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Janardan Bhagat Shikshan Prasarak Sanstha's

**CHANGU KANA THAKUR**

**ARTS, COMMERCE AND SCIENCE COLLEGE, NEW PANVEL  
(AUTONOMOUS)**

Re-accredited 'A+' Grade by NAAC (3<sup>rd</sup> Cycle - CGPA 3.61)

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## Department of Zoology

### COURSE OUTCOMES

<b>F.Y. B. Sc. Semester I (Major Course) Paper I</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: USC1ZO1 PAPER - I: ANIMAL DIVERSITY (NON-CHORDATES)</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Know the diversity of animals.	Knowledge
CO2	Comprehend the importance of classification.	Comprehension
CO3	Develop insight of group and type study.	Apply

<b>F.Y. B. Sc. Semester I (Major Course) Paper II</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: USC2ZO2 GENETICS</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Understand the basic concepts of genetics.	Knowledge
CO2	Understand recombination and interaction of Genes	Comprehension
CO3	Analyze the impact of genetics on diversity of animals.	Apply



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<b>F.Y. B. Sc. Semester I OPEN ELELCTIVES 1</b>		
<b>Title of the Course and Course Code</b>	<b>COURSE CODE- UOE1IFM INTRODUCTION OF FISHERYMANAGEMENT</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Demonstrate an inclusive understanding of the importance of fisheries and their role in providing food, livelihoods, and ecological balance and explain the fundamental principles and theories of fishery management.	Knowledge
CO2	Identify and analyze the legal and regulatory frameworks governing fisheries at the national and international levels	Comprehension
CO3	Evaluate the consequences of overfishing and depletion on fish stocks and marine ecosystems, and recognize the importance of managing fisheries sustainably.	Apply

<b>F.Y. B. Sc. Semester I OPEN ELELCTIVES 2</b>		
<b>Title of the Course and Course Code</b>	<b>COURSE CODE -UOE2ET ECOTOURISM -I</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Gain the basics of ecotourism.	Knowledge
CO2	Evolve eco-literate society by integrating market-based instruments with eco-cultural knowledge of traditional societies	Comprehension
CO3	Practice ecological knowledge for wealth generation, environmental conservation, and popularization of Indian traditional knowledge	Apply



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<b>F.Y. B. Sc. Semester I VOCATIONAL SKILL COURSE</b>		
<b>Title of the Course and Course Code</b>	<b>COURSE CODE - UIVSCOFB ORNAMENTAL FISH BREEDING</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Identify and describe various species of ornamental fish used in the aquarium trade.	Knowledge
CO2	Demonstrate proficiency in different breeding techniques and demonstrate an understanding of sustainable breeding practices,	Comprehension
CO3	Implement proper water quality management practices in ornamental fish breeding setups and manage brood stock effectively.	Apply
CO4	Comply with legal regulations and ethical considerations in ornamental fish breeding, promoting responsible fish welfare and trade practices	Comprehension



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<b>F.Y. B. Sc. Semester I SKILL ENHANCEMENT COURSE</b>		
<b>Title of the Course and Course Code</b>	<b>COURSE CODE - UISECAFK AQUARIUM FISH KEEPING</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Recognize and categorize different types of aquarium fish based on their characteristics, behavior, and compatibility with other species	Knowledge
CO2	Gain knowledge of the essential components and equipment required for a successful aquarium setup	Comprehension
CO3	Learn to monitor and maintain optimal water quality parameters and understand the dietary requirements of aquarium fish	Knowledge
CO4	Learn how to design and manage a peaceful and compatible community of fish, considering their behavior, size, and environmental preferences.	Apply



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<b>F.Y. B. Sc. Semester I INDIAN KNOWLEDGE SYSTEM COURSE</b>		
<b>Title of the Course and Course Code</b>	<b>COURSE CODE - USCZO1IKSC SERICULTURE</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Explore the traditional knowledge and practices associated with sericulture in India.	Knowledge
CO2	Gain an understanding of the historical significance of sericulture in India, its connection to local communities, and the integration of traditional wisdom with modern sericulture practices	Knowledge
CO3	Gain an understanding of the historical significance of sericulture in India, its connection to local communities, and the integration of traditional wisdom with modern sericulture practices	Knowledge



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<b>F.Y. B. Sc. Semester II (Major Course) Paper -I</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: USC2ZO1 ANIMAL DIVERSITY (CHORDATA)</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Learners will be able to comprehend the diversity of animals.	Knowledge
CO2	Learners will be able to understand the importance of classification	Comprehension
CO3	Learners develop insight of group and type study.	Knowledge

<b>F.Y. B. Sc. Semester II (Major Course) Paper -II</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: USC2ZO2 CELL BIOLOGY</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Describe cell as structural and functional unit of life	Knowledge
CO2	Differentiate prokaryotic and eukaryotic cell and role of various cell organelles.	Comprehension
CO3	Learn to use the various techniques of cell biology.	Knowledge



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<b>F.Y. B. Sc. Semester II MINOR ELECTIVE COURSE</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: USC2ZOM BASIC CONCEPTS OF ECOLOGY</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Introduces the fundamental concepts and principles of ecology and the interactions between organisms and their environment.	Knowledge
CO2	Students will explore key ecological concepts, including the structure and function of ecosystems, population dynamics, community interactions, and the impacts of human activities on the environment.	Comprehension
CO3	Develop a solid foundation in ecological principles and gain an understanding of the interconnections of all living organisms	Knowledge





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<b>F.Y. B. Sc. Semester II OPEN ELECTIVE COURSE 1</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: U2OE1FMII FISHERY MANAGEMENT-II</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Demonstrate skill in fishery data collection, analysis, and stock assessment techniques to make informed management decisions.	Knowledge
CO2	Evaluate the socio-economic and ecological impacts of fishery management decisions on fishing communities and the marine environment interactions, and the impacts of human activities on the environment.	Comprehension
CO3	Apply various fishery management tools and strategies, such as fishing quotas, size limits, and gear regulations, to promote sustainable fishing practices.	Apply
CO4	Critically assess the role of stakeholders in fishery management and the importance of collaborative approaches in decision-making	Evaluate





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<b>F.Y. B. Sc. Semester II OPEN ELECTIVE COURSE 2</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: U20EET2 ECOTOURISM -II</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Develop next-generation ecological entrepreneurs.	Knowledge
CO2	Evolve eco-literate society by integrating market-based instruments with eco-cultural knowledge of traditional societies	Comprehension
CO3	Practice ecological knowledge for wealth generation, environmental conservation, and popularization of Indian traditional knowledge	Apply



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<b>F.Y. B. Sc. Semester II VOCATIONAL SKILL COURSE</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: U2VSCBVFP BY-PRODUCTS AND VALUE-ADDED FISH PRODUCTS</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Identify and classify various by-products generated during fish processing understanding their potential value and applications.	Knowledge
CO2	Explore good manufacturing practices while manufacturing these products	Comprehension
CO3	Demonstrate proficiency in various techniques for developing value-added fishery products, including processing, preservation, and packaging methods.	Apply



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<b>F.Y. B. Sc. Semester II SKILL ENHANCEMENT COURSE</b>		
<b>Title of the Course and Course Code</b>	<b>PAPER CODE: U2SECVT VERMICOMPOSTING TECHNOLOGY</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Prepare a vermicomposting setup and select appropriate containers and bedding materials and describe the potential for using vermicomposting for small-scale food production and commercial farming.	Knowledge
CO2	Analyze cutting-edge techniques and equipment for vermicomposting and develop a plan for implementing vermicomposting in a specific setting, such as a garden, farm, or community.	Comprehension
CO3	Demonstrate critical thinking and problem-solving skills by applying vermicomposting concepts to real-world scenarios. The course is structured at the basic level for the benefit of the students coming from different discipline having broad scope for employability.	Apply



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<b>S.Y. B. Sc. Semester III Paper I</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USCZO301 Fundamentals of Genetics, Chromosomes and Heredity, Nucleic acids</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Describe the structure of chromosomes and its types and mechanisms of sex determination.	Knowledge
CO2	Differentiate the autosomes and sex chromosomes, euchromatin and heterochromatin.	Comprehension
CO3	Apply the principles of inheritance to study heredity	Knowledge
CO4	Analyze the Pedigree chart	Apply

<b>S.Y. B. Sc. Semester III Paper II</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USCZO302 Nutrition and Excretion, Respiration and Circulation, Nervous system in Invertebrates, Control and Coordination, Locomotion and Reproduction</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Recognize the increasing complexity of nutritional, excretory and osmoregulatory physiology in evolutionary hierarchy and correlate the habit and habitat with nutritional, excretory and osmoregulatory structures.	Knowledge
CO2	Explain the increasing complexity of respiratory and circulatory physiology in evolutionary hierarchy and correlate the habit and habitat with nutritional, excretory and osmoregulatory structures.	Comprehension
CO3	Analyze the cause and effect of alterations in chromosome number and structure.	Analyse
CO4	Compare the process of control and coordination by nervous and endocrine regulation.	Apply



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<b>S.Y. B. Sc. Semester III Paper III</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USCZO303 Developmental Biology, Ethology and Parasitology</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Develop critical understanding relates with single cell fertilized egg become embryo	Knowledge
CO2	Compare different developmental stages.	Comprehension
CO3	State different types of animal behavior.	Knowledge
CO4	Describe the life cycle of specific parasites, the symptoms of the disease and its treatment.	Knowledge

<b>S.Y. B. Sc. Semester IV Paper -I</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USCZO401 Origin and Evolution of Life, Population Genetics, Scientific Attitude, Methodology, Scientific Writing and Ethics in Scientific Research</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Develop critical understanding relates with single cell fertilized egg become embryo	Knowledge
CO2	Compare different developmental stages.	Comprehension
CO3	State different types of animal behavior.	Knowledge
CO4	Describe the life cycle of specific parasites, the symptoms of the disease and its treatment.	Knowledge



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**S.Y. B. Sc. Semester IV Paper -II**

<b>Title of the Course and Course Code</b>	<b>Course code- USCZO402 Cell Biology, Endo membrane System and Biomolecules</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Describe the functioning of nucleus, extra nuclear organelles and understand the intricate cellular mechanisms involved	Knowledge
CO2	Explain composition of the transport mechanisms adopted by the cell and its organelles for its maintenance and composition of cell	Comprehension
CO3	Discuss intricacy of endomembrane system and the interlinking of endomembrane system for functioning of cell	Knowledge
CO4	Summarize the biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids	Knowledge

**S.Y. B. Sc. Semester IV Paper -III**

<b>Title of the Course and Course Code</b>	<b>Course code- USCZO403 ECONOMIC ZOOLOGY</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Describe basics of sericulture and its scope in India.	Knowledge
CO2	Identify varieties of silkworms, host-plants and aspects on silk extraction and the diseases afflicting silk-worms.	Understand
CO3	Apply the culture techniques of prawn, pearl and fish	Knowledge
CO4	Discuss dairy animals' management, the breeds and diseases	





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<b>T.Y. B. Sc. Semester V Paper-I</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC5ZO1 Principles of Taxonomy, Modern Trends in Taxonomy and study of invertebrates</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Learners will understand the basics concept of taxonomy and learn to classify animals on the basis of their relation to other animals by body structure, external characters and development	Knowledge
CO2	Apply the International rules of Nomenclature to give a scientific name to animals which are found during research.	Comprehension
CO3	Understand the gradual development and evolutionary history of different kinds of living organisms from earlier forms over several generations	Knowledge

<b>T.Y. B. Sc. Semester V Paper-II</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC5ZO2 Haematology and Immunology</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Achieve proficiency in the skills necessary for the study of hematology. identify the major cellular and tissue components which comprise the innate and adaptive immune system.	Knowledge
CO2	Get familiar with different terminologies and diagnostic tests performed in a pathological laboratory and equipped for taking any further pathological course or working in a diagnostic laboratory.	Knowledge
CO3	Comprehend the types of immunity and the components of immune system and realize the significant role of immune system in giving resistance against diseases	Comprehension
CO4	Understand immune related pathologies and the principles and applications of vaccines and develop basic understanding of immunology of organ transplantation.	Understand





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<b>T.Y. B. Sc. Semester V Paper-III</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC5ZO3 Histology, Toxicology, Enzymology and Biostatistics</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Describe the well- planned organization of tissues and cells in the organ system.	Knowledge
CO2	Recall the principles of toxicology with particular emphasis on toxic responses to chemical exposures, nature and effect of toxicity and toxicity testing.	Comprehension
CO3	Develop introductory understanding of regulatory affairs in toxicology.	Knowledge
CO4	Describe basics of enzyme structure, function and variations in enzyme activity and kinetics.	Understand

<b>T.Y. B. Sc. Semester V Paper-IV</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC5ZO4 Biotechniques and Introduction to Endocrinology</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Learn the theoretical basis of technique, its principle of working and its correct application.	Knowledge
CO2	Learn the construction repair and adjustment of any equipment required for a technique	Knowledge
CO3	Learn the maintenance laboratory equipment's/ tools, safety hazards and precautions.	Apply
CO4	Understand the technique of cell and tissue culture	Knowledge



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<b>T.Y. B. Sc. Semester V Paper-V</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC5ZO5 Oceanography, Aquaculture Practices, Marketing and Finance</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Describe breeding techniques and skills for culture of major carps.	Knowledge
CO2	Comprehend hatchery and nursery management of major carps and also learn about breeding techniques, hatchery and management of fin-fish and crustaceans and shell fishes	Comprehension
CO3	Develop the knowledge about how to breed and rear ornamental fishes and commercially viable fish species	Knowledge
CO4	Explain the value of maintaining and taking sanitary precautions during the processing and packaging operations	Apply

<b>T.Y. B. Sc. Semester VI Paper-I</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC6ZO1 Phylum Chordata, Group Euchordata- I, Group Euchordata II and Type study – Shark</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Classify the Chordates up to class with reference to phylogeny and their special features.	Knowledge
CO2	Outline the taxonomy of division Gnathostomata with the distinguishing characters	Comprehension
CO3	Demonstrate the characteristic features and examples of class of Reptilia, Aves and Mammalia	Apply
CO4	Compare the vertebrate animal life after studying one representative animal Shark.	Analyze



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<b>T.Y. B. Sc. Semester VI Paper-II</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC6ZO2 Molecular Biology, Genetic Engineering, Human Genetics and Bioinformatics</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Illustrate the intricacies of chemical and molecular processes that affect genetic material and related areas in relatively new fields of genetic engineering and biotechnology	Knowledge
CO2	Describe the vast array of techniques used to manipulate genes which can be applied in numerous fields like medicine, research, etc. for human benefit	Comprehension
CO3	Discuss the impact of changes occurring at gene level on human health and its diagnosis	Knowledge
CO4	Outline the computational point of view of studying the genomes	Analyze

<b>T.Y. B. Sc. Semester VI Paper-III</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC6ZO3 Developmental biology</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Review the embryo development and important processes of cell differentiation, stages of development and morphogenesis.	Knowledge
CO2	Illustrate the process of early and late embryonic development in animals.	Comprehension
CO3	Explain the post Embryonic Development and Implications of Developmental Biology.	Knowledge
CO4	Discuss the processes involved in embryonic development and its application.	Apply



॥ विद्या विनयेन शोभते ॥

Janardan Bhagat Shikshan Prasarak Sanstha's

**CHANGU KANA THAKUR**

**ARTS, COMMERCE AND SCIENCE COLLEGE, NEW PANVEL  
(AUTONOMOUS)**

Re-accredited 'A+' Grade by NAAC (3<sup>rd</sup> Cycle - CGPA 3.61)

'College with Potential for Excellence' Status Awarded by UGC

'Best College Award' by University of Mumbai

<b>T.Y. B. Sc. Semester VI Paper-IV</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC6ZO4 Wild life conservation and Management</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Develop an understanding of how animals interact with each other and their natural	Knowledge
CO2	Environment and ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues	Comprehension
CO3	Develop the ability to work collaboratively on team-based projects and demonstrate	Apply

<b>T.Y. B. Sc. Semester VI Paper-V</b>		
<b>Title of the Course and Course Code</b>	<b>Course code- USC6ZO5 Marine resources, Post-harvest, and Farm Engineering</b>	<b>Number of Credits :02</b>
<b>On completion of the course, the Learners will be able to:</b>		<b>Bloom's Cognitive level</b>
CO1	Describe the deep sea and coastal fishes and commercial potential and know about the major landing centers of the fishes	Knowledge
CO2	Demonstrate crustacean and molluscan fisheries and the performance of landing centers of above fisheries	Comprehension
CO3	Apply the knowledge and practice the preservation and processing techniques for commercial ventures	Knowledge
CO4	Review the knowledge with the knowledge of fish by-products, value-added products and good manufacturing practices.	Apply