



**Subject Code: 02BT0453**

**Subject Name: Immunobiology (Core)**

**M. Sc. Semester - II**

**Objective:** To provide comprehensive knowledge of inner workings of Immune System and its implications in medicine and health.

**Credits Earned:** 4 Credits

**Course Outcomes:** After completion of this course, student will be able to

1. Distinguish various components of Immune System
2. Explain the development and role of various cells, organs and components of Immune System.
3. Rationalize the disease conditions created during Immune System malfunction.
4. Explain various experimental methods of Immunotechnology and its application in disease diagnosis and treatment.

**Pre-requisite of course:** Fundamental knowledge of Cell Biology, Biomolecules and Molecular Biology.

**Teaching and Examination Scheme**

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE(I)	Viva (V)	Practicals/ TW	
4	0	0	4	50	30	20	0	0	100



**Contents:**

<b>Unit</b>	<b>Topics</b>	<b>Contact Hours</b>
1	<b>Overview of the Immune system and Innate Immunity</b> Immune system - Cells and organs; Innate immunity – Role of Microbial Associated Molecular Patterns (Toll-like receptors & Noll Like Receptors); Phagocytes, NK cells, MALT system; Mechanisms of Migration of immune cells into primary and secondary lymphoid organs; Complement System; Histocompatibility antigens - HLA and Disease. Hematopoiesis, The Complement system.	15
2	<b>Adaptive Immunity</b> Nature and types of Antigens and their characteristics. Antibody general structure and classification. Development, maturation, activation and differentiation of B and T cells, Types of T cells, Generation of B and T cell diversity – VDJ recombination; B and T cell receptors and signalling, Antigen presentation; Immunological Tolerance. Cytokines and Chemokines.	15
3	<b>Immunotechnology</b> Immunoassays, Monoclonal & Recombinant antibodies, antibody engineering, chimeric antibodies, phage display, Immunodiagnostics; immunoprecipitation techniques, agglutination, Fluorescence techniques, ELISA, ELISPOT assay, RIA, Western blotting CMI techniques lymphoproliferation assay, Mixed lymphocyte reaction, Cell Cytotoxicity assays, Apoptosis and Immno-histochemical techniques.	15
4	<b>Clinical Immunology</b> Immunodeficiency, Hypersensitivity, Immune tolerance and autoimmunity, Autoimmune diseases, Transplantation, Immunological basis of graft rejection, Immunosuppression, Vaccines, Blood typing. Origin and advancement of cancer. Strategies to manage cancer.	15
	<b>Total Hours</b>	<b>60</b>



**References:**

1. B. M. Hannigan, C. B. T. Moore and D. G. Quinn (2010) Immunology 2nd Edn., Viva Books.
2. K. D. Elgert (2009) Immunology, 2nd Edn., Wiley Blackwell.
3. K. M. Murphy, P. Travers, M. Walport (2011) Janeway's Immunobiology, 8th Edition, Garland Science.
4. W. E. Paul (2008) Fundamental Immunology, 6th Edition, Lippincott Williams & Wilkins.
5. K. Abbas, A. H. Lichtman & S. Pillai (2007) Cellular and Molecular Immunology, 6th Edition, Saunders.
6. Kindt, T. J., Osborne, B. A. & Goldsby, R. A. (2006) Kuby Immunology, 6th edition, W. H. Freeman.
7. P. J. Delves, S. J. Martin, D. R. Burton and I. M. Roitt (2006) Roitt's Essential Immunology 11th Edn., Blackwell Publ..
8. D. Male, J. Brostoff, D. B. Roth & I. Roitt (2006) Immunology, 7th Edn., Mosby-Elsevier.
9. T. W. Mak and M. E. Saunders (2006) The Immune Response – Basic and Clinical Principles, Academic Press.
10. R. Coico, G. Sunshine and E. Benjamini (2003) Immunology - A Short Course, 5th edition, John Wiley & Sons.
11. M. Wilson (2005) Microbial inhabitants of humans, Cambridge Univ. Press.

**Suggested Theory distribution:**

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
20%	20%	30%	15%	15%	0%

**Instructional Method:**

- a. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.
- b. The internal evaluation will be done based on continuous evaluation of students in the classroom in the form of attendance, assignments, presentations, verbal interactions etc.
- c. Students will use supplementary resources such as online videos, ebooks, ppts etc.