



Unit 1 Animal diversity and taxonomy

Systems of classification - concepts of species and hierarchical taxa, biological nomenclature - levels of cellular organization - symmetry. Concept of five kingdom classification. Salient features of various invertebrate and vertebrate phylum and classification up to class with examples – invertebrate larval forms. Diversity of corals - types and formation of coral reefs. Parasitic adaptation in helminths. Social & beneficial insects - Indian butterflies and moths. Economic importance of molluscs. Affinities of hemichordates – evolution of chordates - retrogressive metamorphosis in Ascidia-evolution of aortic arches.

Unit 2 Ichthyology and Herpetology

Characteristics and classification of fishes, amphibians and reptiles up to orders with examples. Accessory respiratory organs – air breathing fishes - types of fins and function - migration of fishes. Parental care in fishes, amphibians and reptiles –economic importance of amphibians and reptiles – endemic amphibians and reptiles of Western Ghats. Poisonous and non-poisonous snakes. Skull types in reptiles. Threats and conservation of Chelonia. Crocodiles of India. Adaptive features of Chameleon.

Unit 3 Ornithology and Mammalogy

Characteristics and classification of birds and mammals up to orders with examples. Flight adaptations, economic importance, feet and beak modifications, migration and feather types in birds. Flightless birds. Avian hazards in airports. Endemic birds and mammals of Western Ghats – Endangered mammals of India. Dentition, adaptive radiation, threats and economic importance of mammals. Old world and new world monkeys. Adaptations in aquatic mammals. Evolution of elephants.

Unit 4 Ecology & Conservation

Abiotic and biotic factors – biogeochemical cycles. Food chain, food web – trophic levels - energy low-pyramids. Ecosystem types (Indian) & significance. Concepts and types of habitats and niche – niche width and overlap – resource partitioning. Species interactions and animal relationships. Meta populations. Community structure. Exploitation of Natural resources - Pollution and after effects. Habitat degradation – Deforestation – Human animal conflicts & mitigation. Concepts and strategies of in situ and ex situ conservation – project tiger - protected areas – Tiger Reserves & National Parks (emphasis to south India) - corridors – community reserves – Joint Forest Management. Biosphere reserves in India.



Unit 5 Animal Behaviour

Approaches and methods in study of behaviour. Proximate and ultimate causation. Altruism and evolution - Group selection, Kin selection, Reciprocal altruism. Neural basis of learning, memory, cognition, sleep and arousal. Biological clocks. Development of behaviour. Social communication. Social dominance. Use of space and territoriality. Mating systems, Breeding behaviour. Parental investment and Reproductive success. Aggressive behaviour. Habitat selection and optimality in foraging. Domestication and behavioural changes.

Unit 6 Geo informatics & Data visualisation

Latitudes & longitudes - Topography maps – Contour lines – Colours & symbols – Scale – types & measuring distance. Satellite images and uses in wildlife. GPS and applications. Brief outlines to Arc View – Mapinfo & QGIS. Spatial Data generation, Concept of Database and Metadata, Spatial Modelling and Data Visualization. LULC maps - Usage of layers in mapmaking. Habitat suitability modelling. Usage of bioclimatic variables in habitat prediction. Usage of R Packages in Wildlife Sciences.

Unit 7 Conservation genetics and evolution

Structure of animal cell. Organisation and fine structure of genes and chromosome – extrachromosomal DNA – Cell division and cell cycle. DNA replication. RNA & protein synthesis and processing. Genetic code. Gene regulation. Structure of mitochondrial DNA and barcoding. Use of microsatellites in population genetics – allelic frequency – Hardy Weinberg equilibrium - linkage disequilibrium – genetic drift. Classical and modern evolutionary thoughts. Mutation and evolution. Modern concepts of Natural selection. Neutral evolution, molecular divergence and molecular clocks. Molecular tools in phylogeny.

Unit 8 Biostatistics & Data Science

Measures of central tendency and dispersal; probability distributions (Binomial, Poisson and Normal). Sampling methods. Difference between parametric and non-parametric statistics. Confidence Interval. Errors. Levels of significance. Regression and Correlation. t-test. Analysis of variance. Chi square test. Multivariate analysis. Generalised linear models. Boot strapping and Jackknife test. AIC values and importance. Presence / Absence analysis in Wildlife – Occupancy estimation.



Unit 9 Forestry and Wildlife management

Factors influencing vegetation – types of forests -Regeneration of forests – Methods of propagation – Silviculture management in India. Forest Mensuration - measuring diameter, girth, height and volume of trees. Methods of forest survey. Urban forestry - Watershed management - Harvesting practices – Timber identification. Basic instruments in wildlife studies. Sign survey and significance. Prey species density estimation. Wildlife census methods. Capture - recapture method in population estimation. Tiger monitoring techniques.

Unit 10 Wildlife laws and forensics

History of wildlife laws in India - Wildlife Protection Act and its amendments - Declarations & regulations of Sanctuaries, National parks & protected areas – Central Zoo Authority & recognition of Zoos – Prevention of wildlife trade and Schedule I to VI species. IUCN red list & CITES. Biological Diversity Act, 2002 & Biological Diversity Rules, 2004. Significance of Wildlife forensics – species identification of seized products (Skin, tissue, bones and ivory) based on morphology, trichology and molecular methods. Uses of PCR, RT-PCR, GC-MS, FTIR and radio isotopes in wildlife forensics.