ZOOLOGY COMPONENT - DSC

DISCIPLINE SPECIFIC CORE COURSE (DSC-06)

Credit distribution, Eligibility and Pre-requisites of the Course

Course title & Code	Credits	Credit distribution of the course			Eligibility criteria	Pre-requisite of the course
		Lecture	Tutorial	Practical/ Practice		
Immunology and Immunotechnology ALS ZOO DSC 06	4	2	0	2	Class 12th Pass with Science	NIL

Learning Objectives:

The learning objectives of this course are as follows:

- to acquaint the students about cells of innate and acquired immune system and their interactions.
- to learn the structure of antibody, different isotypes and their biological functions.
- to acquire knowledge of different types of vaccines.
- to apprise the students of the mechanisms of antigen processing and presentation.
- to train the students in various immunotechniques applied in diagnostics and therapeutics.

Learning Outcomes:

By studying this course, students will be able to:

- have better understanding of the concepts of innate and acquired immunity.
- acquire knowledge of antigenicity and immunogenicity of biomolecules.
- comprehend and analyse different cellular and humoral components of the immune system.

- appreciate the applications of immunotechniques used in diagnostics and therapeutics.

Unit 1: Overview of Immune System (3 Hours)

Historical perspectives of immunology, clonal selection theory, brief outline of immune dysfunctions (hypersentivity, autoimmunity and immunodeficiency).

Unit 2: Innate and Adaptive Immunity (7 Hours)

Anatomical barriers, inflammation, cells of immune system; adaptive immunity: cell-mediated and humoral, active and passive, natural and artificial.

Unit 3: Antigens (4 Hours)

Antigenicity and immunogenicity; Immunogens:factors influencing immunogenicity; adjuvants and haptens; properties of B and T-cell epitopes.

Unit 4: Immunoglobulins and Vaccines (7 Hours)

Structure and functions of different classes of immunoglobulins, different types of vaccines.

Unit 5: Major Histocompatibility Complex (4 Hours)

Structure and functions of MHC molecules (MHC I and II), endogenous and exogenous pathways of antigen processing and presentation.

Unit 6: **Immunotechniques (5 Hours)**

Double immunodiffusion assay, haemagglutination assay (ABO typing), immunoeletrophoresis, immunofluorescence, ELISA, hybridoma technology: monoclonal antibodies in therapeutics and diagnosis.

PRACTICAL (60 Hours)

1. Demonstration of lymphoid organs of rat/mouse. (Subject to UGC guidelines).
2. Study of primary and secondary lymphoid organs through slides/photographs/videos.
3. Preparation of stained blood film to study various types of cells.
4. Preparation of serum using rat /mouse (Subject to UGC guidelines).
5. Perform Ouchterlony's double immunodiffusion (DID) to study immunoprecipitation and interpretation of patterns of identity, non-identity and partial identity.
6. Identification of ABO blood group by heamagglutination using antisera.

7. Cell counting and viability test of splenocytes from farm bred animals/cell lines.
8. Demonstration of ELISA and Immunoelectrophoresis.
9. Project on any topic related to theory.

Essential/ Recommended Readings:

1. Kindt, T. J., Goldsby, R.A., Osborne, B. A. and Kuby, J. (2006*). Immunology,* VI Edition, W.H. Freeman and Company.
2. David, M., Jonathan, B., David, R. B. and Ivan, R. (2006). *Immunology*, VII Edition, Mosby, Elsevier Publication.
3. Punt, J., Stranford, S., Jones, P., Owen J., A. (2018) Kuby Immunology, W H Freeman Publications.

Suggestive readings:

1 Abbas, K. Abul and Lechtman H. Andrew (2017) *Cellular and Molecular Immunology*. IX Edition, Saunders Publication.

2 Kaur, H., Toteja, R., and Makhija, S. (2021). *Textbook of Immunology*. IK International Publishing House and Wiley India Ltd.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.