Program Outcome (PO) and Course Outcome (CO) under ~~LOCF~~/NCCF

Program Offered: B.Sc. in Zoology

Program Outcomes (PO)	
PO1:	Core competency
PO2:	Analytical reasoning
PO3:	Critical thinking
PO4:	Research skills
PO5:	Team Work

Programme Specific Outcome

PROGRAMME NAME	B.Sc in Zoology
PSO	The syllabus for Zoology Honours at undergraduate level using the Choice based Credit system has been framed in compliance with model syllabus given by UGC. The main objective of framing this new syllabus is to give the students a holistic understanding of the subject giving substantial weightage to both the core contents and techniques used in Zoology. Keeping in mind and in tune with the changing nature of the subject, adequate emphasis has been given on new techniques and understanding of the subject

SEMESTER: I(NCCF)

COURSE OUTCOMES (CO)			
Sl No.	**Course Name**	**Course Code**	**Course Outcomes(CO)**
1	Diversity of Non-chordates	BSCZOOMJ101	**CO1:**Define systematics, taxonomy, and hierarchical classification. Differentiate between taxonomic levels (alpha, beta, gamma, omega, cytotaxonomy, numerical taxonomy, and chemotaxonomy). **CO2:**Gain insights into evolutionary biology, the origin of metazoans, and species diversification. **CO3:** Explain the principles of binomial nomenclature and the significance of scientific names. Understand the principle of priority and typification (Holotype, Paratype, Neotype, etc.) **CO4**:Define multicellularity and its significance in evolutionary biology. Differentiate species concepts: biological and evolutionary. **CO5:**Understand the transition from unicellular to multicellular organisms. Explain diploblastic and triploblastic organization, body cavities, and embryonic development in protostomes and deuterostomes. **CO6:**Classify protists up to the phylum level. Classify and describe the structural characteristics of Porifera, Cnidaria, Platyhelminthes, and Nematoda. **CO7:**Understand the classification and characteristics of Annelids, Arthropods, Molluscs, Echinoderms, and Hemichordates. **CO8:**Develop a strong foundation in taxonomy and systematics, understanding species classification and nomenclature. **CO9**: They aquire knowledge about the anatomy, physiology, and ecological roles of major invertebrate phyla. Apply classification concepts to identify and study different non-chordate organisms, aiding in research and conservation. **CO10:**Examine Living Fossils and Evolutionary Affinities

2	Public Health and Hygiene	BSCZOOSE101	**CO1:** Understand the fundamental concepts of public health, hygiene, and their determining factors. **CO2:** Analyze the impact of pollution on health and identify waterborne and airborne diseases. **CO3**: Evaluate the health hazards associated with radiation from mobile cell towers and electronic gadgets, along with recommended safety measures. **CO4:** Recognize the significance of health education in environmental improvement and disease prevention. **CO5:** Explain the importance of personal hygiene, oral hygiene, and sexual hygiene in maintaining overall health. **CO6:** Understand the necessity of community hygiene and its maintenance for disease prevention. **CO7:** Classify food components into macronutrients and micronutrients, and their roles in health.Formulate balanced dietary plans for different life stages, including infants, adults, pregnant women, and the elderly. **CO8:** Recognize the importance of dietary fiber in nutrition and digestion. Explain the significance of breastfeeding for infant health and immunity. **CO9:**Identify malnutrition disorders such as anemia (iron and B12 deficiency), kwashiorkor, marasmus, rickets, and goiter, along with their causes, symptoms, and preventive measures. **CO10:**Identify various infectious agents responsible for human diseases.Describe viral communicable diseases (e.g., measles, chickenpox, polio, swine flu, dengue, chikungunya, rabies, leprosy, and hepatitis) in terms of causative agents, symptoms, precautions, and treatment. **CO11.**Explain bacterial communicable diseases (e.g., tuberculosis, typhoid, cholera, tetanus, plague, whooping cough, diphtheria, and leprosy) with their causes, symptoms, and preventive measures.Analyze sexually transmitted diseases (STDs) such as AIDS, syphilis, and gonorrhea, their symptoms, and preventive strategies. **CO12:** Identify major non-communicable

			diseases such as hypertension, stroke, coronary heart disease, myocardial infarction, osteoporosis, osteoarthritis, and rheumatoid arthritis, including their causes, symptoms, and precautions. **CO13:** Understand common gastrointestinal disorders (acidity, peptic ulcers, constipation, and piles) and obesity, along with their causes, symptoms, and preventive measures. **CO14:**Analyze the causes, symptoms, and preventive measures of oral and lung cancer.
3	Diversity of Non-chordates	BSCZOOMN101	**CO1:**Define systematics, taxonomy, and hierarchical classification. Differentiate between taxonomic levels (alpha, beta, gamma, omega, cytotaxonomy, numerical taxonomy, and chemotaxonomy). **CO2:** Explain the principles of binomial nomenclature and the significance of scientific names. Understand the principle of priority and typification (Holotype, Paratype, Neotype, etc.) **CO3:**Define multicellularity and its significance in evolutionary biology Differentiate species concepts: biological and evolutionary. **CO4:** Understand the transition from unicellular to multicellular organisms. Explain diploblastic and triploblastic organization, body cavities, and embryonic development in protostomes and deuterostomes. **CO5:** Classify protists up to the phylum level. Classify and describe the structural characteristics of Porifera, Cnidaria, Platyhelminthes, and Nematoda. **CO6:** Understand the classification and characteristics of Annelids, Arthropods, Molluscs, Echinoderms, and Hemichordates. **CO7:**Develop a strong foundation in taxonomy and systematics, understanding species classification and nomenclature. Gain insights into evolutionary biology, the origin of metazoans, and species diversification. Acquire knowledge about the anatomy, physiology, and ecological roles of major invertebrate phyla. Apply classification concepts to identify and study different non-chordate organisms, aiding in research and conservation.

			CO8: Examine Living Fossils and Evolutionary Affinities
4	Application of Bio-Science	MDC106	**CO1:** Understand the concept of Vermiculture – Gain knowledge about the role of earthworms in organic waste decomposition, soil fertility, and sustainable farming practices. **CO2:** Learn Apiculture techniques – Understand the caste system of honey bees, different types of beehives, honey extraction methods, and the economic importance of honey and beeswax. **CO3:** Gain insights into Sericulture – Identify different types of silkworms, their host plants, silk composition, and the methods involved in rearing and reeling silk for textile industries. **CO4:** Understand the concept of pests and Integrated Pest Management (IPM) – Learn about pests' impact on agriculture, IPM strategies, and eco-friendly pest control methods. **CO5**:Develop knowledge of Aquaculture – Understand composite fish culture, induced breeding techniques, and pearl culture for economic benefits. **CO6:**Learn about Aquarium Fish Keeping – Gain knowledge of ornamental fish species, maintenance of aquariums, and commercial breeding practices. **CO7:**Learn about different poultry breeds, deep litter systems, common diseases affecting poultry, and their management. **CO8:**Identify indigenous (Sahiwal, Tharparkar, Gir) and exotic (Jersey, Holstein Friesian) cattle breeds, their distribution, characteristics, and economic contributions. **CO9:**Understand Immunization and Vaccines – Differentiate between innate and acquired immunity, active and passive immunization, and various types of vaccines (inactivated, live-attenuated, toxoid, conjugate, DNA/RNA, recombinant). **CO10:**Understand the basic characteristics of cancerous cells and their significance in medical research. **CO11:**Learn the principles and methods of blood testing, including Total Count (TC), Differential Count (DC), blood grouping, Erythrocyte Sedimentation Rate (ESR), Packed Cell Volume (PCV), Hemoglobin estimation, Mean Corpuscular Volume

			(MCV), and Mean Corpuscular Hemoglobin Concentration (MCHC). **CO12:**Understand Basic Microscopy Principles and Applications – Learn the working principles of Bright Field and Fluorescence Microscopy and their applications in biological studies**.** **CO13:**Understand the definition, general steps, and significance of IVF in reproductive biology.

SEMESTER: II (NCCF)

COURSE OUTCOMES (CO)			
Sl No.	**Course Name**	**Course Code**	**Course Outcomes(CO)**
1	Diversity of Chordates	BSCZOOMJ201	**CO1:** Understand the characteristics and affinities of Hemichordates **CO2**:Study the general characteristics of Urochordata and Cephalochordata **CO3:** Analyze larval forms in Protochordates **CO4:**Retrogressive Metamorphosis in Urochordata **CO5:**Understand the Origin of Chordates **CO6:**Study the general characteristics, affinities, and biology of Cyclostomes **CO7:**Conduct Type Studies of Labeo, Duttaphrynus, and Calotes **CO8:**Understand the General Characteristics and Classification of Fish, amphibian, reptiles, aves, mammalia,
2	Instrumentation and Clinical Diagnosis	BSCZOOSE201	**CO1:** Understand the Basics of Microscopy.Study the Principles and Applications of Advanced Microscopy **CO2**:Gain Hands-on Experience with Micrometry and Camera Lucida Drawings **CO3:**Understand Physiological Salines and Chemical Concentrations **CO4:**Learn the Use of pH Meters **CO5:**Explore the Principles and Types of Centrifugation **CO6:**Study the Principles and Applications of Colorimetry and Spectrophotometry **CO7:**Understand the Principles and Applications of Electrophoresis **CO8:**Learn Chromatographic Techniques **CO9**:Understand Immunological Assays **CO10:**Learn Diagnostic Immunology Techniques, **CO11:**Understand the Basics of Cell

			Cultureearn Cell Counting and Viability Testing Methods **CO12:**Gain Practical Knowledge of Haematology Techniques
3	Diversity of Chordates	BSCZOOMN201	**CO1:** Understand the characteristics and affinities of Hemichordates **CO2**: Study the general characteristics of Urochordata and Cephalochordata **CO3:** larval forms in Protochordates **CO4:** Retrogressive Metamorphosis in Urochordata **CO5:** Understand the Origin of Chordates **CO6:** Study the general characteristics, affinities, and biology of Cyclostomes **CO7:** Conduct Type Studies of Labeo, Duttaphrynus, and Calotes **CO8:**Understand the General Characteristics and Classification of Fish, amphibian, reptiles, aves, mammalia,

SEMESTER: III (NCCF)

COURSE OUTCOMES (CO)			
Sl No.	**Course Name**	**Course Code**	**Course Outcomes(CO)**
1	Animal Physiology and Comparative Anatomy	BSCZOOMJ301	**CO1:**Understand the Structure and Function of Teguments in Non-Chordates **CO2**:Learn the Integumentary System in Chordates **CO3:**Study Skeletal and Muscular Elements in Non-Chordates **CO4:**The Skeletal and Muscular System in Chordates **CO5:**Understand the Digestive System in Non-Chordates **CO6:**The Digestive System in Chordates **CO7:**Study Locomotory Organs in Non-Chordates Learn the Respiratory System in -Chordates **CO8:**Analyze Circulatory Systems in Non-Chordates and chordates **CO 9:**Study Excretory Systems in Non-Chordate and non-chordates **CO 10:**Understand the Endocrine System in Non-Chordates
2	Applied Zoology of Invertebrates	BSCZOOMJ302	**CO1:** Understand the Morphology of Silkworms **CO2**:Distinguish Between Mulberry and Non-Mulberry Sericulture **CO3:**Understand Rearing and Spinning

			Techniques,Identify Diseases and Pests in Sericulture **CO4:**Explore the Silk Industry and Employment Potential **CO5:**Classify Honeybee Species in India, Analyze Bee Products and Their Applications **CO6:**Explore Pollination Services and Planned Pollination Techniques Understand Honey Extraction, Processing, and Marketing **CO7:**Study the Life Cycle of Lac Insects Analyze Processing and Uses of Lac **CO8:**Understand Vermiculture and Earthworm Biology **CO9:**Classify Agricultural PestsUnderstand Economic Threshold Level (ETL) and Economic Injury Level (EIL) **CO10:**Apply Integrated Pest Management (IPM) Techniques
3	Indian Health Sciences	MDC304	**CO1:** Understand the Definition and Components of Health **CO2**:Analyze Health-Enhancing and Health-Compromising Behaviors **CO3:**Demonstrate Knowledge of Public Health and Nutrition **CO4:**Comprehend Human Health and Disease **CO5:**Recognize the Importance of Mental Health and Well-being **CO6:**Gain an elementary understanding of neurological disorders such as Parkinson's disease, dementia (including Alzheimer's), and amyotrophic lateral sclerosis (ALS). **CO7:**Understand the importance of mental health awareness and the impact of anxiety, stress, and resilience on overall well-being.

SEMESTER: IV (NCCF)

COURSE OUTCOMES (CO)			
Sl No.	**Course Name**	**Course Code**	**Course Outcomes(CO)**
1	Ecology	BSCHZOOMJ401	**CO1:** Understand the Structure and Function of Ecosystems **CO2**:Analyze Population Ecology and Growth Models **CO3:**Examine Community Ecology and Interactions

			CO4:valuate Environmental Issues and Conservation Strategies **CO5:** Recognize the impact of human activities on biodiversity and propose sustainable solutions.
2	Livestock Management and Animal	BSCHZOOMJ402	**CO1:**Understand skills and requirements necessary to find and maintain a job. **CO2:**Select and develop a breeding system for a livestock enterprise. **CO3:**Understand the importance of genetic improvement in animal production. **CO4:**Formulate feed rations for different classes of livestock. **CO5:**Identify common problems associated with livestock and horse herd health and solutions. **CO6:**Identify current and future issues relating to animal husbandry **CO7:**Understand different marketing opportunities available for livestock production.
3.	Aquaculture	BSCHZOOSE401	**CO1:** Gain knowledge of traditional and modern aquaculture systems, including indigenous and exotic cultivable carp species. **CO2**:Learn different types of culture methods such as extensive, intensive, and composite fish culture. **CO3:**Understand specialized aquaculture techniques like brackish water shrimp culture and freshwater prawn culture. **CO4:**Learn about pearl-producing mollusks and the pearl formation process. **CO5:**Acquire skills in artificial pearl culture techniques, including oyster collection, nucleus insertion, and pearl harvesting. **CO6:**Understand feed formulation for shrimps and carps, including live feed options. **CO7:**Learn induced breeding techniques for carps, including broodstock maintenance, hypophysation, and synthetic hormone-induced breeding. **CO8:**Understand different fishing techniques used in aquaculture. **CO9:**Learn the preparation and management of fish aquariums. **CO10:**Develop skills in ornamental fish breeding and rearing. **CO11:**Explore the economic potential of the aquarium fish industry as a cottage industry.

			CO12: Learn preventive and control measures for maintaining fish health and sustainability in aquaculture.
4.	Ecology, Ethology and Evolution	BSCZOOMN401	**CO1:** Know the evolutionary and functional basis of animal ecology. **CO2**:Understand what makes the scientific study of animal ecology a crucial and exciting endeavour. **CO3:**Engage in field-based research activities to understand well the theoretical aspects taught besides learning techniques for gathering data in the field. **CO4:**Analyse a biological problem, derive testable hypotheses and then design experiments and put the tests into practice. **CO5:**Solve the environmental problems involving interaction of humans and natural systems at local or global level.Learn a wide range of theoretical and practical techniques used to study animal behaviour **CO6:**Develop skills, concepts and experience to understand all aspects of animal behaviour. **CO7:**Objectively understand and evaluate information about animal behaviour and ecology encountered in our daily lives. **CO8:**Understand and be able to objectively evaluate the role of behaviour in the protection and conservation of animals in the wild. **CO9:**Acquire an in-depth knowledge on the diversity and relationships in animal world. **CO10:**Develop a holistic appreciation on the phylogeny and adaptations in animals. **CO11:**Understanding on the process and theories in evolutionary biology. **CO12:**Develop an interest in the debates and discussion taking place in the field of evolutionary biology.

SEMESTER: V (LOCF PROGRAM)

COURSE OUTCOMES (CO)			
Sl No.	**Course Name**	**Course Code**	**Course Outcomes(CO)**
1.	GENETIC ENGINEERING AND BIOTECHNOLOGY	BSCPZOODSE501	**CO1:**The fundamental principles and applications of genetic engineering in medicine, agriculture, and biotechnology. **CO2:** Develop an understanding of the fundamental molecular tools and their applications of DNA modification and cloning. **CO3**: Describe the role and function of key enzymes in genetic engineering, such as restriction enzymes, DNA polymerases, ligases, and reverse transcriptases **CO4:** Explain modern genome editing methods (CRISPR, TALENs, ZFNs) and their applications in gene therapy and research. **CO5:** Analyze genome sequencing techniques (Sanger method) and the impact of projects like the Human Genome Project. **CO6:** Assess the economic, social, and ethical aspects of genetic engineering, ensuring responsible scientific advancements. **CO7**: Develop future course of their career development in higher education and research with a sound base. **CO8:** Apply their knowledge with problem solving approach to recommend strategies of genetic engineering for possible applications in Biotechnology and allied industry. **CO9:**Genome sequencing techniques (Sanger method) and the impact of projects like the Human Genome Project
2	LIVESTOCK MANAGEMENT AND ANIMAL	BSCPZOODSE502	**CO1:** Learn the significance of livestock enterprises, key issues in animal agriculture, and the role of animal products in the economy.

	HUSBANDRY		**CO2:**The nutritional and economic importance of animal products such as beef, pork, lamb, and poultry. **CO3:** They gain the knowledge of reproductive systems, breeding systems (including cattle and goat breeding), and the influence of hormones and the environment on animal reproduction. **CO4:** Learn artificial insemination (AI) and other reproductive technologies for improving livestock productivity. **CO5:** Identify energy and nutritional requirements for livestock at different stages (maintenance, growth, and production of milk, eggs, wool, and meat). **CO6:** Analyze the role of carbohydrates, fats, proteins, minerals, vitamins, and water in livestock nutrition. **CO7:** Utilize direct and indirect calorimetry and advanced ration formulations to optimize livestock feeding. **CO8:** Recognize common breeds of cattle, goats, and poultry and implement best practices for their selection, housing, and health care. **CO9:** Develop effective vaccination and deworming programs for disease prevention and breed management. **CO10:**Livestock marketing strategies, quality control measures, and genetic tools for livestock improvement. **CO11;** Apply basic genetic principles and modern tools for livestock improvement and breeding programs.
3	PUBLIC HEALTH AND HYGIENE	BSCHZOOSE502	**CO1:**Understand the fundamental concepts of public health, hygiene, and their determining factors. **CO2:** The impact of pollution on health and identify waterborne and airborne diseases.

			CO3:Evaluate the health hazards associated with radiation from mobile cell towers and electronic gadgets, along with recommended safety measures. **CO4:** Recognize the significance of health education in environmental improvement and disease prevention. **CO5:**The importance of personal hygiene, oral hygiene, and sexual hygiene in maintaining overall health. **CO6:**Understand the necessity of community hygiene and its maintenance for disease prevention. **CO7:**Classify food components into macronutrients and micronutrients, and their roles in health.Formulate balanced dietary plans for different life stages, including infants, adults, pregnant women, and the elderly. **CO8:**Recognize the importance of dietary fiber in nutrition and digestion. Explain the significance of breastfeeding for infant health and immunity. **CO9:**Identify malnutrition disorders such as anemia (iron and B12 deficiency), kwashiorkor, marasmus, rickets, and goiter, along with their causes, symptoms, and preventive measures. **CO10:**Identify various infectious agents responsible for human diseases.Describe viral communicable diseases (e.g., measles, chickenpox, polio, swine flu, dengue, chikungunya , rabies, leprosy, and hepatitis) in terms of causative agents, symptoms, precautions, and treatment. **CO11.**They learn bacterial communicable diseases (e.g., tuberculosis, typhoid, cholera, tetanus, plague, whooping cough, diphtheria, and leprosy) with their causes, symptoms, and preventive measures.Analyze sexually transmitted diseases (STDs) such as AIDS, syphilis, and gonorrhea, their symptoms, and preventive strategies. **CO12:** Identify major non-communicable diseases

			such as hypertension, stroke, coronary heart disease, myocardial infarction, osteoporosis, osteoarthritis, and rheumatoid arthritis, including their causes, symptoms, and precautions. **CO13:** Understand common gastrointestinal disorders (acidity, peptic ulcers, constipation, piles) and obesity, along with their causes, symptoms, and preventive measures. **CO14:**The causes, symptoms, and preventive measures of oral and lung cancer.
4.	BIOTECHNIQUES	BSCHZOOC501	**CO1:**Learn the theoretical basis of techniques like Microscope, centrifugation, chromatography, electrophoresis, Colorimetry and Spectrophotometry, its principle of working and its correct application **CO2:**Learn the construction repair and adjustment of any equipment required for a technique**.** **CO3:**Learn the accuracy of technique CO4:Learn the maintenance laboratory equipments / tools, safety hazards and precautions. **CO4:** Learn the theoretical basis of different tools and techniques (ELISA,EIA, RIA, immunodiffusion) used in endocrinology and immunology **CO5:** Understand the process of preparation of buffer. Learn the techniques of separation of amino acids, proteins and nucleic acids. **CO6:** Understand the technique of cell and tissue culture. Learn the preparation of solution of given percentage and molarity.
5	MICROBIOLOGY, PARASITOLOGY & IMMUNOLOGY	BSCHZOOC502	**CO1:**Carry out common procedures for culturing, purifying and diagnostics of micro-organisms understand the disease-causing potential of bacteria and viruses, and the responses of the immune system. **CO2**:The mechanisms for transmission, virulence and pathogenicity in pathogenic micro-organisms. **CO3:**Diagnose the causative agents, describe pathogenesis and treatment for important diseases like malaria, leishmaniasis,

			trypanosomiasis, toxoplasmosis, schistosomiasis, cysticercosis, filariasis etc. **CO4:**Assess the importance of incidence, prevalence and epidemiology in microbiological diagnostic activities. Know how resistance development and resistance transfer occur. **CO5:**Identify the major cellular and tissue components which comprise the innate and adaptive immune system. **CO6:**Understand how are immune responses by CD4 and CD8 T cells, and B cells, initiated and regulated. **CO7:**Understand how the immune system distinguishes self from non-self. **CO8:**Gain experience at reading and evaluating the scientific literature in the area.
6	GENETIC ENGINEERING AND BIOTECHNOLOGY	BSCHZOODSE501	**CO1:**The fundamental principles and applications of genetic engineering in medicine, agriculture, and biotechnology. **CO2:**Develop an understanding of the fundamental molecular tools and their applications of DNA modification and cloning. **CO3**: Describe the role and function of key enzymes in genetic engineering, such as restriction enzymes, DNA polymerases, ligases, and reverse transcriptases **CO4:**Modern genome editing methods (CRISPR, TALENs, and ZFNs) and their applications in gene therapy and research. **CO5:**Genome sequencing techniques (Sanger method) and the impact of projects like the Human Genome Project. **CO6:**Assess the economic, social, and ethical aspects of genetic engineering, ensuring responsible scientific advancements. **CO7**: Develop future course of their career development in higher education and research with a sound base. **CO8:** Apply their knowledge with problem solving approach to recommend strategies of genetic engineering for possible applications in Biotechnology and allied industry. **CO9:**Analyze genome sequencing techniques (Sanger method) and the impact of projects like the Human Genome Project

7.	LIVESTOCK MANAGEMENT AND ANIMAL HUSBANDRY	BSCHZOODSE502	**CO1:** Studentslearnthe significance of livestock enterprises, key issues in animal agriculture, and the role of animal products in the economy. **CO2:** Analyze the nutritional and economic importance of animal products such as beef, pork, lamb, and poultry. **CO3:** They gain the knowledge of reproductive systems, breeding systems (including cattle and goat breeding), and the influence of hormones and the environment on animal reproduction. **CO4**: They learn artificial insemination (AI) and other reproductive technologies for improving livestock productivity. **CO5:** Identify energy and nutritional requirements for livestock at different stages (maintenance, growth, and production of milk, eggs, wool, and meat). **CO6:** Analyze the role of carbohydrates, fats, proteins, minerals, vitamins, and water in livestock nutrition. **CO7:** Utilize direct and indirect calorimetry and advanced ration formulations to optimize livestock feeding. **CO8:**Recognize common breeds of cattle, goats, and poultry and implement best practices for their selection, housing, and health care. **CO9:**Develop effective vaccination and deworming programs for disease prevention and breed management. **CO10:**Explain livestock marketing strategies, quality control measures, and genetic tools for livestock improvement. **CO11;** Apply basic genetic principles and modern tools for livestock improvement and breeding programs.

SEMESTER: VI (LOCF PROGRAM)

COURSE OUTCOMES (CO)			
Sl No.	**Course Name**	**Course Code**	**Course Outcomes(CO)**
1.	WILD LIFE CONSERVATION AND MANAGEMENT	BSCPZOODSE601	**CO1:**students will develop a strong understanding of wildlife conservation, population dynamics, habitat restoration, and human-wildlife interactions, preparing them for careers in ecology, environmental

			science, and wildlife management. **CO2:** Define wildlife, its value, and its importance in maintaining ecological balance. Understand the principles of wildlife conservation, ethics, and the necessity of conservation efforts. Explain ecosystem interactions and the distribution of animals across biomes. **CO3**: Assess the impact of topography, geology, soil, and water on wildlife populations. Analyze the effects of habitat destruction and fragmentation on wildlife. **CO4:**Understand the biological parameters (food, cover, forage) affecting wildlife populations. Explain population attributes and the concepts of exponential and logistic growth in wildlife. **CO5:**Understand the objectives, strategies, and challenges of wildlife conservation, including poaching, forest fires, mining, hunting, illegal trading, and marine pollution. Learn about captive breeding techniques and their role in wildlife translocation and reintroduction. **CO6:**Identify different terrestrial wildlife habitats in India. Explore restoration techniques for degraded wildlife habitats. Examine the damage caused by wildlife to human settlements and crops, and strategies for mitigation. **CO7**:Differentiate between types of wildlife management (manipulative and custodial).Develop strategies for managing overabundant wild animal populations causing damage to human settlements. **CO8:**Learn about tools (e.g., compass, binoculars, spotting scopes, drones, radio collars, camera traps) and techniques used in wildlife management. **CO9:**Analyze man-wildlife conflicts and explore resolution and mitigation strategies. Understand the management of exotic and invasive wetland species in India**.**

2	INSECT PEST, VECTOR BIOLOGY AND MANAGEMENT	BSCPZOOSE602	**CO1:**Identify major insect pests and vectors affecting plants and animals.Classify pests based on their status (major, minor, occasional, migrant). **CO2:** Explain the impact of human activities on pest outbreaks and disease transmission. **CO3**: Understand population growth patterns in insect pests and vectors. Differentiate between density-dependent and independent factors influencing pest populations. **CO4:**Learn various methods for pest sampling and monitoring. **CO5:**Identify different types of insecticides, their formulations, toxicity, and safety measures. Understand application techniques, droplet size, and equipment used in insecticide application. **CO6:**Evaluate problems associated with insecticide use and their environmental impact. **CO7**:Learn about cultural control methods (e.g., irrigation, crop rotation, sanitation, and intercropping). **CO8:**Learn about biocontrol agents, including predators, parasitoids, and parasites. Understand the role of microbial pathogens (fungi, viruses, bacteria, nematodes) in pest control. **CO9:**Analyze pathogen transmission and area-wise pest management. **CO10:**Understand the role of pheromones, allele chemicals, traps, and physical barriers in pest management. **CO11:** Explore the use of larvivorous fish and insectivorous plants in vector control. **CO12:** Explore the role of genetically modified organisms (GMOs) in pest control and associated ethical concerns.

			CO13: Understand the principles of Integrated Pest Management (IPM) and its adoption constraints.
3.	BIOSTATISTICS & BIOINFORMATICS	BSCHZOOC601	**CO1:**Know the theory behind fundamental bioinformatics analysis methods/tool. **CO2:**Be familiar with widely used bioinformatics databases**.** **CO3:**Know basic concepts of probability and statistics. **CO4:**Describe statistical methods and probability distributions relevant for molecular biology data. **CO5:** Know the applications and limitations of different bioinformatics and statistical methods. **CO6:**Conduct analysis of variance (ANOVA) including one-way ANOVA and post-hoc tests. Apply parametric (paired and unpaired t-tests) and non-parametric (Chi-square test) methods for hypothesis testing. **CO7:** Utilize pie charts, bar diagrams, histograms, frequency polygons, cumulative frequency curves, and box plots for data visualization. **CO8:** Demonstrate an understanding of binomial and Poisson distributions and their applications in biological and statistical research. **CO9:** Acquire knowledge of various databases of proteins, nucleic acids. Primary, secondary and composite databases. BLAST, FASTA, DOT PLOT **CO10:** Make phylogenetic predictions or prediction of structure of proteins and nucleic acids

			CO11: Develop understanding in Primer designing **CO12:** Understand data mining tool and its practical application in a case study **CO13:** Apply the knowledge in future course of their career development in higher education and research.
4.	APPLIED ZOOLOGY	BSCHZOOC602	**CO1:**Understand the culture techniques of prawn, pearl and fish. **CO2:**Understand silkworms rearing and their products. **CO3**:Understand the Bee keeping equipments and apiary management. **CO4:**Understand dairy animals management, the breeds and diseases of goats and learn the testing of egg and milk quality **CO5:**Learn various concepts of lac cultivation. **CO6:**Be aware of a broad array of career options and activities in human medicine, biomedical research and allied health professions
5.	WILD LIFE CONSERVATION AND MANAGEMENT	BSCHZOODSE601	**CO1:**Understand the Concept & Importance of Wildlife – Define wildlife, recognize its ecological and economic value, and explain the significance of conservation efforts. **CO2:** Develop an understanding of how animals interact with each other and their natural environment**.** **CO3**: Differentiate between types of protected

			areas and zoning strategies for wildlife conservation. **CO4:**Assess how topography, geology, soil, and water influence wildlife distribution. **CO5:**Understand habitat fragmentation, loss, and its consequences on population viability. **CO6:**Compare exponential and logistic growth patterns in wildlife populations. **CO7**:Demonstrate proficiency in the writing, speaking, and critical thinking skills needed to become a wildlife technician. **CO8:** Analyze Lotka-Volterra models and their applications in ecological studies. **CO9:**Poaching, forest fires, hunting, habitat destruction, and their implications. **CO9:** Develop techniques for rehabilitating degraded habitats. **CO10:**Gain an appreciation for the modern scope of scientific inquiry in the field of wildlife conservation management. **CO11:**Develop the ability to work collaboratively on team-based projects.
6.	MAMMALIAN PHYSIOLOGY	BSCHZOODSE602	**CO1:** The mechanism and regulation of breathing, including the transport of gases (O_2 & CO_2) and respiratory quotient. **CO2**The components and functions of blood, including blood buffers, blood groups, and blood cells. **CO3:**Understand the cardiac cycle, haemopoiesis, and homeostasis mechanisms. **CO4**: Comprehend the significance of a balanced diet and the processes of digestion and

			absorption of macronutrients. **CO5:**Explain the role of gastrointestinal hormones in digestion. **CO6:**The structure and function of the nephron and the mechanisms of urine formation. **CO7:**Analyze the regulation of urine formation and the roles of renin, ADH, and aldosterone. **CO8:**Understand the organization of the nervous system, neuron and glial cell structure, and their functions. Explain synaptic transmission, resting membrane potential, and action potential conduction. **CO9:**The structure and function of the eye and the mechanisms of vision, including photoreceptors and ionic basis of potential generation. **CO10:**Analyze the structure of the ear, mechanoreceptors, and the ionic basis of auditory signal generation. **CO11;**Differentiate between types of muscles and describe the ultrastructure of skeletal, smooth, and cardiac muscles. **CO12**:Explain the molecular and chemical basis of muscle contraction and the role of muscle proteins. **CO13:**They understand neuromuscular junction function and mechanisms of contraction.Describe muscle twitch, tetanus, fatigue, and different types of muscle contractions (isotonic and isometric).

Durgapur Government College Mapping/Co-relation Program Outcome(PO) & Course Outcome(CO)						
Department : Zoology Academic Session : 2024-25						
CO details	PO details					
Sl. No.	Course Code	PO1	PO2	PO3	PO4	PO5
1.	BSCZOOMJ101	✓	✓	✓	✓	✓
2.	BSCZOOSE101	✓	✓	✓		✓
3.	BSCZOOMN101	✓	✓	✓	✓	
4.	MDC106	✓	✓	✓	✓	✓
5.	BSCZOOMJ201	✓	✓	✓		✓
6.	BSCZOOSE201	✓		✓	✓	
7.	BSCZOOMN201	✓	✓	✓		✓
8.	BSCZOOMJ301		✓	✓	✓	✓
9.	BSCZOOMJ302	✓	✓	✓		✓
10.	MDC304	✓	✓	✓	✓	✓
11.	BSCHZOOMJ401		✓	✓	✓	
12.	BSCHZOOMJ402	✓	✓	✓		✓
13.	BSCHZOOSE401	✓		✓	✓	✓
14.	BSCZOOMN401	✓	✓	✓		
15.	BSCPZOODSE501	✓	✓	✓	✓	✓
16.	BSCPZOODSE502		✓	✓	✓	✓

17.	BSCHZOOSE502	✓	✓	✓	✓	✓
18.	BSCHZOOC501	✓	✓	✓	✓	✓
19.	BSCHZOOC502		✓	✓	✓	
20.	BSCPZOODSE601	✓	✓	✓	✓	✓
21.	BSCPZOOSE602	✓	✓	✓	✓	✓
22.	BSCHZOOC601	✓	✓	✓	✓	
23.	BSCHZOOC602	✓	✓	✓	✓	✓
24.	BSCHZOODSE601		✓	✓	✓	✓
25.	BSCHZOODSE602	✓	✓	✓	✓	✓