Department of Zoology

Goals

Zoology is a branch of science that deals with the animal kingdom, including the structure, embryology, evolution, classification, habits and distribution of all animals, both living andextinct and how they interact with their ecosystems. B. Sc. in Zoology is an undergraduate program which is premeditated to introduce students to the study of Zoology at the organismal and organ function levels. The theoretical part of the program deals with the general principles of classical as well as modern Zoology. The program provides the student with an introduction to the recent advances in Zoology in the areas of systematic, evolution, reproduction, development, animal diversity, biochemistry, cytology and animal ecology. This course is offered for candidates who are interested in the study of animals. The minimum time required to complete the course is three years.

ProgramSpecific Outcomes(PO)

After successfully completing B.Sc. (Zoology) Program, the student will be able to:

PSO1: Connect and apply biological knowledge to other disciplines and to integrateability to connect and apply biological knowledge to other disciplines and tointegrate.

PSO2: Explain the origin of life with context to the origin of eukaryotic cell and endosymbiotic theory of origin, fossil records, Darwinism and Neo-Darwinism, experimental evidences.

PSO3: Illustrate zoological science for its application in branches like medical entomology, apiculture, aquaculture and agriculture etc;

PSO4: Understand animal interactions with the environment and identify the major groups of organisms with an emphasis on animals and classify them with in a phylogenetic framework.

Course outcome (CO

B.Sc. Sem-I

Course:(BSC0C 104)Zoology: Nonchordates-1, Chordates-1, Mammalian Physiology, Cytology

After successfully completing this course, students will beable to:

CO1: To acquaint students with the general classification of non chordates and chordates. demonstrateanatomicalandphysiologicalattributesofeachanimalgroup.

CO2: Identify a range of invertebrate and vertebrate animals;

CO3: Know about the non chordates and chordates which prove helpful to them in research field or basic sciences.

CO4: State the animal classification with reference to vertebrate animals up to class level;

CO5: Enlist theexamplesof thephylumstudied

CO6: Acquaint students with the structural and functional mechanism of human respiration and excretion.

CO7: Learn the anatomy and physiology of lungs and kidneys, helps students to know about the structural peculiarities and functional mechanism.

CO8: Acquaint with the latest study of the structure and functions of cell organelles, label the various cell partsandcell organelles.

Course: Practical 1 (BSC0C 104)

After successfully completing this course, students will beable to:

CO1: study the classification of non chordate animals up to class level through charts, slides and specimen.

CO2: study the classification of chordate animals up to order level through charts, slides and specimens.

CO3: study of simple and compound microscope.

CO4: study the histology of kidney, lungs and neurons.

CO5: study of cell organelles.

CO6: study of life cycle of Hydra through charts and slides.

CO7: study of life cycle of Frog through charts and slides.

B.Sc. Sem-II

Course:(BSC0C 204 Zoology)Non Chordates 2, Chordates 2, Comparative Anatomy & Genetics.

After successfully completing this course, students will beable to:

CO1: Students will be aware of advanced non chordates.

CO2: Students will become familiar with important phenomena of non chordates.

CO3: Students will be aware of advanced chordates.

CO4: study the comparison between anatomy of circulatory system, nervous system and urinogenital system.

CO5: Students will learn genetics, about genes and different genetic phenomena.

CO6: Understand basic concept of classical genetics, law of heredity, dominance, multiple alleles, blood groups, polygenetic inheritance and lethal genes.

Course: Practical 2(BSC0C 204 Zoology)

After successfully completing this course, students will beable to:

CO1: study the classification of non chordate animals up to class level through charts, slides and specimens.

CO2: study the classification of chordate animals through charts and specimens.

CO3: study the life cycle of pigeon through charts.

CO4: study the comparative anatomy of aortic arches, brain and kidney through charts.

CO5: study of genetic phenomena through charts.

B.Sc. Sem-III

Course:(BSCC 304 A)Animal Diversity, Cytology & Genetics.

After successfully completing this course, students will beable to:

CO1:know the life cycle of plasmodium and ascaris and aware about malaria and ascariasis.

CO2: Students will be able to understand peculiarities of porifera and coelenterate.

CO3: Students will become familiar with anatomy of Earthworm by knowing its all systems.

CO4: Students will come to know about structure and significance of microscopy, cell organelles and cell division.

CO5: Students will also be able to know about molecular genetics and their applications in research work.

CO5: To understand molecular structure of genetics, chromosome and sex determination.

Course:(BSCC 304 B)Animal Diversity, Biochemistry, Animal adaptation, Animal behavior and Evolution

After successfully completing this course, students will beable to:

CO1:acquaint student with basic anatomy of chordates for which type study of shark is mentioned.

CO2: Students will become familiar with Biochemistry

CO3: Students can developed skill to identify carbohydrates.

CO4: Students can classify carbohydrates and will know the basic structure of various organic food components.

CO5: Students will come to know about different types of adaptations.

CO6: They will be aware of learning behavior and social life of Termites.

CO7: Students will know the causes of variation, evolutionary theories like Origin of life, Lamarckism, Darwinism and Phylogeny of horse.

Course:Practical(305-A)

After successfully completing this course, students will beable to:

CO1: Study of life cycle of plasmodium through charts and permanent slides.

CO2: Study of *Ascaris lumbricoidis*through specimen, charts and permanent slides.

CO3: Study of spicules of sponges through permanent slides.

CO4: Study of polymorphism through slides and specimens.

CO5: Study of Earthworm through specimen, charts, permanent slides.

CO6: Study of Cytology through charts, models and by making temporary mountings.

CO7: Study of genetics through charts and models.

Course:Practical(305-B)

After successfully completing this course, students will beable to:

CO1: Study of shark through charts, specimen and slides.

CO2: Study of Biochemistry by making structure of some monosaccharide and disaccharides.

CO3: Study of animal adaptation and behavior through specimens and charts.

CO4: Study of Evolution through charts and models.

B.Sc. Sem-IV

Course:(BSCC 404 A)Animal Diversity, Cytology, Genetics and Biotechnology

After successfully completing this course, students will beable to:

CO1: Students will understand the morphology and anatomy of cockroach.

CO2: Able to understand cellular organization, cell organelles, morphological and physiological characteristics of cancer cell.

CO3: Students will also able to understand Epistasis, Linkage, crossings over and sex linked inheritance.

CO4: Students will learn tools, techniques, types and applicability of laboratory equipments and their uses in the field of Biotechnology.

Course:(BSCC 404 B)Animal Diversity, Fishery biology, Histology, Animal Physiology

After successfully completing this course, students will beable to:

CO1: This course is designed to aware of basic anatomy of chordates for which type study of Calotes is mentioned.

CO2: Students will learn about fishes, their identification, their importance, their management, catching and handling.

CO3: Students will be benefited by gaining knowledge about establishment of aquarium, their management, and aquarium fishes. This will prove helpful them in self earning process or even can settle small business.

CO4: Students will become familiar with histology of some human organs.

CO5: Students will come to know about physiology of digestion, composition of blood, blood components and blood coagulation.

Course:Practical(405-A)

After successfully completing this course, students will beable to:

CO1: To study the external characters and various systems of cockroach through charts.

CO2: Study of temporary and permanent slides of cockroach.

CO3: To study the centriole and cytoskeleton through charts.

CO4: To study the different genetic phenomena through charts.

CO5: To study the equipments for animal cell culture through instruments and charts.

CO6: To study the genetic problems by solving them.

Course:Practical(405-B)

After successfully completing this course, students will be able to:

CO1: To study external characters & different systems of Calotes through charts/specimen.

CO2: Study of fishing gears through charts and models [Fishering nets, Boats and Identification of fishes].

CO3: Study of mammalian histology through permanent slides and charts.

CO4: To study the action of salivary amylase on starch by performing it.

CO5: To study differential WBC through human blood smear preparation and permanent slides.

B.Sc. Sem-V

Course:(BSCC 504 A)Ecology, Environmental Pollution and Histology

After successfully completing this course, students will beable to:

CO1: Students will be aware about what are ecosystem and its importance.

CO2: Students will be aware about ecology, biotic community and ecological succession.

CO3: Student will know how ecosystem is formed and functioning, which are basic need for conserving nature.

CO4: Students will know about types (Marine & Fresh water) and function of ecosystem.

CO5: Students will acquaint with ecological Biomes.

CO6: Students will be aware about different types of pollutants and its effect on environment.

CO7: Students will aware about environmental pollution: Various pollutants like Air, Water, Soil and radioactive pollutants, andtheir effects.

CO8: Students will involve in protection and conservation activities of environment and other natural resources.

CO9: Studentswill encourage to protect environment and various life forms.

CO10: This will help students to understand histology of endocrine glands.

Course:Practical(505-A1)

After successfully completing this course, students will beable to:

CO1: To study the coral reefs through charts.

CO2: To study various biomes using charts.

CO3: To estimate Acidity, Alkalinity, Chlorinity, Calcium Hardness, Total Hardness; physico-chemical parameters of pond water by titrimetric method.

CO4: To estimate Phosphate and Sulphate from water using colorimetric method.

CO5: To study trickling filter system by chart.

CO6: To study trickling filter system by chart.

CO7: To study histology of endocrine glands by chart/permanent slides.

Course:(BSCC 504 B)Animal Diversity and Physiology

After successfully completing this course, students will be able to:

CO1: This course is designed to acquaint student with basic anatomy of non-chordates for which, type study of Starfish (*Asterias*) is mentioned.

CO2: Students will gain knowledge about larval forms of Crustacean and Echinodermata.

CO3: Students will be aware about Minor phyla

CO4: Students will know the structure and function of muscles and reproductive system.

CO5: Students will acquaint with physiology of Enzymes: classification, nomenclature, properties and mechanism of enzyme actions.

CO6: define enzymes anddescribeits chemical naturealongwith itsproperties.

CO7: describe nomenclature and classification of enzymes.

CO8: elucidatetheconceptofenzymeactivationandmechanismofenzymeaction.

CO9: explainindetailthefactors affectingtheenzymeactivity.

Course:Practical(505-A2)

After successfully completing this course, students will beable to:

CO1: To study external characters of starfish by chart.

CO2: To study water vascular system in starfish by chart.

CO3: To study structure of tube feet by chart.

CO4: To study larval forms of crustacea by chart.

CO5: To study larval forms of Echinodermata by chart.

CO6: To study minor phyla by charts/models.

CO7: To study structure of striated muscle by chart.
CO8: To study menstrual cycle by chart with T.S. of uterus.
CO9: To study molecular structure of Testosterone, Estrogen and Progesterone by charts.
CO10: To study the factors (Temp. pH, velocity) affecting enzyme activity by chart.

Course:(BSCC 504 C)Animal Biochemistry

After successfully completing this course, students will beable to:

CO1: Students will become familiar with basic structure of monosaccharide, disaccharide, polysaccharide, proteins and lipids.
CO2: Students develop skills to identify the carbohydrates,proteins and lipids.
CO3: Student can classify carbohydrates and proteins and fatty acids.
CO4: Students will know about various biological significance of carbohydrates, proteins and lipids.
CO5: This knowledge will helpful to the students for any professional lab practices

Course:Practical(505-B1)

After successfully completing this course, students will beable to:

CO1: To study the detection of carbohydrate.
CO2: To study the detection of proteins.
CO3: Colorimetric estimation of proteins and glucose.
CO4: Preparation of atomic models of carbohydrates, proteins and lipids.
CO5: Colorimetric estimation of cholesterol and creatinine.
CO6: Study of basic steroid nucleus and cholesterol by charts.

Course:(BSCC 504 D) Cytology Biostatistics and Evolution

After successfully completing this course, students will beable to:

CO1: Students will know the structure and functions of plasma membrane, cell junctions, cilia, and flagella.
CO2: Students will be aware about Karyotyping.
CO3: Students will become familiar and gain knowledge to use such different lab equipments and their applications.
CO4: Students will gain basic knowledge of types and working of different kinds of Microscopes, Electrophoresis, Centrifugation, Paper chromatography, Karyotyping techniques and their applications.
CO5: Students become handy in some data analysis by gaining the knowledge of Biostatistics.
CO6: To acquaint students with importance of statistics in biological sciences and gain knowledge to derive central values (Mean, Median, Mode and SD).
CO7: Students will understand different mechanisms of evolution.
CO8: Students will learn about Variation, Isolation and Speciation of Evolution.

Course:Practical(505-B2)

After successfully completing this course, students will beable to:

CO1: To study fluid mosaic model of plasma membrane.
CO2: To study specialized structures of plasma membrane.
CO3: To study cilia/ flagella by charts/models.
CO4: Human Karyotyping by chart.
CO5: Study of working principal of Dark field microscopy and polarized microscopy.
CO6: To study centrifuge with the help of charts/models/instrument.
CO7: To study the structure and peculiarities of plasma membrane through charts and models.
CO8: To study ascending paper chromatography.
CO9: To study central values (Mean, Median and Mode) with suitable data.
CO10: To derive SD value from given data.
CO11: Preparation of Pi-chart, Bar diagrams and Pictogram using suitable data set.

Course:(BSCSE 504 EC)Poultry Science

After successfully completing this course, students willbeable to:

CO1: Students will come to know about importance of poultry science and different breeds of poultry.

CO2: learn different housing methods, brooders, feed hopper, egg lying utensils, incubators.

CO3: Students will learn selection methods of breeding, selection of eggs for hatching.

CO4: learn sexing, grading, debeaking, dubbing and vaccination of chicks.

CO5: understand management of poultry house and common poultry diseases.

CO6: By studying poultry science students can set their own business or poultry farm.

B.Sc. Sem-VI

Course:(BSCC604 A)Animal Diversity, Economic Zoology and Entomology.

After successfully completing this course, students will beable to:

CO1: This course is designed to acquaint student with basic anatomy of chordates for which, type study of Rat (*Rattus rattus*) is mentioned.

CO2: Students will understand the morphology and anatomy of Rat (*Rattus rattus*).

CO3: Students will be aware about Dentition in mammals and derivatives of mammalian skin.

CO4: Student will become familiar with neoteny and parental care in Amphibians.

CO5: Students will learn about identification of venomous and non-venomous snakes of India.

CO6: By studying apiculturestudents can set their own business or consultation.

CO7: Students will be aware about harmful insects, types of mouth parts and role of insects in forensic sciences.

Course:Practical(605 A1)

After successfully completing this course, students will be able to:

CO1: To study Digestive, Arterial, Venous, Nervous (Brain) and Reproductive system of Rat.

CO2: To study striated muscle fiber and modulated nerve fiber in rat using charts.

CO3: To study identification of venomous and non-venomous snakes by chart.

CO4: To study castes in honey bee and structure of typical bee hive through charts.

CO5: To study life cycle of honey bee by charts.

CO6: To study life cycle of blow fly by charts.

CO7: To study different types of mouth parts of insects by charts/permanent slides.

CO8: To study dentition of human, cow, horse, rat, elephant, dog, cat.

CO9: To study parental care in amphibians through charts.

CO10: To study derivatives of mammalian skin through charts.

Course:(BSCC604 B)Ornithology, Zoogeography, Immunology and Biotechnology

After successfully completing this course, students will beable to:

CO1: Students can learn about the basic concepts of ornithology: flight adaptation, types of feet and beaks and Bird migration.

CO2: Students will be aware about zoogeographical realms with reference to mammalian fauna.

CO3: To acquaint students with basic of knowledge of Immunology and aware about Allergy, Tissue rejection, Autoimmune diseases and AIDS.

CO4: Students will gain the knowledge of Antigens, Antibodies, Cellular and humoral immunity.

CO5: Student will become familiar with Animal biotechnology techniques.

CO6: Students will learn about Animal Tissue culture, organ culture and whole embryo culture techniques and its important requirements.

Course:Practical(605-A2)

After successfully completing this course, students will beable to:

CO1: To study the avifaunal diversity of college campus and prepare a checklist report.

CO2: To study types of feet and beaks in birds.

CO3: To study tools used in bird watching through charts.

CO4: To study different zoogeographical realms with charts.

CO5: To study structure of antibody, T-cell and cellular immunity, B-cells and humoral immunity, AIDS, hypersensitivity.

CO6: To study Balanced Salt Solutions (BSS), Antibiotics, Serum, Tissue culture and Whole embryo culture.

Course:(BSCC604 C)Molecular Biology, Toxicology, Animal Behavior and Endocrinology

After successfully completing this course, students will be able to:

CO1: Students will learn basics of molecular biology like DNA replication, DNA synthesis, Types of DNA, DNA fingerprinting.

CO2: Students will gain the knowledge of basic molecular biology and its applications with PCR and DNA fingerprinting.

CO3: To acquaint student with the concept of Toxicology with classification of toxicants and types of toxicity and factors affecting toxicology.

CO4: Students will gain knowledge about toxicology and various factors affecting toxicology with entry of toxicants into animals' body.

CO5: To acquaint student with patterns of animal behavior.

CO6: Student will become familiar with different types of animal behavior and their importance and application.

CO7: Students will come to know the structure and function of human endocrine glands.

CO8: Students will learn about histology and endocrinological functions of some human glands.

Course:Practical(605-B1)

After successfully completing this course, students will beable to:

CO1: To study modes of DNA replication through chart.

CO2: To study types of DNA through chart.

CO3: To study PCR through chart.

CO4: To study DNA finger printing through chart.

CO5: To study linkage and crossing over through chart.

CO6: To study LD50 and LC50 through chart.

CO7: To study communication between bats and moths through chart.

CO8: To study social organization in baboons through chart.

CO9: To study courtship in balloon fly, persuasion in appeasement, stickle bakes, harringulls, scorpion fly, false information.

CO10: To study endocrine functions of hormonal glands.

CO11: To study human behavior by trial-and-error method.

Course:(BSCC604 D)Fishery Biology, Developmental Biology, Wildlife and Histological Techniques

After successfully completing this course, students will beable to:

CO1: This course is designed to acquaint students with Fish biology and Fisheries.

CO2: Students will be aware about different types of fins, scales, respiratory organs, parental care and economic importance of fishes.

CO3: The objective of this course is to provide a comprehensive understanding of the concepts of early animal development by studying Chick embryology.

CO4: Students will gain knowledge about types of eggs, patterns of cleavage and different stages of early development of chick embryo.

CO5: Students will gain an appreciation for the modern scope of scientific inquiry in the field of wildlife conservation management.

CO6: Develop an ability to analyze, present and interpret wildlife conservation management information.

CO7: Students will understand wildlife damaging factors and role of different agency to protect wild life. Also gain knowledge about some endangered fauna of India.

CO8: By studying the histological techniquesstudents will gain the knowledge about preparation of histological permanent slides.

CO9: Students will acquaint with histological techniques like slide preparation, fixation, dehydration, embedding, sectioning, and staining.

Course:Practical(605-B2)

After successfully completing this course, students will beable to:

CO1: To study different types of caudal fins in fishes.
CO2: To study scales in fishes.
CO3: To study types of swim bladders in fishes.
CO4: To study accessory respiratory organs in fishes.
CO5: To study parental care in fishes.
CO6: To study types of eggs.
CO7: To study patterns of cleavage through chart.
CO8: To study chick embryo of 21 hrs, 33 hrs, 48 hrs and 72 hrs.
CO9: To study types of placentation in mammals.
CO10: To study endangered fauna through chart.
CO11: To study staining methods by passing permanent slides.

Course:(BSCSE604 EC)Research Methodology(EC)

After successfully completing this course, students will beable to:

CO1: Students will be aware about objectives and types of research.

CO2: Students will learn how to write research proposal and which are the major research funding agenesis of India.

CO3: Students will be able to write research proposal and know about different funding agenesis.

CO4: Students gain knowledge about IPR, Plagiarism and Citation.

CO5: Students should be able to understand the IPR, its types and the type of legal rights it provides to the owner.

CO6: Students will be aware about various sampling methods used in the field of ecological research.

CO7: Students will understand different types of Ecological sampling methods.