

F. Y. B. Sc. Zoology Syllabus As Per NEP – 2020

(PO, PSO & CO)

SEMESTER - I

Aims and Objectives:

- Focus is on building concepts in biological sciences and enabling them to apply their experimental knowledge in various sectors of life sciences specifically in animal biology.
- Specifically, this programme aims at enhancing the professional competencies and skills.
- Analyze complex interactions among various animals of different phyla, their distribution and their relationship with the environment.
- Helps to understand the physiological, biochemical, molecular and genetic principles of animals and their surroundings.
- Empower learners by enabling them with communication, professional and life skills.
- This course provides an advanced knowledge of modern biology and help to develop a range of generic skills that are relevant to wage employment, self-employment and entrepreneurship.

Program outcomes (POs) :

The curriculum is designed after a long thinking and interacting process with various components of the stakeholders. After successful completion of B. Sc. Zoology Major program students will be able to gain the basic, applied and research based knowledge pertaining to the various branches of Animal sciences.

1. Knowledge and skills on the topic :

- i. In-depth knowledge of the major concepts, theoretical principles and experimental skills of zoology and its various fields, including biodiversity, anatomy, physiology, biochemistry, bio-nanotechnology, ecology, evolutionary biology, cell biology, molecular biology, immunology, genetics, as well as some other areas of applied research such as wildlife conservation and management,

beekeeping, sericulture, vermiculture, neuroscience, aquatic biology, fisheries science, animal breeding, bioinformatics and research methodology, etc.

ii. Interdisciplinary knowledge of life sciences, environmental sciences, and related biochemical sciences.

iii. Learn about the various techniques, tools, and computer software used to analyze the forms and functions of animals.

2. Skillful communication: Ability to communicate complex zoological information effectively and efficiently

3. Critical thinking and problem-solving skills : The ability to rationally analyze and solve animal science issues without relying on hypotheses and guesswork.

4. Logical thinking and reasoning : Ability to search for solutions and solve them Logically by experimenting and processing the data manually or by using softwares.

5. Team spirit and leadership qualities: Ability to identify and mobilize the resources required for the project and management of the project responsibly while adhering to ethical scientific concern and bio-safety protocols.

6. Digital efficiency: Ability to use computers and other tools for biological simulations, calculations, appropriate bio-statistical software, and research tools to locate, retrieve, and evaluate zoology-related data.

7. Ethical awareness and reasoning: Avoid unethical behaviour such as data falsification, forgery or deception, plagiarism and value environmental and sustainability issues.

8. Lifelong learning: Capable of independent, self-directed learning with the aim of personal and social development.

9. Entrepreneurship qualities: Develop entrepreneurship qualities as this course contains almost all branches of applied zoology. One can establish a start up project by learning various courses.

10. Advanced education: Students will be able to develop their mind with some advanced and superior knowledge, research outcomes and also the new as well as easy system of education. This will make them more reliable and capable in the world to lead the nation.

Program Specific Outcomes (PSOs) :

PSO 1 : After completion of this course students will be able to contribute as policy makers in biodiversity conservation, animal preservation and environment protection.

PSO 2 : Equip with the knowledge of animal classification and diversity, ecology and economic importance of animals.

PSO 3 : Acquire the advanced concepts in insect rearing and various animal breedings for the food security of human beings.

PSO 4 : Inculcate the traditional knowledge of using various animal based products in human healthcare system.

PSO 5 : Adapt scientific research techniques in various applied branches of Zoology for sustainable development.

PSO 6 : Perform procedures as per laboratory standards in the areas of Taxonomy, Physiology, Ecology, Cell biology, Genetics, Applied Zoology, Toxicology, Entomology, Sericulture, Biochemistry, Fish biology, Animal breeding and Clinical Pathology.

PSO 7 : Zoology course also provide a knowledge of applied subjects to develop various skills to make a career and become an entrepreneur in the field of aquatic biology, sericulture, apiculture, vermiculture, prawn culture, dairy management, animal breeding and management, wildlife conservation and management, wildlife photography etc.

PSO 8 : Analyze the relationships among animals, plants, and microbes.

PSO 9 : Understand and analyze the ecological and evolutionary significance of different taxa of animals.

PSO 10 : Analyze the mechanisms involved in life processes up to the molecular level.

PSO 11: Gains knowledge about research methodologies, effective communication and skills of problem solving methods.

PSO 12 : Contributes the knowledge for Nation building.

ZOO - 101 - T : Genetics and Medical Zoology (T)

Course Outcomes :

After the completion of the course, students should be able to :

CO1 : Apply Mendelian genetic principles to predict outcomes of genetic crosses, interpret pedigrees and understand the basics of genetic inheritance.

CO2 : Recognize and explain the inheritance patterns and molecular basis of common genetic disorders, including both Mendelian and complex traits.

CO3 : Understand the concept of non - Mendelian genetics.

CO4 : Concept and characteristics of multiple alleles, ABO blood group system, Inheritance of Rh antigen, Erythroblastosis foetalis and their medicolegal importance.

CO5 : Understand the structure of chromosomes, chromatin and its types, giant chromosomes and chromosomal aberrations.

CO6 : Successfully solve genetic problems using Punnett squares, probability calculations and pedigree analysis.

CO7 : Understand basic concepts of medical zoology.

CO8 : Understand different epidemic, vector borne and microbial diseases in humans.

CO9 : Understand about investigations and treatments of human physiological disorders.

ZOO - 102 - P : Practicals in Genetics and Medical Zoology (P)

Course Outcomes :

After completion of this course, students should be able to :

CO1 : Calculate and interpret monohybrid, dihybrid, test and back cross ratios based on hypothetical data.

CO2 : Use collected data to understand the inheritance patterns of Mendelian traits.

CO3 : Identify and describe the chromosomal composition of a normal human karyotype.

CO4 : Perform blood typing and interpret blood group results.

CO5 : Perform to understand study of facultative heterochromatin from humans.

CO6 : Learn an experiment to know the structure of polytene chromosomes

CO7 : Learn various vector borne as well as protozoan diseases and their control measures.

CO8 : Learn scientific approach or techniques used in clinical laboratories to investigate various diseases and will be skilled to work in research laboratories.

CO9 : Understand the human immune system and its response to the pathogen.

CO10 : Measurements of blood pressure under normal and stressed condition

OE - 101 - ZOO : Apiculture –T

Course Outcomes :

After the completion of the course, students should be able to :

CO1 : Students will know about different species of honey bees and their diseases and enemies.

CO2 : Students will gain skill of rearing honey bees.

CO3 : Students will be able to apply knowledge of bee economy in setting up their own apiary and they can be entrepreneur in this field.

CO4 : Acquire knowledge about different species and casts of the honey bees.

CO5 : Aware about economic importance of honey bees.

CO6 : Identify role of honey bees in nature and in agricultural productivity.

CO7 : Understand the basics about beekeeping tools, equipment, and managing beehives.

CO8 : Acquire knowledge about distribution of species of honey bees.

SEC - 101 - ZOO : Vermiculture Management – T

Course Outcomes :

After the completion of the course, students should be able to :

CO1 : Acquire a critical knowledge on the role of earthworms in making organic matter from biodegradable wastes.

CO2 : Understand the biology of some important species of earthworms used in vermiculture.

CO3 : Acquire skills in production of vermicompost.

CO4 : Explain benefits and problems with vermiculture and vermicompost. Become an entrepreneur by culturing earthworms.

CO6 : Acquire a knowledge about life cycle of earthworm.

CO7 : Understand economics importance of earthworm.

CO8 : Identify enemies and diseases of earthworm.

SEMESTER II

ZOO - 151 - T : Cell Biology and Biomedical Techniques (T)

Course Outcomes:

After the completion of the course, students should be able to:

CO1 : Demonstrate the knowledge of cell diversity.

CO2 : Explain the cell membrane, cell – cell interactions and its dynamics.

CO3 : Understand nuclear structure and cell organelles.

CO4 : Explain mitochondria and its functions.

CO5 : Understand cytoskeleton and its functions.

CO6 : Understand safety protocols, ethical standards, professional conduct and best practices.

CO7 : Know about the biomedical instruments, their functioning and principle of operation.

CO8 : Apply immunological techniques for the detection of antigens, antibodies, and immune responses in disease diagnosis.

CO9 : Understand and perform hematological tests and diagnose common hematological Disorders and interpret urine analysis data.

ZOO - 152 - P : Practicals in Cell Biology and Biomedical Techniques (P)

Course Outcomes:

After completion of this course, students should be able to:

CO1 : Learn to visualize animal and plant cells under microscope.

CO2 : Understand principles and workings of simple, compound microscopes.

CO3 : Acquire the skills to accurately measure microscopic objects using micrometry.

CO4 : Staining and visualization of mitochondria by Janus green stain.

CO5 : Estimate Hemoglobin using Sahli's haemometer.

CO6 : Perform RBC count in blood by using hemocytometer.

CO7 : Perform WBC count in blood by using hemocytometer.

CO8 : Study of human blood smear to observe different types of blood cells.

CO9 : Study of principle & working of Spectrophotometer, PCR and ECG.

CO10 : Work as a laboratory technician to do urine analysis - normal and abnormal constituents

OE - 151 - ZOO : Apiculture – P

Course Outcomes:

After completion of this course, students should be able to:

CO1 : Students will know about different species of honey bees and their diseases and enemies.

CO2 : Students will gain skill of rearing honey bees.

CO3 : Students will be able to apply knowledge of bee economy in setting up their own apiary and they can be entrepreneur in this field.

CO4 : Acquire knowledge about different species and casts of the honey bees.

CO5 : Aware about economic importance of honey bees.

CO6 : Identify role of honey bees in nature and in agricultural productivity.

CO7 : Understand the basics about beekeeping tools, equipment, and managing beehives.

SEC - 152 - ZOO : Practicals in Dairy Science – P

Course Outcomes :

After completion of the course, students should be able to :

CO1 : Estimate fat, SNF, specific gravity of milk.

CO2 : Estimate acidity, surface tension, viscosity of milk.

CO3 : Understand standardization, pasteurization, sterilization of milk.

CO4 : Understand preparation of toned milk, double toned milk and reconstituted milk.

CO5 : Understand separation of cream and quality of given milk sample.

CO6 : Learn various types of breeds of cattle.

CO7 : Acquire knowledge about equipments use in dairy industry.

CO8 : Explore a small scale dairy business.