B.Sc. III Year **Semester – VI**

BIM -E601
DSE-2 IMMUNOLOGY

MM : 100
Time : 3 hrs
L Credit
4 4

Sessional : 30
ESE : 70
Pass Marks : 40

Total Hours: 60

Learning objectives:

- Students will learn about the components of the immune system as well as their functions and response..
- To develop understanding of innate and adaptive immunity
- To understand different serological reaction for the diagnosis of diseases.
- To integrate immunology with medical sciences and enrich the knowledge for autoimmune disorders, hypersensitivity reactions.

Learning outcomes:

At the end of course student will be able to

- Explain the different components of immune system and how they provide defense against infections.
- Describe how our immune system protects against foreign pathogens.
- Diagnose the viral and bacterial infection through different serological tests.
- Gain knowledge of different diseased conditions generated due abnormalities in immune system.
- Explain antigen antibody reactions.

UNIT - I

Introduction; Concept of Innate and Adaptive immunity; Contributions of following scientists to the development of field of immunology - Edward Jenner, Karl Landsteiner, Paul Ehrlich, Elie Metchnikoff; Functions of immune cells - Stem cell, T cell, B cell, NK cell, Macrophage, Neutrophil, Eosinophil, Basophil, Mast cell, Dendritic cell; and Immune Organs – Bone Marrow, Thymus, Lymph Node, Spleen.

(14 Lectures)

UNIT - II

Antigens and antibodies; Characteristics of an antigen (Foreignness, Molecular size and Heterogeneity); Haptens; Epitopes (T & B cell epitopes); T-dependent and T-independent antigens; Adjuvants; Structure, Types, Functions and Properties of antibodies; Antigenic determinants on antibodies (Isotypic, allotypic, idiotypic); VDJ rearrangements; Monoclonal and Chimeric antibodies.

(12 Lectures)

UNIT - III

Major Histocompatibility Complex;Organization of MHC locus (Mice & Human); Structure and Functions of MHC I & II molecules; Antigen processing and presentation (Cytosolic and Endocytic pathways); Complement System-Components of the Complement system; Activation pathways (Classical, Alternative and Lectin pathways); Biological consequences of complement Activation.

(14 Lectures)

UNIT - IV

Generation of Immune Response;Primary and Secondary Immune Response; Generation of Humoral Immune Response (Plasma and Memory cells); Generation of Cell Mediated Immune Response (Self MHC restriction, T cell activation, Co- stimulatory signals); Killing Mechanisms by CTL and NK cells.

(12 Lectures)

UNIT - V

Immunological Techniques; Principles of Precipitation, Agglutination, Immunodiffusion, Immunoelectrophoresis, ELISA, Western blotting, Immunofluoresence, Flow cytometry.

(08 Lectures)

Suggested Reading

1. Janis Kubey, Immunology, W.H.Freeman
2. Peter J Delves, S.J. Martins, D.R. Burtons, Roitts Essential Immunology, Wiley Blackwell
3. C.V.Rao , An Introduction to Immunology, Alpha Science International Ltd , **ISBN** 978-1842650356

17.4.21