Shri Agrasen Kanya Post Graduate College
Bulanala/Parmanandpur Varanasi

Department of Zoology (PG)

1. Programme :M. Sc. Semester -I

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Course Code: B050701T
Course Title : Structure and Functions in Invertebrate

Course Outcome:

- After completion of the course the students would gain knowledge about the different ways invertebrate animals are structured and how their body systems function.
- This knowledge could be applied to understanding the ecology and evolution of invertebrates.

2. Programme :M. Sc. Semester -I

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Course Code: B050702T
Course Title : Cell Biology

Course Outcome:

- After completion of the course the students would gain a deep understanding of the fundamental processes of life at the cellular level.
- This knowledge is essential for many fields of biology, including medicine, biotechnology, and genetics.

3. Programme :M. Sc. Semester -I

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Course Code: B050703T
Course Title : Toxicology

Course Outcome:

- After completion of the course the students would gain knowledge about the different types of environmental toxins, how they enter and move through organisms, and the effects they can have on living things.
- This knowledge could be applied to environmental protection, public health, and understanding the impact of human activities on ecosystems and developing antidote procedures.

4. Programme :M. Sc. Semester -I

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Course Code: B050704T

Course Title : Biostatistics, Tools, and Techniques in Biology

Course Outcome:

- After completion of the course the students would gain a strong foundation in statistical methods and develop laboratory skills commonly used in biological research.
- This knowledge and skillset could be applied to various fields of biology, including genetics, ecology, and evolution.

5. Programme :M. Sc. Semester -I

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Course Code: B050705P
Course Title : Practical

Course Outcome:

After completion of the course the students would equip with fundamental biological knowledge and practical laboratory skills applicable to various life science disciplines

- Identify and classify different invertebrate groups based on their anatomy and morphology.
- Understand the adaptations of invertebrates for movement and survival in various environments.
- Explain the life cycles of invertebrates, including the role of larval forms.
- Apply laboratory techniques commonly used in research and understand the principles and applications of techniques like electrophoresis for biomolecule separation, autoclaving for sterilization, incubation for cell culture growth, laminar flow for aseptic technique, and toxicology experiments to assess the harmful effects of substances.

6. Programme :M. Sc. Semester -II

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Course Code: B050801T
Course Title : Molecular Biology

Course Outcome:

- After completion of the course the students would gain a comprehensive understanding of the fundamental molecular mechanisms that underlie how genetic information is replicated, transcribed, regulated, and repaired in living organisms.
- This knowledge is essential for many fields of biology, including genetics, medicine, and biotechnology.

7. Programme :M. Sc. Semester -II

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Course Code: B050802T
Course Title : General Endocrinolog

Course Outcome:

- After completion of the course the students would gain a comprehensive understanding of the endocrine system and its role in regulating vital physiological processes in animals.
- This knowledge is essential for understanding animal physiology, reproduction, development, and homeostasis.

8. Programme :M. Sc. Semester -II

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Course Code: B050803T

Course Title : Physiology of Vertebrates

Course Outcome:

- After completion of the course the students would gain knowledge about the different organ systems in vertebrates and how they function together to maintain homeostasis.
- This knowledge is essential for understanding the health and well-being of vertebrate animals including human.

9. Programme :M. Sc. Semester -II

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Course Code: B050804T
Course Title : Biochemistry

Course Outcome:

- After completion of the course the students would gain a foundational understanding about application of chemical principles as they apply to biological systems.
- This knowledge is essential for understanding various biological processes at the cellular and molecular level.

10. Programme :M. Sc. Semester -II

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Course Code: B050805P
Course Title : Practical

Course Outcome:

- After completion of the course the students would equip with fundamental biological knowledge and practical laboratory skills applicable to medical laboratory and various life science disciplines
- This knowledge provides a comprehensive learning experience that equips students with essential laboratory skills, knowledge of
- blood analysis, biochemical tests, DNA isolation, and an understanding of the structure and function of endocrine glands and tissues.
- By performing these exercises, students would gain valuable laboratory skills and a deeper understanding of various biological processes at the cellular and molecular level.

11. Programme :M. Sc. Semester -III

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Course Code: B050901T

Course Title : Comparative Anatomy of Vertebrates

Course Outcome:

- After completion of the course the students would gain a comprehensive understanding of the anatomical structures of different vertebrate groups and how these structures have evolved in relation to their environment and function.
- This knowledge is essential for many fields of biology, including evolutionary biology, ecology, and paleontology.
- This knowledge is mainly essential for understanding the diversity of vertebrates and their evolutionary relationships.

12. Programme :M. Sc. Semester -III

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Course Code: B050902T
Course Title : Molecular Cytogenetics

Course Outcome:

- After completion of the course the students would gain a deeper understanding of the structure and function of chromosomes and how abnormalities in chromosomes can lead to genetic diseases.
- This knowledge is important for fields such as genetics, medicine, and biotechnology.

13. Programme :M. Sc. Semester -III

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Course Code: B050903T
Course Title : Population Genetics, Evolution and Animal Behavior

Course Outcome:
After completion of the course the students would understand that this course combines population genetics, evolution, and animal behavior. Students understand the :

- Principles of Mendelian inheritance and how it applies to populations.
- Analyze the forces that affect allele frequencies in populations (mutation, selection, genetic drift, gene flow).
- Explain how populations can reach Hardy-Weinberg equilibrium and the factors that can disrupt it.
- Analyze how adaptations arise through natural selection and their role in an organism's fitness.
- Understand the process of speciation and how new species form.
- Identify and categorize different types of animal behavior (e.g., foraging, mating, migration).
- Explain the ecological and evolutionary significance of animal behavior.
- Analyze the internal and external factors influencing animal behavior (e.g., hormones, learning, environment).

  This knowledge is essential for various fields like ecology, conservation biology, and evolutionary biolohey.

14. Programme :M. Sc. Semester -III

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Course Code: B050904T

Course Title : Biology of Vertebrate Immune System

Course Outcome:

After completion of the course the students would understand that this course :

- Explain the difference between innate and acquired immunity.
- Describe the structure and function of the major cells and organs of the immune system.
- Explain the role of antigens and antibodies in the immune response.
- Describe the structure and function of the major histocompatibility complex (MHC).
- Explain the role of cytokines in the immune response.
- Describe the function of the complement system.
- Explain the different types of vaccines.

This knowledge is essential for health and medical science. By studying this paper, students would gain a better understanding of how the vertebrate immune system works.

15. Programme :M. Sc. Semester -III

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Course Code: B050905P
Course Title : Practical

Course Outcome:

After completion of the course the students would understand to :

- Identify and compare the skeletal structures of different vertebrate groups (amphibians, reptiles, birds, mammals).
- Relate the differences in bone structure to the function and movement of each animal group.
- Apply knowledge of skeletal morphology to understand vertebrate evolution and adaptation.
- Demonstrate the proper use of a microtome to prepare thin sections of biological tissue for microscopic examination.
- Explain the principles behind microtomy and how it allows for detailed observation of cells and tissues.
- Apply microtomy techniques to prepare slides for further practical exercises or research projects.
- Analyze and interpret a human karyotype, identifying the different chromosomes.
- Explain the chromosomal basis of human inheritance and genetic disorders.
- Observe and differentiate between phototactic (light) and geotactic (gravity) responses in living organisms.
- Perform an experiment to demonstrate the specific binding between antigens and antibodies.
- Explain the role of antigen-antibody reactions in the immune response.
- Apply this knowledge to understand how vaccines work and the importance of a functional immune system.

16. Programme :M. Sc. Semester -IV

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Course Code: B0501001T
Course Title : Microbiology

Course Outcome:

After completion of the course the students would understand the :

- The different types of microorganisms, including bacteria and viruses
- How to identify and classify pathogenic bacteria
- The methods used to test the effectiveness of antibiotics
- How to culture microorganisms
- The applications of microorganisms in industry
- How foodborne illnesses can occur

This knowledge is essential for further studies or careers in microbiology, medicine, or other related fields.

17. Programme :M. Sc. Semester -IV

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Course Code: B0501002T
Course Title : Gamete Biology

Course Outcome:

After completion of the course the students would understand to :

- Explain the structures and functions of the male and female reproductive systems.
- Describe the processes of spermatogenesis and oogenesis.
- Explain the basic principles of in vitro fertilization and embryo transfer.
- Discuss the causes and potential consequences of teratogenesis.
- Describe the hormonal changes that occur during pregnancy and lactation.
- Explain different methods of contraception.

This knowledge aims to help students to understand the fundamental processes of sexual reproduction in animals, with a focus on mammals.

Students would learn about the structures involved in sperm and egg production, fertilization, and development. The course would also explore some of the challenges to reproduction, including birth defects and unwanted pregnancy.

18. Programme :M. Sc. Semester -IV

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Course Code: B0501003T

Course Title : Functional Morphology of Teleost Fishes

Course Outcome:

After completion of the course the students would understand the functional morphology of teleost fishes, which is the study of the relationship between the structure and function of their organs and organ systems. Students would understand to :

- Describe the structure and function of the digestive system in teleost fishes.
- Explain how teleost fishes respire and excrete waste products.
- Describe the structure and function of the swim bladder and sensory receptors in teleost fishes.
- Explain the role of endocrine glands in fish reproduction.

This knowledge provides a solid foundation for understanding the functional morphology of teleost fishes.

19. Programme :M. Sc. Semester -IV

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Course Code: B0501004T
Course Title : Fishery Biology and Ecology

Course Outcome:

After completion of the course the students would understand to :

- Describe the different types of fisheries in India.
- Explain the methods used for spawning fish in aquaculture.
- Discuss the management and fertilization of fishery ponds.
- Describe the adaptations of fish to different aquatic environments.
- Explain the relationship between plankton and fish production.
- Discuss the impact of pollution on fishery waters.
- Analyze the interrelationships between fish and their biotic and abiotic environment.

This knowledge provides a solid foundation for understanding pisciculture and its management.

20.Programme :M. Sc. Semester -IV

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Course Code: B0501005P

Course Title : Practical

Course Outcome:

After completion of the course the students would understand to :

- Demonstrate proficiency in using various techniques to identify bacteria (e.g., staining, microscopy).
- Apply appropriate criteria to classify bacteria based on morphology, physiology, and biochemistry.
- Aseptically prepare and use different culture media for bacterial growth.
- Perform and analyze a sperm count to assess semen quality in bulls.
- Identify the different structures and cell types within the male and female reproductive organs.
- Relate the structure of the reproductive organs to their function in gamete
- Explain the mechanisms of action of different contraceptive methods.
- Evaluate the effectiveness and potential side effects of various contraceptives.
- Utilize morphological and ecological characteristics to identify fish species from UP and Bihar
- Dissect a bony fish to gain a deeper understanding of its internal anatomy.
- Relate the internal organs to their specific functions in fish physiology.
- Analyze the differences in bone structure between fish and other vertebrates.
- Explain how skeletal adaptations contribute to fish movement and buoyancy.
- Identify and explain the morphological adaptations of fish for specific habitats or lifestyles (e.g., deep-sea fishes, bottom feeders).

By participating in these laboratory practices, students should develop a strong foundation in microbiology, animal reproduction, reproductive health, and ichthyology. They will gain practical skills in laboratory techniques, data analysis, and critical thinking.