**BCH 320**

**Course Specifications (CS)**

1. **Introduction to enzymes.**

General concepts and comparison of enzymes as biocatalysts with chemical

Catalysts

1. **Characteristics and properties of enzymes.**

Nature of enzyme, Substrate specificity (lock & key model, induced fit model) and Stereo specificity

1. **Factors affecting the velocity of enzyme catalyzed reactions.**

Enzyme units, turnover number and the effect of the temperature and salt

concentration on the action of an enzyme. The effect of pH, substrate and enzyme concentration, inhibitors and activators on the action of an enzyme.

1. **Nomenclature and classification of enzymes**

Oxidoreductases, Transferases, Hydrolases, Lyases, Isomerases, and Ligases.

1. **Enzyme assay methods.**

Select the best method to assay the enzyme activity depending on the Variables

and product formation for example Spectrophotometric methods. Continuous and non-continuous assays.

1. **Kinetics elementary reactions.**

Transition State Theory; Enzyme kinetics- Michaela’s Menten equation, Km and

analysis of kinetic data. Lineweaver-Burk Analysis, Eadie-Hofstee analysis and calculation of Km and Vmax.

1. **Enzyme inhibition**

Competitive, noncompetitive, uncompetitive, mixed inhibition, Calculation of Ki.

Enzyme inhibitors as drugs and numerical relate to enzyme inhibition.

1. **Cofactors: coenzymes , prosthetic group, and metal ions**

Coenzymes: the structure and functions, precursors of coenzyme, and the

mechanism of action of some coenzymes such as NADH, FADH and Lipoic acid.

The mechanism of action of other coenzymes such as CoA and biotin. The mechanism of action of other coenzymes such as TPP and PLP.

1. **Metabolic regulation of enzyme activity.**

Covalent modification, Phosphorylation and zymogen activation. Allosteric enzymes in controlling enzyme activity Feedback regulation, Concept of co-operativity and models of cooperatives, sigmoid kinetics.

1. **Isozymes ( Isoenzymes)**
2. **Clinical and industrial applications of enzymes**
3. **Isolation, purification, and characterization of enzymes**

Isolation, purification, characterization of enzymes and purity criteria of enzymes, units of enzyme activity and specific activity