GOVERNMENT GENERAL DEGREE COLLEGE AT MANGALKOTE

DEPARTMENT OF ZOOLOGY

PROGRAMME OUTCOMES

&

COURSE OUTCOMES

of

THREE-YEAR DEGREE COURSE IN ZOOLOGY (HONS)
UNDER CHOICE BASED CREDIT SYSTEM (CBCS)

Dr. Pradipta Kumar Basu
OFFICER IN CHARGE, W.B.E.S.
Government General Degree College, Mangalkote
Dt. Purba Bardhaman, West Bengal- 713132

Government general degree college at Mangalkote offers Zoology (Hons.) programme under the choice based credit system (CBCS) for the U. G. students. Since the college is affiliated to 'The University of Burdwan' it follows the syllabus framed by it. The 'Skill Enhancement Courses' (SECs) offered are 'Sericulture' and 'Aquarium Fish Keeping' which have been carefully chosen considering the specializations of the departmental faculty members. Likewise, the 'Discipline Specific Elective Courses' (DSEs) offered include 'Animal Biotechnology', 'Parasitology', 'Wild life Conservation' and 'Endocrinology'. Interestingly, the programme has both theoretical and practical courses which have been designed intricately to promote holistic development of the students. Apart from the laboratory works, the field studies, project works and power point presentations (as recommended by the syllabus) serve to foster research aptitude, scientific outlook, proficiencies in writing and communication in the students. These also serve to nurture several life skills in the students such as critical thinking, problem solving abilities, statistical data interpretation, team spirit and application of ICT in various fields. Additionally, the programme focusses on cultivating values among the students like appreciation for nature and natural resources, environmental sustainability, biodiversity, wildlife, conservation and the socio-cultural factors associated with them. Furthermore, the programme provides ample opportunities for dissemination of indigenous knowledge related to nature (e.g., knowledge on Indian flora and fauna; ethnozoology; local, regional and national environmental issues); health issues (e.g., parasites prevalent in India); agricultural issues (e.g., dominant agricultural pests in India); industrial issues (e.g., status of fisheries industry in India) and evolution of humans (e.g., genetic variability in different ethnic groups).

Programme specific outcomes

The programme 'Zoology' deals with the study of animal life in an integrated and cross-disciplinary manner such that it provides a comprehensive understanding of all living systems and their relationships with nature. This serves to unravel their application value; basis of their biodiversity and draw parallels with their phylogenetic relationships using well thought cardinal features of classification on the basis of morphology and molecular information wherever available. As such, the students get an opportunity to gain comprehensive knowledge about different animal species in one go, appreciating the differences and similarities, thereby achieving proficiency in handling them experimentally or for research. Moreover, it offers a comprehensive knowledge of structure-function relationship at the level of gene, genome, cell, tissue, organ, and systems, through development that enrich their conceptual frameworks and learning outcome in terms of gene and genome editing for industrial application and research. The scope of Zoology as a subject is very broad. Thereby, the programme is intended to make the students understand the subject of Zoology in the evolving biological paradigm in the modern times; where, living beings need to be understood at the level of atomic interactions; and comparative systems of organisms need to be studied through the prism of integrated chemical, physical, mathematical and molecular entities. This enables the students to appreciate the inner working of different organisms at morphological, cellular, molecular,

interactive and evolutionary levels. No matter what our relationships with the animals are, we need to understand their behaviour, population dynamics, physiology and the way they interact with other species and their environments.

The programme offers both theoretical and practical knowledge on several basic and advanced techniques related to histology, cell biology, molecular biology, biochemistry and biotechnology. These help to nurture the students' aptitude for research and develop scientific outlook in them. These also help to inculcate problem solving skills in the students which may be utilized by them to design research questions in the future. The programme provides equal emphasis on sampling, methods of data collection in biodiversity studies, statistical interpretation of the obtained data and determination of physicochemical parameters of environmental samples. It provides scope for hypothesis testing through statistical analyses, construction of genetic maps and calculation of all other associated variables. Most importantly, it gives an opportunity to the students to learn to operate various instruments required for performing experiments or field studies related to all the aforementioned topics. Additionally, the students learn to identify various non-chordate and chordate specimens preserved in the museum or prepared on slides. They learn to dissect some representative non-chordate and chordate animals which enable them to develop clearer concepts on the comparative aspects of animal anatomy. They also acquire the skills to isolate parasites or planktons from hosts or environmental samples respectively which expands their knowledge base on the existence of living organisms in their surroundings and the dynamic relationships they give rise to.

On completion of all the courses under the programme the students will be able to correlate various disciplines (e.g., ecology, biochemistry, molecular biology, genetics, etc.) thereby boosting their interdisciplinary and multidisciplinary outlooks. This will trigger their critical thinking essential for pursuing higher education and/or future research endeavours aimed at the welfare of mankind and nature as a whole. They will come to know about the various career prospects in all allied disciplines. Furthermore, they will be able to prepare for forest services, academic services and all other government/non-government services (e.g., civil services, administrative services, legal services, etc.) that require the applicants to qualify any undergraduate programme. Some courses (e.g., sericulture, aquarium fish keeping) also serve to foster entrepreneurship skills by informing them about their prospects in the small-scale and cottage industries. Thus, the knowledge and skill base acquired by the students on successful completion of the programme will enable them to undertake further studies in Zoology and related/ multidisciplinary/interdisciplinary areas that include advanced or modern biology. They will also be able to develop a range of generic skills relevant to wage employment, self-employment and entrepreneurship.

Dr. Pradipta Kumar Basu
OFFICER IN CHARGE, W.B.E.S.
Government General Degree College, Mangalkote
Dt. Purba Bardhaman, West Bengal- 713132

SEMESTER-WISE SPECIFIC COURSE OUTCOMES OF THREE-YEAR DEGREE COURSE IN ZOOLOGY (HONS) UNDER CHOICE BASED CREDIT SYSTEM (CBCS) FOLLOWING THE SYLLABUS PRESCRIBED BY THE UNIVERSITY OF BURDWAN

Dr. Pradipta Kumar Basu
OFFICER IN CHARGE, W.B.E.S.
Government General Degree College, Mangalkote
Dt. Purba Bardhaman, West Bengal- 713132

SEMESTER I

Core T1 –Non-Chordates I

On completion of the course the students will be benefitted in the following ways:

a. They will come to know about the fundamentals of classification of the animal kingdom including its laws and principles. They will also become aquatinted with various terms related to animal taxonomy.

b. They will develop an understanding of the evolutionarily derived characters beginning from unicellularity to multicellularity and the hierarchical simplicity to complexity of the structure and function of various organ systems of the lower groups of organisms [Protozoa to Metazoa (Porifera – Nematoda)].

c. They will learn to correlate the evolutionary advancements in various physiological mechanisms like feeding, reproduction, coordination of the nervous system, etc. across the prescribed animal phyla.

d. They will become aware of the basics of parasitism, the associated pathogenicity and the control measures by knowing the life-cycle of some representative parasites as prescribed in the syllabus.

e. They will develop an elementary idea about the conservation of natural resources through the understanding of coral reef ecosystem, their present status and the need to preserve them.

Core P1–Non-Chordates I Lab

The theoretical idea obtained about the basics of classification of animal kingdom will be fortified by seeing some of the representative animals across various phyla in their preserved form and learning to distinguish them from their externally visible characteristic features. Additionally, the students will be enriched by the following ways:

a. They will come to know about the habit and habitats of various animals.

b. They will know about the significance of studying various parasitic specimens.

c. They will develop skills for isolation of parasites or planktons from their hosts (cockroach) or environmental samples (aquatic) respectively and prepare stained slides (both temporary and permanent).

d. They will develop the skills to handle a microscope while studying the protozoan specimens/tiny helminths.

Core T2–Ecology

After completing the course successfully the students will be able to understand the following:

a. How the nature surrounding them performs its cross talk with the biotic and abiotic elements.

b. They will learn about the key factors of environment that regulate spatio-temporal features of a particular climatic zone.

c. Role of habitat for ensuring survivability of particular species.

d. The course will inculcate the ethos of wild life conservation within them.

e. Sensitize them towards the benefits of living harmoniously with other species and make them aware about the principles of environmental sustainability.

Core P2– Ecology Lab

This is a practical course that focusses on the skill development of the students with respect to data collection, statistical interpretation of data and determination of physicochemical parameters of environmental samples through direct hands-on training. This has been elaborated as under:

a. The students will learn how to calculate biodiversity index and interpretation of life table which will allow them to understand population dynamics.

b. Through ecological field studies they will develop identification skills of species and learn about the interactions among different species. Furthermore, this will help them develop their team spirit and make them aware of the benefits and challenges of working in groups. As such, this will largely go to develop their life-skills.

c. They will get an opportunity to learn about different forest types in India and how the forest department works together with local people by involving them in Joint Forest Management. All these will inculcate conservation values within them.

d. They will learn to operate the instruments required to perform experiments related to ecology as recommended by the syllabus.

e. Develop employability skills in freshwater biological water quality analysis.

f. How to write a field study report.

SEMESTER II

Core T3- Non-Chordates II

This course is heavily based on the proper understanding of Core Course I and primarily deals with the higher groups of multicellular animals (Annelida to Hemichordata). On completion of the course the students will have a basic understanding of the following:

a. The variations and evolutionary hierarchy of complexity of organization of multicellular organisms with respect to coelom and metamerism.

b. The increasing sophistication of structure and function of the physiological systems of multicellular organisms especially with respect to the feeding mechanisms, excretion, respiration, vision and development depending on their habitat as well as their position in the evolutionary ladder.

c. Social behaviour in animals with termites as the representative specimen.

d. An in-depth understanding of the evolution of shared and derived characters through ancestor-descendant relationships and their evolutionary affinities taking Onychophora and Hemichordata as the representative specimens.

e. Understanding the connecting links between non-chordates and chordates by knowing the affinities/commonalities of lower groups of animals with higher groups.

Core P3–Non- Chordates II Lab

This is the practical part that helps to give the students a hands-on training or direct correlation between the abstract and concrete of almost all the topics covered in the theoretical parts. The students will learn the following:

a. Identification of various animal specimens (as prescribed in the syllabus) from their visible and reported characters along with their habits and habitats.

b. Dissection of various non-chordate specimens and developing a basic understanding of their general anatomy as recommended by the syllabus.

c. How to write a project report related to laboratory-based studies.

Core T4- Cell Biology

On successful completion of the course the students will be enriched by the following ways:
a. They will develop the basic concepts of cellular structure and function including their complicated regulatory mechanisms.
b. They will come to know about the functioning of nucleus and extra nuclear organelles in maintenance of intricate cellular mechanisms.
c. Acquire detailed knowledge of different pathways related to cell signaling and apoptosis thus enabling them to understand the anomalies in cancer.
d. Eventually, they will understand the modern approaches of cellular research.

Core P4–Cell Biology Lab

This practical course will enable the students to develop certain skills in performing some basic experiments on cell and molecular biology by giving them hands-on training for the same. The students will benefit by the following ways:
a. They will be able to correlate the theoretical knowledge gained with practical, heuristic experiences.
b. They will be able to differentiate between a plant cell and an animal cell by observing them under the microscope. Thus, they will learn to handle a microscope as well.
c. They will come to know about the detailed mechanisms and distinguishing features of meiotic and mitotic cell divisions.
d. They will get a first-hand experience about the changes in the appearance of chromosomes during different stages of cell division. In other words, they will be able to identify the stage of cell division by noting the appearance of chromosomes under a microscope.
e. They will develop skills on basic cell biology techniques such as squash preparations, smear preparations and staining. This will help to foster research aptitude in students.

SEMESTER III

Core T5- Chordates

This course is a development of the earlier courses (CC I and III) as it helps to comprehend the fundamental differences between non-chordates and chordates together with the associated complications and adaptations as one ascends the evolutionary ladder. On completion of the course the students will further come to know the following:

a. The principal characters of chordates, their origin from non-chordates and outline classification.

b. The differences between lower chordates (i.e. invertebrate chordates) and vertebrates.

c. The differences between jawless vertebrates and those with jaws.

d. About various phenomena related to animal behaviour (e.g. parental care, migration), their significance and the associated factors.

e. The adaptive variations and evolutionary gradations of complexity of organization and functioning of exoskeletal derivatives, locomotory organs and accessory respiratory structures in chordates.

f. The factors behind the differences in geographical distribution of animals across the world and their relation to the phenomenon of continental drift.

Core P5–Chordates Lab

This is the practical paper on chordates where students will get a real-life experience of various chordate features and their differentiating characters by identification of some preserved specimens and/or models. Additionally, the students will learn the following:

a. Principles of dissection of chordate samples as advised in the syllabus.

b. Principles of preservation of animal specimens.

c. Development of e-skills in students through preparation and presentation of PPTs as mentioned in the syllabus.

d. Inculcation of research attitude in students by training them to utilize identification keys while identifying chordate specimens.

Core T6 - Animal Physiology: Controlling & Coordinating Systems

On completion of this course the students will be enriched by the following ways:

a. They will come to know about the fundamentals behind division of labour within an animal body taking humans as examples.

b. They will develop an understanding of the neuronal and endocrinal mechanisms of coordination among the different organ systems within the animal body and the outcomes of their malfunctioning.

c. They will have an in-depth idea about the structure and function of the major organ systems within the animal body (especially humans).

Core P6–Animal Physiology: Controlling & Coordinating Systems Lab

This course helps the students to correlate the theoretical parts (like the photo plates in text books) with the real stained tissue sections under the microscope. In this way, they get a scope to grasp the architectural differences among various animal tissues that are directly related to their functions. Additionally, they will develop certain skills as mentioned below:

a. They will learn to process animal tissues to prepare stained tissue sections while understanding the principles behind each step involved in the elaborate process. Thus, they will experience the fundamentals of histology.

b. They will be able to differentiate between temporary and permanent mounts and how to prepare them.

c. They will learn to handle the microscope properly (a reinforcement of the earlier courses directly dealing with microscope).

d. They will develop scientific attitude while performing and observing simple experiments on muscle contraction.

e. They will learn to operate the instruments required for performing all the experiments prescribed in the syllabus.

Core T7- Fundamentals of Biochemistry

On completion of this course the students will learn the following:

a. The structure and function of biomolecules and the vital reactions within living organisms in which they participate.

b. The basic concepts of cellular metabolism and synthesis of various biological products such as amino acids, proteins, antibiotics, hormones, enzymes, nutrients, etc.

c. The underlying principles of enzyme-substrate reactions and their regulation.

d. They will be able to comprehend various interrelated physiological and metabolic events.

e. They will develop an understanding about the interdisciplinary and multidisciplinary approaches of biochemistry in the field of research and application.

Core P7–Fundamentals of Biochemistry Lab

This practical course will help to develop research aptitude and laboratory skills in the students by giving them a hands-on training in basic biochemical techniques as described below:

a. They will be able to identify basic biomolecules (protein, lipid, carbohydrate) through simple biochemical tests.

b. They will be able to quantify protein from test solutions by simple techniques.

c. They will be able to determine the polarity of biomolecules by learning to perform chromatographic analysis.
d. They will be able to demonstrate enzymatic activities through simple experiments.
e. They will learn to operate the instruments required for performing all the experiments prescribed in the syllabus.

SEC T4–Sericulture (~ SEC 1)

The students will benefit from the course in the following ways:
a. They will become aware of the economic, industrial, research and employment opportunities related to sericulture.
b. They will gain knowledge about the history of silk, its production, chemical composition, varieties, utilities and different species of silkworms and their rearing process.
c. They will be enlightened about the challenges of the sericulture industry and their mitigation strategies.
d. They will come to know about the natural enemies of silkworms (pests and parasites) and strategies to control them.
e. They will get an opportunity to fortify their theoretical knowledge with real life experience through sericulture center visits.

SEMESTER IV

Core T8-Comparative Anatomy of Vertebrates

On completion of the course the students will come to know the following:

a. The gradation of complexity of the anatomical systems in vertebrates that are directly correlated with their habits and habitats.

b. The evolutionary significance of such gradations and the advantages that come with increasing complexities of anatomical systems.

Core P8–Comparative Anatomy of Vertebrates Lab

This course will enhance the knowledge gained by the students about the anatomical differences across different vertebrate classes by giving them a hands-on experience through models/charts/preserved specimens/staining-mounting of specimens/dissection.

Core T9- Animal Physiology: Life Sustaining Systems

On successful completion of the course the students will come to know the following:
a. The basic concepts of animal physiology (with humans as examples) and the functioning of various organ systems within the human body.
b. The principles of physiology at cellular and system levels and their roles in maintenance of homeostasis within the human body.
c. Mechanisms of different physiological functions such as respiration, blood circulation, digestion, excretion, thermoregulation and osmoregulation.

d. Correlations between human physiologies and biochemistry thus widening their interdisciplinary concepts.

Core P9–Animal Physiology: Life Sustaining Systems Lab

This practical course will help to enhance the laboratory skills in the students by providing them the first-hand opportunity to perform basic experiments related to human blood and operate the associated instruments as described below:

a. They will learn to determine human blood groups while understanding the underlying principles of human ABO and Rh blood group systems.

b. They will be able to enumerate RBCs and WBCs in human blood with the aid of a haemocytometer.

c. They will be able to prepare haemin crystals from blood samples and identify their species-specific differences.

d. They will be able to estimate the haemoglobin content of human blood using a Sahli's haemoglobinometer.

e. They will learn how to measure blood pressure (BP) using a sphygmomanometer. Further, they will learn to understand the health status of individuals based on deviations of BP from the normal range.

Thus, they will develop certain basic skills related to techniques used in pathological laboratories.

Core T10-Immunology

On completion of this course the students will come to know the following:

a. The principal differences between a healthy and diseased individual.

b. The components of the human immune system.

c. The role of the immune system in protecting the animal body from antigenic agents.

d. The properties of antigenic agents and the mechanisms they adapt to evade immunological responses of the host.

e. The principle behind manipulating the immune system artificially to protect animals from diseased conditions.

Core P10–Immunology Lab

This course helps the students to learn the basics of the preliminary stages of diagnosis of healthy/diseased condition by giving them an opportunity to prepare blood films, stain them and observe under the microscope to identify, differentiate and count the RBCs and WBCs. Moreover, they also get a chance to get first-hand experiences of the following:

a. Observation and identification of stained histological slides of some major organs of the human immune system.

b. The basics of detection of the presence of antigens within the animal body.

c. To operate the associated instruments related to all the experiments prescribed in the syllabus.

SEC T2-Aquarium Fish Keeping (~ SEC 2)

On completion of the course the students will come to know the following:
a. The industrial importance of aquarium fishes as well as the employment opportunities they generate.
b. All aspects of aquarium fish culture, maintenance and transport.
c. The economic aspects of aquarium fish industry as cottage industry.

SEMESTER V

Core T11- Molecular Biology

On completion of the course the students will develop an understanding of the following:

a. The basics of the central dogma and its significance in prokaryotes and eukaryotes.

b. The fundamentals of molecular biology of the cell including the structure and function of nucleic acids.

c. The principles behind conservation of molecular structures in a species and the regulation of gene expression in prokaryotes and eukaryotes.

d. The basics of simple molecular techniques including their biomedical and forensic applications.

Core P11–Molecular Biology Lab

This is a practical course that will help to train the students to perform simple experiments related to molecular biology and operate the necessary equipment as described below:
a. They will be able prepare and stain polytene chromosomes from dipteran species. This will help them develop in-depth understanding of chromosome structure.
b. They will be able to identify polytene and lampbrush chromosomes from photographs.
c. They will be able to isolate and quantify DNA samples from prescribed specimens.
d. They will be able to isolate and cultivate bacteria from various samples (as prescribed in syllabus) and learn to perform antibiotic-sensitivity tests.
e. They will be able to comprehend the principles of separation of biomolecules and perform agarose gel electrophoresis for DNA.

Core T12- Genetics

On completion of this course the students will be able to learn the following:
a. The basic concepts of inheritance (chromosomal and extra chromosomal), gene structure and function and anomalies related to sex chromosomes and autosomes.

b. The principles of modern genetic approaches.
c. The essentials of Mendelian genetics in understanding the inheritance of traits.
d. The basis of chromosomal aberrations triggered by mutagenic agents and their carcinogenic outcomes.
e. Relate the conventional and molecular methods for gene manipulation in other biological systems.
f. Epigenetic modifications and imprinting including its role in diseases.
g. The fundamentals of recombination in bacteria and viruses.

Core P12–Genetics Lab

Though this practical course has a theoretical approach, it helps the students to analyse and interpret the available data in the following ways:

a. Statistical testing of hypotheses through χ^2 analysis.

b. Drawing linkage maps and calculation of basic variables associated with them using *Drosophila* sp. as the model organism.

c. Interpretation of chromosomal anomalies (in humans and *Drosophila* sp.) from photo data.

d. Understanding the genetic basis of heredity of sex-linked and autosomal diseases in humans.

DSE T1- Animal Biotechnology (~ DSE 1)

The students will be enlightened in the following ways after successful completion of the course:
a. They will develop the basic concepts of prokaryotic and eukaryotic genome.
b. They will become aware of the modern technological approaches in gene manipulation, modification and gene cloning.
c. They will know about cell culture techniques and other advanced technologies used in cell biology for diagnosis of diseases.
d. They will understand the underlying principles of molecular biology tools and recombinant DNA technology which find applications in biomedical and genomic science, agriculture, environment management, etc.
e. They will come to know about the career prospects of animal biotechnology and allied sciences.

DSE P1 –Animal Biotechnology Lab (~ DSE 1)

This is a practical course where the students will get ample opportunities to deal with data related to restriction map construction and transformation efficiency as well as interpret the results of some important molecular biology techniques such as PCR, Southern Blotting, Northern Blotting, Western blotting, etc. from photographs. This will help the students in the following ways:
a. Their problem solving and research skills will be boosted which may shape the trajectories of their future research career.

b. The knowledge gained will help in their higher education in this field or any other allied fields.
c. They will come to know about the new avenues of research in related areas such as therapeutic strategies or other associated opportunities in industry.

DSE T3- Parasitology (~ DSE 2)

The students will come to know the following after the course has been completed:

a. The basics of different types of associations encountered in the animal kingdom.

b. Different types of parasites, vectors and modes of transmission of parasites.

c. The fundamentals of parasitism and the mechanisms by which they harm their hosts (animals and plants) in their attempt to obtain food and shelter from them.

d. Bionomics of some common parasites, their medical manifestations in hosts and prophylaxis.

e. Principles of diagnosis of parasitic diseases.

f. Ecological and economic significance of parasitoids.

DSE P3 –Parasitology Lab (~ DSE 2)

On completion of this practical course the students will be benefitted by the following ways:

a. They will learn to identify and distinguish some common microscopic and macroscopic parasitic specimens.

b. They will develop the skills to isolate and fix common parasitic specimens (helminths) from soil samples and animal guts (fowl).

c. They will develop the skills to prepare project reports.

SEMESTER VI

Core T13- Developmental Biology

On completion of the course the students will be enriched as follows:
a. They will be able to understand the basic concepts of sexual reproduction including gametogenesis, fertilization and embryonic development.
b. They will learn about the molecular bases of cell differentiation and cell-to-cell interactions related to gametogenetic and embryonic developmental pathways.
c. They will come to know about the fundamentals of regeneration, teratogenesis, amniocentesis and embryonic stem cells.
d. They will develop a critical understanding of the development of brain and eye in vertebrates.

Core P13–Developmental Biology Lab

This practical course will help to enhance the theoretical knowledge and laboratory skills of the students in the following ways:

a. They will gain critical understanding of different developmental stages at different time periods by observing the permanent slides of different stages of chick under the microscope. This will help them correlate the same with human developmental biology.
b. They will gain an in-depth understanding of the structural variations of placenta in different vertebrate classes.
c. They will develop the skills to rear *Drosophila* sp. in the laboratory giving them an opportunity to closely observe the developmental stages in its lifecycle.
d. They will learn to write project reports and will thereby enhance their presentation skills.
e. The knowledge gained will nourish their research aptitude which will help them thrive in the bio-industry in the future.

Core T14–Evolutionary Biology

On completion of the course the students will learn the following:

a. Origin of life and biomolecules.

b. The driving forces of evolution.

c. Important theories proposed by eminent scientists from time to time to explain the routes of appearance of ancestral organisms and their descendants till the modern day species on Earth.

d. The shortcomings of those theories that led to the conceptualization of modern synthetic theory of evolution.

e. The history of evolution including the extinction and origin of species.

f. Drawing, analyses and interpretation of phylogenetic trees.

g. Fundamentals of population genetics, various terms associated with it, related mathematical equations and their deviations.

Core P14–Evolutionary Biology Lab

This practical course has a theoretical approach and helps the students to analyse and interpret pictorial and numerical data in the following ways:

a. Identification of fossils from photographs and understanding the mechanisms of their formation.

b. Evolutionary origin of vertebrate organs and the principles behind them.

c. Statistical testing of hypotheses (related to Hardy-Weinberg Equilibrium) through χ^2 analysis.

d. Basic statistical calculations (e.g. central tendencies) from given data.

DSE T6–Wild Life Conservation (~DSE 3)

The students will benefit in the following ways after successful completion of the course:

a. They will understand the values of biodiversity and wildlife, their related issues and conservation strategies.
b. They will be equipped with adequate knowledge on various biodiversity monitoring methodologies, conservation and management issues of vertebrate pests, wildlife conflicts and over-abundant species.
c. They will become aware of the wildlife health and diseases along with their mitigation strategies which will sensitize them towards environmental well-being.
d. They will develop an understanding of how animals interact with each other and their natural environment.
e. They will grow the ability to use the fundamental principles of wildlife ecology to solve local, regional and national conservation and management issues.
f. They will develop the abilities for collaborative or team-based projects and imbibe writing, speaking, and critical thinking skills required to become a wildlife biologist.

DSE P6–Wild Life Conservation Lab (~DSE 3)

This is a practical course which gives the students hands-on training to operate various instruments related to biodiversity and wildlife studies. It also trains them to conduct and participate in scientific field-based studies, to collect data and interpret them as described below:
a. The students will become familiar with the Indian flora and fauna through field trips which will help them to develop a keen understanding of the ecosystem.
b. They will be able to determine the population of a particular species through census techniques.
c. They will gain knowledge regarding pug mark, hoof mark and other trail marks.
d. They will be able to appreciate the modern scope of scientific inquiry in the field of wildlife conservation and management.
e. They will develop the ability to analyze, present and interpret wildlife conservation management information.
f. The course can trigger their interest in wildlife research and career as a conservationist in NGOs and government organizations.

DSE T7-Endocrinology (~DSE 4)

On completion of this course the students will learn the following:

a. The basics of hormones including their structure, function, mechanism of actions and deficiency syndromes in humans.

b. Various regulatory pathways related to the regulation of secretion and functions of hormones in humans.

c. Understanding the roles of some major endocrinal organs in maintenance of homeostasis within the human body.

d. Knowing the concepts of biological rhythms and the role of hormones in their maintenance.

DSE P7 –Endocrinology Lab (~DSE 4)

On completion of this practical course the students will develop the following skills:

a. Dissection of a vertebrate specimen (rat) to display their major endocrine organs.

b. Understanding the architectural differences among these mammalian endocrine organs by studying their stained histological slides under the microscope.

c. Isolation of endocrine tissues from specimen, processing them and preparation of stained histological slides using a microtome machine and other accessories such as dehydrating, staining, mounting agents and the likes. This is a reinforcement of the basics of histological techniques already learnt in the course – 'Core P6–Animal Physiology: Controlling & Coordinating Systems Lab'.

d. Basics of hormone assay.

e. They will learn to operate the instruments required for performing all the experiments prescribed in the syllabus.

Debaraj Biswal

HEAD
DEPARTMENT OF ZOOLOGY
GGDC, MANGALKOTE

Dr. Pradipta Kumar Basu
OFFICER IN CHARGE, W.B.E.S.
Government General Degree College, Mangalkote
Dt. Purba Bardhaman, West Bengal- 713132