B.Sc. Zoology Semester Pattern Syllabi

Semester V

Paper 1- Animal Behaviour, Chronobiology Endocrinology and Neurobiology

Unit I

Animal Behaviour

Introduction to Ethology

Patterns of Behaviour: Stereotyped Behaviours (Orientation, Reflexes); Individual Behavioural patterns

Instinct vs. Learnt Behaviour

Learning: Imprinting, Habituation and sensitization, Associative learning; Punishment and Reward Learning, trial and Error Learning; Taste Aversion Learning, Cache Retreival; Social Learning

Gene-Environment Effect on Behaviour

Unit II

Chronobiology

Introduction and History of Chronobiology

Biological Rhythms: definition, types and their characteristics

Free run, Entrainment

Seasonal rhythms, Photoperiodism

Biological clocks and human health

Unit III

Endocrinology

Structure of endocrine glands and their functions (pineal, pituitary, thyroid, adrenal, pancreas, gonads)

Endocrine disorders

Unit IV

Neurobiology

Basic organization of Nervous system

Neurons and Glia, Synapses

Neural transmission

Neurotransmitters: general categories and function

Paper 2- Economic Zoology

Unit-I

Parasitology
Structure, life cycle, Pathogenicity, including diseases, causes, symptoms and control of the following parasites of domestic animals and humans: *Trypanosoma, Giardia Diphyllobothrium, Hymenolepis, Dracunculus, Wuchereria, Paragonimus, Fasciolopsis.*
Plant Nematodes, nature of their damage and control measures including *Meloidogyne.*

Unit-II

Vectors and pests
Vectors: mosquito, house fly, bed bug, louse and their control.
Pests and their types.
Characteristic features, life cycle, nature of damage and control of termite, cockroach, cloth moth, grain moth, wax moth, gundhi bug, sugarcane leaf-hopper and rodents

Unit-III

Animal culture I
Sericulture, Apiculture, Lac-culture.

Unit IV

Animal Culture II

Aquaculture, Pisciculture, Poultry, Vermicomposting

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Practical Syllabus Semester V

Semester V

1. Permanent Preparation of: *Euglena*, *Paramecium* and rectal protozoans from frog.
2. Stool examination for different intestinal parasites.
3. Study of prepared slides/ specimens of *Entamoeba, Giardia, Leishmania, Trypanosoma, Plasmodium, Fasciola, Cotugnia, Taenia, Rallietina, Polystoma Paramphistomum, Schistosoma, Echinococcus, Dipylidium, Enterobius, Ascaris and Ancylostoma*;
4. Permanent Preparation of *Cimex* (bed bug)/ *Pediculus* (Louse), *Haematopinus* (cattle louse), fresh water annelids, arthropods; and soil arthropods.
5. Larval stages of helminths and arthropods.
6. Permanent mount of wings, mouth parts and developmental stages of mosquito and house fly.
7. Permanent preparation of ticks/ mites, abdominal gills of aquatic insects, *viz. Chironomus* larva, dragonfly and mayfly nymphs, preparation of antenna of housefly.
8. Collection and identification of pests.
9. Life history of silkworm, honeybee and lac insect.
10. Different types of important edible fishes of India.
11. Prepared slides of plant nematodes.
12. Demonstration of counting of cells (blood and protozoan) by haemocytometer, haemoglobinometer, pH meter, Colorimeter
13. Microbiological Techniques: Media Preparation and sterilization, inoculation and Examination.
14. Staining of bacteria.
15. Study of an aquatic ecosystem, its biotic components and food chain.
16. Preparation of chromosomes, Test for carbohydrate Photochemical demonstration of proteins and lipids, using hand sections. Endocrine glands (Neurosecretory cells) of cockroach.
17. Demonstration of developmental stages of chick.
18. Project Report/ model chart making.
19. Dissection:
    Cockroach: Central nervous system
    Wallago: Afferent and efferent branchial vessels, Cranial nerves, Weberian ossicles.
20. Practical exercises based on Biostatistics, Microbiology, Immunology, Biotechnology, Animal Behavior, Pollution & Toxicology.

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Semester VI

Paper 1- Molecular Biology and Immunology

Unit I

Chromatin organization and DNA replication
Genome structure, chromatin, and the nucleosome.
DNA replication: Initiation and proteins in DNA replication.
Structure and versatility of RNA.

Unit II

DNA processing and gene regulation
Fine structure of gene
RNA synthesisand Processing Protein Synthesis and Processing
Regulation of gene expression in prokaryotes (Operon Concept)and eukaryotes

Unit III

Basic Immunology
Concepts of immunity
Types of immunity
Structure and functions of different classes of immunoglobulins
Antigen and Antibodies and their interactions

Unit IV

Immunological Mechanisms and Applications
Major Histocompatibility Complex
Cytokines: Properties and functions
Vaccines of different diseases and immunological reactions
Hybridoma technology, Monoclonal antibodies

PAPER 2- Bioinstrumentation, Biotechnology, Bioinformatics and Biostatistics

Unit I

Bioinstrumentation

Principles and uses of instruments: pH Meter, Colorimeter, Spectrophotometer and Centrifuge.

Microscopy (light, transmission and scanning electron microscopy),

Introduction to Chromatography and Electrophoresis

Unit II

Biotechnology

Genetic Engineering (concept and recombinant DNA technology) and its application in agriculture, medicine and energy production. Biotechnology of food-processing, pharmaceuticals (e.g. use of microbes in insulin production) and fermentation.

Unit III

Bioinformatics

Concept of homepages and websites, World Wide Web, URLs, Search engines. Databases: Nucleic acids, Protein sequences and structures, Genomes, Literature. Data Retrieval databases: Entrez system, SRS.

Unit IV

Biostatistics

Sampling, Measures of central tendency (mean, median and Mode) and dispersion (variance, standard deviation and standard error); Correlation and Regression

Paper 3- Environmental Biology, Wildlife and Toxicology

Unit I

Ecosystem structure and function

Ecosystem: concept, components and funadamental operations (energy flow, energy transformation, nutrient cycling)

Trophic levels, Food chain and food web

Population: Characteristics, dynamics and regulation

r- and k-strategies

Unit II

Ecological Processes and Adaptations

Ecological succession

Ecological niche

Adaptations (aquatic, volant, arboreal, cursorial, fossorial and desert)

Animal Distribution and Zoogeographical Realms

Unit III

Wildlife and Its Conservation

IUCN Categories; Basis of Categorization

Wildlife conservation and Biodiversity acts

In situ conservation: Sacred groves, Reserve Forests, Wildlife Corridors, Heritage sites, National Parks, Sanctuaries, Biodiversity Parks and Biosphere reserves (special emphasis on Dudhwa National Park, Kukrail Gharial Breeding Centre, Katarniaghat Wildlife Sanctuary, Bakhira Bird Sanctuary, Pilibhit Tiger Reserve)

Ex situ conservation

Unit IV

Pollution and Toxicology

Concept, sources, types (air, water, soil, noise & radiation), and control of environmental pollution.

Environmental Problems (Acid rain, ozone depletion, global warming) and Priorities, Environmental Ethics

Exposure of toxicants (routes of exposure, and duration and frequency of exposure): dose-response relationship, toxic effects and antidotal therapy.