ST. ALOYSIUS COLLEGE(AUTONOMOUS), JABALPUR

Reaccredited 'A++ 'Grade by NAAC (CGPA:3.58/4.00)
College with Potential for Excellence by UGC
DST-FIST Supported & STAR College Scheme by DBT
SESSION 2025-26

Faculty of Science

Bachelor of Science (B.Sc.) VI Semester
SUBJECT: INDUSTRIAL MICROBIOLOGY
Paper-DSE 1
AGRICULTURAL MICROBIOLOGY
(S3INMB4D)

Course Outcomes

CO. No.	Course Outcomes	Cognitive Level
CO1	On successful completion of this course, the students will be able to demonstrate a knowledge and understanding of role of microbes in agriculture	U,A
CO2	Students can move for sustainable agriculture	A
CO3	Students will learn the production of bio fertilizers, which is helpful for start-ups as well as jobs in companies.	U, A
CO4	Students can move in research areas	A

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 (Total of 40 Marks)	1 External Exams (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. **Maximum Marks:** 60

Units	Topics	No. of Lectures
I	**Agricultural Environment** ❖ Definition, scope and importance ❖ Indian traditional agriculture and role of microbes ❖ Water management: Types of irrigation, drip irrigation ❖ Soil Management: Fertility of soil, important soil microbes, role of microbes to maintain soil fertility ❖ Rhizosphere: Definition, important rhizosphere microbes, interaction of plant root with microbes ❖ Phyllo-sphere: Definition, important phyllo-sphere microbes, interaction of plant leaves with microbes ❖ Climate change: Definition, effect of climate change on agricultural microbes and global warming.	12
II	**Biofertilizers and biopesticides** ❖ Definition, scope and importance. ❖ Keypoints of chemical versus microbial bio fertilizers ❖ Production of following biofertilizers: Rhizobium, Azotobacter, blue green algae, Mycorrhiza, Azospirillum ❖ Biopesticides: Important biopesticides and their production	12
III	**Agricultural biotechnology: Biofuel** ❖ Definition, scope and advantages ❖ Ethanol (1G2G): Industrial Production of Ethanol and its application ❖ Biogas: Production of Biogas, Stages of methanogenesis, Biochemistry of methane formation, Application of Biogas ❖ Hydrogen Production and conversion of light energy, its application ❖ Biodiesel production: Biodiesel producing plants, industrial production and its application	12
IV	**Agricultural biotechnology: Biotransformation** ❖ Definition of biotransformation, scope and importance ❖ Biotransformation process ❖ Biotransformationofmicrobialgenesinplantcellsvia Agrobacteriummediatedgene transfer ❖ Applications of Biotransformation	12

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V	**Agricultural biotechnology: Fermentation and Environmental technology** ❖ Role of microbes in food processing ❖ Preservation of fruits and vegetables ❖ Production and preservation of fruit Juice ❖ Production of SCP, (mycoprotein) (Bacterial, fungal, and algal) ❖ Role of microbes in biocomposting ❖ Role of microbes in agricultural waste recycling ❖ Role of microbes to improve agricultural fields	12

Keywords/Tags: Rhizosphere, phyllosphere, Biodiesel, Microbial biofertilizer, Biopesticides, Biogas, Biotransformation, SCP, Mycoprotein, Biocomposting

Text Books Reference Books, Other resources

Suggested Books:

1. Power C.B. and Chatwal C.R. Biochemistry. Himalaya Pub. House, Mumbai,2008.
2. Berg J.M., Tymaczko J.L. and Stryer L. Biochemistry. W.H. Freeman,2006.
3. Rehm H.J., Reed warlag G. and Casida L. E. Industrial Microbiology, New age international publisher.
4. Crueger W. Biotechnology: A text Book of Industrial Microbiology. Med techpublic.2017.
5. Kutz M. Biochemical Engineering Fundamentals, McGraw Hill Publication.2021
6. LaboratorytechniquesinBiochemistryandMolecularBiologybyworkandwork
7. Peppler H.Jand Periman D Microbial technology, Vol.I and Vol.II. Academic press NewYork.
8. Shuller M.I. and Kargi F. Bioprocess Engineering basic concepts,2ndedition, Prentice Hall publication. 2002

Suggested digital platforms web links www.eshiksha.mp.gov.in

Suggested equivalent online courses:https://onlinecourses.nptel.ac.in/noc20eel7/previewhttps://onlinecourses.nptel.ac.in/noc21bt22/preview

Suggested Continuous Evaluation Methods:

MaximumMarks:100

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

Internal Assessment: Continuous Comprehensive Evaluation (CCE)	Class Test Assignment/Presentation	40
External Assessment: Exam Time: 03.00 Hours	**Section(A)**: MCQ **Section(B)**:Short Questions Each) **Section(C)**: Long Questions Each)	60
		40+60=100

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