3rd SEMESTER
(CORE-3)

BC320C: BIOCHEMISTRY: ENZYMOLOGY

CREDITS: THEORY-4, PRACTICAL: 2
THEORY (4 CREDITS: 60 HOURS)

MAXIMUM MARKS: 60, MINIMUM: 24

Objectives / Expected Learning Outcomes: *Via this course students are introduced to concept of biocatalysts (enzymes) with an expectation to learn how they could be used in disease prognoses/diagnoses.*

Unit I: Basic concepts of enzymes

Historical perspective, classification and nomenclature of enzymes, isoenzymes. Enzyme specificity, active site. Measurement of enzyme activity, enzyme assays.

Unit II: Enzymes Catalysis

Role of cofactors in enzyme catalysis: NAD/NADP+, FMN/FAD, Coenzyme A, Biotin, Cobalamin, lipoamide, TPP, Pyridoxalphosphate, tetrahydrofolate and metal ions with special emphasis on coenzyme functions. Acid-base and covalent catalysis.

Unit III: Enzyme Kinetics

Factors affecting enzyme activity: Enzyme concentration, substrate concentration, pH and temperature. Derivation of Michaelis-Menten equation for uni-substrate reactions. Km and its significance. Line Weaver-Burk plot and its limitations. Importance of Kcat / Km.

Unit IV: Enzyme Regulation

Reversible and irreversible inhibition, competitive, non–competitive anduncompetitive inhibitions, determination of Km &Vmax in presence and absence of inhibitor, Allosteric enzymes-Sigmoidal kinetics and their physiological significance, Symmetric and sequential modes for action of allosteric enzymes and their significance. Feedback inhibition and feed forward stimulation Reversible and irreversible covalent modifications of enzymes. Role of enzyme pattern in disease diagnosis.

PRACTICAL (2 CREDITS: 60 HOURS) **MAX.MARKS 30, MIN. MARKS 12**

1. Verification of Beer-Lambert Law
2. Estimation of SGPT and SGOT in serum.
3. Assay of alkaline phosphatase activity.
4. Effect of substrate concentration on alkaline phosphatase activity and determination of its Km value.
5. Effect of pH on enzyme activity and determination of optimum pH.

BOOKS RECOMMENDED

1. Enzymes by Trevor Palmer
2. Text book of Biochemistry by LubertStryer
3. Text book of Biochemistry by Voet and Voet
4. Laboratory Manual of Biochemistry & Biotechnology by Syed Eazaz Hussain Rizvi
5. Experimental Biochemistry by B A Ganai et al.