

### **Section 1: Animal Diversity**

Distribution, systematics and classification of animals, phylogenetic relationships (based on classical and molecular phylogenetic tools).

### **Section 2: Evolution**

Origin and history of life on earth, theories of evolution, natural selection, adaptation, speciation.

### **Section 3: Genetics**

Basic Principles of inheritance, molecular basis of heredity, sex determination and sex-linked characteristics, cytoplasmic inheritance, linkage, recombination and mapping of genes in eukaryotes, population genetics, genetic disorders, roles of model organisms in understanding genetic principles.

### **Section 4: Biochemistry and Molecular Biology**

Nucleic acids, proteins, lipids and carbohydrates; replication, transcription and translation, Krebs cycle, glycolysis, enzyme catalysis, hormones and their actions, roles of vitamins and minerals.

### **Section 5: Cell Biology**

Basic principles of cellular microscopy, structure of cell, cytoskeletal organization, cellular organelles and their structure and function, cell cycle, cell division, chromosomes and chromatin structure.

### **Section 6: Gene expression in Eukaryotes**

Eukaryotic genome organization and regulation of gene expression, transposable elements.

### **Section 7: Animal Anatomy and Physiology**

Comparative physiology, the respiratory system, Muscular system, circulatory system, digestive system, the nervous system, the excretory system, the endocrine system, the reproductive system, the skeletal system.

### **Section 8: Parasitology and Immunology**

Nature of parasite, host-parasite relation, protozoan and helminthic parasites, the immune response, cellular and humoral immune response.

### **Section 9: Development Biology**

Gametogenesis, Embryonic development, cellular differentiation, organogenesis, metamorphosis, Model organisms used in developmental biology, genetic and molecular basis of development, stem cells.

### **Section 10: Ecology**

The ecosystem, Animal distribution, ecological niche and its contribution to ecological diversity, the food chain, population dynamics, species diversity, zoogeography, biogeochemical cycles, conservation biology, ecotoxicology.

### **Section 11: Animal Behaviour**

Type of behaviours, courtship, mating and territoriality, instinct, learning and memory, social behaviour across the animal taxa, communication, pheromones, evolution of behavior in animals.