

Name of Faculty	:	Faculty of Science
Name of Program	:	Master of Science
Course Code	:	1MSB02
Course	:	Advances in Microbial Biochemistry
Type of Course	:	Professional Core
Year of Introduction	:	2023-24

Prerequisite	:	Provides with a good understanding of the chemical principles within the organisms.
Course Objective	:	To impart the knowledge of Biomolecules Understanding the concepts of various pathways Study about enzymes and enzyme kinetics wherein the student can use the knowledge in various fields. An ability to acquire in depth theoretical and practical knowledge of biochemistry
Course Outcomes	:	At the end of this course, students will be able to:
	CO1	Know and understand the concepts and the pathways of biomolecules.
	CO2	Understand the classification of enzymes and enzyme kinetics.
	CO3	Application of knowledge of enzymology in the pharmaceutical industries.
	CO4	Understand the regulation of biochemical pathway and analyse possible process modifications for improved control over microorganisms for microbial product synthesis.

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	
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	Biomolecules Specific biomolecules their structure and function Carbohydrates: simple and complex Proteins: glycoconjugates- glycoproteins, proteoglycans and glycolipids Central metabolic pathways and feeder pathways Metabolism of fatty acids Metabolism of C1 compounds Fate of pyruvate under anaerobic condition	12	26%	CO1
2	Biosynthesis and regulation Biosynthesis and regulation of amino acids Biosynthesis and regulation of nucleotides Nitrogen metabolism: Nitrate and ammonia assimilation, their control and regulation of Nitrogenase.	13	29%	CO1
3	Enzymology I Extraction and purification of enzymes Structure of enzymes Protein folding and denaturation Kinetics of enzyme catalytic reactions Mechanism of enzyme action- catalysis mechanisms and lysozyme	10	22%	CO2 CO3
4	Enzymology II Allosteric enzymes- sigmoidal kinetics Immobilization of enzymes Clinical, analytical and industrial applications of enzymes. Ribozymes and Abzymes	10	23%	CO3 CO4

Suggested Distribution of Theory Marks Using Bloom's Taxonomy						
Level	Remembrance	Understanding	Application	Analyse	Evaluate	Create
Weightage	20	60	-	20	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
15	HPLC
16	Immunoassay analyser

Suggested Learning Websites

Sr. No.	Name of Website
1	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1693353/

Reference Books

Sr. No.	Name of Reference Books
1	Enzymes, biochemistry, biotechnology, clinical Trevor Palmer chemistry
2	Fundamentals of enzymology N.C.Price & L. Sterens, 3rd edn, Oxford press. J. T. Staley & A.L. Reysenbach
3	Enzymes and immobilized cells in biotechnology A. L. Laskin
4	Biochemistry and molecular biology W. H. Elliott & D. C. Elliott
5	Biology of industrial microorganisms A.L. Duncun microorga