Course: Immunology and Immunotechnology (Department core course-10)

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Immunology and Immunotechnology (BT301)	3	0	2	Nil

Course Objective: To give an overview of the basic concepts in immunology and the development of diagnostic and therapeutic techniques in immunotherapy for complex disorders and infectious diseases.

Course Outcome (CO):

1. Understanding innate and adaptive immunity and exploring their role in immune response to pathogens.
2. Detailed understanding of the role of innate immunity as the first line of defense
3. Analysing the role of the adaptive immune system in complex immune therapeutics.
4. Learning the principles of immune tolerance, identifying the causes and mechanisms of autoimmune disease and immunodeficiencies, hypersensitivity reactions and cancer biology
5. Equip students with the knowledge of immunology for application in developing techniques for diagnostics and therapeutics

S.No	Content	Contact Hours
Unit 1	**Introduction and overview of the Immune system** Introductory concepts in immunology; Active and passive immunity; principles of the innate and active immune system; cells and organs of the immune system; and Hematopoiesis.	**10**
Unit 2	**Innate immune system** Mechanisms of the innate immune response, neutrophils, NK cells, dendritic cells, macrophages, and cytokines, as well as their role in immune response, are components of the complement pathway.	**8**
Unit 3	**Adaptive immune system** Antigen presentation by MHC class I & class II; T cell response; regulation of cellular immune response; Antibody structure and types; Antibody gene rearrangement; Clonal selection; and B& T cell epitope analysis.	**8**
Unit 4	**Immunity and health care**	**10**

	Central and peripheral tolerance; Autoimmunity causes and treatment; systemic & local autoimmune disease; Hypersensitivity and its types; Cancer biology	
Unit 5	**Immunotechnology** Antibody Engineering Immune diagnostics; Immunological techniques: agglutination, precipitation, immunodiffusion, ELISA, ELISPOT, RIA, Immunoelectrophoresis, Flowcytometry	**9**
	Total	**45**

Practical:

Sno.	Aims
1	Identify primary and secondary lymphoid organs using permanent slides and understand their histological features and functions.
2	Study of Radial Immuno diffusion as a diagnostic tool.
3	Study of Double Immuno diffusion as diagnostic tool.
4	Blood smear identification of leucocytes by Giemsa stain
5	Elucidating Antibody titre by ELISA method.
6	Elucidation of advanced techniques of immune diagnostics like Immuno-electrophoresis
7	Blood smear identification of leucocytes by Giemsa stain
8	Separation of mononuclear cells by Ficoll-Hypaque
9	Study of Flowcytometry; identification of T cells and their subsets using Flowcytometry
10	Identification of blood groups using agglutination