SARDAR PATEL UNIVERSITY
Programme: MSC (Biotechnology)
Semester: III
Syllabus with effect from: June 2011

Paper Code: PS03CBIT02	**Total Credits: 4**
Title Of Paper: Immunology	

Unit	Description in detail	Weightage (%)
1	Innate and adaptive immunity: role of cells, receptors and proteins in innate immunity, ubiquity of the innate system. Cells and organs of the immune system: Hematopoiesis, primary and secondary lymphoid organs. Complement: components of the system, activation, regulation, biological consequences and deficiency diseases. Inflammation and anti-inflammatory agents.	**25 %**
2	Antigens and antibodies: properties of immunogens, haptens, epitopes, structure and classes of immunoglobulins, biological activities and effector functions, monoclonal antibodies and abzymes. Antibody diversity: models, organization of Ig genes, mechanism of gene rearrangement, generation of diversity; expression, synthesis and class switching, antibody engineering. Production of polyclonal and monoclonal antibodies: Principles, Techniques and applications Antigen-antibody interactions: Agglutination and precipitation techniques, Radio Immunoassay, ELISA, Immunofluorescence assays: Florescence activated cell sorter (FACS) technique, Cytotoxicity assay, Cytokines assays: ELISA and ELISPOT	**25 %**
3	Major histocompatibility complex and antigen presentation: MHC-organization, inheritance, genes, molecules and peptide binding, expression, disease susceptibility,immune responsiveness, self MHC restriction, cytosolic and endocytic pathway for antigen processing. T-cell receptor, T-cell maturation, activation and differentiation: TCR- genetic organization and rearrangement of genes, TCR-complex, peptide binding, thymic selection, activation and differentiation of T cells. Generation, activation and differentiation of B cells: B cell maturation, activation and proliferation, germinal centers, regulation of the responses. Cell mediated cytotoxicity: Effector T cells, cytotoxic T cells, NK cells, ADCC.	**25 %**
4	Hypersensitivity reactions: classification and types of hypersensitivity reactions. Immune tolerance and autoimmunity: establishment and failure of tolerance, autoimmune diseases, mechanisms for the induction, animal models, treatment. Transplantation immunology: basis and manifestation of graft rejection, immunosuppressive therapy, immune tolerance. Experimental systems in immunology.	**25 %**

Basic Text & Reference Books:

- Kuby-Immunology: T. J. Kindt, R. A. Goldsby and B. A. Osborne; W. H. Freeman
- Janeway's Immunology: K. Murphy, P. Travers and M. Walport; Garland Sciences
- Immunology: Ivan Roitt, J. Brostoff and D. Male; Mosby
- Essential immunology: Ivan Roitt; Oxford: Blackwell
- Topic related review articles.