

**B.Sc. BIOCHEMISTRY (CBCS STRUCTURE)
CORE-2 BIOENERGETICS & ENZYMOLOGY (THEORY)
SEMESTER-II**

CREDITS: 4

Unit-I: Biological Energy Transformations:

- 1.1. Thermodynamics –First law of thermodynamics, second law of thermodynamics, Gibb's Free energy, Exergonic and endergonic reactions,
- 1.2. High energy compounds, ATP cycle.
- 1.3. Interconversion of Adenine nucleotides and phosphate cycle.
- 1.4. Redox reactions, Standard Redox potential of some Biochemically important reactions.

Unit-II: Biological Oxidations:

- 2.1. Ultra structure of mitochondria , Chloroplast ,
- 2.2. ATP Synthase. Electron transport chain and carriers involved.
- 2.3. Oxidative Phosphorylation ,Uncouplers , Substrate level phosphorylation, Cyclic and non-cyclic photophosphorylation.
- 2.4. Mitchell's Chemiosmotic theory.

Unit-III: Enzymes:

- 3.1. Introduction to biocatalysis, differences between chemical and biological catalyst,
- 3.2. Nomenclature and Classification of enzymes. Definition, of Holoenzyme, Apo-Enzyme, Cofactor. Allosteric enzymes, Isoenzymes, Multienzyme complexes, Ribozyme.
- 3.3. Enzyme specificity. Active site, Principles of activation energy, transition state.
- 3.4. Interaction between enzyme and substrate- Lock and Key Theory, Induced fit models.

Unit-IV: Enzyme kinetics and applications

- 4.1. Factors affecting the Enzyme activity like - substrate concentration, P^H , temperature,
- 4.2. Michaelis - Menten equation for uni-substrate reaction (derivation not necessary), significance of K_M and V_{Max} .
- 4.3. Enzyme inhibition - irreversible and reversible, types of reversible inhibitions- competitive and non-competitive. Feedback inhibition.

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4.4. Application of enzymes in diagnostics (SGPT, SGOT, creatine kinase, alkaline and acid phosphatases), enzyme immunoassay (HRPO), enzyme therapy (Streptokinase). Immobilized enzymes.

CORE-2: ENZYMOLOGY (PRACTICALS)
SEMESTER – II

CREDITS: 2

1. Calibration of p^H meter.
2. Buffer preparation and determination of p^H
3. Preparation of normal and molar solutions.
4. Identification of Peroxidase activity.
5. Assay of Amylase.
6. Assay of Acid Phosphatase.
7. Assay of Alkaline Phosphatase.
8. Effect of Temperature and p^H on enzyme activity
9. Immobilization of Amylase.
10. Succinate dehydrogenase Enzyme Inhibition study.

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