LS429A	**Immunology**	**2 Credits**
Name of the Faculty: Dr. Niti Puri* and Dr. Stanzin Dava		
Sr.No.	**Topic**	**Faculty Name/ Contact Hours**
1.	Introduction to Immune system, organs, cells, and molecules involved in Innate and Adaptive Immunity. Mechanisms of barrier to entry of microbes/pathogens	NP 2
2.	Hematopoiesis and its regulation: Differentiation of stem cells to different cellular elements in blood, role of cytokines; HSCs in Transplantation and gene therapy.	NP 1
3.	Introduction to inflammatory reaction: chemokines, adhesion molecules, migration of leukocytes to the site of infection, phagocytosis and evasion strategies, and oxidative and non-oxidative microbicidal mechanisms. Immediate hypersensitivity: role of eosinophils, and mast cells. Asthma. IgE receptor, prostaglandins, and leukotrienes	NP 3
4.	Receptors of innate immunity: Toll-like receptors and sensing of PAMPs, signal transduction, opsonization, Fc receptors	NP 2
5.	Antigens, antigenicity, and immunogenicity. B and T cell epitopes	NP 1
6.	Antibody structure and function (classification of immunoglobulins, immunoglobulin domains, concept of variability, isotypes, allotypes And idiotypic markers).Antigen-antibody interactions	NP 2
7.	Immunoglobulin genes, VJ/VDJ rearrangements, and genetic mechanisms responsible for antibody diversity, affinity maturation, and allelic exclusion. Class switching, receptor, and soluble forms of immunoglobulin	NP 2
8.	Hybridoma, monoclonal antibodies, antibody engineering and their applications	SD 1
9.	Immunological Techniques (antibody generation, detection of molecules using ELISA, RIA, Western blot, immunoprecipitation, ChIPassay, flowcytometry, immunofluorescence microscopy etc)	SD 1
10.	The complement system: classical and alternative pathways, their Regulation and deficiencies	SD 2
11.	Major Histocompatibility Complex: genetic organization of H2 and HLA complexes. Class I and class II MHC molecules: structure and function. Antigen processing and presentation pathways; lipid antigen presentation	SD 2
12.	Differentiation and activation of B cells, BCR, and preBCR, receptor editing, T cell help	SD 1
13.	T cell receptors, alpha beta and gamma delta T cells, receptor diversity. Activation of T cells, APC-T cell interaction, Th1/Th2 cells, and cytokines. T cell differentiation in thymus, thymic selection and tolerance to self, MHC restriction, superantigens	SD 4

14.	Cell-mediated effector functions: Cytotoxic T cells, Natural Killer Cells, ADCC, NK cell receptors, inverse correlation with target MHC expression, missing self-hypothesis, cytotoxicity reaction	SD 2
15.	Topics like Applications of immunological principles (vaccines, and diagnostics); tumor and transplantation Immunology; and diseases of relevance to the immune system (autoimmunity and immunodeficiency) would be discussed in the context of the basic Immunological mechanisms as assignments/tutorials	NP 2 SD 2

Suggested reading:

1. Roitt's Essential Immunology
2. Immunobiology:The immune system in health and disease by Charles Janeway et al.
3. Kuby Immunology
4. Relevant review articles/research papers/handouts provided in the course