

**SRM UNIVERSITY**  
**FACULTY OF ENGINEERING & TECHNOLOGY**  
**DEPARTMENT OF BIOINFORMATICS**

**BI0206- IMMUNOLOGY**

**LESSON PLAN**

**Semester: IV**  
**Sub Code: BI0206**

**Course: Immunology**  
**Staff Handling: Dr. Berla Thangam**  
**(Biotechnology Department)**

| UNIT    | TOPICS /CONTENTS   | HOURS | LEARNING OUTCOME   | REFERENCES    |
|---------|--|-------|--|---------------|
| UNIT -I | <b>OVERVIEW OF THE IMMUNE SYSTEM</b>   |       |  |               |
|         | Introduction-<br>Overview of immune system   | 1     | To learn and understand the basic components of immune system and their functions. | Kuby, Travers |
|         | Innate Immunity- various components of the innate immune system-Physical, mechanical and Chemical barriers.                                      | 2     |  |               |
|         | Phagocytosis(bacterial killing mechanism),Soluble mediators, Fever inflammation etc.   | 2     |  |               |
|         | Adaptive Immunity.- Cell mediated immune response  | 2     |  |               |
|         | Antibody mediated immune response  | 1     |  |               |
|         | Cells of the immune system- Monocytes/macrophages,neutrophils, eosinophils, mast cells, basophils and lymphocytes, their structure and functions | 2     |  |               |
|         | Organs of the immune system Primary and secondary lymphoid organs. Bone Marrow, Thymus, Lymph nodes, spleen etc.                                 | 2     |  |               |
|         | Antigens and antigenecity- different types of antigens. General properties of antigens- Molecular size, chemical complexity etc.                 | 1     |  |               |
| UNIT-II | <b>IMMUNOGLOBULIN STRUCTURE AND FUNCTIONS:</b>   |       |  |               |
|         | Basic structure of immunoglobulins. Different classes of immunoglobulins-IgG, IgA, IgM ,IgE and IgD.   | 2     | To learn about the various types of antibodies ,their structure and function.      | Kuby          |
|         | Biological activities and functions of different antibodies  | 1     |  |               |

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|          |   |   |   |                 |
|          | Cytokines-various classes and their biological function and properties  | 1 |   |                 |
|          | Complement system – Classical pathway, Alternative pathway, Mannose binding Lectin pathway  | 2 |   |                 |
| UNIT-III | <b>Unit 3- ANTIGEN-ANTIBODY INTERACTIONS</b>  |   | To study and understand the principles and methods of various immunological techniques. | A.K.Chakravarty |
|          | Antigen-Antibody interactions- Affinity and Avidity. Different types of reactions- Precipitation reactions- Agglutination reaction. | 2 |   |                 |
|          | Various Immunological techniques- Radioimmunoassay, ELISA,  | 1 |   |                 |
|          | Western blotting, Immunoprecipitation, Immunofluorescence, Immuno electronmicroscope.   | 1 |   |                 |
|          | Flow cytometry- principle and its applications.   | 1 |   |                 |
|          | Antigen processing and presentation- Structure and functions of MHC I and MHC II molecule.  | 2 |   |                 |
|          | Exogenous and Endogenous pathway.   | 1 |   |                 |
| UNIT-IV  | <b>UNIT 4: T-CELL AND B-CELL ACTIVATION-</b>  |   |   |                 |
|          | T -cell receptor- T-cell maturation, activation and differentiation. Structure of TCR   | 2 |   |                 |
|          | Positive and negative selection- mechanism. Signal transduction via TCR   | 1 |   |                 |
|          | B-cell receptor, B-cell generation, activation, and differentiation. Structure of BCR   | 2 |   |                 |
|          | Stages of B-lymphocyte development- Signaling through BCR-complex Cell-mediated effector responses                                  | 2 |   |                 |
| UNIT-V   | <b>UNIT 5: IMMUNE SYSTEM IN HEALTH AND DISEASE</b>  |   | To learn about the role of immune response in fighting against pathogens.               | Travers         |
|          | Leucocytes migration and inflammation- Acute and Chronic inflammation- various inflammatory mediators.                              | 2 |   |                 |
|          | Hypersensitivity reaction- Type I.  | 2 |   |                 |

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|--|--|---|--|--|
|  | Type II-Antibody dependent cytotoxic reactions, Type III immune complex mediated , Type IV –delayed type hypersensitivity reactions. |   |  |  |
|  | Immune response to infection-Immunity to bacteria  | 1 |  |  |
|  | Immunity to virus  | 1 |  |  |
|  | Immunity to virus-Immunity to parasites-   | 1 |  |  |
|  | Mechanism of evasion of the immune system by pathogens   | 1 |  |  |
|  | Vaccines- Different types of vaccines,   | 2 |  |  |
|  | Application of vaccines  | 1 |  |  |

**TEXT BOOK:**

1. A.K. Chakravarty, Immunology and Immunotechnology, Oxford University Press, 2006
2. Kuby Immunology by Richard A. Golds by Tharmas J. kindt fourth edition 2000 and Barbara Osborne. W.H.freeman and company.
3. Immunology: A short course, by Richard Coico, Geoffery S and Eli Benjamini.

**REFERENCE BOOK**

1. Immunobiology 6<sup>th</sup> Edition, Janeway, Travers, Walport, Shlomchik, Garland, 2005
2. The Immune response: Basic and Clinical principles, Tak Mak and ME Saunders, Elsevier, 2005.

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