Course Code	Course Name	Credits
26BT008	IMMUNOLOGY AND IMMUNOTECHNOLOGY	04

Course Objectives

- Recall the history and fundamentals of immunology
- Understand the Cells of immune system and their function and regulations
- Understand immunological techniques such as ELISA, RIA, and monoclonal antibody production for diagnostic and research purposes.
- Explain the basis of immune-related diseases such as autoimmunity, hypersensitivity, and tumor immunity.
- Outline the molecular and cellular mechanisms involved in the development and regulation of the immune response.

Learning Outcomes

Upon successful completion of this course it is intended that a student will be able to:

- Know about the history and fundamentals of Immunology
- Design a model of Immunoglobulin/Antibodies
- Describe the structure, components, and functioning of the innate and acquired immune systems.
- Illustrate various mechanisms that regulate immune responses and maintain tolerance
- Apply basic techniques for identifying antigen antibody interactions.

Unit 1 - Basics of Immunology and Immune System (12 Hrs.)

Introduction- Historical Development in Immunology. Immunity- Humoral and Cell mediated response, Primary and Secondary immune response. Cells involved in immune response. Innate and Acquired Immunity. Mechanisms of defense.

Unit 2 – Components of Immune Cells (13 Hrs.)

Antigen- Types and classifications. Antibody – Structure, Types, properties and their biological functions, poly clonal sera, Monoclonal antibody. Primary and Secondary lymphoid organs – Thymus, Bone marrow, Lymph nodes and Spleen. Lymphocytes traffic and regulation. CD Molecules.

Unit 3 - Antigen and Antibody Process (12 Hrs.)

Hematopoiesis and development of B and T lymphocytes. Immunoglobulin Gene expression B cell and T cell activation. MHC molecules Response of B cells to antigens. Plasma Cells, Memory Cells.

Unit 4 - Immunological Reaction and Disorder's (13 Hrs.)

Complement – activation and regulation. Cytokines- structure and functions, Interferon and interleukins. Immuno regulation: Tolerance. Suppression, Autoimmunity and hypersensitivity reactions. Primary and secondary Immuno deficiency disorders.

Unit 5 - Antigen Antibody Reaction (10 Hrs.)

Transplantation, HLA Typing; Mechanism of Graft rejection. Tumor immunology. Immuno surveillance- mechanisms. Antigen – Antibody Interactions. Immunodiffussion and Immunoelectrophoresis. Principle and Applications of RIA, ELISA, Fluorescent Antibody techniques.

Reference Books:

1. Kuby, J. Immunology. W.H. Freeman and Company, New York. 2007.
2. William E. Paul. Fundamental Immunology, VII Edition, Lippincott Williams & Wilkins publisher.2012.
3. Roitt, I. Essential Immunology, VI Edition, Elsevier Science Publishing Company, New York.2002.
4. SeemiFarhatBasir. Text Book of Immunology by. First edition. PHI LrarningPvt Ltd, New Delhi.
5. MadhaveeLatha, P. A Text Book of Immunology. S.Chand& Company Ltd, New Delhi.1st Edition.