



बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsa Munda Tribal University

राजपिपला, जि. नर्मदा Rajpipla, Dist. Narmada

Established by Tribal Development Department, Govt. of Gujarat

School of Science

B.Sc. (Zoology) Programme

Subject Code & Name: BS05MIZOO2 Basics of Immunology

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
2	-	2	4	25 %	25 %	25 %	25 %

Programme Name	B.Sc. Zoology
Semester	V
Course Code	BS05MIZOO2
Course Title	Basics of Immunology
Course Content Type (Th./Pr.)	Theory + Practical
Course Credit	4
Sessions + Lab. Per Week	2 + 4
Total Teaching/Lab. Hours	60 Hours
* 2 Laboratory = 1 Session	

Learning Objectives

- Understand basic concepts of immunology and immunity.
- Study immune cells, organs, antigens, and antibodies.
- Learn immune responses, vaccines, and immunological disorders.
- Develop basic skills in immunological techniques.

Prerequisites (if any)

- Basic knowledge of cell biology and animal physiology.
- Understanding of blood cells and circulatory system.
- Familiarity with biomolecules such as proteins and carbohydrates.
- Basic laboratory handling and microscopy skills.

Learning Outcomes

After completion of this course, students will be able to:

- Explain the structure and functions of the immune system.
- Differentiate types of immunity and immune responses.
- Describe antigen-antibody interactions and immunological disorders.
- Perform basic immunological laboratory techniques.





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Detailed Contents		
UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	Fundamentals of Immunology • Introduction, scope, and history of immunology. • Types of immunity: Innate and acquired immunity. • Cells and organs of immune system: • Primary lymphoid organs: ◦ Bone marrow and Thymus • Secondary lymphoid organs: ◦ Spleen, Lymph nodes and Tonsils • Cells of immune system: Lymphocytes, macrophages, neutrophils, eosinophils, basophils, mast cells. • Antigens: Properties and types. • Antibodies (Immunoglobulins): Structure, classes, and functions (IgG, IgA, IgM, IgE, IgD). • Antigen-antibody interactions: Agglutination, precipitation, neutralization.	15
II	Immune Response and Applied Immunology • Humoral and cell-mediated immunity. • B-lymphocyte and T-lymphocyte activation and functions. • Major Histocompatibility Complex (MHC): Basic concept and functions. • Complement system: Pathways and biological role. • Hypersensitivity: Types I-IV. • Autoimmunity: Concept and examples. • Vaccines: Types and immunization schedule (basic concept). • Immunodeficiency disorders: Primary and secondary immunodeficiencies (brief overview).	15



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Practicals

List of Practical

1. Study the structure of lymphoid organs through charts/models/slides.
2. Study different blood cells involved in immunity using prepared slides.
3. Study differential leukocyte count (DLC).
4. Study blood grouping (ABO and Rh factor).
5. Study antigen-antibody reaction by agglutination method.
6. Study precipitation reaction using suitable laboratory methods.
7. Study immunoglobulin classes using charts/models.
8. Study ELISA principle and protocol charts/models.
9. Study Widal test.
10. Study pregnancy test as immunological assay.
11. Study hypersensitivity reactions using case studies/charts.
12. Study autoimmune disorders through case records/models.

Text Book(s)

1. Immunology by K. N. Mahajan, Tata McGraw Hill
2. Textbook of Immunology by C. V. Rao, Alpha Science International
3. Essentials of Immunology by K. S. Nageswara Rao, Jaypee Brothers Medical Publishers
4. Immunology and Immunotechnology by K. R. Dikshit, New Age International
5. A Textbook of Immunology by P. Chakraborty, New Central Book Agency
6. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology by P. S. Verma, V. K. Agarwal, S. Chand

Reference Books

1. Kuby Immunology – Judith A. Owen, Jenni Punt, Sharon A. Stranford – W.H. Freeman
2. Janeway's Immunobiology – Kenneth Murphy, Casey Weaver – Garland Science
3. Roitt's Essential Immunology – Ivan Roitt – Wiley-Blackwell
4. Immunology – Richard A. Goldsby, Thomas J. Kindt, Barbara A. Osborne – W.H. Freeman
5. Basic Immunology – Abul K. Abbas, Andrew H. Lichtman, Shiv Pillai – Elsevier





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Web Resources

1. NCBI Bookshelf – <https://www.ncbi.nlm.nih.gov/books/>
2. National Center for Biotechnology Information (NCBI) – <https://www.ncbi.nlm.nih.gov/>
3. Khan Academy Biology – <https://www.khanacademy.org/science/biology>
4. Nature Reviews Immunology – <https://www.nature.com/nri/>
5. British Society for Immunology – <https://www.immunology.org/>
6. Immunopaedia – <https://www.immunopaedia.org.za/>
7. PubMed – <https://pubmed.ncbi.nlm.nih.gov/>
8. HHMI BioInteractive – <https://www.biointeractive.org/>

L:: Lecture, **T::** Tutorial , **P::**Practical

CCE::Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/ surprised), attendance etc. or any combination of these)

PWE::Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)

SEE::Semester End Evaluation

