

**Objective:**

To understand the basic concepts of Immune System Cells and organs of immune system.  
To learn the vaccines and development in vaccine technology

**Outcome:**

Students will learn the various components and working of immune system. They will acquire the techniques for the development of vaccines

**UNIT I:**

Basic concepts of Immune System Cells and organs of immune system, Immunity Humoral and cell mediated, Hematopoiesis and differentiation.  
Antigens- General properties, types, epitope, hapten, adjuvant.  
Antibodies- Types, biological functions. Biology of Superantigen. BCR & TCR (structure & properties), MHC Antigen processing and presentation Maturation and Activation of B-cells Maturation and Activation of T-cells

**UNIT II:**

Complement system; complement activation pathways, biological consequences of complement activation.  
Hypersensitivity: Components, Mechanisms of degranulation, Mediators, Consequences, Transfusion reactions, Localized reactions, generalized reactions, Delayed type hypersensitivity

**UNIT III:**

Autoimmunity: Organ specific autoimmune diseases (Hashimoto's thyroiditis, Autoimmune anemia, Insulin dependent diabetes mellitus) Systemic autoimmune diseases (SLE, Multiple sclerosis, Rheumatoid arthritis) Treatment of autoimmune diseases Transplantation Immunology: Types of graft, Specificity and memory of rejection response, Mechanisms involved in graft rejection, Clinical manifestations of graft rejection Immunity to infectious diseases, Tumor Immunology

**UNIT IV**

Immunodeficiency: Primary immunodeficiency (SCID, X-linked agammaglobulinemia, Defects in complement system), Secondary immunodeficiency (AIDS), Treatment of immunodeficiency diseases. Immunity to Infectious Agents Bacteria Viruses Malaria Anthrax and Helminthes. Immunological reactions: Precipitation. Agglutination, Radioimmunoassay, ELISA, Western Blotting, Flow cytometry and Fluorescence. Immunoelectron microscopy, RIA

**UNIT V:**

Vaccine technology and recombinant vaccines, Identifications of B and T epitopes for vaccine development. *in situ* characterization of cells in tissues. Hybridoma technology, monoclonal antibody production and applications. Catalytic antibodies, FACS.