Skill Enhancement Course (SEC)

Practical: 35 Marks for the End Semester Examination (ESE)

Continuous Evaluation (CE): 10 Marks

(CE: Class Test/Seminar/Review/Dissertation/Training/Group Discussion/Workshop etc.)

Attendance: 5 Marks

Total: 50 Marks

Wild Life Conservation & Management

Course objectives:

- Students can work as faculties in forest services.
- They can also become animal trainers in all fields of biology.
- They can find jobs in any field of biological sciences including forest ecologists, forest entomologists and biomedical related laboratories and field works.
- They can enter services in environment, forest ecosystems and pollution control sectors.
- They can find employment in zoos, museums, zoological parks, tiger reserves, sanctuaries and national parks.
- They can fit into wildlife forensic laboratories.
- They can earn and shine in forest department and research institutions.
- They can work in veterinary sector.
- They can appear examinations to become forest officials.

Learning outcomes:

By successful completion of the course, students will be able to:

- elucidate animal-animal, animal-plant, animal-microbe interactions and their consequences to animals, humans and the environment.

- develop deeper understanding of key concepts of biology at biochemical, molecular and cellular level, physiology and reproduction at organismal level, and ecological impact on animal behaviours.

- strengthen knowledge of genetics and cytogenetic principle in light of advancements in understanding animal genome and other model organisms of wildlife.

- describe the expression of genome revealing multiple levels of regulation and strategies to manipulate the same in the benefit of animal life.

- learn handling DNA sequence data and its analysis which equip students to get employed in research and development in the industries involved in DNA sequencing services, forensic analysis.

- understand relationships of variations in phenotypic expression of genome.

● develop an understanding of zoological science for its application in animal classification forest entomology and wildlife science.

● develop theoretical and practical knowledge in handling the animals and using them as model organisms.

● maintain high standards of learning in animal sciences especially in wildlife.

● focus to prepare them with research-oriented approaches in frontier areas of research in Wildlife Biology and prepare them for carrying out advance research.

Practical Syllabus (3 Credits*/Week)
Semester-I

Unit: 1 IDENTIFICATION WITH REASONS (From photographs/PPT slides)
I) Identification of flora with reasons (*Aleuritopteris formosama, Abies densa, Ficus rumphi, Alstonia scolaris, Terminalia arjuna, Santalum album, Dendrobium aphyllum, Schizophyllum commune, Dillenia indica, Emblica officinalis, Leonurus sibiricus, Mimosa pudica, Murraya koenigii, Piper longum*) II) Identification of fauna with reasons A) Arthropods (*Scolopendra sp., Heterometrus sp., Nephila sp., Pachliopta aristolochiae, Attacus atlas, Oryctes rhinoceros*), B) Fishes (*Notopterus chitala, Puntius chola, Tor tor, Mystus vittatus, Xenentodon cancila*), C) Amphibians and reptiles (*Duttaphrynus melanostictus, Kaloula taprobanica, Lissemys punctata, Nilssonia nigricans, Calotes versicolor, Crocodylus palustris, Malayopython reticulates, Lycodon aulicus, Bungarus caeruleus, Naja kaouthia*), D) Birds (*Pavo cristatus, Tadorna ferruginea, Dendrocopos macei, Megalaima asiatica, Eudynamys scolopaceus*), E) Mammals (*Semnopithecus entellus, Elephas maximus, Rhinoceros unicornis, Axis axis, Bos gaurus, Panthera tigris, Panthera leo, Panthera pardus*)

Unit: 2 EQUIPMENTS IN WILDLIFE
I) Making observations and records: field notes and datasheets, II) Planning wildlife management III) Investigations and projects of funding agencies, IV) Wildlife photography: Types of cameras and binoculars, camera traps, altimeter, pedometer and field compass, V) Sound recording and media players, activity recording and weight measurement

Semester-II

Unit: 1 TRACKING OF ANIMALS
I) Radio isotopes, radio collaring, GPS, GIS and remote sensing, II) Q GIS: Map info, arch view (outlines only), III) Wildlife genetics, IV) Impact and removal of invasive alien species, V) Habitat manipulation: Food, water and shade improvement

Unit: 2 ESTIMATION OF POPULATION
I) Planning census: Sample counts, block counts, roadside counts, dung counts, pug marks, hoof marks, scats, pellet groups, nests, antlers and waterhole census, II) Identifying animals based on indirect signs: Capture recapture techniques of tiger, co-predator monitoring census methods, III) Distance software: Creation of capture matrix and software used in wildlife sciences, IV) Field work: Trail/transect monitoring for abundance and diversity estimation of mammals/birds (Direct/indirect evidences)

Semester-III

Unit: 1 CONSERVATION OF FOREST

I) Survey and mapping water sources: Rain gauge setting, supplementary water source, providing access to natural and artificial water sources, II) Fire as a tool, III) Wildlife damage control assessment methods: Reasons for conflicts, fences, trenches and other methods, IV) Human pressure classification, V) Trail survey in boundary, VI) Forest product collection, VII) Village survey: Anti poaching operations, Vets For Compassion (VFC)

Unit: 2 INSECTS AND THEIR ECONOMIC IMPORTANCE

I) Classification of the Class Insecta up to the Orders with examples, II) Foraging and reproductive behaviours of insects, III) Forecasting, assessing risk of insect outbreaks in forests, IV) Insect management, V) Insect-plant interaction

Suggested Readings:

A) Text books:

1. Agarwala V. P., (1980). Forests in India. Oxford and IBH Publishing Co., New Delhi.
2. Puri G. S., Meher V. M., Gupta R. K. and Puri S., (1981). Forest Ecology. Oxford and IBH Publishing Co., New York.
3. Stebbin E. P., (1977). A Manual of Elementary Forest Zoology For India. International Book Distributors, Dehra Dun.
4. Tiwari K. M. and Singh R. V., (1980). Social Forestry Plantations. Oxford and IBH Publishing Co., New Delhi.
5. Manikandan K. and Prabhu S., (2019). Indian Forestry A Breakthrough Approach to Forest Service. Jain Brother Publishers.
6. Vasanthraj David. B. and Ramamurthy V. V., (2016). Elements of Economic Entomology. Brillion Publishing

B) Reference books:

1. Warning R H and Schlesinger W H, 1985. Forest Ecosystems: Concepts and Management. Academic Press, New York.
2. Imms A D, 1965. A General Textbook of Entomology, ELBS, London.
3. Metcalfe C L and Flint W P, 1973. Destructive and Useful Insects, McGraw-Hill, NewYork.
4. Dasmann R F, 1964. Wildlife Biology, John Wiley & Sons, New York, p 231
5. Das Indraneil and Das Abhijit (2018). A Naturalist's Guide to the Reptiles of India, Bangladesh, Bhutan, Nepal, Pakistan and Sri Lanka. Prakash Books India Pvt. Ltd. New Delhi
6. Dhamorikar A. (2016). A Field Guide to Insects and Spiders of Kanha Tiger Reserve. Resurrect and The Corbett Foundation, Delhi
7. Menon Vivek (2014). Indian Mammals: A Field Guide. Hachette India, Gurugram
8. Daniel J. C. (2020). The Book of Indian Reptiles and Amphibians. Bombay Natural History Society and Oxford University Press, New Delhi
9. Hiware C J., Pawar R. T., Gaikwad, Sonawane S. R. (2018). Classification and Identification of Freshwater Fishes. Daya Publishing House, New Delhi
10. Ali Salim. (2002). The Book of Indian Birds. Bombay Natural History Society and Oxford University Press, New Delhi

**Credit means the unit by which the course work is measured. It is equivalent to one hour of teaching (Lecture or Tutorial) or two hours of practical work/field work per week.*