

Name of Faculty	:	Faculty of Science
Name of Program	:	Bachelor of Science
Course Code	:	2BSB03
Course Title	:	Industrial Microbiology
Type of Course	:	Professional Core
Year of Introduction	:	2023-24

Prerequisite	:	Recall the technology of microbial productions.
Course Objective	:	To impart knowledge of the basic principles of industrial screening for the various products forming microorganisms. To impart the knowledge of the basic procedures for the production of industrially important organisms and develop the skills required for the industry.
Course Outcomes	:	At the end of this course students will be able to:
	CO1	Understand the preservation and screening methods of various microorganisms.
	CO2	Analysing the process of fermentation.
	CO3	Creating the design for the formulation of various microbial products.
	CO4	Understand the biodegradation ability of various microorganisms.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	SEE	CIA	SEE	CIA	
3	0	2	4	50	25	50	25	150

Legends: L-Lecture; T-Tutorial/Teacher Guided Theory Practice; P - Practical, C - Credit, SEE - Semester End Examination, CIA - Continuous Internal Assessment (It consists of Assignments/Seminars/Presentations/MCQ Tests, etc.)

Course Content

Unit No.	Topics	Teaching Hours	Weightage	Mapping with COs
1	Microbial processes in Industrial Biotechnology: Industrially important microbes, its screening, selection and identification. Methods: Maintenance and preservation of industrially important microbial cultures	10	22%	CO1
2	Fermentation Industry and role of microbes: Production Process, Fermentation media, Aeration, pH, Temperature, Batch versus Continuous culture, Downstream processing and product recovery.	10	22%	CO2
3	Quality control of industrial products: Production of Pharmaceuticals: Antibiotics, Vitamins (B12) Production of Organic Acids: Acetic Acid, Citric Acid, Production of Amino Acid: Glutamic Acid.	15	34%	CO3
4	Microbiology enhanced recovery of mineral resources, Bioleaching of metals, Oil recovery. Biodeterioration: Paper, Wood, Paint, Textiles.	10	22%	CO4

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	25	25	-	25	-	25

NOTE: This specification table shall be treated as a general guideline for the students and the teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Suggested List of Experiments

Sr. No.	Name of Experiment	Teaching Hours
1	Microbiology Good Laboratory Practices	02
2	Biosafety cabinets	02
3	Introduction to Various Instruments used in Microbiology Laboratory: Design of Fermentation Vessel	02
4	Isolation and identification of micro-organisms of spoiled food.	02
5	Isolation and identification of fungi from soil	02

6	Isolation and identification of bacteria from soil.	02
7	Screening of Antibiotic producing organism.	02
8	Screening of Amylase producing bacteria.	02
9	Screening of Organic acid producing bacteria.	02
10	Subculturing of the bacterial culture.	02
11	Subculturing of Fungal culture.	02
12	Preservation of culture by making Glycerol stock	02
13	Preservation of anaerobic culture.	02
14	Preparation of stock media for the production of Ethanol.	02
15	Production of Ethanol.	02
16	Estimation of ethanol.	02
17	Preparation of stock media for the Production of Citric acid	02
18	Production of Citric acid	02
19	Estimation of Citric acid.	02
20	Production of Cellulose	02

Major Equipment /Instruments

Sr. No.	Name of Major Equipment/ Instruments and Software
1	Analytical Balance
2	Autoclave
3	Micropipettes
4	Stains
5	Light Microscope
6	Anaerobic jar
7	UV Chamber
8	Hot Air Oven
9	Centrifuge
10	Bioreactor

Suggested Learning Websites

Sr. No.	Name of Website
1	http://www.simbhq.org/

Reference Books

Sr. No.	Name of Reference Books
1	Fermentation Microbiology and Biotechnology by E. M. T. El-Mansi, C. F. A. Bryce, Arnold L. Demain, A.R. Allman
2	Industrial Microbiology Fundamentals and Applications by Agrawal A K & Pradeep Parihar, Agro-Bios



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3	"Introduction to Industrial Microbiology" by Charles L. Cooney
4	"Industrial Microbiology: Biotechnology and Fermentation" by Kenneth J. Ryan and Christopher P. Houck
5	"Principles of Fermentation Technology" by P. F. Stanbury, A. Whitaker, and S. J. Hall
6	Microbial Biotechnology: Fundamentals of Applied Microbiology" by Alexander N. Glazer and Hiroshi Nikaido