**Lesson Plan**

Academic Session- **2023-24** Subject- **Zoology**

Class - **B. Sc. – 1st Semester** Assistant Professor : Dr. Pradeep Kumar

| **August 2023** | |
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|  | General characters and classification of Protozoa up to order level; Biodiversity and economic importance of Protozoa.  Type study of *Plasmodium, Entamoeba, Leishmania* and *Giardia :* Life history, mode of infection and pathogenicity  General characters and classification of Porifera up to order level; Biodiversity and economic importance of Porifera |
| **September 2023** | |
|  | Type study of *Sycon : Habit, Habitat, Distribution, Different body parts with their functions;* Different types of Canal systems and Spicules in sponges.  General characters and classification of Coelenterata up to order level; Biodiversity and economic importance of Coelenterata.  Type Study – *Obelia,* Corals and coral reefs, Polymorphism in Siphonophores.  General characters and classification of Helminths  up to order level; Biodiversity and economic importance of Helminths.  Type study - *Fasciola hepatica;* Helminths parasites: Brief account of life history, mode of infection and pathogenesity of  Schistosoma*, Ancylostoma, Trichinella, Wuchereria* and *Oxyuris.* |
|  | **October 2023** |
|  | Ultrastructure of different cell organelles of animal cell; Plasma Membrane: Fluid mosaic model, various modes of transport across the membrane, mechanism of active and passive transport, endocytosis and exocytosis.  Endoplasmic reticulum (ER): types, role of ER in protein synthesis and transportation in animal cell.  Goigi complex: Structure, Associated enzymes and role of Golgi-complex in animal cell. Ribosomes: Types, biogenesis and role in protein synthesis; Lysosomes: Structure, enzyme and their role; polymorphism.  Cytoskeleton: Microtubules, microfilaments, centriole and basal body, Cilia and Flagella. |
|  | **November 2023** |
|  | Ultrastructure and functions of Nucleus: Nuclear· membrane, nuclear lamina, nucleolus, fine structure of chromosomes, nucleosome concept and role of histones.  Euchromatin and heterochromatin, lampbrush chromosomes and polytene chromosomes.  Mitosis and Meiosis (Cell reproduction). Brief account of causes of cancer. An elementary idea of cellular basis of Immunity.  Revision |

**Lesson Plan**

Academic Session- **2023-24** Subject- **Zoology**

Class - **B. Sc. - 3rd Semester**

Assistant Professor : Dr. Pradeep Kumar

| **August 2023** | |
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|  | Principles of classification; Origin and Evolutionary tree of Chordates; Role of amnion in evolution; Salient features of chordates.  General characters and classification of phyla upto orders with examples. Functional morphology of the types with examples emphasizing Chordate biodiversity, Chordate’s economic importance and conservation measures where required. |
| **September 2023** | |
|  | Protochordates : Systematic position, distribution, ecology, morphology and affinities. General characters and classification of phyla upto orders with examples emphasizing their biodiversity, economic importance and conservation measures where required.  Urochordata: *Herdmania* – type study  Cephalochordata; *Amphioxus –* type study.  Cyclostomes: Classification and ecological significance  Type study of *Petromyzon.*  Cyclostomes: General characters and classification of all phyla upto orders with examples emphasizing their biodiversity, economic importance and conservation measures where required. |
| **October 2023** | |
|  | Pisces:Scales & Fins, Parental care in fishes, fish migration.  Types study of Labeo. Introduction, Classification, Structure, function and general properties of carbohydrates and lipids. Introduction, Classification, Structure, function and general properties of proteins; Nomenclature, Classification and mechanisms of enzyme action. Transport through biomembranes (Active and Passive), buffers. |
| **November 2023** | |
|  | Nutrition:Nutritional components; Carbohydrates, fats, lipids, Vitamins and Minerals, Types of nutrition & feeding, Digestion of dietary constituents, viz. lipids, proteins, carbohydrates & nucleic acids; symbiotic digestion. Absorption of nutrients & assimilation; control of enzyme secretion.  **PAPER I :** Unit test – 1, Unit test – 2, Unit test – 3, Unit test – 4  **PAPER II :** Unit test – 1, Unit test – 2, Unit test – 3, Unit test – 4  Revision |

**Lesson Plan**

Academic Session- **2023-24** Subject- **Zoology**

Class - **B. Sc. - 5th Semester**

Assistant Professor : Dr. Pradeep Kumar

| **August 2023** | |
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|  | Introduction to world fisheries: Production, utilization and demand. Fresh Water fishes of India: River system, reservoir, pond, tank fisheries. Captive and culture fisheries, cold water fisheries. Fishing crafts and gears.  Fin fishes, Crustaceans, Molluscs and their culture. Seed production: Natural seed resources – its assessment, collection, Hatchery production. |
|  | **September 2023** |
|  | Nutrition: Sources of food (Natural, Artificial) and feed composition (Calorie and Chemical ingredients). Field Culture: Ponds-running water, recycled water, cage, culture; poly culture.  Culture technology: Biotechnology, gene manipulation and cryopreservation of gametes. |
| **October 2023** | |
|  | Basic concepts of ecology: Definition, significance. Concepts of habitat and ecological niche. Factors affecting environment: Abiotic factors (light-intensity, quality and duration), temperature, humidity, topography; edaphic factors; biotic factors.  Ecosystem: Concept, components, properties and functions; |
| **November 2023** | |
|  | Ecological energetics and energy flow-food chain, food web, trophic structure; ecological pyramids concept of productivity. Biogeochemical cycles: Concept, reservoir pool, gaseous cycles and sedimentary cycles. Population: Growth and regulation. Concept and evidences of organic evolution. Theories of organic evolution.  **PAPER I :** Unit test – 1, Unit test – 2, Unit test – 3, Unit test – 4  **PAPER II :** Unit test – 1, Unit test – 2, Unit test – 3, Unit test – 4  Revision |

**Lesson Plan**

Academic Session- **2023-24** Subject- **Zoology**

Class - **B. Sc. – 2nd Semester** Assistant Professor : Dr. Pradeep Kumar

**Paper – 1; Life and diversity of Annelida to Hemichordata**

| **January 2023** | |
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|  | **UNIT – I : Phylum - Annelida:**  i) General characters and classification up to order level, ii) Biodiversity and economic importance of Annelida, iii) Type study - *Pheretima* (Earthworm)  iv) Metamerism in Annelida v) Trochophore larva:. Affinities, evolutionary significance  **UNIT-II; Phylum - Arthropoda:**  i) General characters and classification up to order level, ii) Biodiversity and economic importance of insects, iii) Type study – *Periplaneta* |
| **February 2023** | |
|  | **UNIT III; Phylum - Mollusca:**  i) General characters and classification up to order level; ii) Biodiversity and economic importance; iii) Type study – *Pila;* iv) Torsion and detorsion in gastropoda; v) Respiration and foot  **UNIT-IV; Phylum - Echinodermata:**  i) General characters and classification up to order level; ii) Biodiversity and economic importance; iii) Type Study *-Asterias* (Sea Star); iv) Echinoderm larvae  v) Aristotle's Lantern  **Phylum – Hemichordata**: Type study: *Balanoglossus* |
| **March 2023**  **Paper – 2; Genetics** | |
|  | **UNIT-I**  1. Elements of Heredity and variations. 2. The varieties of gene interactions  3. Linkage and recombination: Coupling and repulsion hypothesis, crossing-over and Chiasma formation; gene mapping.  **UNIT-II**  1. Sex determination and its mechanism: male and female heterozygous systems, genetic balance system; role of Y -chromosome, male haploidy, cytoplasmic and environmental factors, role of hormones in sex determination.  2. Sex linked inheritance: Haemophilia and colour blindness in man, eye colour in *Drosophila*, Nondisjunction of sex-chromosome in *Drosophila*; Sex-linked and sex influenced inheritance.  3. Extra chromosomal and cytoplasmic inheritance: i) Kappa particles in Paramecium.  ii) Shell coiling in snails. iii) Milk factor in mice.  **UNIT-III**  1. Multiple allelism: Eye colour in Drosophila; A, B, 0 blood group in man.  2. Human genetics: Human karyotype, Chromosomal abnormalities involving autosomes and sex chromosomes, monozygotic and dizygotic twins. 3. Inborn errors of metabolism (Alcaptonuria, Phenylketonuria, Albinism, sickle-cell anaemia). |
| **April 2023** | |
|  | **UNIT-IV**  1. Nature and function of genetic material; Structure and type of nucleic acids; Protein synthesis. spontaneous and induced (chemical and radiations) mutations; gene mutations; chemical basis of mutations; transition, transversion, structural chromosomal aberrations (deletion, duplication, inversion and translocation); Numerical aberrations (autoploidy, euploidy and polyploidy in animals)  **2.** Applied genetics**:** Eugenics, euthenics and euphenics; genetic counseling, pre-natal diagnostics, DNA-finger printing, transgenic animals.  Revision |

**Lesson Plan**

Academic Session- **2023-24** Subject- **Zoology** Class - **B. Sc. - 4th Semester**

Assistant Professor : Dr. Pradeep Kumar

**Paper – 1; LIFE AND DIVERSITY OF CHORDATES – II**

**Paper II ; MAMMALIAN PHYSIOLOGY – II**

| **January 2023** | |
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|  | **UNIT-I**  **Amphibia:** Origin, Evolutionary tree. Type study of frog (*Rana tigrina*), Parental Care in Amphibia  **UNIT-II**  **Reptilia:** Type study of Lizard (Hemidactylus), Origin, Evolutionary tree. Extinct reptiles; Poisonous and non-poisonous snakes; Poison apparatus in snakes. |
| **February 2023** | |
|  | **UNIT-III**  **Aves:** Type study of Pigeon (*Columba livia*); Flight adaptation, Principles of aerodynamics in Bird flight, migration in birds.  **UNIT-IV**  **Mammals:** Classification, type study of Rat; Adaptive radiations of mammals and dentition. |
| **March 2023** | |
|  | **UNIT-I**  **Circulation:** Origin, conduction and regulation of heart beat, cardiac cycle, electrocardiogram, cardiac output, fluid pressure and flow pressure in closed and open circulatory system; Composition and functions of blood & lymph; Mechanism of coagulation of blood, coagulation factors; anticoagulants, haempoiesis  **UNIT-II**  **Respiration:** Exchange of respiratory gases, transport of gases, lung air volumes, oxygen dissociation curve of hemoglobin, Bohr’s effect, Hmburger’s phenomenon (Chloride shift), control / regulation of respiration.  **Excretion:** Patterns of excretory products viz. Amonotelic, ureotlic uricotelic, ornithine cycle (Kreb’s– Henseleit cycle) for urea formation in liver. |
| **April 2023** | |
|  | **UNIT-III**  **Excretion:** Urine formation, counter-current mechanism of urine concentration, osmoregulation, micturition.  **Neural Integration:** Nature, origin and propagation of nerve impulse along with medullated & non-medullated nerve fibre, conduction of nerve impulse across synapse.  **UNIT-IV**  **Chemical integration of Endocrinology:** Structure and mechanism of hormone action; physiology of hypothalamus, pituitary, thyroid, parathyroid, adrenal, pancreas and gonads.  **Reproduction:** Spermatogenesis, Capacitation of spermatozoa, ovulation, formation of corpus luteum, oestrous-anoestrous cycle, Menstrual cycle in human; fertilization, implantation and gestation.  Revision |

**Lesson Plan**

Academic Session - **2023-24** Subject- **Zoology**

Class - **B. Sc. - 6th Semester** Assistant Professor : Dr. Pradeep Kumar

**Paper – 1; ENTOMOLOGY Paper – 2 Developmental Biology**

| **January 2023** | |
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|  | **UNIT I,** Study of important insect pests of crops and vegetables:  **1. Sugarcane:**  (a) Sugarcane leaf-hopper (*Pyrilla perpusilla),* (b) Sugarcane Whitefly (*Aleurolobus barodensis),* (c) Sugarcane top borer (*Sciropophaga nivella),* (d) Sugarcane root borer (*Emmalocera depresella),* (e) Gurdaspur borer *(Bissetia steniellus),* With their systematic position, habits and nature of damage caused. Life cycle and control of *Pyrilla perpusilla*  **2**. **Cotton:** (a) Pink bollworm *(Pestinophora gossypfolla),* (b) Red cotton bug *(Dysdercus Cingulatus),* (c) Cotton grey weevil *(Myllocerus undecimpustulatus),* (d) Cotton Jassid *(Amrasca devastans),* With their systematic position, habits and nature of damage caused. Life cycle and control of *Pectinophore gossypiella.*  **UNIT II**  **3**. **Wheat:** Wheat stem borer (*Sesamia inferens*) with its systematics position, habits, nature of damage caused. Life cycle and control.  **4**. **Paddy:** (a) Gundhi bug *(Leptocorisa acuta),* (b) Rice grasshopper *(Hieroglyphus banian)*  (c) Rice stem borer *(Scirpophaga incertullus),* (d) Rice Hispa *(Diceladispa armigera)*  With their systematic position, habits and nature of damage caused. Life cycle and control of *Loptocorisa acuta.* |
| **February 2023** | |
|  | **Unit III**  **5**. **Vegetables :** (a) *Raphidopalpa faveicollis* – The Red pumpkin beetle. (b) *Dacus cucurbitas* – The pumpkin fruit fly. (c) *Tetranychus tecarius* – The vegetable mite.  (d) *Epilachna* – The Hadda beetle. Their systematics position, habits and nature of damage caused. Life cycle and control of *Aulacophora faveicollis.*  **6**. **Stored grains:** (a) Pulse beetle (*Callosobruchus maculatus),* (b) Rice weevil (*Sitophilus oryzae),* (c) Wheat weevil (*Trogoderma granarium),* (d) Rust Red Flour beetles (*Tribolium castaneum),* (e) Lesser grain borer *(Rhizopertha dominica),* (f) Grain & Flour moth *(Sitotroga cerealella),* Their systematic position, habits and nature of damage caused. Life cycle and control of *Trogoderma granarium.*  **Unit IV**  6. **Insect control:** Biological control, its history, requirement and precautions and feasibility of biological agents for control.  7. **Chemical control:** History, Categories of pesticides. Important pesticides from each category to pests against which they can be used. Insect repellants and attractants.  8. Integrated pest management.  9. Important bird and rodent pests of agriculture & their management. |
| **March 2023** | |
|  | **Unit I :** 1. Historical perspectives, aims and scope of developmental biology.  2. Generalized structure of mammalian ovum & sperm. Spermatogenesis and Oogenesis.  **Unit II :** 1. Fertilization, parthenogenesis, different types of eggs and patterns of cleavage in invertebrates and vertebrates. 2. Process of blastulation in invertebrates and vertebrates, 3. Fate-map construction in frog and chick. |
| **April 2023** | |
|  | **Unit III :** 1. Gastrulation in invertebrates and vertebrates, 2. Gastrulation & formation of three germinal layers in frog and chick. 2. Elementary knowledge of primary organizers.  **Unit IV :** 1. Extra embryonic membranes: structure & significance in birds and mammals.  2. Concepts of competence, determination and differentiation.  3. Concept of regeneration.  Revision |