KHEJURI COLLEGE

Baratala :: Purba Medinipur

DEPARTMENT OF ZOOLOGY

COURSE OUTCOMES FOR B.Sc. in ZOOLOGY

NAME OF THE PROGRAMME: **B.Sc. in ZOOLOGY**

LIST OF COURSE OUTCOMES:

COURSE	NAME OF THE COURSE	COURSE OUTCOME
C1	Nonchordates I	1.Students should be able to describe unique characters and classification of protozoa ,porifera, coelenterate and helminths. 2.Students should be able to recognise the life function of protozoa, porifera, coelenterate and helminths. 3.Students will learn about importance of systematic, taxonomy, structural organization of animal. 4.They will learn about the significance and interaction of nonchordates along them and with the envioronment. 5.Students will learn about general taxonomic rules on animal classification. 6.Students will be able to describe about life cycle and pathogenecity of Plasmodium vivax, Taenia solium, Wuchereria bancrofti, Ascaris lumbricoides, Fasciola hepatica,etc.
C2	Ecology	1.Students will be able to learn in details about population ecology, community ecology and ecosystem ecology. 2.The students will be able to link the intricacies of food chains, food webs, nutrient cycle and flow of energy through the ecosystem. 3.This course will enable the students to comprehend and analyze ecological parameters by using Lotka-Volterra equation, Shannon-Weiner index, Winkler's method, fecundity tables, survivorship curve and soon. 4.The learner will also be understands and appreciates the diversity of ecosystems and its role and significance in Wildlife Conservation and Management. 5.The inclusion of NationalPark,Biodiversity ,WildLife Sanctuary visit in the course will expose the students to new ideas and enhance their knowledge.

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COURSE	NAME OF THE COURSE	COURSE OUTCOME
C3	Nonchordates II	1.The students would be able to recognise the ecological role of animals belonging to different phylum. 2.The students will get information regarding the habit,habitat and body organization of different species. 3.The students are informed about the unique characters and classification of annelida,arthropada, Mollusca and echinodermata upto class. 4.An introduction is provided about metamorphosis in insectcs,vision in arthropoda ,torsion and detorsion in gastropoda and water vascular system in echinodermata.
C4	Cell Biology	1.Understand the functioning of nucleus and extra nuclear organelles and understand the intricate cellular mechanisms involved. 2. Acquire the detailed knowledge of different pathways related to cell signaling and apoptosis thus enabling them to understand the anomalies in cancer. 3. Develop an understanding how cells work in healthy and diseased states and to give a 'health forecast' by analyzing the genetic database and cell information. 4. Get new avenues of joining research in areas such as genetic engineering of cells, cloning,¬ vaccines development, human fertility programme, organ transplant, etc 5.Students will be able to describe the cell division and cytoskeleton in details.
COURSE	**NAME OF THE COURSE**	**COURSE OUTCOME**
C5	Chordates	1.The students are informed about unique characters of various Chordates subphylum. 2.To understand the diversity of Chordates. 3.Students will get the Idea of different categories of Chordates. 4.To understand the origin and evolutionary relationship in different subphylum of Chordates 5.Students should be recognise life functions of urochordates to fish.. 6.The students will be able to classify the agnatha, amphibia, reptiles, aves, fish and mammals upto order according to their syllabus.

C6	Animal Physiology: Controlling & Coordinating Systems	1.The students are introduced to anatomy, physiology and functions of various tissues ,bone and cartilage. 2.Student will be introduced to the terminologies and working mechanism related to various organ system in animal physiology –in nervous system,mascular system,endocrine system,reproductive system etc. 3 Students will learn detail histological structure of testis, ovary, pancreas ,hypothalamus, pituitary, adrenal gland etc.

COURSE	NAME OF THE COURSE	COURSE OUTCOME
C7	Fundamental of Biochemistry	1. Students will learn the structure and classification of carbohydrates ,protein,fat,nucleic acid and its importance. 2. By reading this paper, student can gain knowledge about various metabolic processes in the body like how glycogen is formed from glucose, how pyruvic acid is formed from H2o, Co2, NADH2, various acids, how PPP occurs, how carbohydrates are formed from non-carbohydrates. 3. By reading Biochemistry, student will understsnd the structure of purine, pyrimidine, different types of DNA and RNA structure, process of complementary DNA and how nucleotide metabolism takes place. 4. To understand the nature, mechanism and kinetics of enzyme action. 5. The composition of lipids, various metabolism of lipids like beta oxidation of fatty acid, fatty acid biosynthesis can be known. 6. From the practical part of this paper, how to determine the carbohydrate, protein, fat content of an unknown sample, paper chromatography method, Lowry method etc.
C8	Comparative anatomy of vertebrates	1.Understand comparative account of the different vertebrate system. 2. Students learn the comparative account of integument, skeletal system,their functions and modifications in different vertebrates. 3. Learn the evolution of brain,sense organ and excretory organs to a complex, highly evolved from in mammals.

		4.Students should be able to describe the evolution of heart, modifications of aortic arches, structure of respiratory organs used in aquatic, terrestrial and aerial vertebrates.

COURSE	NAME OF THE COURSE	COURSE OUTCOME
C9	Animal Physiology: Life Sustaining Systems	1.Students are introduced to physiology of digestive,respiratory,circulatory,cardio vascular,excretory system. 2. Students will know about process of thermoregulation and osmoregulation process in vertebrates. 3 .Students will be able to determine the ABO blood,group,Haemoglobin level and measurement of blood pressure. 4.They also understand the structure and functions of haemoglobin ,and the mechanism of haemostasis; blood clotting system, fibrinolytic system and haemopoiesis. 5.Student will understand about structure of heart, cardiac cycle. cardiac output etc.
C10	Immunology	1.Students are introduced about basic concept of Immune System. 2.Students will l learn about different types of vaccines, also learn how active and passive immunization occurs in the human body. 3.Student will get a clear idea about various diseases like malaria, dengue, filaria, tuberculosis etc and how immunity is developed in our body against these diseases. 4.They will understand interaction of antigens, antibodies, complements and other immune components. 5. Understanding of types of hypersensitivity reactions and auto immune diseases.

COURSE	NAME OF THE COURSE	COURSE OUTCOME
C11	Molecular Biology	1. Students will learn about structure of nucleic acids,replication, transcription,translation etc. 2. They also learn about gene expression and gene regulation. 3. To understand detail explanation of trancriptional regulation with example of Lac operon and tryp operon in prokaryotic and eukaryotic organism. 4. To provide adqeuate knowledge about post trancriptional modification and processing of eukayotic RNA to the course learners,
		1.Students will know about Mendel's particulate mechanism differed from the blending theory of inheritance.

C12	Genetics	2. Students will know the terminology : true breeding, hybridization, monohybrid cross, P generation, F1 generation, F2 generation. 3. Students will use a Punnett square to predict the results of a monohybrid cross, stating the phenotypic and genotypic ratios of the F2 generation. 4. Students will know Mendel's Law of Segregation and the phase of meiosis in which it is applied. 5.Student may distinguish between the following pairs of terms: dominant and recessive; heterozygous and homozygous; genotype and phenotype. 6.Students will explain how a testcross can be used to determine if an individual with the dominant phenotype is homozygous or heterozygous. 7. Students will use a Punnett square or probabilities to predict the results of a dihybrid cross and state the phenotypic and genotypic ratios of the F2 generation. 8. Students will know about Linkage, Crossing Over and Chromosomal Mapping 9. Students will be able to know about Mutation types and its impact. 10. Students will know the Sex Determination process and role of different gene, Extra-chromosomal Inheritance, recombination in Bacteria and Viruses, Transposable Genetic Elements.

COURSE	NAME OF THE COURSE	COURSE OUTCOME
C13	Developmental Biology	1.It helps to explain how a variety of interacting processes generate an organism's heterogeneous shapes, size, and structural features that arise on the trajectory from embryo to adult, or more generally throughout a life cycle. 2.It helps to understand the molecular, genetic, cellular, and integrative aspects of building an organism. 3.Knowledge of normal developmental processes can aid in the understanding of developmental abnormalities and other conditions such as cancer. 4.Philosophers of biology have shown renewed interest in developmental biology due to the potential relevance of development for understanding evolution and the theme of reductionism in genetic explanations

C14	Evolutionary Biology	1. By reading the phylogenetic tree, they can know how advanced organisms have evolved from previous organisms through step-by-step evolution. 2. By studying chemical evolution can be conceived as a process of matter complexification with intermediate stages, where the gradually increasing degree of functional order is preserved through physicochemical interactions with a semiotic character. 3. By studying Geological Time Scale provides a framework for understanding the key events in Earth's history and their placement in a chronological context. 4. The molecular clock can also be used for putting a series of evolutionary events into chronological order. This is done by comparing sequences from different species to determine when they last shared a common ancestor, in effect drawing the family tree. 5. The H. W Law offers a prototype which is typically used as a point of origination to study the population genetics of diploid entities, which fulfil the fundamental assumption of random mating, large population, no mutation, migration or selection. 6. By studying evolutionary biology, student can learn how modern humans evolved from early primitive humans. 7. By extension, they can find out why the previous species became extinct and the reasons why the existing ones may have become extinct due to various reasons.

COURSE	NAME OF THE COURSE	COURSE OUTCOME
SEC1	Apiculture	1.The learner will be able to learn the social behavior of honey bee and handle the bee colony. 2. The learner will be able to understand the basics of beekeeping tools, equipment, and managing beehives. 3. The learner will be able to learn and manage beehives for honey production and pollination. 4. The course will be useful for providing self-employment to the learner and understand the marketing of various bee products. 5.. Beekeeping will be useful in the pollination of flora. 6.To know about bee enemies and various types of bee disease.

SEC2	Sericulture	1.The Students are informed about basic concept of moriculture. 2.To understand the morphology and digestive system of silk worm. 3.To understand the management of rearing house, processing of cocoons and different methods of silk reeling. 4.To understand the pest, diseases of silkworm and their control measures. 5.Analyze the importance of sericulture in entrepreneurship development.

COURSE	NAME OF THE COURSE	COURSE OUTCOME
DSE1	Fish and Fisheries	1.Students are introduced about different types of aquatic eco-systems , fish species,their habit,habitats and their functional anatomy. 2.Students will be able to differentiate the fishery from aquaculture and pisciculture. 3.Students are informed about the craft and gear used in fishing method. 4.Students should be able to describe the sustainable fishing and protecting the Marine environment. 5.Students will get information,ideas, practical experience on all matters relating to fishes. 6.To understand the technique involved in aquaculture practices.

DSE2	Animal Biotechnology	1.After completing this unit, students should have a foundational understanding of the principles and concepts of animal biotechnology, including its historical development and significance in various fields. 2.By the end of this unit, students should be proficient in various molecular techniques used for gene manipulation, including DNA extraction, PCR (Polymerase Chain Reaction), gene cloning, and gene editing methods such as CRISPR-Cas9. 3.Upon completing this unit, students should have an in-depth understanding of GMOs, their applications in agriculture, medicine, and research, as well as the ethical and environmental considerations associated with their use. 4.After finishing this unit, students should be capable of performing animal cell culture techniques and be aware of their applications in biotechnology, such as the production of biopharmaceuticals and tissue engineering. 5.These course outcomes are meant to guide students in what they will learn and achieve in each unit, helping them gain a comprehensive understanding of animal biotechnology.

COURSE	NAME OF THE COURSE	COURSE OUTCOME
DSE3	Endocrinology	1.Understand the fundamentals of the endocrine system and its role in maintaining body functions. 2.Student gain knowledge about difference between the nervous system and the endocrine system. 3.They will learn about endocrine glands, their locations and functions in the body. 4.The significance of the hypothalamus-pituitary axis in regulating hormone secretion. 5.Understand how the hypothalamus communicates with the pituitary gland and how this impacts hormone production. 6.Student should be able to identify and describe the functions of various peripheral endocrine glands, including the thyroid, adrenal, pancreas, and gonads.

		7.Understand the concept of hormone receptors and their role in signal transduction.
DSE4	Biology of Insects	1. Students will learn about general features of Insects and gain knowledge about their distribution and success on earth. 2. Student will be able to classify insects upto their respective order. 3. They can differentiate the beneficial insects from the harmful insect. 4. To understand the versatile roles of insects in agriculture. 5. Students will learn about the different disease caused by insects as vector. 6. To understand the different physiological systems such as integument system, respiratory system, excretory system in insects.
COURSE	**NAME OF THE COURSE**	**COURSE OUTCOME**
GE3	Aquatic Biology	1.Recognize scope and significance of Aquatic Biology and introduce the Limnology, Marine Biology and Oceanography. 2.Create awareness about the properties of freshwater and seawater, the elixir of life. 3.Understand and study different geomorphic formations of water bodies. 4. Give an insight to aquatic flora and fauna . 5. Critically evaluate the pollution, its sources and eco-restoration of aquatic systems. 6.Students will get information about zooplankton, phytoplankton,rotifers, copepods and their role in aquatic ecosystems.
GE4		

	Environment and Public Health	1.Students can evaluate the relation among environment, human and health. 2.To understand the biological, chemical, physical hazards of the ambient, indoor and work environment that can adversely affect human life. 3.Students will be able to diagnose the cause of environment pollution and design appropriate control measures to improve the health outcomes. 4.To understand the acid rain, green house gases and global warming. 5.General concept of different disease, mechanism of pathogenesis and their control measure. 6.To understand various types of waste, their source and management system for a sustainable environment.