LS 475—IMMUNOLOGY (2 credits)

Dr. Niti Puri

S. No.	Topics	Name of faculty	No. of lectures
1.	Introduction to Immune System, organs, cells and molecules involved in Innate and Adaptive Immunity. Mechanisms of barrier to entry of microbes/pathogens	Niti Puri	2
2.	Hematopoiesis and its regulation: Differentiation of stem cells to different cellular elements in blood, role of cytokines.	Niti Puri	1
3.	Introduction to inflammatory reaction: chemokines, adhesion molecules, migration of leukocytes to the site of infection, phagocytosis and microbicidal mechanisms. Immediate hypersensitivity: role of eosinophils, and mast cells. Asthma. IgE receptor, prostaglandins and leukotrienes	Niti Puri	3
4.	Receptors of innate immunity: Toll-like receptors and sensing of PAMPs, signal transduction, opsonization, Fc receptors	Niti Puri	2
5.	Antigens, antigenicity, and immunogenicity. B and T cell epitopes	Niti Puri	1
6.	Antibody structure and function (classification of immunoglobulins, immunoglobulin domains, concept of variability, isotypes, allotypes and idiotypic markers). Antigen-antibody interactions	Niti Puri	2
7.	Immunoglobulin genes, VJ/VDJ rearrangements and genetic mechanisms responsible for antibody diversity, affinity maturation, allelic exclusion. Class switching, receptor and soluble forms of immunoglobulin	Niti Puri	2
8.	Hybridoma, monoclonal antibodies, and antibody engineering	Niti Puri	1
9.	Immunological Techniques (antibody generation, detection of molecules using ELISA, RIA, Western blot, immunoprecipitation, flowcytometry, immunofluorescence microscopy etc)	Niti Puri	1
10.	The complement system: classical and alternative pathways	Niti Puri	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	Niti Puri	2
12.	Differentiation and activation of B cells, BCR and pre BCR, receptor editing, T cell help	Niti Puri	1
13.	T cell receptors, αβ and γδ 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, super antigens	Niti Puri	4
14	Cell-mediated effector functions: Cytotoxic T cells, Natural Killer Cells, ADCC, NK cell receptors, inverse correlate On with target MHC	Niti Puri	2

	expression, missing self hypothesis, cytotoxicity reaction		
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) etc. would be discussed in context of the basic immunological mechanisms as assignments/tutorials	Niti Puri	4

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