M.G. Science Institute, Autonomous

Affiliated to Gujarat University, Ahmedabad

(Managed by The Ahmedabad Education Society)

Department of Biotechnology

Programme: Bachelor of Science (Hons.) in Biotechnology

SYLLABUS

(Effective from Academic Year 26-27)

Syllabus B.S. Biotechnology Semester V

Semester: V	Title: Enzymology	Credit: 4
Course Code: BTM352 (T)		4hr/week

Course Outcomes:

By the end of the course, students should be able to:

CO1: Understand the basic concepts of enzymes, enzyme classification, and nomenclature.

CO2: Explain enzyme kinetics, mechanisms of enzyme action, and enzyme inhibition.

CO3: Gain knowledge about enzyme regulation, allosteric enzymes, and coenzymes.

CO4: Outline principles of enzyme purification, characterization, and industrial applications.

COs	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8
CO-1	3	2	2	1		2		
CO-2	2	3	1	1			1	1
CO-3					1		2	3
CO-4					1	3	3	

Unit 1: Introduction to Enzymes Teaching Hours: 15

- Historical background and scope of enzymology
- Nomenclature and classification of enzymes (IUBMB system)
- Properties of enzymes
- Concept of active site, cofactors, and prosthetic groups
- Isoenzymes and ribozymes

Unit 2: Mechanism and Regulation of Enzyme Action Teaching Hours: 15

- Mechanisms of enzyme catalysis: acid-base, covalent, metal ion catalysis
- Enzyme specificity and models: Lock and Key, Induced Fit
- Allosteric enzymes and non-allosteric enzymes: characteristics
- Role of coenzymes and vitamins in enzymatic activity

- Enzyme regulation: Functional level and Production level

Unit 3: Enzyme Kinetics and Inhibition Teaching Hours**:** 15

- Types of enzyme inhibition: competitive, non-competitive, uncompetitive
- Michaelis Menten kinetics and derivation
- Lineweaver-Burk plot and its significance
- Irreversible inhibition and inhibitors

Unit 4: Enzyme Purification and Applications Teaching Hours**:** 15

- Enzyme extraction and purification methods (salting and acetone precipitation, chromatography, electrophoresis)
- Immobilized enzymes: techniques and applications
- Industrial and clinical applications of enzymes
- Enzymes as

therapeutic agents References

1. Lehninger, A.L., Nelson, D.L., & Cox, M.M. *Principles of Biochemistry*, 7th Edition.
2. Palmer, T. *Enzymes: Biochemistry, Biotechnology, Clinical Chemistry*, 2nd Edition.
3. Price, N.C., & Stevens, L. *Fundamentals of Enzymology*, 3rd Edition.
4. Dixon, M., & Webb, E.C. *Enzymes*, 3rd Edition.
5. Voet, D., & Voet, J.G. *Biochemistry*, 4th Edition.
6. Stryer, L. *Biochemistry*, 8th Edition.
7. Satyanarayana, U. *Biochemistry*.
8. Chaplin, M., & Bucke, C. *Enzyme Technology*.
9. Wiseman, A. *Handbook of Enzyme Biotechnology*.