**Faculty of Science and Humanities**
B.Sc. (Biotechnology) (Semester - 5)
In Effect from Academic Year 2023-24

| | |
|---|---|
| **Branch Name:** | B.Sc. Biotechnology |
| **Program Code:** | SC101 |
| **Course Name:** | **Immunology** |
| **Course Code:** | **2SC1010504** |
| **Pre-requisite Course:** | |

**Course Objectives:**

1. This course is designed to enable students to acquire understanding of the structure of immune system, its functions.
2. This will enable the student to understand basics of various immunoreactions and immunodiagnostic techniques.
3. It will also help in acquiring knowledge in the field of vaccine.

**Teaching and Examination Scheme:**

| Teaching Scheme (Hours per week) | | | | Evaluation Scheme (Marks) | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | Theory (Marks) | | Practical (Marks) | | |
| Lecture (L) | Tutorial (T) | Practical (P) | Credit | University Assessment | Continuous Assessment | University Assessment | Continuous Assessment | Total (Marks) |
| 3 | -- | -- | 3 | 70 | 30 | -- | -- | 100 |

**Subject Contents:**

| Sr. No | Topic | Total Hours | Weightage (%) |
|---|---|---|---|
| 1 | **Immunity and Immune response:**<br>Introduction and Historical perspective,<br>Immunity: Types: Innate and Acquired Immunity, Active and Passive Immunity, Natural and Artificial Immunity, Cell Mediated and Humoral Immunity, Herd Immunity<br>Innate immunity: Skin& Mucosal Barrier, Physiological Barrier, Phagocytic Barrier, Inflammatory Barrier<br>Complement Fixation –Classical, Alternative and lectin Pathway<br>Acquired Immunity: Primary and Secondary Immune Response, Clonal Selection Theory<br>Cells and Organs of immune system : Peripheral and Central Lymphoid System | 15 | 33% |
| 2 | Antigen and Immunogen: Types of Antigen, Characteristics of Antigen (Foreignness, High molecular weight, Chemical complexity, Degradability)<br>Antigenicity and Immunogenicity, Epitopes, MHC molecules, Haptens Immunogenic adjuvant.<br>Antibody structure and functions.<br>Structural features and biological properties of IgG, IgM, IgA, IgD & IgE.<br>T-Cell & B-Cell generation:-Generation(Maturation), Activation, Proliferation and differentiation | 15 | 33% |
| 3 | **Immunoreactions and immunization**<br>Antigen-antibody Interactions : -Types(Precipitation reactions, Agglutination reaction, CFT, Neutralization, Serotyping, Flow cytometry, Immunoblot technique, Immunochromatographic techniques, IFT, RIA, **ELISA ) and Mechanism(Lattice Hypothesis)**<br>**Prophylactic Immunization: Principles of vaccination, Types of Vaccines** | 16 | 34% |

**Text Books:** J Kuby (1991). Immunology freeman and company

**Reference Books:**


1. Immunology : by IM Roitt, J. Brostoff and DK Male (1993) BMP, London.
2. A.K. Abbas, A.H. Uchtman, J.S. Pober (1994). Cellular Molecular immunology - W.B. Saundes Co. Philadelphia.
3. V.R. Muthukkaruppan, S. Baskar and F. Sinigaglia (1986) Hybridome techniques : A Laboratory Course - Macmillan India Limited.
4. V.E. Cells (1994) Cell Biology Vol-I Immunology to III - Academic Press.
5. Basic Immunology by Jacqueline Sharon
6. Coleman, Lombard & Sicard. 1993, Fundamental of immunology. WCB
7. Janeway etal. 1999. Immunobiology.
8. Todd R.F. 2001. Lecture notes on immunology.
9. David Wilid. 2001. Immunoassay Handbook, Macmillan.


**List of Open Source Software/learning website:**

https://www.youtube.com/watch?app=desktop&v=xdlvPk_2r-w

*https://www.youtube.com/watch?v=kpwTHDKQ-k4*

**Course Learning Outcomes (CLO):**

| CLO | Description | Bloom's Taxonomy Level |
|---|---|---|
| CLO1 | Discuss the development of the knowledge of structure and function of Immune system . | 2 Understanding |
| CLO2 | **List** the types of Immunity. | 1 Remembering |
| CLO3 | Understand various Immunoreactions and its application | 2 Understanding, |
| CLO4 | Learn basic techniques to **identify** and **interpret disease state and drug effect.** | 3 Applying, 2 Understanding |
| CLO5 | Compare primary and secondary immune system. Evaluate antibody structure. | 5, 4 Evaluate,Analyze |
| CLO6 | The awareness of the immune system will help them for further work in the field of vaccine production. | 6 Creating |

**Mapping of CLOs with POs & PSOs**

| Course LearningOutcomes | Program Outcomes (POs) | | | | | | | | | | | | Program Specific Outcomes (PSOs) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
| CLO1 | M | M | H | M | M | M | H | H | M | L | L | H | L | M | M |
| CLO2 | H | L | | M | L | H | M | H | L | | M | M | M | L | |
| CLO3 | | L | M | | M | L | M | M | H | L | | H | L | | L |
| CLO4 | M | H | L | M | H | L | | L | M | M | H | L | M | H | |
| CLO5 | H | L | M | M | L | H | L | M | | M | M | H | M | M | H |
| CLO6 | M | H | L | M | M | M | L | M | M | L | H | M | L | | M |

**H: High, M: Medium, L: Low**