

INSTITUTE	FACULTY OF SCIENCE
PROGRAM	MASTER OF SCIENCE (MICROBIOLOGY)
SEMESTER	2
COURSE TITLE	IMMUNOLOGY
COURSE CODE	02MB0460
COURSE CREDITS	4

Objective:

- 1 To provide comprehensive knowledge on functional mechanism of Immune Systems & Immunotechnology and their applications in medicine and health.

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

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

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Structure and Organization of Immune System Significance, roles and functions of the Immune System; Principles of innate and adaptive immunity ?Haematopoiesis: Cells and molecules of the innate and adaptive immune system and their functions; ?Microbial Associated Molecular Patterns, PAMP and Toll-like receptors; ?Function and organization of Lymphatic system and lymphatic organs Immune responses: Primary and secondary immune responses;	15

Contents : Unit	Topics	Contact Hours
2	Function and Regulation of the Immune System Antigen: Types and characteristics, Adjuvants, Haptens; ?Antibody: general structure and classification; Antibody diversity and VDJ recombination; ?B cell and T cell: development, maturation, activation and differentiation, B and T cell receptors and signalling; ?Complement System: Types, mechanisms and functions, MAC ? Structure and function of MHC molecules; Antigen Presenting Cells & Antigen presentation; Cell-mediated cytotoxicity; Immunological Tolerance; Cytokines and Chemokines	15
3	Dysfunctions of Immune System and Immunological Diseases Dysfunction of Immune system: Immunodeficiency-Primary and Secondary immunodeficiency; Hypersensitivity and its classification; Autoimmune diseases and its mechanism; Diagnosis and treatment of immunodeficiency, hypersensitivity and autoimmunity; ?Transplantation immunology: Immunological basis of graft rejection and prevention, HLA typing; Immunosuppression; Tumor Immunology: Origin and host defense against tumors; Tumor antigens; Immune responses to tumors; Immunotherapy of tumors	15
4	Immunotechnology and its applications Antigen-antibody interactions: concepts and their types; Blood typing; ?Immunoassays: ELISA, RIA, Immunoprecipitation and Fluorescence techniques, Western Blotting, Cell Cytotoxicity assays and Immuno-histochemical techniques; ?Antibody Engineering: Hybridoma technology, Monoclonal and polyclonal antibodies; Antibody engineering, Recombinant and Chimeric antibodies; ? Molecular immune diagnostic methods: PCR and real-time PCR techniques for the diagnosis of immunological disorders, cancers, and infectious diseases; Vaccines: Types, mechanism, and development of vaccines	15
Total Hours		60

Textbook :

- 1 Kuby Immunology, S. Stranford, J. Owen, P. Jones, J. Punt, Macmillan Learning. , 2022

References:

- 1 Immunology, 2nd Edn, Immunology, 2nd Edn, K. D. Elgert , 3.Wiley Blackwell. , 2009
- 2 Janeway's Immunobiology, 8th Edition,, Janeway's Immunobiology, 8th Edition,, K. M. Murphy, P. Travers, M. Walport, Garland Science. , 2011

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as 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 / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
10.00	20.00	25.00	25.00	10.00	10.00

Instructional Method:

- 1 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, virtual labs, role play, Quiz, brainstorming, etc.
- 2 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.
- 3 Students will use supplementary resources such as online videos, ebooks, ppts etc.

Supplementary Resources:

- 1 <https://microbenotes.com/category/immunology/>
- 2 <https://www.studocu.com/en-gb/document/imperial-college-london/medicine/immunology-notes-from-year-1/964032>
- 3 <https://www.sanfoundry.com/life-sciences-questions-answers-immunology-introduction/>
- 4 <https://vlab.amrita.edu/?sub=3&brch=69>
- 5 <https://vlab.amrita.edu/?sub=3&brch=70>