

B.Tech. Biotechnology: Semester-IV	
BBT 403: IMMUNOLOGY AND IMMUNOTECHNOLOGY	
Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

### Course Objective

The objective of this course is to provide Students with detail understanding of different cells of the immune system and their role in immune protection as well as application of immunological techniques. The course will provide knowledge about role of immune system in pathogenesis of cancer, autoimmune disease, AIDS and different infectious diseases.

### Course Learning Outcomes

After completing the course, the student shall be able to:

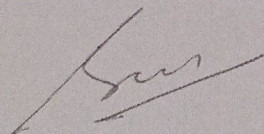
- CO1: Explain the role of immune cells and their mechanism in body defense mechanism.
- CO2: Apply the knowledge of immune associated mechanisms in medical biotechnology research
- CO3: Demonstrate immunological techniques.
- CO4: Interpret association of immune system with cancer, autoimmunity, transplantation and infectious disease.
- CO5: Generate new vaccine target and develop strategy to design novel vaccine

#### Unit 1: Introduction to immunity

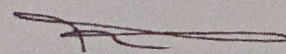
Characteristics of innate and adaptive immunity, Humoral and Cell mediated immune response, Hematopoiesis, Cells and Molecules of the immune system, Primary and Secondary lymphoid organs. Inflammation, Characteristics of T&B cell epitopes, T & B cell maturation, activation and differentiation. Characteristics and types of Antigens, Factors affecting the immunogenicity. Haptens and adjuvants. ABO blood group antigens, Epitopes. Structure, functions and characteristics of different classes of antibodies, Antigenic Determinants on Immunoglobulins.

#### Unit 2: Antigen Processing and presentation

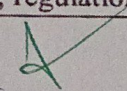
Structure and Function of MHC molecules, Exogenous and Endogenous pathways of antigen processing and presentation, Complement system, Structure, function and application of cytokines, regulation of immune



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response, immune tolerance.

**Unit 3: Antigen and antibody interactions**

Cross reactivity, precipitation reactions, serological techniques, ELISA, RIA and western blotting. Production and application of monoclonal antibodies, dose of antigens, Vaccines. Immunity against infectious diseases (virus, bacteria and protozoan), Hyper-sensitivity, Autoimmunity, Cancer, AIDS and Transplantation immunology.

**Suggested Readings**

- Kuby, RA Goldsby, Thomas J. Kindt, Barbara, A. Osborne Immunology, 6th Edition, Freeman, 2002.
- Brostoff J, Seaddin JK, Male D, Roitt IM., Clinical Immunology, 6th Edition, Gower Medical Publishing.
- Janeway et al., Immunobiology, 4th Edition, Current Biology publications., 1999.
- Paul, Fundamental of Immunology, 4th edition, Lippencott Raven, 1999.
- Goding, Monoclonal antibodies, Academic Press. 1985.



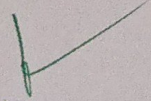
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