

# MOHANLAL SUKHADIA UNIVERSITY, UDAIPUR

## B. Sc. BIOTECHNOLOGY II YEAR TDC (2016-17)

### Paper IV : *Immunology and Enzymology*

#### Unit-I

Immune system and immunity, history of immunology, structure, composition and functions of cells and organs involved in immune system. T cells, B-cells, macrophages, antigen-processing cells, eosinophils, neutrophils, mast cells and killer T-Cells; Microbial infections and immune responses, innate immunity, acquired immunity; clonal nature of immune response; immunohaematology-blood groups, blood transfusion and Rh incompatibilities.

**15 Credit hours**

#### Unit-II

Antigens – structure and properties, types (iso and alloantigens), haptens, adjuvants; antigen specificity. Immunoglobulins – structure, heterogeneity, types and subtypes, properties (physico-chemical and biological). complement – structure, components, properties and functions of complement; complement pathways and biological consequences of complement activation. Effector mechanisms.

**15 Credit hours**

#### Unit-III

Antigen antibody reactions – agglutination, precipitation, complement fixation, immunofluorescence, immunoelectrophoresis, ELISA and Radio-immunoassays. Applications of these methods in diagnosis of microbial infections. Major histocompatibility complex – structure and functions of MHC.

**15 Credit hours**

#### Unit-IV

History and introduction to enzymes, Classification of enzymes, IUPAC system of nomenclature, E.C. numbers, Enzyme kinetics (Michaelis-Menten laws), importance and determination of  $V_{max}$  and  $K_m$  values, catalytic mechanisms of enzymes, acid-base, covalent, metal ion and electrostatic catalysis, preferential binding of transition state proximity and orientation effects, Detail mechanism of action of chymotrypsin.

**15 Credit hours**

#### Unit-V

Regulation of enzyme activity, various controls : metabolic compartmentation, covalent modification, feedback regulation. Enzyme inhibition : competitive and non competitive. Introduction to cofactors and coenzymes. Multienzyme complexes,

purification of enzymes : salt precipitation, gel filtration, ion exchange and affinity chromatography.

**15 Credit hours**

### **Suggested Readings**

1. Coico R, Sunshine, Benjamin E. Immunology : A short course. John Wiley and Sons.
2. Roitt, Brostoff, Male and Mosby. Immunology.
3. Kuby *et al.* Immunology. W.H. Freeman and Company.
4. Rao, C.V. An Introduction to Immunology. Narosa Pub. House.
5. Coleman, R.M. Fundamental Immunology. McGraw Hill.
6. Paul, W.E. Fundamentals of Immunology. Raven Press New York.
7. Palmer, T. Understanding Enzymes.
8. Price and Stevenson. Fundamentals of Enzymology. Oxford University Press.
9. Dixon and Webb. The Enzymes. Academic Press, London.
10. Foster, F.L. The nature of Enzymology. John Wiley and Sons.