b>	<b>Total: 70</b>	

Manindra  
11/09/25

SG 11/09/25

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