

Faculty of Science

Bachelor of Science (B.Sc.)

SUBJECT: B.SC. INDUSTRIAL MICROBIOLOGY

B.Sc. II Semester

Paper- Minor 2

Microbes in Environment and Health

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO 1	To have knowledge of development of Industrial Microbiology.	U, K
CO 2	To understand role and scope of Industrial Microbiology for human welfare	U

Credit and Marking Scheme

	Credits	Marks		Total Marks
		Internal	External	
Theory	3	30	70	100
Practical	1	30	70	100
Total	4	200		



[Handwritten signatures and dates]

St. Aloysius College (Autonomous), Jabalpur, Madhya Pradesh

Department of Botany & Microbiology

Session 2025-2026

Syllabus of Theory Paper

Part A Introduction

Program:
Certificate

Class: B.Sc.

Year: First

Session: 2025-26

Subject: Industrial Microbiology

1.

Course Code

2.

Course Title

Microbes in Environment and
Health

3.

Course Type

Minor 2

4.

Pre-requisite (if any)

To study this course, a student must
have had the subject BIOLOGY in
class 12th/ certificate/ Diploma

5.

Course Learning outcomes (CLO)

To have knowledge of development
of Industrial Microbiology.

To understand role and scope of
Industrial Microbiology for human
welfare.

6.

Credit Value

3

7. Total Marks

Max. Marks: 30+70

Min. Passing Marks: 35

Part B Content of the Course

Total no. of Lectures- Tutorials-Practical (in hours per week) - L-T-P:45 hrs

Unit

Topics

No. of Lectures

1

Significant contributions by Indian sages and scientists to
the understanding and development of microbiology.

12

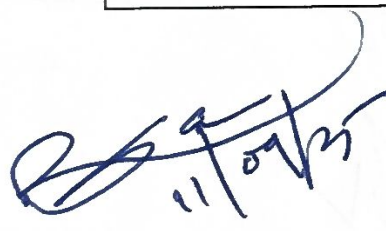
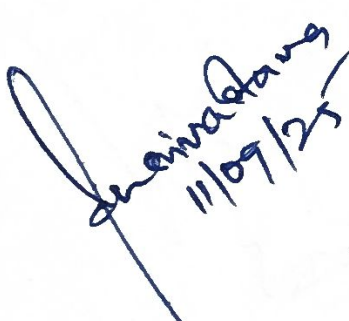

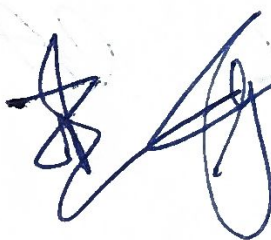
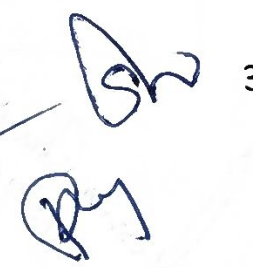
11/07/25

11/09/25

2

2

	<p>Context of microbiology in ancient texts (Sushruta and Charaka). Contribution of modern Indian scientists in advanced microbiological research.</p> <p>Introduction to Microbes</p> <ul style="list-style-type: none"> • Definition and types of microbes: Bacteria, Viruses, Fungi, Protozoa, Algae • Beneficial vs. Harmful microbes • Role of microbes in nature <p>Activity: Organize a quiz based on the topic</p>	
2	<p>Microbes in the Environment</p> <p>Microbial Ecology</p> <ul style="list-style-type: none"> • Microbial diversity in soil, water and air • Role of microbes in biogeochemical cycles (Carbon, Nitrogen, Sulfur, Phosphorus) • Symbiotic relationships (Rhizobium & leguminous plants, Mycorrhizae) <p>Biodegradation & Bioremediation</p> <ul style="list-style-type: none"> • Microbes in waste management (sewage treatment, landfill degradation) • Biodegradation of pollutants (oil spills, plastic degradation, heavy metal detoxification) • Bioremediation case studies <p>Microbes and Climate Change</p> <ul style="list-style-type: none"> • Role of microbes in greenhouse gas production (methanogens) • Microbes in carbon sequestration (cyanobacteria, phytoplankton) • Impact of climate change on microbial ecology <p>Activity: Prepare Chart/Poster on the topic</p>	11
3	Microbes in Human Health	11

 11/09/25
  11/09/25
 

 3

	Human Microbiome <ul style="list-style-type: none"> • Normal flora of the human body • Importance of gut microbiota in digestion and immunity Pathogenic Microbes and Diseases <ul style="list-style-type: none"> • Bacterial diseases (Tuberculosis, Cholera, Typhoid) • Viral diseases (Influenza, Hepatitis, HIV/AIDS, COVID-19) • Fungal infections (Candidiasis, Ringworm) • Protozoan diseases (Malaria, Amoebiasis) Microbial Control Measures <ul style="list-style-type: none"> • Antibiotics and their mechanisms • Vaccines and immunization • Sterilization and disinfection Activity: Organize a Scientific Talk Session	
4	Microbes in Food and Industry Microbes in Food <p>Fermented foods (Idli, Dosa, Dahi, Buttermilk, Cheese, Yoghurt)</p> <p>Probiotics and their health benefits</p> <p>Food spoilage and preservation methods</p> Microbes in Biotechnology and Medicine <p>Production of antibiotics (Penicillin)</p> <p>Role in vaccine production (Recombinant vaccines)</p> <p>Industrial applications (Ethanol production, Biogas, Enzymes)</p> Activity: Prepare Models on the topic	11
Keywords/Tags: Use of Microbes in industry.		
Part C- Learning Resources		
Text Books, Reference Books, Other Resources		

1 Suggested Readings:

1. Dubey R. C. and D. K. Maheswari (2004). A text book of Microbiology, Ist Edition; S. C. Chand and Company Ltd.
2. Sukshmjeevanu in Vedas: The Forgotten Past of Microbiology in Indian Vedic Knowledge, U. Kuhad, G. Goel, P. K. Maurya, R. C. Kuhad, Indian J Microbiol. <https://doi.org/10.1007/s12088-020-00911-5>

2. Suggestive digital platforms web links

<https://nptel.ac.in/courses/102/103/102103015/microbiology>

Suggested equivalent online courses:

https://www.researchgate.net/publication/325320951_VEDIC_MICROBIOLOGY_Microbiology_in_the_Vedas-_A_Revived_History

https://www.researchgate.net/profile/Chakradhar-Frend/publication/325320951_VEDIC_MICROBIOLOGY_Microbiology_in_the_Vedas-_A_Revived_History/links/5df708d94585159aa4808738/VEDIC-MICROBIOLOGY-Microbiology-in-the-Vedas-A-Revived-History.pdf

[http://krepublishers.com/02-Journals/JBD/JBD-07-0-000-16-Web/JBD-07-2-000-16-Abst-PDF/JBD-07-2-101-16-055-Padhy-S/JBD-07-2-101-16-055-Padhy-S-Tx\[3\].pmd.pdf](http://krepublishers.com/02-Journals/JBD/JBD-07-0-000-16-Web/JBD-07-2-000-16-Abst-PDF/JBD-07-2-101-16-055-Padhy-S/JBD-07-2-101-16-055-Padhy-S-Tx[3].pmd.pdf)

Part D - Assessment and Evaluation

Suggested Continuous Evaluation Methods:

Maximum Marks: 100

Continuous Comprehensive Evaluation (CCE):30 marks Final Exam (UE): 70 marks

Internal Assessment:	Class Test - 2	
Continuous Comprehensive Evaluation (CCE): 30	Assignment/ Presentation – 1 (3 CCE will be taken)	15 marks each (Best two will be considered) 30
External Assessment:	Section(A): Objective type questions (1X5=5) Section (B): Short questions (200 words each/ 5X5=25) Section (C): Long questions (500 words each/ 8X5=40)	-70
Final Exam: 70		

Signature
11/09/25

Signature
11/09/25
ew

Signature
Signature

5
Signature