

DEPARTMENT OF ZOOLOGY (UG)

PROGRAM OUTCOME: B.Sc. Honours & General in Zoology

PROGRAM SPECIFIC OUTCOME:

Honours Course:

Zoology is the branch of biological science that scientifically deals with the structure, function, behavior, evolution and biological processes of animals. This broad field has been branched and subsequently re-branched into several minor disciplines. It encompasses most of the fields of biological sciences and the subjects typically studied here are classical biology of Invertebrates and Vertebrates, Cell Biology, Animal Physiology, Biochemistry, Biophysics, Genetics, Molecular Biology, Biostatistics, Environmental Physiology, Ecology & Environment, Developmental Biology, Immunology, Microbiology, Biotechnology, Parasitology etc. The students are presented with a plethora of career options once they chose to be associated with the fields of zoology. Zoologists are hired for zoos, wildlife services, botanical gardens, conservation organizations, national parks, nature reserves, universities, laboratories, aquariums, animal clinics, fisheries and aquaculture, museums, research, pharmaceutical Companies, veterinary hospitals, etc. If anybody wants to go for higher studies, then he/she can do Master of Science in Zoology, M.Sc. Health care sciences, Master of Business Administration, Master of Philosophy in Zoology and much more. They make their career as an Environmental consultant, Ecologist, Marine scientist, Field trials officer, Physician Associate, Nature conservation officer, etc. There are different jobs available after Ph.D in life science (zoology) such as Assistant Professor, Biology Researcher, Scientist, Content Developer, Research Associate, Geneticist Biology, Sr. Associate Scientist, Biomedical Scientist, Microbiologist, Clinical Research Associate, etc.

General Course:

The reframed syllabus of zoology general course is of significant importance to the students who have scored comparatively lesser marks in higher secondary level. There is a relatively lower scope of establishment in government sectors in comparison to honours course. Yet they can do their masters in different stream and establish themselves in different sectors like teaching, nursing, pathology, technical, hatchery, piggery, goatery etc.

COURSE OUTCOME (2017-2018):

1. B.Sc. Honours in Zoology

SEMESTER-I [Choice Based Credit System]

Sl.No.	Name of the Subject	Nature	Outcome
C1	C1T: Non-Chordates -I	Theory	<ul style="list-style-type: none"> ➤ Classical Zoology comprised of Non-chordates and Chordates are the basis of modern-day Zoology being studied. ➤ Non-chordate diversity should be properly understood. ➤ Various properties of life like growth, development, reproduction, adaptation, evolution etc. should be understood. ➤ Complex organization of non-chordate animals should be understood practically by the students. ➤ They should be able to differentiate plants, animals like non-chordates & chordates and put them in definite taxonomic category.
	C1P: Non-Chordates -I	Practical	
C2	C2T: Ecology	Theory	<ul style="list-style-type: none"> ➤ Man, an organism within an environment like other living organisms is influenced by the various factors of the environment. He is completely dependent upon other living and nonliving organisms for his requirements such as food, clothing, medicine etc. The knowledge of the fundamental ecological principle is absolutely essential for man for his own existence and it should be known by theoretical study. ➤ The students should be able to know practically various ecological parameters that are being changed continuously due to anthropogenic activities. ➤ Adequate knowledge about the ecosystem and the ecological problems are absolutely essential for the existence of mankind on this planet
	C2P: Ecology	Practical	
GE1	GE1T: Animal Cell Biotechnology	Theory	<ul style="list-style-type: none"> ➤ They should know about cancer and how it spreads and affects human beings. ➤ They can amplify DNA by PCR techniques. ➤ They should know gene regulation in prokaryotes. ➤ Have an idea regarding cloning. ➤ Have knowledge of cell culture. ➤ They should know the fermentation process. ➤ Have knowledge of PCR, DNA Fingerprinting, Blotting etc. ➤ They can prepare culture media.
	GE1P: Animal Cell Biotechnology	Practical	

			➤ They can sterilize plastic and glass wares required for cell culture.
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SEMESTER-II

Sl.No.	Name of the Subject	Nature	Outcome
C3	C3T: Non-Chordates-II	Theory	<ul style="list-style-type: none"> ➤ Classical Zoology comprised of Non-chordates and Chordates are the basis of modern-day Zoology being studied. ➤ Non-chordate diversity should be properly understood. ➤ Various properties of life like growth, development, reproduction, adaptation, evolution etc. should be understood. ➤ Complex organization of non-chordate animals should be understood practically by the students. ➤ They should be able to differentiate plants, animals like non-chordates & chordates and put them in definite taxonomic category.
	C3P: Non-Chordates-II	Practical	
C4	C4T: Cell Biology	Theory	<ul style="list-style-type: none"> ➤ Have knowledge of cell, cell membrane and cellular organelles in cell. ➤ Cellular communication should be perceived. ➤ Cell division and its significance should be known. ➤ They should identify Barr body in human female. ➤ From onion root tip and grasshopper testis they should understand mitosis and meiosis respectively.
	C4P: Cell Biology	Practical	
GE-2	GE2T: Animal Diversity	Theory	<ul style="list-style-type: none"> ➤ Classical Zoology comprised of Non-chordates and Chordates are the basis of modern-day Zoology being studied. ➤ Non-chordate diversity should be properly understood. ➤ Various properties of life like growth, development, reproduction, adaptation, evolution etc. should be understood. ➤ Complex organization of non-chordate animals should be understood practically by the students. ➤ They should be able to differentiate plants, animals like non-chordates & chordates and put them in definite taxonomic category.
	GE2P: Animal Diversity	Practical	

PART – II (3-Tier System)

Sl.No.	Name of the Subject	Nature	Outcome
P- III	Gr.-A: Ecology, Ethology, Environmental Biology, & Environmental Management	Theory	<ul style="list-style-type: none"> ➤ People should know the behavior of animal usually in their natural habitat through the study of ethology. ➤ Man, an organism within an environment like other living organisms is influenced by the various factors of the environment. He is completely dependent upon other living and nonliving organisms for his requirements such as food, clothing, medicine etc. The knowledge of the fundamental ecological principle is absolutely essential for man for his own existence. ➤ Adequate knowledge about the ecosystem and the ecological problems are absolutely essential for the existence of mankind on this planet. ➤ We should be able to reduce environmental pollution and save our nature.
	Gr. - B: Parasitology, Immunology, Biodiversity & Economic Zoology	Theory	<ul style="list-style-type: none"> ➤ Parasites with their hosts should be identified and the mechanism of action could be understood. ➤ Differentiation and discrimination of self from non-self should be understood. The defense mechanisms by the organisms against pathogen should be known and can apply in our life. ➤ The varieties and variabilities of living beings should be understood through biodiversity. We should conserve our nature and natural resources. ➤ The increasing demand of agricultural products, fish, meat, egg, milk and milk products etc should be minimized by increasing production.
P-IV	Gr. - A: Microbiology, Biostatistics, Computer Application & Bioinformatics	Theory	<ul style="list-style-type: none"> ➤ Microbes should be identified and the mechanism of action should be understood. Able to know the various antibiotics, fungicides etc. ➤ Computer is used to resolve various bio-statistical problems.
	Gr. – B: Histology, Histochemistry,	Theory	<ul style="list-style-type: none"> ➤ Various Cells and their chemistry should be understood.

	Endocrinology & Bioinstrumentation		<ul style="list-style-type: none"> ➤ Endocrine glands and their hormonal role should be understood in man and other animal. Hypo and hyperactivity of hormones and their symptoms should be known. ➤ Instruments used in research and pathological centre should be known. They should be able to operate and establish themselves in future.
P-V	Unit - A : Dissection, Computer Application	Practical	<ul style="list-style-type: none"> ➤ Organs and systems, their location and distribution in living beings should be understood. ➤ They should compare the structural complexity towards higher vertebrates and can compare the evolutionary significance.
	Unit - B :Cytogenetics, Histology, Histochemistry & Developmental Biology	Practical	<ul style="list-style-type: none"> ➤ They should know the chromosome number of different species, their structure and function. ➤ Various Cells and their chemistry should be understood. ➤ They should know and compare the complex development of birds and mammals.

PART – III (3-Tier System)

Sl.No.	Name of the Subject	Nature	Outcome
P- VI	Gr. - A: Molecular Biology & Biotechnology	Theory	<ul style="list-style-type: none"> ➤ They should know about cancer and how it spreads and affects human beings. ➤ They can amplify DNA by PCR techniques. ➤ They should know gene regulation in prokaryotes. ➤ Have an idea regarding cloning. ➤ Have knowledge of cell culture.
	Gr. - B: Animal Physiology, Biochemistry &	Theory	<ul style="list-style-type: none"> ➤ Metabolic processes occurring in organism's body should be understood.

	Biophysics		<ul style="list-style-type: none"> ➤ They should aware of metabolic disorders like diabetes etc. ➤ Various physiological processes like excretion, thermoregulation, muscular activity, estrous and menstrual cycle etc should be known.
P- VII	Unit - A :Parasitology, Immunobiology & Microbiology	Practical	<ul style="list-style-type: none"> ➤ Parasites with their hosts should be identified and the mechanism of action could be understood. ➤ Biology of different parasites should be known and they can control the spreading of different parites ➤ They come to know various Gram positive and negative bacteria and their structure also. ➤ They should know various sensitive techniques like ELISA, Blotting etc required for identification of antigen, antibody and biomolecules.
	Unit - B : Animal Physiology, Biochemistry & Biophysics	Practical	<ul style="list-style-type: none"> ➤ They should know Qualitative tests for carbohydrate (glucose, fructose, Lactose/Maltose, Sucrose, Starch, Dextrin), Protein (albumin/globulin, gelatine, peptone). ➤ They should know Quantitative test-colorimetric analysis (Lowry's method) of protein. ➤ They should be able to estimate their own Hb, differential count; total count; determination of CT, BT & ESR. ➤ They can estimate ammonia, uric acid and urea in the urine of fish ➤ They can estimate pH of water. ➤ They should know the working principle of digital balance, homogeniser, colorimeter/spectrophotometer, Electrophoresis and centrifuge machine

P- VIII	Unit - I : Experiments on Ecology & Environmental Management	Practical	<ul style="list-style-type: none"> ➤ They can determine the dissolved O₂, free CO₂, alkalinity & hardness of water that play significant influence in aquacultural and agricultural practices. ➤ They can determine LC₅₀ & LD₅₀ of a pollutant can compare the toxicity of different pollutants. ➤ The Qualitative and Quantitative Study of Zooplankton and soil fauna should be understood. They can assess the status of water and soil quality.
	Unit II: Identification Project work Unit - III : Field report, Laboratory Note Book	Practical	<ul style="list-style-type: none"> ➤ They can identify various non-chordate, chordate specimen. ➤ They should know various pests with their host plants. ➤ Economic importance of various fishes should be known. ➤ Structure of bone should be known. ➤ In the field they practically observe various ecosystems and biodiversity of national parks, biosphere reserves etc. ➤ They can acquire knowledge through project works by hand.

B.Sc. General in Zoology

PART-1

Sl.No.	Name of the Subject	Nature	Outcome
P-I	Gr.-A: Non-Chordata	Theory	<ul style="list-style-type: none"> ➤ Understand the various internal systems like Digestive system, nervous system with the help of charts. ➤ Understand the economical importance of Molluscan shells. ➤ The students will understand the classification of Non-chordates with the help of charts/models/pictures. ➤ Understand the evolutionary history of Non - chordates.
	Gr.-B: Taxonomy, Evolution,	Theory	<ul style="list-style-type: none"> ➤ Understand the Origin of life and from simple organism how complex body forms developed. ➤ Understand the Lamarkism, Neo-Lamarkism and Darwinism.

	Adaption & Distribution		<ul style="list-style-type: none"> ➤ Understand the Geological time scale and the origin of life forms in different era. The students for will know the Fossils and its significance. ➤ Understand the Zoogeographical realm with the distribution of animals.
	Gr.-C: Developmental Biology	Theory	<ul style="list-style-type: none"> ➤ Be able to the organism ideal for the study of developmental biology. ➤ Be familiar with the events that lead to fertilization. ➤ Be able to describe the cleavage process in different groups. ➤ Be able to describe the stages and cellular mechanisms for gastrulation. ➤ Able to understand difference between specification and determination.
	Gr.-D: Ecology, Ethology & Wildlife	Theory	<ul style="list-style-type: none"> ➤ Students will be able to understand the relation between abiotic and biotic factors. ➤ Students will come to know various biological interactions. ➤ They understand how change in population affects the ecosystem.

PART-2

Sl.No.	Name of the Subject	Nature	Outcome
P-II	Gr.-A: Chordata	Theory	<ul style="list-style-type: none"> ➤ Understand the basic concepts about chordates. ➤ Understand the external morphology and sexual dimorphism in chordates. ➤ Study and understand the various systems, adaptation and dentition in Mammals. ➤ Student should be able to recognize life functions from urochordates to fishes. ➤ To understand the ecological role of different groups of chordates in environment. ➤ Understand the diversity of chordates.
	Gr.B: Cell Biology, Genetics & Molecular Biology	Theory	<ul style="list-style-type: none"> ➤ Structural and functional aspects of basic unit of life i.e. cell concepts would be understood. ➤ They will come to know the Mendelian and non Mendelian inheritance. ➤ Concept behind genetic disorder, gene mutations-various causes associated with inborn errors of metabolism should be understood.

	Gr.-C: Physiology & Biochemistry	Theory	<ul style="list-style-type: none"> ➤ Understand the vertebrate blood and blood coagulating mechanism. ➤ Understand the term pH, Buffer. ➤ Understand the structure and function of carbohydrate, amino acids, proteins, and lipids. ➤ Understand the concept Enzymes and also Vitamins and minerals. ➤ Understand the osmoregulation of fish.
	Gr.-D: Parasitology, Histology & Endocrinology	Theory	<ul style="list-style-type: none"> ➤ Understand the various parasites and pathogens of human and domestic animals. ➤ Understand the structure of various cells and tissues. ➤ Understand the cell, tissue, organ, system and organisms. ➤ Have an idea of Endocrine glands, hormones and their functions. Hypo and hyper activity of hormones should know.
P-III	Chordata, Non-chordata, Histology, Immunology & Parasitology.	Practical	<ul style="list-style-type: none"> ➤ Understand the Internal as well as External characters of the Non-Chordates and Chordates. ➤ Identify the histological slides. ➤ Understand the gut content of cockroach for protozoa. ➤ Learn fieldwork modalities.

PART – 3

Sl.No.	Name of the Subject	Nature	Outcome
P-IV	Gr.-A: Applied Zoology	Theory	<ul style="list-style-type: none"> ➤ Understand concepts of fisheries, fishing tools and site selection. ➤ Aquaculture systems, induced breeding techniques, post harvesting techniques. ➤ Have knowledge of silk worm rearing. ➤ Understand the concepts of Goatery and Lac culture. ➤ Understand the various Indian breeds and their distribution and characteristics of Goats. ➤ To aware the students about Goatery and its economical importance.

			<ul style="list-style-type: none"> ➤ Understand the Various concepts of Lac Culture. ➤ To know the Economical importance of lac Cultivation.
	Gr.-B: Applied Zoology	Practical	<ul style="list-style-type: none"> ➤ Should identify their Blood group. ➤ Should know zooplankton of aquatic bodies and can predict the status of water body. ➤ Should know RBC and WBC counting method and can estimate their own. ➤ Understand the Internal as well as External characters of the Non-Chordates and Chordates and can compare the structural complexity that play important role in evolution. ➤ The students will aware of food Adulteration and make aware people the adverse effect of adulteration.