B. Sc. Part - I
Semester - I
Zoology
Paper - I: Animal Diversity-I
Lower Non-Chordata

(A) General Characters and classification of all Phyla up to orders

(B) Structural & functional organization of the given type study under each phylum

Unit-I: Protozoa:

Paramecium and Euglena, Protozoa & Human Diseases

Unit-II: Porifera:

Sycon

Unit-III: Coelenterate:

Obelia, Corals and Coral reef (in brief)

Unit-IV: Plathyhelminthes:

Tapeworm, Helminth Parasites and human diseases

B. Sc. Part - I
Semester - I
Zoology
Paper - II: Cell Biology-I

Unit-I:

1. Microscopic techniques for study of cells - Light microscope and phase contrast microscope.
2. Structure of prokaryotic and eukaryotic cells, diversity of cell size and shape

Unit-II:

Cellular organelles - elementary knowledge of structure and functions of plasma membrane, endoplasmic reticulum, Golgi complex and Lysosome

Unit-III:

Cellular energy transaction - structure & function of mitochondria

Unit-IV:

A brief account of cytoskeleton: Structure & function of:

1. Microtubule
2. Microfilament
3. Intermediate filament

B. Sc. Part - I
Semester - I
Zoology
Paper - III: Genestics-I

Unit-I:

1. Mendel's Laws of Heredity
2. Co-dominance and incomplete dominance

Unit-II:

Varieties of gene expression - multiple allele, (coat colour of rabbit & Blood group) lethal genes & pleiotropic genes

Unit-III:

Gene interaction - Dominant, recessive, complementary, supplementary, cumulative, duplicate dominant & recessive epistasis

Unit-IV:

1. Linkage and Crossing-over
2. Sex linked inheritance

B. Sc. Part - I

Semester - II

Zoology

Paper - I: Animal Diversity-II

Higher Non-Chordata

(A) General Characters and classification of all Phyla up to orders

(B) Structural & functional organization of the given type study under each phylum

Unit-I:

1. **Annelida :**
   Nereis
2. **Onychophora :**
   External features & Affinities

Unit-II:

Arthropoda :

Prawn

Brief account of beneficial insects - Honey bee & silk work

Unit-III:

Mollusca:

Pila

Unit-IV:

1. **Echinodermata:**
   Sea-star (external features and water vascular system)
2. **Hemichordata:**
   Balanoglossus (external features and affinities)

B. Sc. Part - I
Semester - II
Zoology
Paper - II: Cell Biology-II

Unit-I :

Organization of interphase Chromatin and metaphase chromosome

Unit-II:

An elementary ideas of Cell cycle:

Cell division - mitosis & meiosis

Unit-III:

Nucleolus:

Biogenesis of ribosome

Unit-IV:

An elementary idea of Cell transformation:

Cancer: Sarcoma, adenoma, carcinoma and oncogenes

B. Sc. Part - I
Semester - II
Zoology
Paper - III: Genetics-II & Evolution

Unit-I:

Sex determination

Unit-II:

Cytoplasmic inheritance (Kappa particles & Shell Coiling)

Unit-III:

Mutation: Molecular basis of mutation, structural & numerical alterations of chromosomes

Unit-IV:

1. Origin of Life
2. Theories of organic evolution
3. Evidences of organic evolution

B. Sc. Part - II
Semester - III
Zoology
Paper - I: Animal Diversity-III
Chordata-I: Protochordata, Agnatha & Pisces

Unit-I:

1. General characters & classification of chordata upto classes only
2. Protochordata (Urochordata & cephalo-chordata) : Classification up to orders

Unit-II:

1. Urochordata : Herdmania : Structural organization & Post-embryonic development
2. Cephalochordata : Branchiostoma-External features only

Unit-III:

1. Agnatha : Classification upto orders
2. Cyclostomata : Petromyzon : External features only.

Unit-IV:

1. Pisces : classification up to orders
2. Scoliodon : Structural & functional morphology

B. Sc. Part - II

Semester - III

Zoology

Paper - II: Reproductive Biology

Unit-I

Mammalian reproductive cycle: Oestrous cycle and Menstrual cycle

Unit-II

Gametogenesis

1. Spermatogenesis
2. Oogenesis

Unit-III

1. Type of egg
2. Structure of Hen's egg
3. Structure of Human Sperm

Unit-IV

Fertilization

1. Sperm & egg interaction
2. Biochemical event
3. Post Fertilization event

B. Sc. Part - II
Semester - III
Zoology
Paper - III: Mammalian Physiology-I

Unit-I

Glycolysis: Aerobic and Anaerobic

Unit-II

1. Kreb's Cycle
2. Electron transport chain

Unit-III

Digestion and absorption of Carbohydrate, Protein & Lipid

Unit-IV

Circulation:

1. Blood- Composition & function of blood, blood groups & blood coagulation
2. Structure of heart, origin and conduction of heart beat, cardiac cycle & its regulation

B. Sc. Part - II
Semester - IV
Zoology
Paper - I: Animal Diversity-IV
Paper-II: Amphibia to Mammalia

Unit-I

Amphibia - Classification up to orders

Parental care and neoteny

Unit-II

Reptilia: Classification up to orders

Uromastix: Structural & Functional morphology

Unit-III

Aves: Classification up to orders

Aerial adaptations

Columba: Structural & functional morphology

Unit-IV

Mammalia: General Characters and classification up to orders

Affinities of Prototheria, metatheria & eutheria

B. Sc. Part - II
Semester - IV
Zoology
Paper-II: Development Biology

Unit-I

1. Cleavage

   1.1 Types

   1.2 Pattern

2. Blastula

Unit-II

1. Fate maps (Frog & Chick)
2. Gastrulation (Frog & Chick)

Unit-III

1. Extra embryonic membranes (Chick)
2. Placentation in mammal

Unit-IV

Organogenesis

1.1 Development of central nervous system

1.2 Development of eye

B. Sc. Part - II
Semester - IV
Zoology
Paper-III: Mammalian Physiology-II

Unit-I

Respiration:

1. Mechanism and control of breathing
2. Gaseous exchange
3. Structure of haemoglobin
4. Transport of O_2 & CO_2

Unit-II

Excretion:

1. Urea cycle
2. Structure of nephron
3. Mechanism of urine formation
4. Counter - current mechanism

Unit-III

Nervous system:

1. Types and structure of neuron
2. Nerve conduction : Resting membrane Potential, Action potential, Axonal conduction, Saltatory conduction & Synaptic transmission

Unit-IV

Muscie:

1. Different types
2. Structure and mechanism of contraction (Sliding filament theory) of skeletal muscle.

B. Sc. Part - II
Semester - V
Zoology
Paper-II
Immunology & Molecular Biology of Prokaryotes

Unit-I

1. Immunity:

    1.1 An over view of Innate and adaptive immunity.

    1.2 Cells and organs of immune system

2. Antigen

3. Antibody:

    3.1 Unit Structure of antibody

    3.2 Classes of antibodies

Unit-II

1. Humoral immune response - basic details
2. Concept of Immunotolerance, autoimmunity
3. Vaccines

Unit-III

1. DNA replication - general principles, related enzymes
2. DNA repair
3. Transcription - Basic details

Unit-IV

1. Protein biosynthesis - Basic details
2. Regulation of gene expression - lac & tryptophan operon mode

B. Sc. Part - II
Semester - IV
Zoology
Biotechnology

Unit-I

1. Basic concept of biotechnology, genetic engineering & their application,
2. Restriction enzyme, DNA ligase.

Unit-II

1. Cloning vehicles: Plasmids, Cosmids, Lambda phage (lytic & lysogenic cycle), Shuttle vectors.

Unit-III

1. Recombinant DNA technology
2. C-DNA synthesis

Unit-IV

1. Genetically engineered microbes (GEM) for recombinant pharmaceuticals (Insulin and Growth hormones)
2. Brief account of production of transgenic animals Technology.

B. Sc. Part - III

Semester - V

Zoology

Paper-IV: Applied Zoology-I

Brief account of life history, mode of infection, pathogenicity Prophylaxis & treatment of the following-

Unit-I:

Protozoan: (i) Trypanosoma & (ii) Plasmodium

Unit-II:

Helminths: (iii) Schistosoma & (iv) Wuchereria

Unit-III:

Damage caused, prevention and control of the following important phytoparasites, nematodes

1. Heterodera
2. Meloidogyne

Unit-IV:

Damage caused prevention and centred of the following insect pests:

1. Pyrilla
2. Leptocorisa
3. Tribolium

B. Sc. Part - III

Semester - VI

Zoology

Paper-I: Environmental Biology-II

Unit-I

Environmental Pollution:

1. Kinds of Pollution
2. Water Pollution (Source, effects and control)
3. Solid Waste Pollution
4. Sewage treatment plant

Unit-II

1. Air Pollution (Source, effects and control, Acid reain, Green house effect)
2. Noise Pollution (Source, effects and control)
3. Radioactive Pollution (Source, effect and control)

Unit-III

1. Natural Resources and their conservation
2. Wild life Management in India

Unit-IV

1. Environmental challenges in India and efforts to meet the challenges
2. Environmental education Programmes
3. Environmental Organisation and Agencies.

B. Sc. Part - II
Semester - VI
Zoology
Paper-III: Endocrinology

Unit-I

Classification of hormones and their mechanism of action (Peptide and steroid hormones)

Unit-II

Brief account of hypothalamo-hypophysial complex.

Unit-III

Structure and functions of following endocrine glands & regulation of their hormone action:

(1) Thyroid
(2) Parathyroid
(3) Pancreas

Unit-IV

1. Adrenal
2. Testis
3. Ovary

B. Sc. Part - III

Semester - VI

Zoology

Paper-IV: Applied Zoology-II

Brief accounts of

Unit-I

1. Apiculture
2. Sericulture

Unit-II

1. Lac Culture
2. Pearl Culture

Unit-III

Pisciculture:

1. Rearing of fishes
2. Induced breeding
3. Methods of fishing
4. Preservation of fishes
5. By- Products of fish

Unit-IV

Prawn Culture:

1. Culture of fresh water prawn
2. Culture of marine prawn
3. Methods of prawn fishing
4. Preservation & Processing of prawn