

Name of the Programme: M.Sc. Biotechnology

Course Code: GBT-502

Title of the Course: IMMUNOLOGY

Number of Credits: 3

Effective from AY: 2022-23

Pre-requisites for the Course:	No prerequisite is required	
Course Objectives:	1. To provide basic knowledge and appreciate the components of the human immune response that work together to protect the host. 2. To understand the concept of immune-based diseases as either a deficiency of components or excess activity as hypersensitivity. 3. To gain an insight into the mechanisms that lead to beneficial immune responses, immune disorders, and immune-deficiencies. 4. To understand the principles of immunodiagnostic tests used in immune system related diseases.	
Content:	<u>MODULE I</u> Concepts and Basics • Introduction – History and scope of immunology • Innate immunity:- factors, features, processes • Acquired:- the Specificity, memory, recognition of self from non-self. • Cells of the immune system: Hematopoiesis and differentiation, Lymphoid and Myeloid lineage, lymphocyte trafficking, B lymphocytes, T lymphocytes, macrophages, dendritic cells, natural killer and lymphokine-activated killer cells, eosinophils and mast cells, lymphocyte subpopulations and CD markers. • Organization of lymphoid organs MALT, GALT, SALT • Phagocytosis: oxygen-dependant/ independent killing intracellularly. • Major histocompatibility complex...Structure of MHC molecules, basic organization of MHC in human , haplotype-restricted killing. • Nature and biology of antigens and superantigens: haptens, adjuvants, carriers, epitopes, T dependant and T independent antigens	No. of hours 15

	<u>MODULE II</u> Defence Components: Constituents of immune system and response • Theories of antibody formation and resolution of antibody structure • Humoral immunity: cells, antibody formation, primary and secondary response. • Immunoglobulins – structure, distribution and function. • Antigen – Antibody interactions: forces, affinity, avidity, valency and kinetics. • The basics of Immuno-diagnostics.	15
	<u>MODULE III</u> Defence Strategies and Pitfalls: Effector mechanisms of immune responses • Complement system: mode of activation, classical, alternate and MBL pathways. Structures of key components. • Cell mediated immune responses: cell activation, cell-cell interaction and cytokines. • Cell-mediated cytotoxicity: Mechanism of T cell and NK cell mediated lysis, antibody-dependant cell-mediated cytotoxicity. • Hybridoma technology and monoclonal antibodies. • Hypersensitivity: An introduction to the different types. I introduction to autoimmune diseases.	15
Pedagogy:	Lectures, tutorials, assignments	
References/ Readings:	1. D. R. Burton , P. J. Delves , S. J. Martin , I. M. Roitt. Roitt's Essential Immunology, Includes Desktop Edition. United Kingdom: Wiley, 2011. 2. J. Brostoff , D. K. Male, I. M. Roitt . Immunology. United Kingdom: Mosby, 2001. 3. M. Luttmann, K. Bratke, M. Kupper, & D. Myrtek, Immunology, 2006. 4. R.A. Goldsby, T.J. Kindt, B.A Osbrne and J. Kuby, Immunology, 2007.	
Course Outcomes:	1. The course will enable student to understand the fundamentals of basic immunological processes in human system 2. Application of the knowledge of immune system and processes to pursue research in field of immunology. 3. The mode of continuous assessment and formulation of tests enables	

	students to handle competitive entrance exams. 4. Knowledge of principles of immunodiagnostics would enable them to upskill effectively for research and development in the field. 5. The basic overview of Immunology strengthens their foundations for a career in Biotechnology.
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