

# **AMBT09 ENZYME TECHNOLOGY**

## **UNIT-1 INTRODUCTION TO ENZYMES**

What are enzymes, brief history of enzymes, nomenclature and classification of enzymes.

## **UNIT-2 STRUCTURAL FEATURES OF ENZYMES**

Chemical nature of Enzymes: amino acids, the building blocks of protein, Levels of protein Structure: Primary, secondary, tertiary and quaternary structure.

## **UNIT-3 SPECIFICITY OF ENZYMES**

Types of specificity, the Koshland “induced fit” hypothesis, Strain or transition - state stabilization hypothesis.

## **UNIT-4 ENZYME CATALYSIS AND KINETICS**

Factors affecting the rate of chemical reactions, kinetics of uncatalyzed chemical reactions, kinetics of enzyme-catalyzed reaction, methods for investigating the kinetics of enzyme-catalyzed reactions, nature of enzyme catalysis, inhibition of enzyme activity.

## **UNIT-5 THE INVESTIGATION OF ACTIVE SITE STRUCTURE AND CHEMICAL NATURE OF ENZYME CATALYSIS**

The identification of binding sites and catalytic site, three dimensional structure of active site, mechanism of catalysis, mechanism of reaction catalyzed by enzyme without cofactors, metal-activated enzyme and metalloenzyme, coenzymes in enzyme catalyzed reactions.

## **UNIT-6 IMMOBILIZATION OF ENZYMES**

Concept, methods of immobilization, Kinetics of immobilized enzymes, effect of solute partition and diffusion on kinetics of immobilized enzymes, use of immobilized enzymes, bioreactors using immobilized enzyme.

## **UNIT-7 INDUSTRIAL USES OF ENZYMES**

Industrial enzymes: Sales value of industrial enzymes, traditional (non-recombinant) sources of industrial enzymes, The impact of genetic engineering on enzyme production, Engineered enzymes, Extremophiles: hyperthermophiles, enzymes from hyperthermophiles, enzymes from additional extremophiles, enzymes in organic solvent

## **UNIT-8 INDUSTRIAL ENZYMES**

Proteases and carbohydrases: Proteolytic enzymes: Carbohydrases, Lignocellulose degrading enzymes, Pectin and pectic enzymes.

## **UNIT-9 ADDITIONAL INDUSTRIAL ENZYMES**

Lipases, Penicillin acylase, Amino acylase and amino acid production, cyclodextrins and cyclodextrin glycosyl transferase, enzymes in animal nutrition, Oxidoreductases, Enzymes in molecular biology.

## UNIT-10 ENZYME ENGINEERING

Prediction of enzyme structure, design and construction of novel enzymes.

### Reference Books

1. Enzymes by Palmer (2001): Horwood Publishing Series.
2. Fundamentals of Enzymology by Price and Stevens (2002): Oxford University Press.
3. Enzyme Technology by Helmut uhling (1998): John Wiley
4. Introduction to Proteins Structure by Branden and Tooze (1998): Garland Publishing Group.

