CENTRE FOR WILDLIFE RESEARCH AND BIODIVERSITY CONSERVATION

BODOLAND UNIVERSITY, KOKRAJHAR

PG DIPLOMA COURSE IN WILDLIFE SCIENCE

This course is a comprehensive course that is designed for wildlife enthusiasts, and budding conservationists. This course offers a profound understanding of the intricate relationships within ecosystems, the challenges faced by wildlife today, and the strategies employed to protect and conserve them.

Eligibility: B. Sc. With biology in H.S. level
Duration: 2 semesters
Seat Capacity: 20
Course fee: ₹ 10000 (Excluding field tours)

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Aaranyak

Wildlife Trust of India

Post Graduate Diploma Course on
Wildlife Science
Centre of Wildlife Research & Biodiversity Conservation
Department of Zoology
Bodoland University
BTR, Kokrajhar, Assam

Course Structure

Semester-I	**Duration- 6 months**	
Course Code	**Course Name**	**Total Marks = 800**
PGDWS 01	Plant and animal taxonomy and ecology	70+ 30 = 100
PGDWS02	Basic Ecology and Ecosystem development	70+ 30 = 100
PGDWS 03	Practical Paper-I	70+ 30 = 100
PGDWS 04	Practical paper-II	70+ 30 = 100
Semester-II	**Duration-6 months**	
PGDWS 05	Animal diversity and Conservation Genetics	70+ 30 = 100
PGDWS 06	Biostatistics and Wildlife Management	70+ 30 = 100
PGDWS 07	Practical paper-III/	70+ 30 = 100
PGDWS 08	Dissertation Project	70+ 30 = 100

PGDWS 01: Plant and animal taxonomy and ecology

Unit I: Introduction to wildlife

Definition, concept, importance and values of wildlife; Concept of biodiversity: Species diversity, Genetic diversity and Ecosystem biodiversity; biodiversity hotspots; Factors governing species diversity; Threats to biodiversity, causes and consequences of biodiversity loss and decline; island biogeography, metapopulation concept.

Unit II: Plant taxonomy & Ecology

Introduction to angiosperm systematics and evolution: Morphology and Taxonomy of major groups, Plant identification and use of Taxonomic literature. Floral diversity and botanical regions of India. Principles of vegetation classification. Major vegetation types of India (Champion & Seth's classification). Vegetation and its effect on animal distribution; Pollination & seed dispersal, Vegetation preferences of animal species; Plant phenology.

Unit III: Animal Taxonomy

Taxonomy and Systematics of Animals: classification and nomenclature issues of vertebrates, Taxonomy as a basic tool in wildlife research; natural selection and speciation: biological, phylogenetic, evolutionary and ecological species concepts; Classification up to order of major taxa: insects, fishes, amphibia, reptiles, aves and mammals.

Unit IV: Habitat Ecology

Basic concepts. Ecology of major terrestrial habitats: Deserts, Grasslands, Wetlands, Forests. Definition, fundamentals, classification and significance of Landscape and Wetland ecology. Urban Ecology: Ecological aspects of urbanization, Urban Wildlife diversity, case studies. Habitat degradation and fragmentation.

PGDWS02: Basic Ecology and Ecosystem development

Unit I: Population Ecology

Definition, characteristics of population ecology; monitoring of wildlife population other demographic parameters, Population dynamics: survivorship curves, k & r selected species, population regulation, natality, fecundity, density, mortality; Predator-Prey Dynamics; Occupancy Modeling. Animal dispersion: immigration, emigration, migration in different taxa with examples in details.

Unit II: Community ecology

Community structure, organization and its stability; guilds, resource partitioning, concept of niche; niche width and overlap; fundamental and realized niche; competitive exclusion. Species interactions: competition, mutualism, commensalism, protocoperation, parasitism and predation. Plant and animal interactions.

Unit III: Behavioural Ecology

Concept of Ethology, Definition and types of behaviours: Innate behavior, learned behavior; Adaptation; Evolution of unsocial behaviour; Altruism; Sexual selection: parental care and mating systems, polygyny, polyandry, promiscuity; Animal Communications, Sexual selections, Mating systems, courtship and display; Sociobiology; Parental care. Foraging ecology of animals: optimal foraging theory; home range, territory.

Unit IV: Ecosystem Development

Concept of ecosystem; Ecological succession: Types of succession, mechanisms, changes involved in succession, concept of climax community; Energy flow and trophic dynamics. Biodiversity and ecosystem services; Restoration ecology; forest seed dormancy and germination; regeneration of forest trees.

PGDWS03: Practical I

1) Sampling approaches: Complete Random Design, Stratified Random Design, and Sampling methods for estimation of terrestrial vegetation: the nearest individual method, point-centred quarter method, line intercept method, quadrat sampling method, crown-canopy estimation method**,** estimation of canopy cover using ocular method. Species-area curve**.**

2) Estimation of quantitative and qualitative characteristics of plant community**:** frequency, density, abundance, basal area and phenology. Estimation of Important Value Index (IVI).

3) Feather identification of birds.

4) Hair identification of mammals.

5) Recording of birds call and song, and of amphibians.

6) Study of biology of selected species of butterflies/moths.

7) Identification of butterflies, dragonflies, moths, fish, amphibians, reptiles, birds and mammals.

8) Morphometric measurements of insects, fish and birds.

PGDWS04: Practical II

1) Wildlife population estimation by: Line transect method, point count method, belt transect method, marked-recaptured technique; encounter rate;

2) Analysis of species diversity: Shannon-Wiener Index, Simpson's Index; Similarity Index.

3) Methods of behavioural observation: focal animal, all-occurrence and one-zero sampling, Scan animal sampling; collection and analysis of behavioural data on some common availability species; time-activity budgets and preparation of ethograms of studied animal species.

4) Scat, pellet, dung identification in wild.

5) Scat, pellet and dung analysis: Pellet Group counting methods, scat/dung analysis, sign survey analysis.

6) Tree architecture measurements for nesting ecology study.

7) Nest materials analysis of birds.

8) Visit to wildlife sanctuary and national park for proper orientation with wildlife diversity; Field report preparation.

PGDWS05: Animal diversity and Conservation Genetics

Unit I: Animals Diversity and Distribution

Diversity and distribution of butterflies in northeast India, seasonal and altitudinal migration; Ichthyogeography and diversity of freshwater fishes of India with special reference to Assam; Zoogeography of amphibians and reptiles, Factors affecting distribution and abundance of amphibian and reptilian fauna of the Indian sub-continent. Biogeographic patterns in Indian avifauna and their affinities; Diversity and distribution of Indian mammals.

Unit II: Wildlife Biology Case Studies

Introduction to threatened species of butterflies, fishes, herpetofauna, birds and mammals of Northeast India. Ecology and adaptation of fishes in different ecosystems; Biology of major Indian amphibians and reptiles; Biology of endangered bird species of India; Biology of endangered mammal species of India. Bird Migration.

Unit III: Basic Ornithology and Entomology

Habitat ecology of Indian birds; Inland water birds, Birds woodlands and grasslands; Morphometric measurement used in food habit studies. Feeding ecology: Insectivores, Frugivores, Nectarivores, Graminivores, Carnivores and Scavengers. Acoustics: songs and calls; Breeding biology of birds; Feathers and Moulting – Types, Functions, growth. Introduction to Entomology: Insect taxonomy and diversity. Insects as indicator for biodiversity monitoring. Socio-biology of insects with case studies. Introduction to threatened species of butterflies; Biology of butterflies and moths, host plants and nectar plants, mud puddling.

Unit IV: Conservation Genetics

Application of genetics for wildlife conservation; PCR, DNA Sequencing, DNA Finger Printing, Loss of genetic diversity, Genetical Depression, Demographic bottlenecks. Wildlife forensics: Overview, various forensic protocols for species identification, Molecular markers used in wildlife forensics; Wildlife forensics based on DNA analysis and morphometry; Scat/dung analysis techniques, hair and feather analysis techniques.

PGDWS06:

Unit I: Basic and Applied Biostatistics

Descriptive statistics: Concepts of statistical Population and Sample; Simple random sampling; frequency distribution; graphical/representation of data; Measures of central tendency: mean, median and mode; Measures of dispersion: range, standard deviation, variance, coefficient of variance, standard error; Probability theory, probability distributions, Normal distribution, definition and statement of properties, skewness and kurtosis. critical probability values, confidence limits; Test statistics of significance**:** Test of hypothesis: Null and alternative hypothesis; one-tail test and two-tail test; Type I and Type II errors. Parametric and non-parametric tests: Product moment Correlation test, coefficient of correlation; Regression analysis, regression line, regression coefficient; z-test; t-tests: independent and dependent t-test; F-test, One-way and two-way Analysis of Variance; Spearman Rank Correlation test; Mann- Whitney U test; Wilcoxon matched pair test; Chi-square test; Kruskal-Wallis test.

Unit II: Modern technology in wildlife research

Overview of research methods, techniques and application; Introduction to Remote Sensing: Definitions, concepts and types of remote sensing and advantages of remote sensing; Principles of GIS and GPS: Basic concepts of GIS, Components of GIS, Data structure and formats Spatial data models; Fundamentals of GPS, Components of global positioning system; Mark-release-recapture technique, Camera trapping; Bird Ringing, Use of Transmitters, PTT; Radio telemetry, Micro Chips, Radio collar; Satellite tracking.

Unit III: Human dimensions in Wildlife Management

Human-wildlife conflict, case studies in India with special reference to northeast India; Wildlife crime: Wildlife trade, hunting, poaching; CITES, TRAFFIC; Sustainable Biodiversity Conservation: Ecosystem people; Sacred groves, home garden; Citizen science: e-bird, Birdcount India; Ecotourism: definition and scope, wildlife tourism; Environment Impact Assessment (EIA): Basic concepts & objectives of EIA, Relationship between EIA and wildlife conservation. Wildlife health: Emerging wildlife and zoonotic diseases, Wildlife-livestock interface and conservation, Determinants of disease and disease transmission. Climate change: Effects of climate change on wildlife. Animal health monitoring: Body Condition Scoring (BCS).

Unit IV: Conservation of Wildlife and management

Wildlife (Protection) Act 1972; Conservation Practices in NE Region of India: In-situ and Ex- situ conservation; Introduction, reintroduction and translocation of wild animals; Concept of Keystone, Flagship and Umbrella species; IUCN Criteria of Threatened Wildlife; Conservation Breeding Programme with few successful case studies in India; Wildlife Management Plan, controlled

burning. Reserve forest, wildlife sanctuary, national park, Biosphere Reserve, Conservation and Community Reserves, Community Conserved Areas (CCA) wildlife outside PAs, Tiger Reserve, Elephant Reserve, Important bird and Biodiversity Areas (IBA) in India, eco-sensitive zones. Major International and National Organizations in Wildlife Conservation: IUCN, UNDP, FAO, WWF; BNHS, SACON, National Biodiversity Authority (NBA), Convention on Biological Diversity (CBD), Central Zoo Authority (CZA); Convention on wetlands of international importance: Ramsar Convention.

PGDWS07: Practical III

1. Graphical representations of data through scattergram, bar diagrams, stack-bar diagrams, pie diagrams.
2. Calculation of relationship between two samples through product moment correlation, spearman rank correlation and linear regression
3. Finding differences between two samples through independent and dependent t-test, Mann-Whitney U test and Wilcoxon Matched pair test.
4. Measuring association and difference through chi-square test; Kruskal-Wallis test.
5. Finding differences of mean among samples by ANOVA**.**
6. Monitoring wild animals health.
7. Observation of captive animals, and in conservation breeding centres/ Visit to Zoo.
8. Research questions and research hypotheses designing. Research methodology exercise.
9. Concept of data collection, datasheet preparation, work plan designing.
10. GIS map preparation.
11. Questionnaire and Schedule preparation. Analysis of pressure and resource dependency of local communities upon PAs; and Community survey methods including participatory learning methods.
12. Excursions to nearby forests, grasslands and wetlands under various management regimes; visit to wildlife sanctuary and national park for proper orientation with wildlife diversity; Field report preparation.

PGDWS08: Practical IV

DISSERTATION PROJECT

The student is required to undertake a 6 month project consisting of approximately three months field investigation, followed by 1 months data analysis and writing up. Projects will be selected in consultation with faculty members during the beginning of 2nd semester. The faculty member(s) will be supervisors for the dissertation study. Once his/her dissertation topic has been selected and supervisors identified, the student should familiarize with existing literature on the subject. The students will be encouraged to develop a study design and improve it through consultations. A detail proposal to execute the study will also be essential.

The supervisors should be frequently consulted at every stage of the dissertation project, from preparation of proposal to writing the thesis. This exercise is important as it provides the student with the experience to develop a research proposal and execute it efficiently. Students are generally encouraged to start data entry and analyses in the field to save time. Dissertations will be of the following sequence: Introduction, Methods, Results, Discussion, and Literature cited. The examiners will evaluate the student's ability to identify and discuss ecological problems, develop a hypothesis about the problem, devise a methodology to suite the hypothesis, collect and analyze results with clear understanding of the biases in the data and the results that come out of it, draw conclusions and interpret the results in the context of the research question.