Department of Zoology

S.K Women's College, Nambol, Manipur

Programme outcomes.

A graduate with Zoology, Botany and Chemistry Programme will be able to:

PO-1. Provide a comprehensive education in biology/chemistry that stresses scientific reasoning and problem solving in various discipline of biology.

PO-2. Ability to enter any job in the areas of chemistry and biology.

PO-3. Design and perform experiments as well as to analyze and interpret data.

PO-4. Solve various environmental related issues in the global arena.

PO-5. Become future researcher and intellectuals in the area of general biology.

Programme specific outcomes

PSO-1. Enhance the technical skills for experimental purposes.

PSO-2. Helps in understanding the behavior, structure and evolution of animals

PSO-3. Students will know about the animal diversity, principles of ecology, comparative anatomy and developmental biology of vertebrates, physiology and biochemistry, genetics and evolutionary biology, animal biotechnology, applied zoology, behavior, immunology, reproductive biology and insect, vectors and diseases.

PSO-4. Skill enhancement courses such as Apiculture, Aquarium fish keeping, sericulture etc. will increase the job creation and help in running the economy of the nation.

PSO-5. Instill ideas and to undertake research in any aspect of zoology in future.

Course outcome B.Sc.Zoology

SEMESTER I

ZOO-101: Principles of Classification, Zoogeography and Palaeozoology

After the completion of this course the students will be able to understand the following concept:

CO1. Knowledge of historical account of taxonomy and classification of animals.

CO2. Understand the concept of species.

CO3. Developed the knowledge of Taxonomy and systematics and also taxonomic hierarchy

CO4. Gain knowledge about the International code of Zoological Nomenclature

CO5. Understand the relationship of Chemistry and Taxonomy

CO6. Understood the relationship of Mathematics and Taxonomy

CO7. Well ideas of approaches in taxonomy with morphometric and cytological techniques.

CO8. Gain knowledge about the concepts of molecular techniques in taxonomy.

CO9. Will clear the concept of fossils and fossilization

CO10. Understood the type of fossils.

CO11. Knowledge about the trace fossils and living fossils

CO12. Understood the ideas about dating of fossils and significance of fossils.

CO13. Concept of geological time scale and their associated faunas.

CO14. Students will understand about different Zoogeographical regions of the world with characteristic fauna

SEMESTER II

ZOO-202: Functional Anatomy of Non-Chordata

After the completion of this course the students will be able to understand the following concept:

CO1. The students will improve knowledge about the invertebrate animals.

CO2. Gain knowledge about the characters and classification of protozoan even upto orders.

CO3. Knowledge about structure, physiology, life history and pathogenicity of particular species like *Entamoeba histolytica*, *Trypanasoma gambiense*, *Plasmodium vivax* and *Plasmodium falciparum,* etc.

CO4. Concepts of reproduction and nutrition in Euglena

CO5. Knowledge about origin, metamerism and symmetry of metazoa

CO6. Came to know the distinguishing characters and classification even upto orders of phylum Porifera.

CO7. Knowledge of different types of canal system and skeleton of Porifera

CO8. Concepts of economic importance of Sponges.

CO9. Gain in detail knowledge about structural organization and affinities of Coelenterata

CO10. Knowledge about structural organization in Trematoda and Cestoda of Platyhelminthes and also life cycle and mode of parasitic adaptation in *Fasciola hepatica* and *Taenia solenum*.

CO11. Understood the characters and classification upto order of the phylum Nemathelminthes.

CO12. Will know the different stages in the life cycle, pathogenicity and prophylaxis of *Ascaris lumbricoids*.

CO13. Knowledge about structure and examples of Nemertinea, Rotifera, Acanthocephala, Sipunculida, Echiurida, Bryozoa, Brachyopoda and Phoronida in minor phyla.

CO14. Students will know about the role of Annelids in nutrient cycling of the soil environment.

CO15. Students will understand about the metamorphosis and social life in insects.

SEMESTER-III

ZOO-303: Functional Anatomy of Chordata

After the completion of this course the students will be able to understand the following concept:

CO1. The students could be able to know about the functional anatomy of different vertebrate animals.

CO2. Gain knowledge about characters and classification upto order of primitive groups of protochordata.

CO3. Improved knowledge about the structural organization of Hemichordata, Urochordata and Cephalochordata.

CO4. Knowledge about the affinities of Amphioxus.

CO5. Understand the external features, digestive system and reproductive system of Petromyzon (Circular mouth fishes)

CO6. Knowledge of external feature, respiratory system, reproductive system, brain and cranial nerves of Scoliodon.

CO7. Gain the specific knowledge about air bladder, accessory respiratory organ of fishes.

CO8. Concepts on general characters and distribution of lung fishes (Dipnoi) in the world

CO9. Knowledge about the origin of birds, distinctive characters and classification upto order with examples of the class Aves.

CO10. Knowledge about feather, digestive, respiratory, circulatory, urinogenital and skeletal system of Pegion.

CO11. Obtained the knowledge about the distinctive characters of Ratitae and Carinatae.

CO12. Understand the characters of the fossil of Archaeopteryx.

CO13. Gained knowledge of perching mechanism of birds

CO14. Attained knowledge of the origin of mammals.

CO15. Understood the general characters and classification of Protheria, Metatheria and Eutheria

CO16. Gained knowledge on the skeletal, excretory and reproductive systems of Rabbit.

CO17. Gained the knowledge about the comparative studies

CO18. Differentiation of physiological systems among the different vertebrate animals like digestive, circulatory and nervous systems and also skeletal system

CO19. Understanding the knowledge of urino-genital system and endocrine glands.

CO20. Students will understand about the distinctive characters and classification of Amphibia and Reptilia

CO21.Significant economic value and ecological services of reptiles and amphibians.

SEMESTER-IV

ZOO-404: Biodiversity, Environmental Biology, Applied Zoology, Wildlife and Computer Application

After the course is completed, the students must be able to:

CO1: Understand the concept of biodiversity hotspots and different IUCN Redlist categories

CO2: Wildlife of India with particular reference to Manipur and different methods adopted in wildlife census.

CO3: Concept of wildlife conservation and biotechnological intervention.

CO4: Knowledge about the different Sanctuaries, National parks and Ramsar sites of India

CO5: Understand the concept of Ecosystem
CO6: Food chain, energy flow, ecological niche, biosphere and biomes of the world.

CO7: Different biological cycles of water, oxygen, carbon and nitrogen.

CO8: Knowledge about the environmental pollution. Causes, control and prevention of pollution.

CO9: Toxic effects of pesticides and industrial wastes and biomagnification.

CO10: Students will understand the ideas of Apiculture and Sericulture. Economic importance of some useful insects like Bees, Tasar worms and Mulberry silk worm.
CO11: Knowledge about the culture and capture of fishes. Commercial value of fishes.

CO12: Different Pisciculture techniques.

CO13: Understand the basic concept of computer and its operating systems.
CO14: Knowledge about the computer application in Biological sciences.

CO15: Elementary knowledge of Bioinformatics, E-learning, Networking and programmes used in Biostatistics like SPSS, Minitab, etc.

CO16: Different biotic and abiotic components of ecosystems of a pond.

CO17: Will understand how to record turbidity, temperature and pH of water.

CO18: Estimation of Oxygen and Carbon-dioxide of pond water.

CO19: Different methods adopted in the population study of animals.

CO20: Different life history stages of Honey bee, Silk moth and fish and morphological differences among the different castes of Honey bee.

CO21: Will know and understand about different animals available in Zoo/National Park/Wildlife Sanctuary etc.

SEMESTER-V-HONOURS ZOOLOGY

ZOO-505: Cell biology and Genetics

After the course is completed, the students must be able to:

CO1: Types of cells and intercellular interactions.
CO2: Extra-nuclear organization of cells and transport systems between the cells.

CO3: Students will be able to understand the structures and functions of different cytoplasmic organelles present inside a cell.

CO4: Nucleus and its different components

CO5: Knowledge about the chromosomes and its different functions.

CO6: Cell cycle and different types of cell division and regulations of cell division

CO7: DNA replications and molecular expressions of genes

CO8: Protein synthesis and its regulations

CO9: History of genetics and the importance of studying genetics to mankind

CO10: Gene interactions and different genetic diseases.

CO11: Genetics of blood groups

CO12: Chromosomal aberrations and diseases associated with single gene inheritance

CO13: Different molecular genetic tools used in genetic engineering

CO14: Knowledge and importance about the Human genome project

ZOO-506: Evolution, Ethology, Biotechnology and Bioinstrumentation

After the course is completed, the students must be able to:

CO1: Origin of life, history and evidences of evolution.

CO2: Role of mutation in evolution and evolution of man

CO3: Will gain knowledge about the basic concept of adaptation of animals to different habitat.

CO4: Different adaptational methods adopted by animals to protect themselves from prey.

CO5: Types of animal behaviour and learning in animals

CO6: Different types of communication in insects

CO7: Migration of insects, fishes and birds

CO8. Will understand the History, scope and importance of biotechnology

CO9. Knowledge about the importance of Viruses, bacteria and fungi in biotechnology

CO10. Will study the principles and techniques of animal cell culture

CO11. Students will clear the ideas of health care biotechnology and genetic engineering

CO12. Students will understand the principles and ideas of bioinstrumentation.

SEMESTER-VI-HONOURS ZOOLOGY

ZOO-608: Animal Physiology, Endocrinology and Immunology

After the course is completed, the students must be able to:

CO1. Develop understanding for the fundamental concept of physiology of nutritional requirements, digestion and absorption.

CO2. Develop understanding of structure of heart and blood vascular system.

CO3. Develop the fundamental concepts of physiology of respiration.

CO4. Understanding of fundamental concepts of excretion.

CO5. Familiarize students with physiology of nerves and sense organs.

CO6. Gain knowledge about the physiology of muscle.

CO7. Students gain knowledge about the concept of endocrine glands and role of neurosecretory cells in nervous functions.

CO8. Understand about the specific functions of different hormones which secreted from various endocrine glands.

CO9. Students gain fundamentals knowledge about the hyper and hypo secretion of hormones ofvarious endocrine glands with their effects.

CO10. Students came to know the importance of endocrine glands like pineal, hypothalamus, pituitary, thyroid, parathyroid and thymus etc.

CO11. Understand the concept of Islets of Langerhans, Testis and Ovary.

CO12. Attained knowledge about the particular hormones and their functions secreted from extra-exocrine glands like gastrointestinal system, Kidney, Placenta and Heart etc.

CO13. Understand the concept of Immunology

CO14. Knowledge about the difference between innate immunity and acquired immunity

CO15. Understand about the structure and types of Immunoglobulins.

CO16. Interactions of Antigens and Antibodies.

CO17. Understanding the immune mechanisms in disease control and aware the harmful and control measures of HIV and AIDS.

ZOO-609: Developmental Biology, Histology and Biological Chemistry

After the course is completed, the students must be able to:

CO1. Understand the process of development of animals.

CO2. Understand the process of Gametogenesis, Fertilization and Parthenogenesis.

CO3. Understand the process of organogenesis of selected organs like heart and kidney.

CO4. Development of extra embryonic membrane and the nature and physiology of placenta.

CO5. Came to know the inducer and inductor role in embryogenesis and knowledge about metamorphosis and process of regeneration.

CO6. From the histological studies, students will understand the structural organization of different organs like mammalian skin, stomach, liver, kidney, heart, spinal cord, testes and ovary, etc.

CO7. Students will know about the essentialities of biomolecules in living organisms.

CO8. Chemical bonds and the principles of thermodynamics.

CO9. Gain the knowledge of macromolecules such as carbohydrates, protein and fat, their types and significance.

CO10. Understand the knowledge of cholesterol and its biological significance.

CO11. Classification of enzymes, mechanism of enzyme action and factors affecting the enzyme activity.

CO12. Concept of glycogenolysis, glycogenesis and bioenergetics.