JULY 1, 2018

COURSE OUTCOME

B.SC ZOOLOGY (HONOURS AND GENERAL) PROGRAMME CBCS SYLLABUS OF WEST BENGAL STATE UNIVERSITY

DEPARTMENT OF ZOOLOGY, BASIRHAT COLLEGE

Course Outcome

Of different courses offered

in

B.Sc Zoology

(Honours and General) Programme

Under

Choice Based Credit System

(CBCS)

Department of Zoology

Basirhat College

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PROGRAM OUTCOMES: ZOOLOGY HONOURS

PO1. Demonstrate in-depth knowledge and understanding about the fundamental concepts, principles and processes underlying the animal sciences and its different subfields (ecology, physiology, genetics etc.), and its linkages with related disciplinary areas/subjects

PO2. Demonstrate the procedural knowledge that creates different types of professionals in the field of zoology and related fields such as pharmaceuticals, bio-chemical industry, teaching, environmental monitoring, forestry, etc;

PO3. Demonstrate practical skills of using classical methods and techniques related to specialised area(s) within zoology as well within the subfields of zoology.

PO4. Use skills required for setting up economically viable project using animal life form like fishery, apiculture, sericulture, dairy etc.

PO5. Understand newer techniques of molecular biology, genetics, bio-statistics and use modern equipments like PCR, Spectrophotometer, electrophoresis and computer guided technologies etc.

PO6. Acquire the ability of critical thinking and analysis that may be used for solving problems related to optimum use of biological and natural resources to build a sustainable future.

PO7. Develops empathy and love towards the animals and contributes the knowledge for Nation building.

PROGRAM SPECIFIC OUTCOMES: ZOOLOGY HONOURS

PSO1: Acquire knowledge over various disciplines of animal sciences and understand the basic principles of biology in the light of evolutionary concept.

PSO2: Analyse relationship of different phyla of Animal Kingdom and identify or classify animals at least up to class (in case of invertebrates) or order (in case of vertebrates) based upon external characteristics.

PSO3: Understand the relationship of living organisms with environment and its implication in case of biodiversity loss and conservation.

PSO4: Understand the basic structure and function of cell and cellular organelle in context of modern discovery of genetics and molecular biology.

PSO5: Correlate the physiological and biochemical processes of animals and alteration of such processes in case of parasitic interaction and immunological response.

PSO6: Understand the developmental process of animal embryo and its application

PSO7: Application of acquired knowledge and understanding in applied field like Fishery, Vermicomposting, Aquarium fish keeping

PSO8: Perform field study and laboratory test in the above-mentioned areas of Zoology.

PROGRAM OUTCOMES: ZOOLOGY GENERAL

PSO1: Acquire broad understanding of animal diversity and knowledge of scientific classification.

PSO2: Correlate the physiological and biochemical processes of animals.

PSO3: Apply zoological knowledge in the field of public health, disease control and environmental problems.

PSO4: Apply zoological knowledge in scientific farming of livestock like fishery, poultry, and dairy.

PSO5: Skill development in economically important procedures like aquarium making and vermicomposting.

PSO6: Perform field study and laboratory test in the above-mentioned areas of Zoology.

COURSE OUTCOMES OF ZOOLOGY HONOURS PROGRAMME

ZOOACOR01: NON-CHORDATES I

CO1: Understand the general characteristics of Protists, Parazoa, and Metazoan phyla up to nemathelminthes, and can classify them up to class.

CO2: Critically analyse the organisation, special characteristics, and life cycle traits of some selected animals from phylum porifera to nemathelminthes.

CO3: Understand the evolutionary significance of symmetry, segmentation of Metazoa and parasitism in helminths.

CO4: Able to appreciate the importance of conservation through the study of formation and degradation of coral reefs around the world.

CO5: Can identify organisms of the above-mentioned taxa by inspecting through microscope or naked eye.

ZOOACOR02: ECOLOGY

CO1: Understand the preliminary concepts of ecology through discussion from historical perspective of development of this discipline.

CO2: Understand the organisation, characteristics and functioning of population, community and ecosystem.

CO3: Can apply the basic concepts of ecology for conservation of nature and wildlife.

CO4: Perform various methods to measure different attributes of ecosystem using chemical procedures and ecological apparatus.

CO5: Acquire the efficiency of study of animals in the field and can analyse their interrelationship.

ZOOACOR03: NON-CHORDATES II

CO1: Can classify non-chordates animal from coleomates to hemichordata with taxonomically important characteristics.

CO2: Appreciate the life-forms and survival strategies of non-chordates living in diverse habit and habitats.

CO3: Elucidate the evolutionary relationships of different non-chordates through functional and structural affinities.

CO4: Understand the organization, complexity and characteristic features of non-chordates.

CO5: Enhance collaborative learning and communication skills through practical sessions, team work, group discussions, assignments and projects.

CO6: Can dissect animal body for acquiring knowledge for animal body system and further research.

ZOOACOR04: CELL BIOLOGY

CO1: Can understand the structure and functions of various cell organelles involved in diverse cellular processes.

CO2: Can comprehend the different phases of cell cycle and cellular death and their importance in maintaining stability of body system.

CO3: Relate the cellular processes with the process of cell signalling.

CO4: Perform the laboratory tests for detecting various cellular components and processes.

ZOOACOR05: CHORDATES

CO1. Comprehend the the characteristics in different classes of chordates.

CO2. Recognize an animal as an individual of specific group or subgroup of chordates from its characteristics and distinguishing features.

CO3. Appreciate the course of evolution from the similarities and differences in lifeform and functions among various groups of animals in Phylum Chordata.

CO4. Elucidate specific way of living in different classes of chordates.

CO5. Understand the distribution of chordates in different continents and can explain the possible reason of it.

CO6. Independently study animals in its natural habitat to apprehend its life-style in relation to its specific characteristics.

ZOOACOR06: PHYSIOLOGY: CONTROLLING AND COORDINATING SYSTEMS

CO1. Acquire knowledge about location and general structure of different vertebrate tissues.

CO2. Understand the detailed functioning of bones, cartilage, muscular and reproductive system.

CO3. Explain the coordination of different body system through the action of neural and endocrine pathways.

CO4. Apply the theoretical knowledge for identifying different histological slide preparations of mammalian tissues.

CO5. Attain efficiency in techniques of temporary slide preparation of different tissue and preparation of permanent slide through microtomy.

CO6. Can record simple muscle twitch with electrical stimulation.

ZOOACOR07: BIOCHEMISTRY

CO1. Understand the structure and biological importance of protein, carbohydrate, lipid and nucleic acids.

CO2. Attain knowledge about fundamentals of biochemical reactions and their catalysis by enzymes.

CO3. Explain different biochemical pathways for synthesize, transformation and metabolism of biomolecules.

CO4. Can perform classical laboratory techniques for identification of different functional groups of biomolecules.

CO5. Can isolate and separate different amino acids and proteins by laboratory procedures.

CO6. Be knowledgeable in proper procedures and regulations in handling and disposal of chemicals.

ZOOACOR08: COMPARATIVE ANATOMY

CO1. Acquire knowledge about different body systems viz. Integumentary, skeletal, digestive, respiratory, circulatory, urogenital, nervous system and sense organ in different vertebrate classes.

CO2. Compare those system details in different vertebrate classes to point out similarity and dissimilarity.

CO3. Recognize the gradual increase in complexity and transformation with modifications of different anatomical systems in vertebrates.

CO4. Understand and apply the knowledge for realisation of evolutionary significance of comparative anatomy.

CO5. Study the details of anatomical characteristics from actual samples and specimens and use that that knowledge for inferring proof of evolution.

ZOOACOR09: PHYSIOLOGY: LIFE SUSTAINING SYSTEM

CO1. Understand the detailed functioning of digestive, respiratory, circulatory, cardiac and renal system in vertebrate.

CO2. Comprehend the role and significance of those systems in sustaining life .

CO3. Explain the coordination of those body systems for maintaining homeostasis of internal body environment.

CO4. Apply the theoretical knowledge for recording different physiological parameters like blood pressure, hemoglobin concentration, and blood cell count.

CO5. Attain efficiency in laboratory techniques and using physiological lab apparatus.

ZOOACOR10: IMMUNOLOGY

CO1. Can appreciate the basic mechanism and interplay of innate and adaptive immunity with relation to cells and organ to immune system.

CO2. Can realise the cellular and molecular pathways that leads to humoral and cell-mediated immunity including role of MHC.

CO3. Understand the controlling of immune system by chemokines, cytokines and other inflammatory mediators.

CO4. Understand the developmental pathways of cells of humoral and cellular immunity.

CO5. Can relate the immunity related diseases with molecular biological events of immune system.

CO6. Understand the basic principle of laboratory techniques using immunological events.

CO7. Perform simple laboratory experiments related to immunology like ABO group determination, WBC count etc.

ZOOACOR11: MOLECULAR BIOLOGY

CO1. *Describe and explain* the basic mechanism of core molecular biological process of information transfer in a cell i.e. replication, transcription and translation.

CO2. Compare the process of replication, transcription and translation in prokaryotic and eukaryotic system.

CO3. Elucidate post transcriptional processing and modification of RNAs which includes capping, polyadenilation, splicing and editing.

CO4. Recognize the roll of RNA and other proteins in prokaryotic regulation of gene expression.

CO5. Describe different repair mechanism of DNA and can link it to the other cellular process

CO6. Understand the underlying principle of molecular biological techniques for amplifying, identifying and sequencing nucleic acids.

CO7. Apply the knowledge to decode genetic sequence to corresponding amino acid sequence

CO8. Appreciate the underlying similarity of molecular biological system in animal world

ZOOACOR12: GENETICS

CO1. Can understand the basic principle of inheritance and sex determination following Mendel's and other scientists'classic experiments.

CO2. Understand the deviation from Mendel's Law due linkage , crossing over, recombination and mutation.

CO3. Make some idea of extra-chromosomal inheritance and transposable genetic element.

CO4. Apply the gained knowledge to construct genetic map and pedigree from supplied data.

CO5. Can do simple statistical analysis to infer from data of genetic experiment.

CO6.Can identify chromosomal aberration from from prepared slide or pictures.

ZOOACOR13: DEVELOPMENTAL BIOLOGY

CO1. Develop critical understanding of the basic processes of differential gene expression, cellular interaction and movement that leads to the embryo formation.

CO2. Can appreciate and recognize the details of sperm and egg formation and different aspects of fertilization in chordates.

CO3. Compare the process of early and late embryonic development processes in frog and chick and can realize the basic similarity of processes followed n diverse organism.

CO4. Develop the understanding of organ formation from germ layers and importance of regeneration process.

CO5. Understand the structure, types and function of placenta in mammals.

CO6. Understand the relevance of developmental biology in medicine or its role in development of congenital abnormalities and diseases.

ZOOACOR14: EVOLUTIONARY BIOLOGY

CO1. Acquire an in-depth knowledge on the diversity and relationships in animal world.

CO2. Develop a holistic appreciation on the phylogeny and adaptations in animals

CO3. Enable the students to understand the evolution of universe and life.

CO4. Understanding on the process and theories in evolutionary biology.

CO5. Develop an interest in the debates and discussion taking place in the field of evolutionary biology

ZOOADSE01: ANIMAL BEHAVIOUR AND CHRONOBIOLOGY

CO1: Understand the methods of studying of animal behaviour through the works of eminent ethologists.

CO2: Understand types of animal behaviour and their importance to the organisms.

CO3: Explore communication techniques and sexual behaviour in relation to the formation of society.

CO4: Understand significance of biological rhythm and their type in synchronization of activity of animals.

CO5: Perform field study and laboratory test on behavioural biology of animals.

ZOOADSE02: ENTOMOLOGY: INSECTS AND THEIR BIOLOGY

CO1: Acquire knowledge on Classification of Insects up to order and appreciate the diversity of insects in global and local scale.

CO2: Understand general morphology and physiology of insect

CO3: Compare different types of insect society and their characteristic behaviour for highly organized social life

CO4: Understand the role of insect species as pest and vector and co-evolution of such species with host

CO5: Efficiency in collection, preservation and identification of insect

ZOOADSE04 : FISH AND FISHERY

CO1: After completion of the course the students will be able to: Acquire knowledge of physiology, reproduction of fishes.

CO2: Analyse different kinds of water and identify/differentiate different kinds of fishes.

CO3: Procure pure fish seed by artificial procedures such as artificial and induced breeding which can learn by visiting any fish farm or demonstrated in research labs in college/Departments

CO4: Become aware and gain knowledge of Inland and marine Fisheries in India and how it contributes to Indian economy.

CO5: Know about different kinds of fishing methods and fish preservation which can be employed for export and storage of commercial fishes.

CO6: Find the reasons behind the depletion of fisheries resources.

CO7: Develop skills for entrepreneurship or self-employment in their own fisheries-related business.

ZOOADSE05: PARASITOLOGY

CO1: Understand the variation amongst parasites, parasitic invasion in both plants and animals; applicable to medical and agriculture aspects.

CO2: Help to know the stages of the life cycles of the parasites and the respective infective stages.

CO3: Develop ecological model, know population dynamics of parasite, establishment of parasite population in host body, adaptive radiations and methods adopted by parasite to combat with the host immune system

CO4: Develop skills and realize significance of diagnosis of parasitic attack and treatment of patient or host.

CO5: Learn important case studies to highlight interesting researches, serendipities towards the advancement and enrichment of knowledge in the field of Parasitology.

COURSE OUTCOMES OF ZOOLOGY GENERAL ELECTIVE COURSES FOR HONOURS PROGRAMMES AND ZOOLOGY GENERAL PROGRAMME

ZOOHGEC01 / ZOOGCOR01: ANIMAL DIVERSITY

CO1: Understand the general characteristics of Protists, Parazoa, and Metazoan phyla from protozoa to mammalia.

CO2: Can classify organisms upto class for invertebrates and upto orders for vertebrates.

CO3: Critically analyse the organisation, special characteristics, and life cycle traits of some selected animals from phylum porifera to nemathelminthes.

CO4: Can identify organisms of the above mentioned taxa by inspecting through microscope or naked eye.

CO5: Can appreciate the diversity of animal kingdom and its importance for sustenance of life on earth.

ZOOHGEC02/ ZOOGCOR02: HUMAN PHYSIOLOGY AND BIOCHEMISTRY

CO1: Understand the detailed functioning of neural, muscular, circulatory, digestive, excretory and reproductive system.

CO2. Explain the coordination of different body system through the action of neural and endocrine pathways.

CO3. Apply the theoretical knowledge for identifying different histological slide preparations of mammalian tissues.

CO4: Understand the structure and biological importance of protein, carbohydrate and lipid.

CO5. Attain knowledge about fundamentals of biochemical reactions and their catalysis by enzymes.

CO5. Explain different biochemical pathways for synthesize, transformation and metabolism of biomolecules.

CO5. Can perform classical laboratory techniques for identification of different functional groups of biomolecules and estimate total protein in a solution.

ZOOHGEC03/ ZOOGCOR03: INSECT VECTOR AND DISEASES

CO1: To gain Knowledge about various insects and their characteristics.

CO2: To understand mechanism of transmission of various diseases causing parasite via insects.

CO3: It helps to improve awareness among students regarding disease transmitting insects and how to prevent spread and transmission of disease.

ZOOHGEC04/ ZOOGCOR04: ENVIRONMENT AND PUBLIC HEALTH

CO1: Can recognize the sources of hazardous substances for environment and can understand their toxicity in living system.

CO2: Can understand the importance of climate change and their effect on public health.

CO3: Can appreciate the mechanism of different kinds of pollution due to human activity and its consequences as manifested in different health issues.

CO4: Can understand how waste is generated in modern human societies and how it should be managed for cleaner and healthier society.

CO5: Can determine different environmental pollution parameter through suitable laboratory techniques.

ZOOGDSE01: APPLIED ZOOLOGY

CO1: In this DSE course component, students can learn about the different animal interaction, emphasizing on the influence of parasitism.

CO2:To understand the Epidemiology of Diseases.

CO3:To know about the different group of parasite and their life cycle and pathogenesity.

CO4:To learn about the pest and pest management.

CO5: Students can also learn about livestock industry, their problem and management.

ZOOGDSE04: IMMUNOLOGY

CO1. Can appreciate the basic mechanism and interplay of innate and adaptive immunity with relation to cells and organ to immune system.

CO2. Can realise the cellular and molecular pathways that leads to humoral and cell-mediated immunity including role of MHC.

CO3. Understand the controlling of immune system by chemokines, cytokines and other inflammatory mediators.

CO4. Undrstand the developmetal pathways of cells of humoral and cellular immunity.

CO5. Can relate the immunity related diseases with molecular biological events of immune system.

CO6. Understand the basic principle of laboratory techniques using immunological events.

CO7. Perform simple laboratory experiments related to immunology like ABO group determination, WBC count etc.

SKILL ENHANCEMENT COURSE (SEC): OFFERED BY DEPARTMENT OF ZOOLOGY

ZOOSSEC01M : AQUARIUM FISH KEEPING

CO1: Acquire knowledge about different kinds of fishes, their compatibility in aquarium.

CO2: Become aware of Aquarium as commercial, decorative and of scientific studies.

CO3: Develop personal skills on maintenance of aquarium.

CO4: Know about the basic needs to set up an aquarium, *i.e.*, dechlorinated water, reflector, filters, scavenger, aquatic plants etc. and the ways to make it cost-effective

ZOOSSEC02M: VERMICOMPOST PRODUCTION

CO1: Students will be able to compost in a limited space and describe the decomposing process.

CO2: Students will learn, how to promote earthworm life in the soil, how to attract worms where they can be most useful in the garden; how to start a small-scale vermi-composting bins for maximum benefit of their garden.

CO3: Students will get the employment, and they can generate employments,

CO3: Students will also turn towards organic farming, Will help to maintain the environment pollution free and Will get the knowledge of biodiversity of local earthworms.