

## — Paper - VII - Immunology

### I Learning objectives:

- 1) Acquainting Student with immunological techniques via theory taught in the class room.
- 2) ~~Inter~~ To trace the history & development of Immunology
- 3) To provide students with a foundation in immunological process.
- 4) understand the significance of the Major histocompatibility complex in terms of immune response and transplantation.

### II Course outcomes (Theory)

- 1) To get the knowledge of organs of immune system, types of immunity and cells of immunity.
- 2) To provide basic knowledge about immune system & allows the student to create insight as how to improve their immune system & health.
- 3) Major histocompatibility complex & their response in the body.
- 4) To understand the types of allergies, autoimmune-diseases & transplantation immunology.

### Practical:

- 1) Identification of blood grouping & blood analysis.
- 2) Students know the histological study of cells.
- 3) Interconnect the theoretical and practical knowledge of immunity with the outer world for the development of healthier life.

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Semester-IV - Paper V - Immunology & Animal Biotechnology

I Learning objectives:

- 1) To trace the history & development of Immunology and able to compare & contrast the innate versus adaptive immune systems and humoral versus cell-mediated immune responses.
- 2) To provide knowledge on animal cell and tissue culture & their preservation.
- 3) To empower students with latest technology technique like stem cell technology, genetic engineering, hybridoma technology, transgenic technology and their applications in medicine and industry for the benefit of living organisms.

II Course outcomes: (Theory):

- 1) Interactions of antigens, antibodies and other immune components.
- 2) Understanding of immune mechanism in disease control, vaccination & process of immune interaction.
- 3) Imparts knowledge to culture animal cells in artificial media.
- 4) Use of recombinant DNA technology, genetic manipulation & in a variety of industrial process. Practical:
  - 1) Identifying the blood grouping & blood analysis.
  - 2) promoting application of lab techniques for taking up research in higher studies.

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Semester - III - Cell Biology, Genetics, Molecular  
Biology & Evolution

I Learning objectives:

- 1) To understand the role of different cell organelles in maintainance of life activities.
- 2) To enable the Students distinguish between polygenic, sex-linked, gene interactions, multiple allelic modes of inheritance.
- 3) To acquaint Student with basic concepts of molecular biology as to how characters are expressed with a Coordinated functioning of replication, transcription and translation in living beings.
- 4) To provide knowledge on origin of life, theories and forces of evolution.

II Course Outcomes: (Theory):

- 1) To understand Structure & functional aspects of basic unit of life i.e., Cell concepts.
- 2) To understand Concept behind genetic disorder, gene mutations, Various causes associated with inborn errors of metabolism.
- 3) To understand application of DNA & molecular biology for research.
- 4) To know the knowledge of evolution & Species Variation.

Practical:

- 1) Ability to observe on human karyotyping and chromosomal arrangement during cell division.
- 2) Develop skill in simple biochemical laboratory procedures.
- 3) To identify the contributions of various evolutionists.

Semester - IV - Animal Physiology, Cellular metabolism  
and Embryology

I Learning objectives:

- 1) To achieve a thorough understanding of various aspects of physiological systems.
- 2) To provide insightful knowledge on the structure and classification of carbohydrates, proteins, lipids & enzymes.
- 3) To understand the disorders associated with the deficiency of hormones.

II Course Outcomes: (Theory):

- 1) Students gain fundamental knowledge of animal physiology.
- 2) Students will gain skill to execute the role of a biology teacher as they have basic fundamentals.
- 3) Students gain knowledge about metabolism of protein, carbohydrates & lipids for the release of energy.
- 4) Gains knowledge about gametogenesis, cleavage, types of eggs & gastrulation prours.

Practical:

- 1) Identification of an organ system with histological structure.
- 2) Identification of various biomolecules of tissues by simple colorimetric method & also quantitative methods.
- 3) Identification of different stages of early embryonic development in animals.

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# Course objectives & outcomes

## Semester-I

### Paper I - Animal diversity - Non-Chordata

#### I Learning objectives:

- 1) To understand the taxonomic position of protozoa to Hemichordata
- 2) To understand the general characteristics of animals belonging to protozoa to Hemichordata.
- 3) To understand the origin & evolutionary relationship of different phylum from protozoa to Hemichordata.

#### II Course Outcomes: (Theory)

- 1) Students gain knowledge & skill in the fundamentals of animal Kingdom.
- 2) Understand the general taxonomic rules on animal classification.
- 3) Classify phylum protozoa to Hemichordata with examples from parasitic adaptation & Vermicompost.
- 4) Be Students will equipped to become very competent in research or teaching field after completion of this course.

#### Practicals:

- 1) To understand the importance of preservation of museum specimens & identify animals based on special identifying characters.
- 2) To understand different organ system through demo (or) Virtual dissection.
- 3) To maintain a neat, labelled record of identified museum specimens.

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Semester - II  
Paper - II - Animal diversity - Chordata

I Learning objectives:

- 1) Imparts conceptual knowledge of vertebrates, their adaptations and association in relation to their environment.
- 2) To understand the Animal Kingdom.
- 3) To understand the body organization of chordata.
- 4) To understand the taxonomic position of protochordata to Mammalia.

II Course outcomes (Theory)

- 1) classify protochordata to Mammalia with taxonomic keys.
- 2) Students know complex vertebrate interactions.
- 3) Understand the significance of dentition & evolution, Significant.
- 4) understand the origin & evolutionary relationship of different phylum from protochordata to Mammalia.

Practical:

- 1) To understand the taxonomic and other methods of preservation of chordates & identify chordates based on special identifying characters.
- 2) Experience in anatomy through simple dissections and to maintain a neat, labelled record of identified museum specimens.
- 3) Ability to love and understand the fascinating world of vertebrates & Invertebrates.

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