

Name of Faculty	:	Faculty of Science
Name of Program	:	Master of Science
Course Code	:	2MSB03
Course	:	Microbial Biotechnology
Type of Course	:	Professional Core
Year of Introduction	:	2023-24

Prerequisite	:	Learn the concepts of production of useful products using microorganisms
Course Objective	:	Microbial Biotechnology will lead to breakthroughs such as improved vaccines and better disease diagnostic tools, improved microbial agents for biological control of plant and animal pests, modifications of plant and animal pathogens for reduced Production of a range of value added products. Target the selection and manipulation of microorganisms with the objective of improving process control, product quality, safety, consistency and yield.
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Recall a sound knowledge in the synthesis of various products using genetically engineered microorganisms
	CO2	Able to understand the process for the byproducts formed by microorganisms.
	CO3	Analysing and exploitation of microorganisms in the food sector
	CO4	Application of principles and techniques to the study and utilization of microorganisms and their products.

Teaching and Examination Scheme

Teaching Scheme (Contact Hours)			Credits	Examination Marks				
				Theory Marks		Practical Marks		Total marks
L	T	P	C	SEE	CI A	SEE	CI A	
4	0	0	4	70	30	0	0	100

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 production of Antibiotics: Streptomycin Enzymes: proteases, amylases, lipases. Organic acids: Citric acid, acetic acid. Vaccines-Recombinant Vaccines. Siderophores.	10	22%	CO1, CO2 CO3
2	Microbial production of Amino acids: Glutamic acid, Lysine & Tryptophan Industrial Alcohol, Beer and wine Vitamins: Vit B12, B2, Ergot alkaloids	15	34%	CO2, CO3
3	Biotransformation of steroids. Production of single cell protein from bacteria, fungi and algae: Nutritional value and safety. Edible Mushrooms: Cultivation of edible and medicinal mushrooms. Bioplastics: Single cell oil.	10	22%	CO3, CO2
4	Microbial Exopolysaccharides: Xanthan, Alginate Microbial Flavours: Diacetyl, Methyl ketones, Terpenes, Vanillin Fermented food and Dairy products: Starter cultures, cheese and yogurt manufacture. Science and technology of bread.	10	22%	CO3, CO4

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	25	25	25	25	0	0

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.

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	Electrophoresis
11	SDS PAGE
12	PCR
13	Deep Freezer
14	Autoradiography

Suggested Learning Websites

Sr. No.	Name of Website
1	http://www.ncbi.nlm.nih.gov

Reference Books

Sr. No.	Name of Reference Books
1	Biotechnology: RehmandReid.
2	Comprehensive Biotechnology Murray Moo
3	Fermentation Microbiology and Biotechnology, El Mansi and Bryc