



## B.Sc. Zoology Programme Specific Outcomes (PSO)



The B.Sc. Zoology programme is a specialized study of the various aspects of animal life. The study includes animal systematics, anatomy and physiology, developmental biology, genetics and evolution, behaviour and animal distribution. The programme will enable students to opt for careers in areas such as ecology, conservation biology and broad area of research.

- PSO1** Inculcating students with requisite domain knowledge, skills and right attitude necessary for the effective understanding of Zoology.
- PSO2** Elucidating principles of animal systematics and biodiversity and developing an understanding of the morphology and anatomy of representatives of different animal groups.
- PSO3** Elucidating biological principles involved in the study of functional anatomy, biochemistry, genetics, cell and molecular biology, ecology and environmental studies, developmental biology, basic biotechnology, and behaviour in animals.
- PSO4** Developing an understanding of the application of animal science to apiculture, pisciculture, sericulture and insect pest management.
- PSO5** Developing sound laboratory and safety practices used in animal sciences.
- PSO6** Acquisition of skills related to animal identification and the experimental techniques in physiology, cell and molecular biology, genetics and cytogenetics, biochemistry and immunology, field ecology and developmental biology.
- PSO7** Developing basic analytical skills and scientific communication skills.

### Course Outcomes (COs) in BSc Zoology, SAC

#### Paper 1A: Systematics, Animal Diversity and Evolution (Theory)

- 1A1** Learning the scientific concept of animal systematics.
- 1A2** Knowing the classification of animal phyla and the representatives of each phylum in the animal kingdom.
- 1A3** Understanding the concept of origin of life and evolution of man.
- 1A4** Understanding the principles and theories of evolution.

#### Paper 1B: Systematics, Animal Diversity and Evolution (Practical)

- 1B1** Acquiring skills in the dissection of anatomical systems of select organisms.
- 1B2** Acquiring skills in permanent slide preparation.
- 1B3** Learning the skeletal system of mammals.
- 1B4** Learning the histology of invertebrate and vertebrate tissues through microscopic sections.

- 1B5** Learning and understanding the representatives of non-chordates and chordates through museum specimens.

### **Paper 2A: Cell Biology and Genetics (Theory)**

- 2A1** Acquiring knowledge on structure and functions of cells and their organelles.
- 2A2** Learning about the cell cycle and cell divisions.
- 2A3** Understanding the basics of cancer.
- 2A4** Acquiring knowledge about the components and functions of the immune system.
- 2A5** Learning Mendelian and Non-Mendelian principles of inheritance.
- 2A6** Understanding sex determination and chromosomal aberrations.

### **Paper 2B: Cell Biology and Genetics (Practical)**

- 2B1** Learning the identification of cell organelles and chromosome types.
- 2B2** Acquiring skills in preparation of mitotic, meiotic stages and polytene chromosomes.
- 2B3** Understanding phenotypic variations in a population.

### **Paper 3A: Animal Physiology, Endocrinology and Biochemistry (Theory)**

- 3A1** Learning the physiology of digestion and absorption; respiration and circulation in vertebrates.
- 3A2** Learning the characteristics and functions of vitamins.
- 3A3** Learning the ultrastructure and functions of skeletal muscle, urinary and nervous systems in vertebrates.
- 3A4** Understanding the structure and function of major endocrine glands in mammals, and neuroendocrine system in insects.
- 3A5** Acquiring knowledge of the classification and functions of different biological molecules.
- 3A6** Understanding the organisation and functions of biochemical pathways.
- 3A7** Understanding enzymes and their mechanism of action.
- 3A8** Learning the structure and functions of nucleic acids.

### **Paper 3B: Animal Physiology, Endocrinology and Biochemistry (Practical)**

- 3B1** Acquiring skills in the preparation of haemin crystals and estimating the clotting time of human blood.
- 3B2** Acquiring skills in estimating the amount of oxygen consumed by fishes.
- 3B3** Learning the histology of different endocrine glands through microscopic sections.
- 3B4** Acquiring skills in detecting carbohydrates, lipids and proteins from different biological samples.

**3B5** Acquiring skills in the estimation of ascorbic acid.

#### **Paper 4A: Developmental Biology, Ecology and Economic Zoology (Theory)**

- 4A1** Acquiring knowledge on the basic concepts of developmental Biology.
- 4A2** Learning the processes of pre- and post-embryonic development in organisms.
- 4A3** Understanding on the various aspects of Ecology.
- 4A4** Learning on the structure and functions of ecosystems.
- 4A5** Acquiring knowledge on resource management and environmental pollution.
- 4A6** Understanding different aspects of pisciculture, apiculture and integrated pest management.

#### **Paper 4B: Developmental Biology, Ecology and Economic Zoology (Practical)**

- 4B1** Learning the anatomical features of developmental stages through microscopic slides.
- 4B2** Acquire knowledge of non-chordate larval forms.
- 4B3** Acquiring skills in water analysis.
- 4B4** Ability to identify fish species, castes and stages of economically important organisms.

#### **Paper 5A: Functional Anatomy, Zoogeography and Adaptations (Theory)**

- 5A1** Learning the functional anatomy of animal representatives from Invertebrate Phyla.
- 5A2** Understanding the anatomical features and affinities of animal representatives of the Phylum Chordata.
- 5A3** Understand the concepts of Zoogeography and Zoogeographical realms.
- 5A4** Understanding the patterns and regulations of animal behaviour.
- 5A5** Understanding adaptation of animals in different habitats.

#### **Paper 5B: Functional Anatomy, Zoogeography and Adaptations (Practical)**

- 5B1** Acquiring skills in dissection of functional organ systems.
- 5B2** Acquiring skills in preparation of permanent mounts.
- 5B3** Ability to identify vertebrate tissue sections and whole mounts of invertebrates through microscopic slides.
- 5B4** Understanding adaptive modifications in birds through charts and models.

### **Paper 6A: Cell and Molecular Biology, and Genetics (Theory)**

- 6A1 Acquiring knowledge about viral, prokaryotic and eukaryotic genomes.
- 6A2 Understanding the concept of a gene and gene expression.
- 6A3 Understanding DNA mutation and repair.
- 6A4 Attaining knowledge about human karyotype, genetic disorders and sex determination in humans.
- 6A4 Understanding the characteristics and functions of the humoral and cell-mediated immunity.
- 6A5 Understanding the working principles and applications of biological techniques.

### **Paper 6B: Cell and Molecular Biology, and Genetics (Practical)**

- 6B1 Proficiency in the working principle and acquiring skills of paper chromatography.
- 6B2 Understanding in-vitro antigen-antibody reaction and gel electrophoresis.
- 6B3 Acquiring skills in nucleic acid estimation, meiotic analysis and karyotyping techniques.

### **Paper 7A: Biochemistry, Animal Physiology and Endocrinology (Theory)**

- 7A1 Understanding the chemical foundations of physiology and enzyme kinetics.
- 7A2 Understanding the structure and classification of carbohydrates and proteins.
- 7A3 Understanding the functions and significance of various biochemical pathways.
- 7A4 Learning the structural components and regulation of physiological processes.
- 7A5 Elucidating the structure and function of the endocrine system in animals.
- 7A6 Understanding reproductive cycles and roles of hormones in reproduction of mammals.
- 7A7 Understanding the principle and process of IVF and embryo transfer technology.

### **Paper 7B: Biochemistry, Animal Physiology and Endocrinology (Practical)**

- 7B1 Acquiring skills on WBC, RBC counts and estimation of haemoglobin concentration in blood.
- 7B2 Acquiring skills on estimation of glucose and protein concentration.
- 7B3 Acquiring skills in dissection and display of endocrine systems.
- 7B5 Acquiring skills in microtomy.




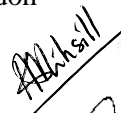
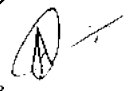
## Paper 8A: Developmental Biology, Environmental Biology and Biotechnology (Theory)

- 8A1 Learning processes of development (cleavage, morphogenetic movements, gastrulation and organogenesis).
- 8A2 Learning types of placenta in mammals; principles of regeneration in organisms, teratogenesis and ageing.
- 8A3 Learning the components of different biomes and ecosystems.
- 8A4 Understanding different biogeochemical cycles.
- 8A5 Understanding Ecological succession.
- 8A6 Understanding environmental pollution, anthropogenic activities and conservation of natural resources.
- 8A7 Learning the techniques and tools used in Biotechnology.

## Paper 8B: Developmental Biology, Environmental Biology and Biotechnology (Practical)

- 8B1 Acquiring skills to prepare permanent mounts of chick embryo.
- 8B2 Acquiring skills in understanding regeneration.
- 8B3 Learning development of chick by observing different stages from microscopic slides.
- 8B4 Acquiring skills in understanding structure and function of a community using quadrat.
- 8B5 Acquiring skills in qualitative and quantitative analysis of plankton.
- 8B6 Acquiring experiential learning through exposure trips.

### Names and Signatures of Faculty:

1. Frederick A. Lamare (Head) 
2. Dr. Bashida Massar 
3. Dr. Damanbha Lyngdoh 
4. Karen R. Mihsill 
5. Alban D. Marbaniang 
6. Jeremy N. Syiem 