

Department of Zoology
Rabindra Mahavidyalaya
Champadanga Hooghly

Year: 2024-2025

PROGRAMME SPECIFIC OUTCOME:

- ☐ Apply zoological knowledge in much more broader areas of life.

- ☐ Identify and analyze problems by applying the principles of natural science.
- ☐ Provide a comprehensive understanding of various animals from their primitive forms to their highly evolved forms.
- ☐ Inculcate knowledge and prepare for a successful career in the field of zoology. ☐ Aims to emphasize the need for biodiversity conservation.

Semester	Course	Paper Code	Paper Name	Objective	Course Outcome
I	Major	ZOOL1011	Non-Chordates	The main objective of this syllabus is to acquaint the students about the diversity of animals (invertebrates) of this universe especially their taxonomic position of animal kingdom as well as their physiology and organ system.	At the end of the syllabus students learn the Systematic and biology of non chordates through their adaptive features and their body organization. Comprehend the identification of species and their evolutionary relationships.
I	Major	ZOOL1051	VERMICULTURE	Vermiculture is the study of technologies that utilize earthworms for degrading waste organic materials for sanitation and agricultural re-use. Earthworms degrade organic waste materials and convert them into vermicompost. The main objective of this course is to provide the students with knowledge of Commercial application	1. The Course Has A Broad scope for Employability. 2. Students will gather knowledge on soil earthworms; their characteristic features, occurrence, and their influence on soil fertility and solid waste management are included. 3. Students will gather knowledge on Vermicomposting

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				vermitechnology and its application in agriculture as well as entrepreneurship.	technology in respect of the global level as well as the Indian perspective. 4. Application of Vermiculture products and their benefits in agriculture practice.
I	Major	ZOOL1051	Apiculture	This Skill Enhancement Course aims to enlighten students on the health status of patients with simple diagnostic tests and evaluations. This course will help to make students self-sufficient in future. They are expected to be adept in laboratory techniques.	After completion of course, students will be able to: <ul style="list-style-type: none"> · Get complete knowledge of honeybees and their different casts. · Get knowledge about artificial beehive and their uses for apiculture. · To know about different diseases on enemies of honeybees. · Able to know the techniques of honey extraction and handling of honeybees. · Get a brief idea about entrepreneurship in Apiculture.
I	Minor	ZOOL1021	Non-Chordates	The main objective of this syllabus is to acquaint the students with the diversity of animals (invertebrates) of this universe especially their taxonomic position of the animal	At the end of the course students will learn about the systematics and biology of non-chordates through their adaptive features and body organization and comprehend the

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				kingdom as well as their physiology and organ system.	identification of species and their evolutionary relationships.
II	Major	ZOOL-2011	Chordates	<p>This course is designed to give a learner the fundamental understanding of the diversity of Phylum Chordata with emphasis on their origin, key characteristics, classification, distribution, and function. This course will make the students enlightened with the concept of diversity, organization, adaptation, and taxonomic status of Chordates. The course will give an understanding of the systemic physiology of chordates. There will be a discussion about the affinities of chordates to different groups.</p>	<p>The students will get knowledge to explain the diversity of Protochordates and chordates. Identify the taxonomic position of chordates, their diversity, and their distribution. Gain insights about economic importance and significance Pieces and Pisciculture. Identify and distinguish between poisonous and non-poisonous snakes by observing characteristic features. Students gain knowledge about the composition and significance of venom. Gain insights About the Structural specialties of birds which will help them for Poultry (commercial application). Adaptive radiation of Mammals will give the insight into diversity and distribution of Mammals</p>

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II	Major	ZOOL2051	SERICULTURE	<p>The syllabus for Sericulture at undergraduate SEC according to NEP has been framed. The main objective of framing this new syllabus is to give the students a proper understanding of Sericulture. Students will get knowledge about mulberry plant cultivation, different silkworms, culture techniques, silk production, and the knowledge of diseases and enemies of silkworms. The students can be utilized the knowledge in starting their own enterprise after completion of the course.</p>	<p>1. Get Complete Knowledge of Silkworms and their different types. 2. Get knowledge about technology of silkworm culture and making of silk. 3. To Know About Different Diseases On Enemies Of Silkworms. 4. Get a Brief Idea about entrepreneurship in Sericulture.</p>
II	Minor	ZOOL2021:	CHORDATES	<p>his course is designed to give a learner the fundamental understanding of the diversity of Phylum Chordata with emphasis on their origin, key characteristics, classification, distribution and functioning. This course will make the students enlightened with the concept of diversity, organization, adaptation and taxonomic status of Chordates. The course will</p>	<p>The students will get knowledge to explain the diversity of Protochordates and chordates. Identify the taxonomic position of chordates, their diversity, and their distribution. Gain insights about economic importance and significance Pieces and Pisciculture. Identify and distinguish between poisonous and non-poisonous snakes by</p>

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				give the understanding of systemic physiology of chordates. There will be discussion about the affinities of chordates to different groups.	observing characteristic features. Students gain knowledge about the composition and significance of venom. Gain insights About the Structural specialties of birds which will help them for Poultry (commercial application). Adaptive radiation of Mammals will give the insight into diversity and distribution of Mammals.
III	Major	ZOOL3031	Biochemistry	The objective of this study is to foster enthusiasm among students for Biochemistry, highlighting its significance within the broader context of Zoology. Through this course, learners will gain an understanding of the fundamental chemistry that drives biological processes, enabling them to independently address challenges in both biology and chemistry. The curriculum covers the analysis of molecular structure and function, as well as the myriad chemical reactions occurring within	v This topic is designed to help learners to understand the objectives of studying Biochemistry. v The learner will get a clear concept of the structures and reactions of different biomolecules in the living system. v Learners will cope with the fast and far-reaching advancement of biological sciences in this century and be able to update themselves with the emerging concept of biochemistry. v Students will develop a deep interest in this subject, which is very

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				<p>living cells. It aims to ignite a sense of important for daily life and also for curiosity in students, encouraging them to different competitive examinations explore the intricate mechanisms of various biomolecules and their interconnections. This program also seeks to motivate students to pursue advanced studies in Biochemistry and related interdisciplinary fields, thereby equipping them with the skills necessary for both salaried and entrepreneurial ventures</p>	
III	Major	ZOOL3032	Cell Biology	<p>To give an idea of the different structures involved in cellular organization, both within and outside the cell; outline knowledge of division and signaling at cellular level and a detailed idea of the important subcellular components that are involved in the process of transportation of molecules to and from the cell, as well as synthesis of various proteins and ATP</p>	<p>The students will learn about the different subcellular components-their structure, function and biochemical properties, organization at cellular level with respect to extracellular matrix, cytoskeleton, cell junction, cell signaling and cell division. They will also have an outline knowledge of cancer cells and apoptosis.</p>

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III		ZOOL3051	Medical Diagnostics	<p>This Skill Enhancement Course aims to enlighten students on the health status of patients with simple diagnostic tests and evaluations. This course will help to make students self-sufficient in future. They are expected to be adept in laboratory techniques.</p>	<p>After completion of course, students will be able to: 1. Learn basic understanding of the structure of the human body. 2. Learn aspects related to medical diagnosis. 3. Learn to perform tests which help in the diagnosis and treatment of diseases. 4. Handle laboratory instruments. 5. Students are expected to be economically self-sufficient.</p>
IV	Major	ZOOL4011	Animal Physiology	<p>To understand various functional components of an organism. To explore the complex network of these functional components. To comprehend the regulatory mechanisms for maintenance of function of the body.</p>	<p>To understand various functional components of an organism. To explore the complex network of these functional components. To comprehend the regulatory mechanisms for maintenance of function of the body.</p>

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IV	Major	ZOOL4012	Disease Biology	<p>The specific learning goals for disease biology are to explore the causes of diseases of the animal world and to provide students with a working knowledge of fundamental concepts and molecular mechanisms leading to diseases. This will help in further understanding of the immune responses facilitating recovery and protection, also examine the mechanism of action of disease therapies and investigate the physiological and ecological factors that influence the frequency of disease occurrence.</p>	<p>The specific learning goals for disease biology are to explore the causes of diseases of the animal world and to provide students with a working knowledge of fundamental concepts and molecular mechanisms leading to diseases. This will help in further understanding of the immune responses facilitating recovery and protection, also examine the mechanism of action of disease therapies and investigate the physiological and ecological factors that influence the frequency of disease occurrence.</p>
IV	Major	ZOOL4013	Comparative Endocrinology	<p>To introduce basic terms of Endocrinology. To develop conceptual clarity of Endocrinology. To familiarize the learners with the structure, types, and classification of chromosomes. To introduce the concept of sex determination and its types, sex-linked, sex-influenced, and sex-Limited Genes. To develop an understanding of</p>	<p>v Students understand how the endocrine system is functioning. v They know the structures and molecular modes of action of a large variety of vertebrate and invertebrate hormones and understand how metazoan hormones and their functional mechanisms have evolved. v Hormones as</p>

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				genetic variability within a population and learn as to how the changes take place.	mediators of growth, development, phenotype, behavior, reproduction, and epigenetic effects are covered and connected to relevant current events.
IV	Minor	ZOOL4051	Wildlife Conservation	To provide a knowhow of the (a) various aspects of wildlife, including their values, depletion, conflicts with human beings and principles of conservation and various ecological attributes, (b) Management and legal protection of different natural habitats and threatened species, and (c) different tools and techniques related to wildlife study. Objectives of the Course	At the end of the course, students should learn about the importance of wildlife and conservation in and around our surroundings as well as wild habitats and their relation to different ecological principles, emerging cases of man - animal conflict and impact of ecotourism on wild animals, with a general knowledge on the different legal structures associated with wildlife fauna.
V	Major	ZOOL5011	Genetics	To develop conceptual clarity of Mendelian principles of inheritance and other forms and patterns. To introduce the concept of sex determination and its types sex-linked, sex-influence and sex-limited genes. To develop an	Integrate the knowledge of principles of inheritance. Imbibe the concept of chromosomes, multiple alleles, linkage, crossing over, sex determination.

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				understanding of genetic variability within a population and learn as to how the changes take place	Compare the structure and types of chromosomes, genetic disorder and cancer.
V	Major	ZOOL5012	Molecular Biology	To give an idea of the relationship between DNA, RNA and protein synthesis, to study the interaction of different factors regulating these processes and the different processes of DNA repair.	The students will be able to understand the molecular basis of various biological processes and the diverse mechanisms of gene regulation.
V	Major	ZOOL5013	Animal Biotechnology	To understand Biotechnology, which is a major tool in modern research, especially in biological sciences, medical sciences, forensic science, and environmental science. To know the various techniques for research work. It is truly regarded as the scientific technology of the twenty-first century	At the end of the course, the students will be able to develop the skill of modern techniques of biological tools at the molecular level of research; enhance basic laboratory skills like keen observation, analysis, and discussion; learn the functional attributes (molecular level) of different cell type and disorder of the various cell and help in diagnosis of the different disorders.

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VI	Major	ZOOL6011	Evolutionary Biology and Ethology	<p>1. Evolutionary Biology is a foundational science that explores the origin of life, various theories of evolution, animal evolution, and evolutionary genetics. Understanding evolutionary biology provides insights into how organisms have evolved over time and the processes that drive these changes</p> <p>2. Ethology is an important branch of Zoology today. Understanding animal behaviour is crucial for students, as it aids in the conservation process and promotes better coexistence with other species</p>	<p>1. Students will get knowledge of the history of life on earth and the causal processes of evolution</p> <p>2. Students will gather knowledge about the causes of the extinction of species and the application of genetics in evolution</p> <p>3. Students will be able to learn some essential aspects of Evolutionary Biology and acquire an understanding of the subject</p> <p>4. Knowledge of animal behaviours increases the students' understanding of how behaviours help animals survive, reproduce, and interact with nature</p> <p>5. Knowledge of wildlife will help in their conservation, and human-animal coexistence rather than conflict</p> <p>6. Study of animal behaviour can help to develop new approaches and ideas for the conservation and management of wildlife</p>

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VI	Major	ZOOL6012	Ecology and Conservation Biology	<p>Understanding ecology and biodiversity provides a thorough knowledge of the interactions between organisms and their environment, including various ecosystem components and functions that are important for maintaining biodiversity, as well as the role of species, populations and communities in ecological processes. In this era of rapid biodiversity loss, conservation biology focuses on protecting wildlife and other components of biodiversity. This is achieved through various management strategies, efforts, and policies implemented at local, national, and global levels.</p>	<p>Students will get knowledge of the fundamentals of ecological organisation, limiting factors and different attributes related to population, community and ecosystem levels of organisation. Students will gather knowledge on different aspects of biodiversity, including its levels, species diversity measures and indices, megadiverse countries and biodiversity hot spots. Knowledge of wildlife and conservation biology will help to increase awareness among students regarding the importance of wildlife and different biodiversity components in maintaining a healthy relation between man and environment. The students will be able to learn about different management techniques to protect the threatened wild animals and ecosystems, like the tigers, hoolock gibbon, red panda, snow leopard,</p>

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					pygmy hog, golden langur, etc. in India.
VI	Major	ZOOL6013	Developmental Biology	Study of Developmental Biology aims to provide an understanding of the development of a single cell into an organised grouping of cells, which is programmed at specific times to become specialised	Upon successful completion, students will have the knowledge and skills to: 1. Explain the molecular and genetic background of animal development 2. Describe the evolutionary history of complex multicellular life forms 3. Compare environmental influences in the development and homeostasis of cells

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VI	Major	ZOOL6014	Histology and Histochemistry	Students will learn Bioanalytical Techniques, including mammalian tissue structure, histopathological changes in diseases, and permanent slide preparation. They will explore immunofluorescence, protein identification, and cell morphology alterations. The course covers immunohistochemistry, cryotechniques, enzyme histochemistry, and histochemical methods for detecting carcinomas using immunofluorescent techniques.	The study of mammalian tissues at the histological level involves understanding their structural organisation and disease-induced morphological alterations. It explores the relationship between aetiology, pathogenesis, and histopathological changes. Key techniques include permanent slide preparation, immunofluorescence, immunohistochemistry, and enzyme histochemistry, which aid in protein localisation and carcinoma detection.