

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**Department of Biochemistry**  
**Course Curriculum**

| <b>PART- A: Introduction</b>  |  |   |   |
|---|--|---|---|
| <b>Program: Bachelor in Science</b><br>(Degree / Honors)                                  |  | <b>Semester - VII</b>   | <b>Session: 2024-2025</b>                             |
| 1   | <b>Course Code</b>   | BCSC-07 T   |   |
| 2   | <b>Course Title</b>  | Immunology  |   |
| 3   | <b>Course Type</b>   | Discipline Specific Course (Theory)   |   |
| 4   | <b>Pre-requisite (if, any)</b>   | As per the Program  |   |
| 5   | <b>Course Learning Outcomes (CLO)</b>  | <p><i>On successful completion of the course, the student shall be able to:</i></p> <ul style="list-style-type: none"> <li>➤ Differentiate between innate and adaptive immunity and also between humoral and cell mediated immunity.</li> <li>➤ Explain the primary and secondary response and the irrelevance to immunizations.</li> <li>➤ Identify the role of antigen presenting cells, lymphocytes, and phagocytic cells in immune responses.</li> <li>➤ Apply immunochemical techniques used in pathological laboratories.</li> <li>➤ Discriminate the nature of antigens and antibodies.</li> </ul> |   |
| 6   | <b>Credit Value</b>  | <b>3 Credits</b>  | <i>Credit = 15 Hours - learning &amp; Observation</i> |
| 7   | <b>Total Marks</b>   | <b>Max. Marks: 100</b>  | <b>Min Passing Marks: 40</b>                          |
| <b>PART -B: Content of the Course</b>   |  |   |   |
| <b>Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)</b> |  |   |   |
| <b>Unit</b>   | <b>Topics (Course contents)</b>  |   | <b>No. of Period</b>                                  |
| <b>I</b>  | <b>Cell and Organs of Immune System:</b> Innate immune mechanism and characteristics of adaptive immune response. Cells of immune system: Hematopoiesis and differentiation, mononuclear cells and granulocytes. Antigen presenting cells. Primary and Secondary lymphoid organs and tissues. Ontogeny and phylogeny of lymphocytes. Lymphocyte traffic.   |   | <b>12</b>   |
| <b>II</b>   | <b>Antigens:</b> nature of antigens, factor affecting immunogenicity, Haptens and super antigens. Antigenic determinants. Recognition of antigens by T and B cell. Antigen processing. Role of MHC molecules in antigen presentation and co-stimulatory signals. Antigen and antibody interaction. Antigen receptor molecules: B-cell receptor complex,<br><b>Immunoglobulin-</b> structure types and functions. T-cell receptor complex. Clonal selection theory- concept of antigen specific receptor. Organization and expression of immunoglobulin genes. Generation of antibody diversity. Light and heavy chain gene recombination. Recombination Signal Sequences. Heavy chain constant region genes. Class switching. T-cell receptor diversity. |   | <b>11</b>   |
| <b>III</b>  | <b>Immune Response:</b> Cell mediated and Humoral immune response and its regulation.<br><b>Cytokines and interleukins-</b> structure and function. Hypersensitive reactions and their types. Immunodeficiency disorders. Autoimmunity. Major Histocompatibility Complex- types, structural organization, function and distribution. Transplantation and Rejection. Complements in immune function.  |   | <b>11</b>   |
| <b>IV</b>   | <b>Immune response to infectious diseases:</b> viral, bacterial and protozoal. Cancer and immune system. Nutrition and Immune response. Principles of vaccination. Immunization practices. Passive immunization (immunotherapy). Role of vaccine in prevention of diseases: vaccines against important viral, bacterial, protozoan and parasitic diseases. DNA vaccines; Antiviral, antibacterial agents.  |   | <b>11</b>   |
| <b>Keywords</b>   | Recognition, Response, Antibody, Antigen, Cancer, Disease.   |   |   |

Name and Signature of Convener & Members of CBoS:



| <b>PART-C: Learning Resources</b>  |  |  |
|--|--|--|
| <b>Text Books, Reference Books and Others</b>  |  |  |
| <i>Text Books Recommended –</i>  |  |  |
| <ul style="list-style-type: none"> <li>➤ Kuby's Immunology R.A. Goldsby, T. J Kindt and B. A. Osborne</li> <li>➤ Immunology- A short Course E. Benjamini, R. Coico and G. Sunshine</li> <li>➤ Immunology Roitt, Brostoff and Male</li> <li>➤ Fundamentals of Immunology William Paul</li> <li>➤ Immunology Tizard</li> <li>➤ Immunology Abbas et al</li> </ul> |  |  |
| <b>PART -D: Assessment and Evaluation</b>  |  |  |
| <b>Suggested Continuous Evaluation Methods:</b>  |  |  |
| <b>Maximum Marks:</b>  |  | <b>100 Marks</b>   |
| <b>Continuous Internal Assessment (CIA):</b>   |  | <b>30 Marks</b>  |
| <b>End Semester Exam (ESE):</b>  |  | <b>70 Marks</b>  |
| <b>Continuous Internal Assessment (CIA):</b><br>(By Course Teacher)  | Internal Test / Quiz-(2): <b>20 +20</b><br>Assignment / Seminar - <b>10</b><br>Total Marks - <b>30</b>   | Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against <b>30</b> Marks |
| <b>End Semester Exam (ESE):</b>  | <b>Two section – A &amp; B</b><br>Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks<br>Section B: Descriptive answer type qts., <b>1 out of 2</b> from each unit-4x10=40 Marks |  |

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| <b>Program: Bachelor in Science</b><br>(Degree/Honors)                           |   | <b>Semester - VII</b>  | <b>Session: 2024-2025</b>                                     |
| 1  | <b>Course Code</b>  | <b>BCSC-07 P</b>   |   |
| 2  | <b>Course Title</b>   | <b>Immunology</b>  |   |
| 3  | <b>Course Type</b>  | <b>Discipline Specific Course (Practical)</b>  |   |
| 4  | <b>Pre-requisite (if, any)</b>  | As per Program   |   |
| 5  | <b>Course Learning Outcomes (CLO)</b>   | <i>On successful completion of the course, the student shall be able to:</i> <ul style="list-style-type: none"> <li>➤ Apply the techniques to test various clinical conditions.</li> <li>➤ Perform immunological techniques.</li> <li>➤ Analyze the different blood cell counting.</li> <li>➤ Perform qualitative and quantitative test for proteins.</li> </ul> |   |
| 6  | <b>Credit Value</b>   | <b>1 Credits</b>   | <i>Credit =30 Hours Laboratory or Field learning/Training</i> |
| 7  | <b>Total Marks</b>  | <b>Max. Marks: 50</b>  | <b>Min Passing Marks: 20</b>                                  |
| <b>PART -B: Content of the Course</b>  |   |  |   |
| <b>Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)</b> |   |  |   |
| <b>Module</b>  | <b>Topics (Course contents)</b>   |  | <b>No. of Period</b>  |
| <b>Lab./Field Training/ Experiment Contents of Course</b>                        | <ul style="list-style-type: none"> <li>➤ Identification of cells of immune system</li> <li>➤ Identification of Lymphocytes and their subsets</li> <li>➤ Lymphoid organs and their microscopic organization</li> <li>➤ Isolation and purification of Antigens</li> <li>➤ Purification of IgG from serum</li> <li>➤ Estimation of Levels of gamma globulins and A/G ratio in blood</li> <li>➤ Antigen antibody interaction</li> </ul> |  | <b>30</b>   |
| <b>Keywords</b>  | Immunoglobulin, Cell, Antibody, Antigen   |  |   |

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| <b>PART-C: Learning Resources</b>  |
| <b>Text Books, Reference Books and Others</b>  |
| <b>Text Books Recommended –</b>  |
| <ul style="list-style-type: none"> <li>➤ Kuby's Immunology R.A. Goldsby, T. J Kindt and B. A. Osborne</li> <li>➤ Immunology- A short Course E. Benjamini, R. Coico and G. Sunshine</li> <li>➤ Immunology Roitt, Brostoff and Male</li> </ul> |

|   |  |  |
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| <b>PART -D: Assessment and Evaluation</b>                           |  |  |
| <b>Suggested Continuous Evaluation Methods:</b>                     |  |  |
| <b>Maximum Marks:</b>   |  | <b>50 Marks</b>  |
| <b>Continuous Internal Assessment (CIA):</b>                        |  | <b>15 Marks</b>  |
| <b>End Semester Exam (ESE):</b>                                     |  | <b>35 Marks</b>  |
| <b>Continuous Internal Assessment (CIA):</b><br>(By Course Teacher) | Internal Test / Quiz-(2): <b>10 &amp; 10</b><br>Assignment/Seminar +Attendance - <b>05</b><br>Total Marks - <b>15</b>  | Better marks out of the two Test / Quiz<br>+ obtained marks in Assignment shall be<br>considered against <b>15 Marks</b> |
| <b>End Semester Exam (ESE):</b>                                     | <b>Laboratory / Field Skill Performance: On spot Assessment</b><br>A. Performed the Task based on lab. work - <b>20 Marks</b><br>B. Spotting based on tools & technology (written) – <b>10 Marks</b><br>C. Viva-voce (based on principle/technology) - <b>05 Marks</b> | <b>Managed by</b><br><b>Course teacher</b><br><b>as per lab. status</b>  |

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