IV Year B.Tech. Biotechnology I - Semester	L	T	P	To	C
	4	-	-	4	4

BT 403 IMMUNOLOGY

Course Description & Objectives:

The course enables students to acquire knowledge and understanding of theoretical concepts of Immunology.It also helps in acquiring skills and provides competence in specialized immunological techniques in the diagnosis and management of health related disorders. It also imparts knowledge and understanding of research methods employing immunological techniques for application in biomedical and clinical research.

Course Outcomes:

The learning outcomes are the following:

1. The immune system of the vertebrate host will be comprehensively known
2. The blood cells and their defense roles will be familiar
3. The transplantation techniques and principles involved will be known
4. The techniques to asses immune surveillance help students to undertake clinical immunology as a profession.

UNIT I: Immune system and immune responses:

Cells and organs of immune system; innate and acquired immunity, types of immune responses, theory of clonal selection. Development, maturation, activation and differentiation of T-cells and B-cells; antigen presenting cells, major histocompatibility complex, antigen processing and presentation; regulation of T-cell and B-cell responses. TCR and its diversity.

UNIT II: Antigen and antibodies:

Ntigens: Chemical and molecular nature; haptens;adjuvants;Antibodies: structure and functions of antibodies; genetic control of Ab production. Isotype, allotypes, Idiotypes; antigen-antibody reactions and their significance in diagnosis; monoclonal and polyclonal antibody production: principles and applications, Immunotoxic chimeric antibodies and abzymes.

UNIT III: Infection and Immunity:

Injury and inflammation; immune responses to infections: immunity to viruses, bacteria, fungi and parasites, cytokines, complement; immunosuppression, tolerance, allergy and hypersensitivity, AIDS and Immunodeficiencies, resistance and immunization, vaccines.

UNIT IV: Transplantation and Tumor Immunology:

Transplantation: genetics of transplantation; laws of transplantation; Graft rejection evidence and mechanisms of graft rejection,prevention of graft rejection, tumor immunology. Autoimmunity, Autoimmune disorders and diagnosis.

UNIT V: Immuno-Techniques:

Immunoelectrophoresis, SDS-PAGE, HB electrophoresis, ELISA, RIA, non-isotopic methods for detection of ntigens,chemiluminescence assay, immunohistochemistry, purification techniques of antigens and antibodies. Flowcytometer, PCR, RTPCR, application of recombinant DNA technology for the study of the immune system, Immunotherapy with genetically engineered antibodies.

TEXT BOOKS:

1. Kuby Immunology, 5th Edition . Richard A Goldsby, Thomas J Kindt Barbara A Osborne . W H Freeman and Company.

2. Tizard, Immunology., 4th Edition.

REFERENCE BOOKS :

1. Nandini Shetty-Immunology Introductory Text Book.

2. Fundamentals of Immunology-William Paul

3. Cooper E.L General Immunology.

4. Roitt. Essential Immunology, Vaccines conventional, subunit and recombinant, antidiotypic vaccine, Blackwell Scientific publications, Oxford,1991.