MIC 402: Microbial Biochemistry and Enzymology

COURSE CODE: MIC 402
NO. OF CREDITS: 04

COURSE OUTCOMES (COs)

- **CO1** Conveying understanding of biomolecules, microbial metabolism, andenzymes.
- **CO2** Identifying biological importance of biomolecules-carbohydrates, lipids,proteins and enzymes.
- **CO3** Appreciating the knowledge of the biological metabolism of carbohydrates,lipids, amino acids, and nucleotides.
- **CO4** Imparting the knowledge of the working of the enzyme along with portraying their clinical, analytical, and industrial applications**.**

Unit 1: Biochemistry of Carbohydrates and Lipids

- Carbohydrates, types, structure and function
- Lipids: Fatty acids, simple lipids, phospholipids, and cholesterol
- Glycoconjugates- glycoproteins, proteoglycans, and glycolipids
- Central metabolic pathways, feeder pathways, and Fate of pyruvate underanaerobic condition
- PHA and PHB in cells; degradation of fatty acids by beta-oxidation
- Metabolism of C1 compounds

Unit 2: Biochemistry of Proteins and Nucleic Acids

- Amino acids and proteins, structure, classification, and properties
- Structure and function of Nucleic acids, Nucleotides- types, derivatives andfunctions
- Nitrogen metabolism: Nitrate and Ammonia Assimilation, Nitrogen fixation and Nitrogenase
- Biosynthesis and regulation of amino acids
- Biosynthesis and regulation of nucleotides

Unit 3 Enzymology 1

- Extraction and purification enzymes
- Protein folding and denaturation
- Enzyme Kinetics
- Mechanism of enzyme action-catalysis mechanisms and lysozyme
- Enzyme regulation

Unit 4 Enzymology 2

- Enzyme inhibition
- Enzyme turnover
- Immobilization of Enzymes
- Biotechnological applications of enzymes
- Abzymes and ribozymes

Goyal

REFERENCE

No.	Name	Author
1.	Biochemistry and molecular biology	W. H. Elliott & D. C. Elliott
2.	Biochemistry Stryer 5th edition	W.H. Freeman
3.	Biochemical methods	Pingoud A. et al.
4.	Enzymes and immobilized cells in biotechnology	A. L. Laskin
5.	Enzymes, biochemistry, biotechnology, clinical chemistry	Trevor Palmer
6.	Principle of Biochemistry 3rd edition	Lehninger Nelson & Cox
7.	Biotechnology	U. Satayanarayan

WEBLINKS

1. Carbohydrates:
https://www.presentica.com/doc/11089287/module-11-carbohydrates-lecture-29-carbohydrates-i-pdf-document

2. e-PGPathshala:
https://epgp.inflibnet.ac.in/Home/ViewSubject?catid=MNhNzp1RQlU+6LM40KjY1Q==

- Paper-11 Module-17 Nitrogen fixation and cycles
- Paper-04 Module-06 Entry of fructose and galactose
- Paper-04 Module-08 Fate of pyruvate
- Paper-04 Module-23 Gluconeogenesis
- Paper-14 Module-10 Enzyme kinetics
- Paper-14 Module-11 Enzyme inhibition
- Paper-14 Module-26 Enzyme immobilization

Goyal