COURSE OUTCOMES B.SC., ZOOLOGY (Hons.):

Core subjects:

CC1: Non Chordates-1 (SEM I)

- Came to know the basic concept of biosystematics and procedure in taxonomy. Identified the taxonomic status of the entire non-chordates up to annelids and discuss the evolutionary model of the group.
- Described the general characters and classification of non-chordates (from protozoa to nematode)
- Know about some of the important and common protozoan, helminthes of parasitic nature causing diseases in human beings.
- Understood some special features like polymorphism Cnidaria, conjugation in *Paramoecium*, parasitic adaptation in helminthes
- Know about the staining technique and slide preparation of protozoan animals and identification of few selective animals from all groups.

CC2: Molecular Biology (SEM I)

- Understood the molecular structure of genetic materials and understood the mechanism of gene expression and regulation character formation.
- Know about DNA repair mechanism
- Theoretical knowledge about some molecular biology techniques like PCR, Western blot etc
- Hans on training on DNA isolation, gel electrophoresis technique and DNA/RNA staining methodologies

CC3 Non Chordates-2 (SEM II)

- Described the general characters and classification of non-chordates (from protozoa to nematode)
- Understood some special features like metamerism in annelids, Metamorphosis in insects, etc.
- Identified a few selective animals from all groups,
- Anatomical study of different systems by dissecting cockroaches.

CC4 Cell Biology (SEM II)

- Acquired knowledge of Ultra-structure, composition and function of different cell organelles
- Understood the mechanism of cell division and cell signaling
- Understood the properties and treatment of cancer cells
- Prepared temporary squash of cell division from onion root tip and grasshopper testis.
- Prepared and demonstrated of Barr body from human female blood cell
- Prepared permanent slide to demonstrate DNA by Feulgen reaction and viable cell by trypan blue stain.

CC5: Chordate (SEM III)

- Described the general characters and classification of chordates
- Impart knowledge in comparative anatomy and development systems of chordates.
- Became able to discuss some and very important phenomena in Chordates.
- Identified the taxonomic status of the entire chordates

CC6: Animal physiology (SEM III)

- Attained knowledge about composition and function of certain systems like bone and cartilage, nervous system, muscular system, reproductive system and endocrine system.
- Learnt about structure, classification and function of different tissue in our body
- Prepared permanent slide of different tissue with Microtomy machine
- Prepared temporary mount of tissues like squamous epithelium, striated muscle and nerve cells

CC7: Biochemistry (SEM III)

- Comprehended the energy source, chemical bonds and the principles of thermodynamic understood the importance of acid base balance
- Attained the knowledge of macromolecules such as carbohydrates, protein and fat, their types and significance. Understood the knowledge of cholesterol and its biological significance
- Described the enzymes, mechanism of enzyme action and factors affecting the enzyme activity
- Understood central metabolic pathway
- Analyzed qualitatively carbohydrates, proteins and lipids and quantitatively proteins by Lowry method.
- Described the principle and applications of paper chromatography

CC8: Comparative anatomy of vertebrates (SEM IV)

- Attained knowledge about overview, composition and function and comparative account of certain systems like integumentary system, digestive system, respiratory system, circulatory system, urino-genital system, nervous system and skeletal system
- Done comparative study with disarticulated skeleton of toad, pigeon and guinea pig
- Done comparative study of heart and brain with model or picture.
- Done comparative study of different types of scale of fish by model/photograph

CC9: Animal physiology (SEM IV)

- Attained knowledge about composition and function of certain systems like digestive system, respiratory system, circulatory system and renal system.
- Understood the physiology of heart, thermoregulation and osmoregulation.
- Demonstrated blood group, blood pressure of human and estimated haemoglobin in blood using haemoglobinometer.
- Identified types of blood cells from human blood smear and haemolymph of cockroach.
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CC10: Immunology (SEM IV)

- Attained knowledge about concept of health diseases, anatomical barriers, innate and adaptive immunity
- Described structure and function of different important molecules like antigens,immunoglobulins,MHC molecules, cytokines and components of complement systems.
- Conceptualized the components and function of hypersensitivity as well as principle of vaccination
- Demonstrated different lymphoid organs by picture/slide.
- Described ELISA technique

CC11: Ecology (SEM V)

- Understood and appreciated the environment and ecological services of life on earth. Understood the abiotic factors of environment and biogeochemical cycle and intraspecific relationships of animals.
- Acquired knowledge of ecosystem, food chain, energy flow and productivity and Imparted knowledge of habitat ecology,
- Understood concepts of population and community characteristics as well as different diversity indices.
- Acquired knowledge of conservation, its strategies and wild-life protection act.

- Demonstrated population density from the community, and studied zooplankton and phytoplankton.
- Determine CO2, O2, pH and salinity from aquatic ecosystems.
- Submitted project on biodiversity after visiting any place of ecological importance.

CC12: Principle of Genetics (SEM V)

- Understood the theories of classical genetics and blood group inheritance in man. Described the genetic variation through linkage and crossing over, chromosomal aberrations and sex determination.
- Understood different types of mutations, the genetic defects
- Understood the molecular structure of genetic materials, transposable elements.
- Identified chromosomal aberrations through photographs, analyzed inherited traits through pedigree charts and demonstrated chi-square test.

CC13: Developmental Biology (SEM VI)

- Understood the process of development of animals.
- Understood the process of organogenesis of selected organs, development of extra embryonic membrane and the nature and physiology of placenta, concept of molecular induction.
- Conceptualized idea of In-Vitro fertilization, stem cell therapy in bone marrow transplantation and cartilage regeneration.
- Identified different invertebrate larvae through slides.

CC14: Evolutionary Biology (SEM VI)

- Understood the theories of evolution and highlighted the role of evidences in support of evolution
- Acquired knowledge of species, different isolating mechanisms, population genetics and extinction
- Understood origin and evolution of man
- Known phylogenetic tree concept and construction using parsimony convergent and divergent evolution.
- Studied fossils from models/pictures and homology and analogy from suitable specimens.

Discipline Specific Elective subjects:

DSE A1: Parasitology (SEM V)

- Acquired knowledge on an overview of parasitism
- Known morphology, life cycle, epidemiology, pathogenicity, diagnosis and treatment of certain protozoan, helminthes, nematodes, arthropod and vertebrate parasites causing direct or indirect harm to mankind.
- Identified different stages and adult parasites by slide/micro-photograph
- Prepared and submitted project on vertebrate parasites

DSE A2: Biology of insects (SEM V)

- Acquired knowledge on taxonomy, general morphology, physiology and societal structure of insects and their interaction with plants.
- Gather knowledge about different biological and mechanical vectors.
- Studied life cycle of mosquito and Mulberry moth and morphological feature of Honey bee and termite
- Mounted different body parts of insects.

DSE B1: Endocrinology (SEM V)

- Acquired knowledge on endocrine system, Hypothalamo-hypophysial system and structure and function of peripheral endocrine glands.
- Understood regulation of hormone action
- Known about some vertebrate hormones
- Demonstrated dissection of endocrine glands in laboratory bred rat
- Studied and prepared (by tissue fixation, microtomy and staining) permanent histological slides.

DSE B2: Reproductive Biology (SEM V)

- Acquired knowledge on reproductive endocrinology, and functional anatomy of male and female reproduction
- Known about infertility in male and female, its cause, diagnosis and management-assisted reproductive technologies like sperm bank, frozen embryo, IVF and IUI and modern contraceptive techniques.

DSE A1: Animal Cell Biotechnology (SEM VI)

- Understood concept, scope of Biotechnology and its application with special reference to health.
- Studied different techniques of Gene Manipulation, cell culture and fermentation
- Hands on training on certain techniques like genomic and plasmid DNA isolation,preparation of culture media, packing etc
- Demonstrated techniques like Western Blot, Southern Hybridization PCR etc

DSE A2: Animal Biotechnology (SEM VI)

- Studied different techniques of Gene Manipulation, and genetic diseases
- Acquired knowledge on certain molecular Biology techniques and cell culture as well as their application
- Understood concept of Dolly and Polly cloning, and gene therapy
- Hands on training on certain techniques like genomic and plasmid DNA isolation, preparation of culture media, packing etc
- Demonstrated techniques like Western Blot, Southern Hybridization PCR etc

DSE B1: Animal Behavior and Chronobiology (SEM VI)

- Came to know about patterns of behavior, social and sexual behavior, Chronobiology and Biological rhythm of animal
- Studied nesting behavior of birds and insects,
- Demonstrated geotaxis behavior of earthworm, response of woodlice to dry and humid condition and phototoxic behavior in insect larvae
- Prepared a project on circadian functions in humans and also a report on any behavior of an animal in a forest/Biodiversity park/Wildlife sanctuary/Zoological park.

DSE B2: Fish and fisheries (SEM VI)

- Came to know about feeding habits, reproduction, morphology, physiology of cultivable fishes.
- Learnt about different types of fisheries and aquaculture and also about transgenic and zebra fish with special reference to their research utility.
- Identified different types of fishes with specimens and air breathing organs.
- Assessed water quality (pH, salinity, Alkalinity)
- Prepared a project on a visit to a fish firm.

Skill Enhancement courses

SEC (A) 1 Apiculture (SEM III)

- Acquired knowledge on Biology, rearing and economy of honey bees and their diseases
- Learnt about entrepreneurship in apiculture

SEC (A) 2 Sericulture (SEM III)

- Acquired knowledge on Biology, rearing and economy of silkworm and their diseases
- Learnt about entrepreneurship in apiculture

SEC (B) 1 Aquarium fish Keeping (SEM IV)

- Learned about potential scope of aquarium fish industry and exotic and endemic species of aquarium fishes.
- Acquired knowledge on the common characters of aquarium fishes, their feeding habit, transportation and maintenance methods

SEC (B) 2 Medical Diagnostic Technique (SEM IV)

- Learnt about different methods used for analysis of blood and urine, and also certain biochemical and microbiological methods used for medical diagnosis.
- Acquired knowledge about some common non-infectious and infectious diseases
- Visited a pathological laboratory and submitted a report on that.

COURSE OUTCOMES B.SC., ZOOLOGY (General):

CC1: Animal diversity (Sem I)

- Described the general characters and classification of animal kingdom (from protozoa to mammal)
- Understood some special features of all phylum /classes.
- Know about some of the important and common protozoan, helminthes of parasitic nature causing diseases in human beings.

CC2: Comparative anatomy and Developmental Biology (Sem II)

- Attained knowledge about overview, composition and function and comparative account of certain systems like integumentary system, digestive system, respiratory system, circulatory system, urino-genital system.
- Known about stages and certain important features of early and late embryonic development.

CC3: Physiology and Biochemistry (Sem III)

- Attained knowledge about composition and function of certain systems like digestive system, respiratory system, cardiovascular, nervous and renal system.
- Attained the knowledge of macromolecules such as carbohydrates, protein and fat, their types and significance and metabolism.
- Described the enzymes, Classification and factors affecting the enzyme activity

CC4: Genetics and Evolutionary Biology: (SEM IV)

- Understood the theories of classical genetics and blood group inheritance in man. Described the genetic variation through linkage and crossing over, chromosomal aberrations and sex determination.
- Understood the theories of evolution, process of evolutionary changes and speciation.

Discipline Specific Elective subjects:

DSE A1: Applied Zoology (SEM V)

- Acquired knowledge on an overview of parasitism
- Known morphology, life cycle, and economic/medical importance of certain protozoan, helminthic, nematode, arthropod and vertebrate parasites causing direct or indirect harm to mankind.
- Gathered knowledge about some very important features of animal husbandry, poultry farming and fish technology.
- Visited to a poultry farm and submitted project report on it.

DSE A2: Aquatic Biology (SEM V)

- Demonstrated broad understanding about aquatic biome, different ecosystems i.e. fresh water, lake, etc.
- Management of aquatic resources
- Visited to an aquatic ecosystem and submitted project report on it.

DSE B1: Biology of insets (SEM VI)

- Acquired knowledge on taxonomy, general morphology, physiology and societal structure of insects and their feeding habits.
- Known about different insect vectors
- Submitted project report on insect vectors and disease transmitted by them

DSE B2: Ecology and wild life Biology (SEM VI)

- Acquired knowledge of ecosystem, food chain, energy flow and productivity and Imparted knowledge of habitat ecology.
- Understood concepts of population and community characteristics.
- Acquired knowledge of wild life conservation, its strategies and wild-life protection act.

Skill enhancement courses (SEC)

SEC A 1 Apiculture (SEM III)

- Acquired knowledge on Biology, rearing and economy of honey bees and their diseases

- Learnt about entrepreneurship in apiculture

SEC B 2 Aquarium fish keeping (SEM IV)

- Learned about potential scope of aquarium fish industry and exotic and endemic species of aquarium fishes.
- Acquired knowledge on the common characters of aquarium fishes, their feeding habit, transportation and maintenance methods

SEC A 3 Sericulture (SEM V)

- Acquired knowledge on Biology, rearing and economy of silkworm and their diseases
- Learnt about entrepreneurship in apiculture

SEC B 4 Medical Diagnosis (SEM VI)

- Learnt about different methods used for analysis of blood and urine, and also certain biochemical and microbiological methods used for medical diagnosis.
- Acquired knowledge about some common non-infectious and infectious diseases
- Visited a pathological laboratory and submitted a report on that.