SYLLABUS OF ZOOLOGY (MDC)

For 4-Year Undergraduate Programme Under NCCF, 2023

Cooch Behar Pancahanan Barma University
Panchanan Nagar, Vivekananda Street, Cooch Behar,
West Bengal – 736 101

1st Semester

SUBJECT-ZOOLOGY

MDC 1: ANIMAL DIVERSITY

Course Objectives:

1. To form a general understanding of the diversity of the Animal Kingdom through the study of general characters of each Phylum/Class.

2. To form an understanding of the body plan, structural adaptations, life history, physiological processes, behaviour and evolutionary relationships in different animals through the study of special topics included in each Phylum/Class.

MDC 1: ANIMAL DIVERSITY

DIFFICULTY LEVEL: 100 **MODE OF INSTRUCTION: Lecture & Tutorial**

THEORY
(CREDITS 3)

Group A: Non-Chordates

Unit 1. Protista

General characters of Protozoa; Life cycle of *Plasmodium vivax*.

Unit 2. Porifera

General characters of Porifera; Canal System in Sycon.

Unit 3. Cnidaria

General characters of Cnidaria; Polymorphism in Hydrozoa.

Unit 4. Platyhelminthes

General characters of Platyhelminthes; Life cycle of *Taenia solium.*

Unit 5. Nematoda

General characters of Nematoda; Parasitic adaptations.

Unit 6. Annelida

General characters of Annelida; Metamerism in Annelida.

Unit 7. Arthropoda

General characters of Arthropoda; Social life in insects.

Unit 8. Mollusca

General characters of Mollusca; Respiration in *Pila globosa*.

Unit 9. Echinodermata

General characters of Echinodermata, Water Vascular system in star fish.

Group B: Chordates:

Unit 1. Protochordata

Salient features of Protochordata with examples.

Unit 2. Agnatha

General features of Agnatha with examples.

Unit 3. Pisces

General characters of Pisces, Migration in fishes.

Unit 4. Amphibia

General characters of Amphibia; Parental care in Amphibia.

Unit 5. Reptilia

General characters of Reptilia; Dos and don'ts after snake bite.

Unit 6. Aves:

General characters of Aves; Flight adaptations in birds.

Unit 7. Mammalia

General characters of Mammalia; Dentition in mammals.

SUGGESTED BOOKS

• Barnes, R.D. (1992). Invertebrate Zoology. Saunders College Pub. USA.
• Ruppert, Fox and Barnes (2006) Invertebrate Zoology. A functional Evolutionary Approach 7th Edition, Thomson Books/Cole
• Campbell & Reece (2005). Biology, Pearson Education, (Singapore) Pvt. Ltd.
• Kardong, K. V. (2002). Vertebrates Comparative Anatomy. Function and Evolution. Tata McGraw Hill Publishing Company. New Delhi.
• Raven, P. H. and Johnson, G. B. (2004). Biology, 6th edition, Tata McGraw Hill Publications. New Delhi.

3rd Semester

SUBJECT ZOOLOGY

4 YEAR UG SYLLABUS_CBPBU

MDC-2: WILDLIFE & BIODIVERSITY

Objectives:

By successful completion of the course, students will be able to:

● Elucidate animal-animal, animal-plant, animal-microbe interactions and their consequences to animals, humans, and the environment.

● Develop a deeper understanding of key concepts of biomes.

● Strengthen knowledge of conservation and census of wildlife.

● Describe the importance of endangered animals and their conservation management practices.

● Learn habitat management techniques.

● Understand the relationships between biodiversity and ecosystems.

THEORY (Credit 3)

Group-A (Wildlife)

Unit: 1 Concepts of Wildlife

Definition and scope of wildlife; Importance of wildlife.

Unit: 2 Biomes and Wildlife

Faunal make up of major biomes: Savannah, Tropical Rainforest, Desert biome.

Unit: 3 Wildlife Conservation

Necessity and objectives of wildlife conservation; Categories of endangered animals (After IUCN); Red Data Book and Green Data Book; Wildlife Protection Act, 1972; Project Tiger.

Unit: 4 Management of Wildlife

Wildlife Census: Objectives, direct and indirect census techniques; Wildlife tourism; Threats and management of mangrove ecosystem with special reference to Sundarbans.

Group-B (Biodiversity)

Unit: 1 Concepts of Biodiversity

Definition and levels of biodiversity; Measurement of biodiversity: species richness, species evenness, species abundance.

Unit: 2 Values of Biodiversity

Positive Values: recreational, aesthetic, educational, scientific, ecological, utilitarian, commercial, cultural and game value; Negative Values: Accidents, life stock and crop damage, disease reservoirs and man-animal conflict.

Unit: 3 Conservation of Biodiversity

In situ conservation: Biosphere reserves, national parks, wildlife sanctuaries, community reserves; *Ex-situ* conservation: Botanical and zoological gardens, gene banks, germplasm bank, aquarium and butterfly garden; Biodiversity Hotspots; India as a mega diversity country.

Unit: 4 Threats to Global Biodiversity

Causes of loss of biodiversity: Over-hunting, habitat loss, degradation and fragmentation of habitats, invasion of non-native species, pollution and climate change.

Unit: 5 Regional Conservation Approaches

Regional conservation approaches with special reference to Jaldapara National Park.

References:

A) Text books:

1. Kumar U., Asija M. J. (2005). Biodiversity Principles and Conservation (Second Edition). Student Edition, Jodhpur.

B) Reference books:

1. Arora, G. S. and Julka J. M. (1993). Status report on biodiversity conservation: Western Himalayas Ecosystem. IIPA, New Delhi.

2. Chouhan, A. S. and Singh, D. K. (1989). Changing patterns in the flora due to deforestation. Environmental Conservation and Westland Development in Meghalaya, Meghalaya Science Society, Shillong.

3. Daniels, R., Ranjit, J., Hegre, M., Joshi, N. V., and Gadgil M. (1991). Assigning Conservation Value: A Case Study from India. Conservation Biology 5(4):464475.

5th Semester

SUBJECT ZOOLOGY

4 YEAR UG SYLLABUS_CBPBU

MDC-3: APPLIED ZOOLOGY

Modes of Instruction: Lecture and Tutorial

THEORY

(CREDITS 3)

Course Description

This comprehensive course includes the applications of zoological principles to various animal-based industries and practices like sericulture, apiculture, pearl culture, vermiculture, aquaculture, animal husbandry, etc. Students will gain a deep knowledge of methods, techniques and/or skills of rearing, farming, culturing as well as breeding of economically important animals like silkworms, honeybees, lac insect, earthworms, oysters, prawns, ichthyo-species and cattle. They will be acquainted with marketing and management of these animal resources also.

Course Objectives

- To understand the scope and importance of applied zoology
- To develop skills in different fields of applied zoology
- To perceive lesson on how to mitigate food crisis, resolve nutritional issues and increase food value of animal origin food stuff for human welfare
- To provide know-how about uplifting the economically weaker sections by means of entrepreneurship, employment and empowerment

Course Outcomes

After completion of this course, students will be able to

- Know the biology of economically important animals.
- Apply the methods used for culturing various useful faunal resources for commercial purposes.
- Analyse the technical aspects of different cultures.
- Evaluate the prospects of different cultures of animals at commercial level.

Unit: 1 Sericulture

1. Brief Introduction to Sericulture, 2. Types of Silkworms with Special Reference to their Scientific Names, 3. Geographical Distribution of Silkworms and Host Plants, 4. Life Cycle of *Bombyx mori*, 5. Structure of Silk Gland, 6. Composition, Uses and Rearing of Silk, 7. Extraction and Reeling of Mulberry Silk, 8. Silkworm Diseases, Pests, and their Control

Unit: 2 Apiculture

1. Brief Introduction to Apiculture, 2. Identification of Honeybees, 3. Various Domesticated Species of Honeybee, 4. Bee Keeping: Langstroth Box for Rearing of Honeybee, 5. Extraction and Processing of Honey, 6. Composition of Honey, 7. Apiculture by-products and their Uses, 8. Pests and Diseases of Honeybees and their Control Measures

Unit: 3 Pearl Culture

1. Brief Introduction to Pearl Culture, 2. Pearl Giving Molluscs, 3. Biology and Ecology of Pearl Oyster, 4. Pearl Formation and Pearl Composition, 5. Marine Pearl Culture 6. Uses of Pearls

Unit: 4 Vermiculture

1. Brief Introduction to Vermiculture and Vermicomposting Technology 2. Scope of Vermitechnology, 3. Economic Importance of Vermiculture 4. Diseases and Pests of Earthworms

Unit: 5 Lac Culture

1. Brief Introduction to Lac culture, 2. Benefits of Lac Insect, 3. Brief Account on Lac Culture, 4. Uses of Lac Shellac

Unit: 6 Aquaculture

1. Brief Introduction to Aquaculture, 2. Importance and Scope of Aquaculture, 3. Organisms Cultured in Aquaculture, 4. Culture of Indian Major Carps, 5. Culture of Freshwater Prawns, 6. Integrated Fish Farming: Animal Husbandry-cum-Fish Culture, 7. Ornamental Fish Culture 8. Induced Breeding Techniques

Unit: 7 Poultry Farming

1. Brief Introduction to Poultry Farming, 2. Poultry Keeping of Layers (Egg Producing Breeds), 3. Poultry Keeping of Broilers (Meat Producing Breeds), 4. Deep Litter System, 5. Processing and Preservation of Eggs, 6. Poultry Diseases and their Control

Unit: 8 Dairy Farming

1. Brief Introduction to Dairy Farming, 2. Scope of Dairy Farming, 3. Brief Account on Dairy Animals, 4. Management of Dairy Farm 5. Formulation of Standards for Pasteurization

SUGGESTED READINGS

1. Arumugam, N., Murugan T., and Johnson Rajeswar J. (2015). *Applied Zoology*, Saras Publication, Kanyakumari

2. Bisht, D. S. *Apiculture*, ICAR Publication

3. Edwards, C. A. (1996) *Biology and ecology of of Earthworms*

4. *Handbook of Silkworm Rearing: Agriculture and Technical Manual-1*, Fuzi Pub. Co.

5. Jayashree, K. V., Tharadevi C. S. and Arumugam N. (2015) *Home Aquarium and Ornamental Fish Culture*, Saras Publication, Kanyakumari

6. Jolly, M. S. *Appropriate Sericultural Techniques*, Ed., Director, CSR and TI, Mysore

7. Krishnaswamy, S. (1986) *Improved Method of Rearing Young Age Silkworm*, CSB, Bangalore

8. Lee, K. E. (1985) *Earthworms: Their Ecology and Relationships with Soils and Land Use*

9. Narasimhanna, M. N. (1988) *Manual of Silkworm Egg Production*, CSB, Bangalore

10. Prost, P. J. (1962). *Apiculture*. Oxford and IBH, New Delhi

11. Ranganathan, L. S. *Vermicomposting Technology- Soil Health to Human Health*

12. Sengupta, K. A (1989) *Guide for Bivoltine Sericulture*, Director, CSR and TI, Mysore

13. Singh, S. *Beekeeping in India*, Indian Council of Agricultural Research, New Delhi

14. Ullal, S. R. and Narasimhanna, M. N. *Handbook of Practical Sericulture*, CSB, Bangalore

15. Wupang—Chun and Chen Da-Chung (1988), *Silkworm Rearing*, Published by FAO, Rome