# GUJARAT TECHNOLOGICAL UNIVERSITY
## B. E. SEMESTER: V
## BIO-TECHNOLOGY

Subject Name: **Immunology**
Subject Code: **150402**

| Teaching Scheme | | | | Evaluation Scheme | | |
|---|---|---|---|---|---|---|
| **Theory** | **Tutorial** | **Practical** | **Total** | **University Exam (Theory) (E)** | **Mid Sem Exam (Theory) (M)** | **Internal Assessment (I)** |
| 3 | 0 | 2 | 5 | 70 | 30 | 50 |

| **Sr. No.** | **Course content** |
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| 1. | Overview of immune system and classification of immunity. |
| 2. | **Cells and Organs of Immune System:** Hematopoiesis, Apoptosis, Cells of Immune system, Organs of Immune system. |
| 3. | **Antigens and Immunoglobulins:** Immunogenicity, Antigen characteristics, Apitopes and haptenes, Structure of Ig, Classes of Ig and its biological activities, Monoclonal antibody. |
| 4. | **Antigen – Antibody Interaction:** Precipitation, Agglutination, RIA, ELISA, Western Blot, Immunofluorescence, FACS Immuno-electron microscopy. |
| 5. | **Complement System:** Complement components, Complement activation, Regulation of Complement activation, Complement and inflammation, Complement deficiencies. |
| 6. | **Hypersensitive Reactions:** Introduction & meaning of hypersensitivity & allergy, Type-I, II, III and IV hypersensitive reactions and their remedies. |
| 7. | **Vaccines:** Introduction & history of vaccination, Active and passive immunization, Whole organism vaccine, Purified macromolecules as vaccine, Recombinant vector vaccine, DNA vaccine, Synthetic peptide vaccine, Multivalent subunit vaccine. |
| 8. | **Techniques used in Immuno-Technology:** Haemagglutination Titer and Assay for Antibody secreting cells, Hybridoma Technology: Monoclonal Antibody, SCID Mice and SCID- human Mice, Transplantation immunology. |
| 9. | **Microbial Flora of The Healthy Human Host:** |

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| 10. | **Microbial Diseases:**<br>• Air Born Transmitted: Chickenpox, Mumps.<br>• Sexually transmitted diseases: AIDS, Syphilis.<br>• Animal transmitted diseases: Rabies,<br>• Vector transmitted diseases: Malaria. |

## List of Practical:

1. To perform and determine the blood group of ABO and Rh system.
2. Total count of leucocytes.
3. Total count of erythrocytes.
4. Differential count of leucocytes.
5. Estimation of hemoglobin by Drabkin's method.
6. Determination of erythrocytes sedimentation rate.
7. To determine the bleeding time by Duke's method.
8. To determine the clotting time by capillary method.
9. To perform cross matching test by saline tube method.
10. To perform WIDAL test by saline tube method.
11. To perform RPR test for Syphilis diagnosis.
12. Latex agglutination test.
13. Serological diagnosis of enteric fever by WIDAL test.
14. To perform ELISA.
15. Tri dot test.
16. Ouchterlony double diffusion technique.
17. Isolation and identification of medically important microorganisms.

## Reference Books:


1. Immunology by Richard A. Goldsby, Thomus J. Kindt, Barbara A. Osborne & Janis Kuby published by W.H. Freeman & company.
2. Text Book of Microbiology by Ananthnarayan & Paniker published by Universities Press private limited.
3. Brock Biology of Microorganisms by Michael T. Medigan, John M. Martinco published by Pearson Prentice Hall.
4. Microbiology by Prescott Harley Klein published by McGraw Hill Companies.
5. Immunology and Immunotechnology by Ashim K. Chakravarty Published by Oxford University press.