Department of Microbiology

St. Aloysius College Autonomous Jabalpur, M.P

B.Sc II year

Industrial Microbiology: Major Paper 1

Session 2022-23

Format For Syllabus of Theory Paper

Part A Introduction			
Program: Diploma	**Class: B.Sc**	**Year: Second**	**Session: 2022-2023**
Subject: Industrial Microbiology			
1	Course Code	S2INMB1T	
2	Course Tittle	Application of Industrial Microbiology	
3	Course Type [Core Course / Elective/ Generic Elective / Vocational /.....]	Core MAJOR 1	
4	Pre-requisite [if any]	To study this course, a student must have had the subject Biology In class /12th/certificate/.	
5	Course Learning outcomes [CLO]	On successfully completing the module, student will be able to demonstrate a knowledge and understanding of: Basic fermentations processes, design of various fermenters and their type. Different separation techniques and application of fermentation in waste treatment. Students will be able to select industrially important microbes for economical use. Finally student will learn the economics of the fermentation for the total cost of production.	
6	Credit Value	4	
7	Total Marks	Max. Marks: 30+70	Min. passing marks:

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	General concept of industrial microbiology and its applications, history & scope. Exploitation of microorganisms and their products, screening, strain development strategies, inoculum preparation, fermentation media, raw material used in media production, antifoaming agents, immobilization methods, buffers, downstream processing	15
2	Fermentation equipment and its uses, fermenter design, Types of fermenters and fermentations- single, batch, continuous, multiple, surface, submerged and solid state. Scale up and scale down process. Harvesting and recovery of intracellular and extracellular product.	10
3	**Industrial products from microorganisms-**	10

	Antibiotics: production of Penicillin, Streptomycin. **Enzymes from microbes:** Amylase, Protease. **Organic acids:** Citric acid, Acetic acid **Amino acids:** Glutamic Acid, Lysine.	
4	Production of Interferon, Vaccines, Hormones, Vitamins. Production of alcoholic beverages: Beer and wine, Biofuels: Ethanol, Methane, Biogas.	10
5	Ethics and law of industrial production: standard operating procedure (SOP), Good manufacturing practices (GMP), patent and copyrights, environmental hazard from fermentation industry, industrial waste management procedure and environmental safety measures	15

Keywords/Tags: Fermenters, Industrial Production, microbes

Part C – Learning Resources

Text Books, Reference Books, Other resources

1. A.H. Patel. Industrial Microbiology, Laxmi Publications; Second edition
2. K. R. Aneja. A Textbook of Basic and Applied Microbiology, New Age International.
3. Whitaker and Stanbury. Principles of Fermentation Technology.
4. Casida. Industrial Microbiology. Tata McGraw Hill.
5. Biotechnology- Industrial Microbiology, Crueger W and Crueger A 2nd edition (Panima publication
New Delhi).
6. Industrial -Microbiology, Prescott SC & Dunn CG, 4th edition (Agrobios publication, Jodhpur)
7, Industiabrnicrobiology : An Introduction , Waites MJ, Margan NL, Rockey JS, Higton G, 1st editor (Blackwell Science Ltd. UK).

B. Books Poblisbed by M.P Hindi Granth Academy, Bhopal.

Suggested equivalent online courses:

http://ecoursesonline.iasri.res.in/coursc/view.php?id=461
https://nptel.ac.in/courses/102/105/102105058/
https://nptel.ac.in/courses/ 102/104/102104063/
https://nptel.ac.in/courses/102/106/102106022

Part D – Assessment and Evaluation

Suggested Continuous Evaluation Methods:
Maximum Marks: 100
Continuous Comprehensive Evaluation (CCE): 30 marks University Exam (UE) 70 marks

Internal Assessment: Continuous Comprehensive Evaluation (CCE):	**30**
External Assessment : University Exam :	**70**