Government of West Bengal
GOVERNMENT GENERAL DEGREE COLLEGE, KHARAGPUR-II
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Department of Zoology

Programme& Course Outcome for (ZOOLOGY) Undergraduate Programme (3-Tier System)

Introduction:

Zoology is the study of all animal life; from primitive microscopic malaria-causing protozoa to large advanced mammals like humans. In order to understand the surroundings, it is important to understand our relationships with animals. For betterment of human being, we need to understand the interconnectedness between man & the animals in the environment. The scope of this subject is wide starting from gaining knowledge about environment, its components to the molecular mechanisms involved in running the machinery of a living body. Without knowing the structure & function of animals it would have not been possible to develop any new medicine/ vaccines for animals including human. No matter what our relation with the animals is, we need to understand their behaviour, population dynamics, physiology and the way they interact with other species and their environments. A student at B.Sc. level in Zoology can be a specialist in immunology, ornithology, animal behaviour,entomology, ecology, apiculture, sericulture & many more.

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Course Structure for Bachelor's Programme in Zoology with details

Name of the Programme	Year	Courses Offered
B.Sc. Honours in Zoology	Part I	Paper -I: Theory Gr.-A: Non-Chordata Gr.-B: Chordata
		Paper-II: Theory Gr.-A: Cell Biology, Cytogenetics, Developmental Biology Gr.-B: Bio-systematics, Adaptation & Evolution
	Part II	Paper-III: Theory Gr.-A: Ecology, Ethology, Environmental Biology & Environmental Management Gr. -B: Parasitology, Immunology Biodiversity & Economic Zoology
		Paper-IV: Theory Gr.-A: Microbiology, Biostatistics, Computer Application & Bioinformatics Gr.-B: Histology, Histochemistry, Endocrinology & bioinstrumentation
		Paper-V: Practical Unit-A: Dissection, Computer Application Unit-B: Cytogenetics, Histology, Histochemistry & Developmental Biology

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	Part III	Paper-VI: Theory Gr.-A: Molecular Biology & Biotechnology Gr.-B: Animal Physiology, Biochemistry & Biophysics
		Paper-VII: Practical Unit-A: Parasitology, Immunobiology & Microbiology Unit-B: Animal Physiology, Biochemistry & Biophysics Unit-C: Laboratory Note Book & Viva-Voce
		Paper- VIII: Practical Unit-I: Experiments on Ecology & Environmental Management Unit II: Identification & Project Work Unit-III: Field Report, Laboratory Note Book & Viva-Voce
B.Sc. General in Zoology	Part-I	Paper-I: Theory Gr.-A: Non-Chordata Gr.-B: Taxonomy, Evolution, Adaptation & Distribution Gr.-C: Developmental Biology Gr.-D: Ecology, Ethology & Wildlife
	Part-II	Paper-II: Theory Gr.-A: Chordata Gr.-B: Cell Biology, Genetics & Molecular Biology Gr.-C: Physiology & Biochemistry Gr. -D: Parasitology, Histology & Endocrinology

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		Paper -III: Practical
	Part -III	Paper-IV: Applied Zoology (Theoretical & Practical) Gr.-A: Applied Zoology Theory Gr.- B: Applied Zoology Practica

Name of the Programme -B.Sc. Honours in Zoology

ProgrammeOutcome (PO)

After completing this programme students will be able:

1. To get comprehensive knowledge about animals & their relationships with humans.
2. To gain understanding of animal diversity in order to appreciate the variety & variability of animals.
3. To gain insight about anatomy & physiology of animals including human beings.
4. To acquire complete knowledge about biology of animals.
5. To get competitive advantage in pursuing higher education.
6. To get required knowledge that will help them to seek jobs in academia, research or companies.
7. To describe different ecological, economic & medical significance of various animals in human life.
8. To getfield knowledge that will help to take up wildlife photography or wildlife conservation as a career options.
9. To acquire practical skills in biochemistry, biotechnology, immunology & molecular biology that can be used in pursuing career as a scientist in drug development industry.
10. To acquire basic experimental skills in microbiology, parasitology, computer applications that will help them in presentation & analysis of biological data.

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Course Outcomes of this Programme are as follows: -

Name of the Course: Non-Chordata & Chordata

Course Outcomes:

After completing this course students will be able to :-

1. To learn about the existence of single-celled animals.
2. To know about the diversity of non-chordates & their difference from humans.
3. To understand the morphology & anatomy of different popular animals of various phyla of non-chordates.
4. To gain knowledge about the structural organization of different representatives of non-chordates.
5. To learn about unusual phenomena witnessed in different non-chordates.
6. To develop understanding of different classes of chordates, their level of organization & evolutionary relationship between different subphyla, classes both intra & inter.
7. To know about distinguishing features classes of chordates upto order.
8. To understand the similarities & dissimilarities in life functions among various groups of animals in Phylum Chordata.
9. To the peculiar & interesting phenomena seen in different chordates.

Name of the Course: Cell Biology, Cytogenetics, Developmental Biology, Bio-systematics, Adaptation & Evolution

Course Outcomes:

After completing this course students will be able to :-

1. To learn about different techniques used to observe & study cells in laboratory.

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2. To gain knowledge about the components of cell & and their structure & function.
3. To develop basic concept of genes & chromosomes.
4. To understand the mechanism underlying the sex determination procedure in fruit fly & man.
5. To gain insights on the developmental process of an organism's body made of billions of trillions of cells from a single cell.
6. To develop understanding about evolution of different animals on earth including humans.
7. To build a foundation on principles of taxonomy & systematics & how it helps in organizing the vast number of animals into different groups.
8. To understand how taxonomy & systematics help in shaping the history of man.
9. To gain knowledge on distribution pattern of animals in the world.
10. To understand the importance of adaptation in survival & evolution of animals.

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Name of the Course: Ecology, Ethology, Environmental Biology & Environmental Management,Parasitology, Immunology, Biodiversity & Economic Zoology

Course Outcomes:

After completing this course students will be able to:-

1. To learn about different components of environment & their interrelationships.
2. To gain knowledge abot different interesting behaviour of animals.
3. To acquire knowledge about different chemicals & compounds which are toxic for animals.
4. To understand about how an environment degrades.
5. To develop ideas about how degradation of environment poses a direct risk for human life.
6. To know about different disease-causing parasites & their life-cycle.
7. To acquire knowledge about different vectors of diseases & their biology which will help them in designing eradication strategies.
8. To understand how human body reacts when it is invaded by an outsider.
9. To acquire knowledge about innate immunity & acquired immunity.
10. To know about the diversity of animals, importance of biodiversity in human life.
11. To learn about the importance of conservation of animals along with different methods of conservation.
12. To develop knowledge about apiculture, aquaculture, sericulture practices & techniques.
13. To learn about the presence of different pests, their life-cycle & problems faced by humans due to these pests which will help in developing pest control methods.

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Name of the Course: Microbiology, Biostatistics, Computer Application & Bioinformatics Histology, Histochemistry, Endocrinology & bioinstrumentation

Course Outcomes:

After completing this course students will be able:-

1. To gain elementary knowledge on different microorganisms with special refence to bacteria & viruses.
2. To know about how microorganisms can be cultured & stained.
3. To be more aware on harmful effects of microbes.
4. To get to know about the beneficial role of microbes too.
5. To get an idea about how to collect, present, analyze & interpret data obtained from biological phenomena.
6. To learn about different sources of information needed for carrying out research in biological field.
7. To get a picture of the internal tissue structure of different organs of mammals.
8. To gain knowledge on how to fix & stain tissues for studying their structures.
9. To know about the chemical controlling systems of our body termed as endocrine control.
10. To understand how hormones control every function of body.
11. To know the interplay between nervous control & endocrine control.
12. To learn about different instruments used in studying biology.

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Name of the Course: Dissection, Computer Application, Cytogenetics, Histology, Histochemistry & Developmental Biology

Course Outcomes:

After completing this course students will be able: -

1. To dissect & display different systems of non-chordates animals in laboratory.
2. To dissect out the different parts of animals in order to study them in details.
3. To learn the use of windows bases software, to present data diagrammatically on MS Excel.
4. To observe the stages of cell division under microscope.
5. To construct pedigree tree of genetic traits.
6. To fix, stain the cells in laboratory.
7. To identify the different tissue sections of important organs of mammals.
8. To observe the different stages of development of a bird.
9. To detect the biochemical like carbohydrate, proteins, lipids etc.

Name of the Course: Molecular Biology & Biotechnology, Animal Physiology, Biochemistry & Biophysics

Course Outcomes:

After completing this course students will be able:-

1. To know about principles of inheritance.
2. To learn about the code of life.
3. To know about the defects occurred during coding of gene.
4. To gain knowledge about regulation of gene in prokaryotes.
5. To know about different techniques used in studying biology.
6. To learn about the process of animal cell culture.
7. To understand osmosis & diffusion.
8. To get to know about the structure & function of biochemicals.

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9. To understand how the physiology of animals.
10. To understand the reproductive cycle of mammals & their regulation.

Name of the Paper:Parasitology, Immunobiology &Microbiology,Animal Physiology, Biochemistry & Biophysics,Laboratory Note Book & Viva-Voce

Course Outcomes:

After completing this course students will be able:-

1. To isolate parasite from gut of cockroach to study them.
2. To isolate lymphocytes from blood.
3. To acquire lab based knowledge on different immunological techniques.
4. To stain microbes.
5. To detect carbohydrate, protein & lipid from unknown sample.
6. To estimate concentration of proteins in an unknown sample.
7. To estimate Haemoglobin.
8. To perform biochemical test for ammonia, uric acid etc.
9. To determine pH of an unknown sample.
10. To learn about use of different instruments used for studying zoology.

Name of the Course:Experiments on Ecology & Environmental Management, Identification & Project Work, Field Report, Laboratory Note Book & Viva-Voce

Course Outcomes:

After completing this course students will be able:-

1. To determine the amount of dissolved oxygen, free carbon dioxide & alkalinity & hardness of water sample.
2. To know about toxicity experiments.
3. To identify & learn about important zooplanktons & soil fauna.

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4. To identify & classify different common animals of chordates & non-chordates.
5. To identify bones of mammals & birds.
6. To different parasites & animals of economic importance.
7. To write a project work or review work.
8. To learn about importance of field visits & field study in research & knowledge creation.

Name of the Programme -B.Sc. General in Zoology

Programme Outcome(PO)

After completing this programme students will be able:

1. To get firsthand knowledge about animals & their relationships with humans.
2. To gain understanding of animal diversity in order to appreciate the variety & variability of animals.
3. To gain insight about anatomy & physiology of animals including human beings.
4. To acquire field-based knowledge on applied part of zoology used in animal husbandry.
5. To get competitive advantage in pursuing higher education, vocational courses.
6. To get required knowledge that will help them to seek jobs in biotechnology companies, pharmaceutical companies, zoo, wildlife conservation field etc.
7. To start cottage industries related to apiculture, sericulture, poultry etc.

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Course Outcomes of this Programme are as follows:-

Name of the Course: - Paper-I: Theory-Non-Chordata, Taxonomy, Evolution, Adaptation & Distribution, Developmental Biology, Ecology, Ethology & Wildlife.

Course Outcomes:

After completing this course students will be able:-

1. To learn to identify animals without notochord.
2. To distinguish animals of non-chordata group by their characteristic features.
3. To know about how different animals of non-chordata group carry out their basic life activities.
4. To understand principles of taxonomy & systematics used in classification of animals.
5. To get a picture of distribution of pattern of animals throughout the world.
6. To understand the different events involved during development of a an organism from a single cell life stage.
7. To know about environment & ecology.
8. To understand the interdependence of human & environment.
9. To learn about the detrimental effects of pollution on every component of ecosystem.
10. To know about conservation strategies of animals.
11. To gain understanding on interesting behaviour of some animals around us.

Name of the Course: -Paper-II: Theory-Chordata, Cell Biology, Genetics & Molecular Biology, Physiology & Biochemistry, Parasitology, Histology & Endocrinology

Course Outcomes:

After completing this course students will be able: -

12. To learn to identify animals having notochord.

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13. To distinguish animals of different classes ofchordataphylum by their characteristic features.
14. To know about how different animals of chordataphylum carry out their basic life activities.

1. To learn about the structure & functions of cell & its organelles.
2. To know about the process of how cell divides.
3. To understand the concept of genes & chromosomes as well as theory & principles of inheritance.
4. To know about different syndromes that arises in man due to defects in genes & chromosomes.
5. To learn about the different components of connective tissue of vertebrates.
6. To know about how enzymes work & their importance in controlling body physiology.
7. To gain knowledge on the importance of vitamins for our body.
8. To get to know about how water & ion balance are maintained in fishes living in different habitat.
9. To learn about the different disease-causing parasites.
10. To know about the defence mechanism of our body in response to parasite attack.
11. To acquire knowledge on tissue structure of different endocrine glands of our body & their role in maintaining homeostasis in the body.

Name of the Course: Paper -III: Practical

Course Outcomes:

After completing this course students will be able: -

1. To dissect & display important systems of non-chordates & chordates.
2. To know parts of microscope & how to handle it.
3. To mount different parts of animals for observation under microscope.

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4. To able to identify the bones & tissues of organs.
5. To gain field-based knowledge by visiting field & submitting a report on it.

Name of the Course: -Paper-IV: Applied Zoology (Theoretical & Practical),Applied Zoology Theory,Applied Zoology Practical.

Course Outcomes:

After completing this course students will be able: -

1. To get to know the methods of rearing of silkworm & how silk is obtained from these silkworms.
2. To know about the principles of aquaculture, the different techniques used in aquaculture.
3. To know about how pearl is made by pearl oyster & how these pearl oysters are cultured.
4. To get an idea about the ecology of pests, damage caused by the pests & the different methods of controlling them to protect our food crops & cash crops.
5. To learn about lac, insects producing lac, cultivation of lac insects & processing of lac, its uses & its significance.
6. To know about rearing methods of poultry animals, their diseases & their management.
7. To get to know about concept of environment impact assessment & its implication in development of our country.
8. To know about different endangered species of animals & their conservation strategies.
9. To acquire knowledge on different technologies used in studying biology.
10. To know about the different tests performed during diagnosis of diseases based on the principle of antigen-antibody reaction.
11. To estimate the concentration of dissolved oxygen in water.
12. To determine salinity & pH of water.

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13.To determine blood group of humans.
14.To carry out differential count of human blood.
15.To determine dose of toxicity in any model animal.
16.To identify zooplanktons & soil micro-arthropods.
17.To detect food adulteration of commonly used spices, fruits & vegetables.
18.To identify different animals of economic & medical significance.

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