**M.Sc. WildLifeBiology**

Syllabus

AFFILIATED COLLEGES

**ProgramCode:**

**2022– 2023onwards**

**BHARATHIARUNIVERSITY**

**(A State University, Accredited with “A” Grade by NAAC,Ranked13thamongIndianUniversitiesby MHRD-NIRF,**

**WorldRanking:Times-801-1000,Shanghai-901-1000,URAP-982)**

**Coimbatore-641046,TamilNadu, India**



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| **Program Educational Objectives(PEOs)** |
| The **M.Sc. Wildlife Biology** program describe accomplishments that graduates are expected to attain with in five to seven years after graduation |
| PEO1 | M.Sc., graduates can work as teaching faculty in Environmental Science, Wildlife Sciences & Wildlife Biology, Researchers,Scientists,Forest service and Biologists.They can also become teachers in Environmental sciences and animal trainers in all fields of biology. |
| PEO2 | They can find jobs in any field of biological science including Forest EcologistZSI, BSI, WII and field works in conservation. |
| PEO3 | They can enter into environment, forest ecosystems and pollution controlsectors. |
| PEO4 | They can find employment in Zoos, Museums, Zoological Parks, Tiger Reserves, Sanctuaries and National Parks. |
| PEO5 | They can fit into Wildlife Forensic labs |
| PEO6 | They can earn and shine in Forest department & Research institutions |
| PEO7 | They can work in Veterinary sector |
| PEO8 | They are eligible to serve as Biologist & Scientist in wildlife institutions and NGO’S like BNHS, WTI and other organizations. |
| PEO9 | Appear exams to become Forest officials |
| PEO10 | Higher studies as Ph.D in Wildlife Biology and Wildlife biology – Zoology Interdisciplinary |



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| **ProgramSpecificOutcomes(PSOs)** |
| Afterthesuccessfulcompletionof**WildlifeBiology**program,thestudentsareexpected to |
| PSO1 | Elucidate animal-animal,animal-plant,animal-microbe interactions and their consequences to animals, humans and the environment. |
| PSO2 | Develop deeper understanding of key concepts of biology at molecular and cellular level, physiology and reproduction at organism level, and ecological impact on animal behavior. |
| PSO3 | Strengthen knowledge of genetics in light of advancements in understanding animal genome and other model organisms. |
| PSO4 | Describe the expression of genome revealin gmultiple levels of regulation and strategies to manipulate the same in the benefit of animal life. |
| PSO5 | Learn handling forensic analysis of wild animals and identifying dead animals organs. Cause of death of wild animals, Human animal conflicts etc., |
| PSO6 | Understand relationships of variations in phenotypic expression. |
| PSO7 | Develop an understanding of Zoological Science for its application in animal classification Wild Fauna, Forest Entomology and Wildlife Science. |
| PSO8 | Develop theoretical and practical knowledge in handling the animals and usingThem as model organism. |
| PSO9 | Maintain high standards of learning in animal sciences especially in wildlife. |
| PSO10 | Focus to prepare them with research-oriented approach in frontierArea so research in Wildlife Biology and preparing them for carrying out advance research. |



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| **Program Outcomes (POs)** |
| On successful completion of the M.Sc. Wildlife Biology program |
| PO1 | Expected to attain writing skills via assignment, reports, seminar &projects |
| PO2 | To develop presentation & communication skills through research |
| PO3 | To attain analytical skills like understanding & interpreting the results |
| PO4 | To know the basics of instrumentation |
| PO5 | To develop taxonomical skills in identifying the animal species |
| PO6 | To learn about animal biodiversity and forestecosystems |
| PO7 | To understand animal by studying the biology, anatomy, physiology etc., |
| PO8 | To create an awareness of the impact of Wildlife and the environment, forestry and development outside the scientific community. |
| PO9 | To study and understand the classification of whole phyla includes in Chordates with the help of charts/models/pictures/videos |
| PO10 | To inculcate the scientific temperament in the students and creating interest in research. |

**BHARATHIARUNIVERSITY :COIMBATORE641 046**

**M.Sc., ZOOLOGY(Wildlife Biology) DEGREE COURSE (COLLEGES - CBCS PATTERN)REVISEDSCHEME OFEXAMINATION**

*(Forthe students admitted during the academic year 2021 – 23 onwards*

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| **CourseCode** | **Paper** | **TitleoftheCourse** | **Credits** | **Hours** | **MaximumMarks** |
| **Theory** | **Practical** | **CIA** | **ESE** | **Total** |
|  |  | **FIRSTSEMESTER** |
| 13A | Core I | Ichthyology and Herpetology | 4 | 6 | - | 50 | 50 | 100 |
| 13B | Core II | Ornithology | 4 | 6 | - | 50 | 50 | 100 |
| 13C | Core III | Mammalogy | 4 | 6 | - | 50 | 50 | 100 |
| 13D | Core IV | Forestry and Silviculture | 4 | 6 | - | 50 | 50 | 100 |
| 23P | Practical I | (Comprises of Papers I,II&III) | - | - | 2 | - | - | - |
| 23Q | Practical II | (Comprises of Papers V,VI& VII) | - | - | 2 | - | - | - |
| 23R | Practical III | (Comprises of Papers IV & EI) | - | - | 2 | - | - | - |
|  |  | **Total** | **16** |  |  |  |  | **400** |
|  |  | **SECONDSEMESTER** |
| 23A | Core V | Ecology and Evolution | 4 | 6 | - | 50 | 50 | 100 |
| 23B | Core VI | Ethology of Wildlife | 4 | 6 | - | 50 | 50 | 100 |
| 23C | Core VII | Biotechnology and Genetic Engineering | 4 | 6 | - | 50 | 50 | 100 |
| 23D | Elective I | Forest Entomology | 4 | 6 | - | 50 | 50 | 100 |
| 23P | Practical I | (Comprises of Papers I, II & III) | 4 | - | 2 | 50 | 50 | 100 |
| 23Q | Practical II | (Comprises of Papers V, VI & VII) | 4 | - | 2 | 50 | 50 | 100 |
| 23R | Practical III | (Comprises of Papers IV & EI) | 4 | - | 2 | 50 | 50 | 100 |
|  |  | **Total** | **28** |  |  |  |  | **700** |
|  |  | **THIRDSEMESTER** |
| 33A | Core VIII | Physiology and Health care of Wildlife | 4 | 6 | - | 50 | 50 | 100 |
| 33B | Core IX | Management of Zoo, Sanctuaries and National Parks | 4 | 6 | - | 50 | 50 | 100 |
| 3EC | Core X | Wildlife Management Techniques | 4 | 5 | - | 50 | 50 | 100 |
| 3EB | Elective II | Biostatistics, Application of Computing and Artificial Intelligence 4.0 | 4 | 5 | - | 50 | 50 | 100 |
| 43P | Practical IV | (Comprises of Papers VIII & IX) | - | - | 2 | - | - | - |
| 43Q | Practical V | (Comprises of Papers X) | - | - | 2 | - | - | - |
| 43R | Practical VI | ( Comprises of paper XI ) | - | - | 2 | - | - | - |
| 4ES | PracticalVII | Elective Practical (Comprises of Elective Papers II and III) | - | - | 2 | - | - | - |
|  |  | **Total** | **16** |  |  |  |  | **400** |
|  |  | **FOURTHSEMESTER** |
| 43A | Core XI | Conservation of Biodiversity of Wildlife | 4 | 6 | - | 50 | 50 | 100 |
| 43B | Elective III | Research Methodology | 4 | 6 | - | 50 | 50 | 100 |
| 4EC | Paper XV | Project & viva– voce | 6 | - |  | 75 | 75\* | 150 |
| 43P | Practical IV | (Comprises of Papers VIII & IX) | 4 | - | 2 | 50 | 50 | 100 |
| 43Q | Practical V | (Comprises ofPapers X) | 4 | - | 2 | 50 | 50 | 100 |

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| 43R | Practical VI | ( Comprises of paper XI ) | 4 | - | 2 | 50 | 50 | 100 |
| 43S | Practical VII | Elective Practical (Comprises of Elective Papers II and III) | 4 | - | 2 | 50 | 50 | 100 |
|  |  | **Total** | **36** |  |  |  |  | **750** |
|  |  | **GrandTotal** | **90** |  |  |  |  | **2250** |
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\*For Project150 marks(Project work=75 marks and Viva-voce=50 marks).

**Project Guidelines:**

1. Internal and external examiners will evaluate the projectwork and award marks out of

75.

1. Internal and external examiners will conduct viva-voce examination and award marks out

of 75.

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First

Semester



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| **Coursecode** | **13A** | **ICHTHYOLOGY AND HERPETOLOGY** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **CorePaperI** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basicknowledgeabout Fishes, Amphibians and Reptilesandtheirfunctions  | **Syllabus****Version** | **2022 –****2023** |
| **CourseObjectives:** |
| Themain objectivesof thiscourseare:1. To understand about the procedures and trends in taxonomy.
2. To understand important physiological functions in various vertebrate forms.
3. To know about the breeding behaviour of Fishes, Amphibians and Reptiles.
4. To know about the organization of Phylum Pisces, Amphibians and Reptiles and its characters.
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| **ExpectedCourseOutcomes:** |
| Onthesuccessful completionofthecourse,student willbe ableto: |
| 1 | To understand concept soft Taxonomy, its procedures, methods in collection and preservationOf animals as well as classification of animals. | K2 |
| 2 | To attain knowledge about locomotory organs, methods of locomotion, Feeding and Digestion in various Vertebrates. | K3 |
| 3 | To understand about organs of respiration, respiratory pigments, their mechanism, organs andProducts of excretion, mechanism and its relation to osmoregulation. | K2 |
| 4 | To understand the organization and function of nervous system and itsEvolutionary advances. | K4 |
| 5 | Integrate the strategies and evolutionary significance of free living and parasitic larval forms of Invertebrates on Fishes, Reptiles and Amphibians. | K5 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
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| **Unit:1** | **PRINCIPLES &TAXONOMY OF PISCES** | **15hours** |
| Characteristics and Classification of Pisces upto Order with suitable examples – Economically important Marine, Esturine, Lentic, Game and Aquarium fishes in South India |
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| **Unit:2** | **PRINCIPLES & TAXONOMY OF AMPHIBIANS** | **15hours** |
| Characteristics and Classification of Amphibia upto order with suitable examples – Salient features and distribution of South Indian Amphibians – Economic importance of Amphibians |
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| **Unit:3** | **PRINCIPLES & TAXONOMY OF REPTILES** | **15hours** |
| Classification and Characteristics features of Reptilia upto Order with suitable examples – Economic importance of Reptiles – Common South Indian Poisonous and Non- poisonous snakes distinctive features and distribution.Distinctive features and distribution of Indian Crocodiles – Breeding Biology of Indian Crocodiles. |
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| **Unit:4** | **LOCOMOTION AND DIGESTION**  | **15hours** |
| Distinctive features and locomotory organelles of Amphibians and Reptiles. Digestive system and feeding behaviour of Fishes and Amphibians |
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| **Unit:5** | **IMPORTANCE OF INDIAN TURTLES AND TORTOISES** | **15hours** |
| Distinctive features and distribution of Indian Turtles, Indian Tortoise and Indian terrapins – various aspects of migration in sea turtles – Breeding biology of Marine Turtles |
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| **Unit:6** | **Contemporary Issues** | **2hours** |
| Expert lectures, online seminars –webinars ,Conferences and Workshops |
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|  | **Total Lecture hours** | **77hours** |
| **TextBook(s)** |
| 1 | Moyle & Cechi, Fishes An Introduction to Ichthyology |
| 2 | John Richardson, Icthyology |
| 3 | Kothpal, A Text book of Modern Chordata |
| 4 | Laurie J. Vitt, Janalee P. Caldwell, Herpetology: An Introductory Biology of Amphibians and Reptiles  |
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| **ReferenceBooks** |
| 1 | Gupta, General & Applied Icthyology: Fish and Fisheries June 2006 |
| 2 | SS Khanna, Textbook of Fish Biology and Fisheries 3rd Edition |
| 3 | Laurie J. Vitt, Janalee P. Caldwell, Herpetology: An Introductory Biology of Amphibians and Reptiles  |
| 4 | Kerridge, Cold Blood: Adventuresa with Reptiles and Amphibians |
| 5 | McCarthy, Reptile |
| 6 | Pough, Herpetology |
| 7 | Mark O’Shea, Venomous Snakes of the World |
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| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | SystemsBiology(NPTEL)webhttps://nptel.ac.in/courses/102/106/102106035/ |
|  |
| Course Designed By: Dr. P. Kannan, Assistant Professor,T.V.K College, Thiruvaur and Dr. H. Mohanakrishnan, Head of the Department, Department of Wildlife Biology, GAC, Ooty. |

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| **Mapping with Programme Outcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | S | S | L | S | M | S | S | M | L |
| **CO2** | S | M | M | L | S | S | S | M | S | M |
| **CO3** | S | M | M | L | S | S | S | M | S | M |
| **CO4** | L | L | L | L | S | M | S | M | S | S |
| **CO5** | M | M | S | L | S | S | S | S | S | S |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **13B** | **ORNITHOLOGY** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **CorePaperII** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basic knowledge about Birds, anatomy and physiology | **SyllabusVersion** | **2022 –****2023** |
| **CourseObjectives:** |
| Themain objectives ofthis courseare |
| 1. To understand about Aves and its origin.
2. To study about structure and function of Aves.
3. To study about Avian classification, development, structure and function of integument types.
4. To understand the evolution of circulatory organs and process of respiration.
5. To know about the various aspects of skeletal system and evolution of urinogenital system.
6. To understand the working of nervous system and sense organs.
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| **ExpectedCourseOutcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | To understand the origin of Avian, concept of Avian diversity and importance of Avian morphology. | K2 |
| 2 | To gain knowledge about Avian classification, as well as structure and function of integument and its derivatives. | K2 |
| 3 | To analyze the evolution of Avian Physiology, blood components as well as respiratory mechanisms and organs in various Birds. | K4 |
| 4 | To understand the skeletal system and its parts and analyze the evolution of urino-genital system in different Vertebrates. | K2&K5 |
| 5 | To gain knowledge about Avian diversity, receptors of olfaction, taste and hearing and other organs.  | K4 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **Unit:1** | **TAXONOMY OF BIRDS** | **15 hours** |
| Classification of Birds upto order with examples – Economic Values of birds: food and other products from birds – birds of agricultural importance – bird hazards in airports – recreation – aesthetics – hunting - bird watching. |
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| **Unit:2** | **FORAGING BEHAVIOUR IN BIRDS** | **15 hours** |
| Habitat ecology of Indian birds Coastal birds – inland waterbirds of high altitude and deserts – Feeeding ecology of birds – Insectivores – Fugivores – Nectarivores – Graminivores – Carnivores and scavengers |
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| **Unit:3** | **SKELETAL SYSTEM AND MIGRATION**  | **15 hours** |
| Physiology of skeletal system in birds. Bird Migration : mechanics of migration – timing of migration – physiology of migration – orientation and navigation. Nests: Functions of nests – Choice of nest sites –Colonial nesting – Types of nests – Multiple Nests – nest materials – nest building |
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| **Unit:4** | **BREEDING BEHAVIOUR IN BIRDS** | **15 hours** |
| Physiology of Urinogenital system in birds. Reproduction: breeding seasons – factors influencing breeding seasons – courtship display – sexual selection – pair bond – sexual dimorphism – polymorphism – polyandry – polygymy – promiscuity – co-operative breeding – brood parasites. |
| **Unit:5** | **PARENTAL CARE IN BIRDS** | **15hours** |
| Physiology of Nervous system and Sense organs in Birds: Egg laying: timing of egg laying – clutch size – incubation patterns – hatching – parental care; feeding the young – nest sanitation – brooding the young – defence of young |
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| **Unit:6** | **ContemporaryIssues** | **2hours** |
| Expert lectures, online seminars –webinars |
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|  | **Total Lecture hours** | **77hours** |
| **TextBook(s)** |
| 1 | Kotpal, A Textbook of Chordata |
| 2 | Morrison, Rodewald, Voelker & Colon, Ornithology, 2018. |
| 3 | Faaborg & Faaborg, Book of Birds, Introduction to Ornithology, 2020 |
| 4 | Salim Ali, The Book of Indian Birds, 2003 |
| 5 | Kotpal, A Textbook of Chordata |
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| **ReferenceBooks** |
| 1 | Grimmet & Inskipp, Birds of Indian Subcontinent: India, Pakistan, Sri Lanka |
| 2 | Millton Hilderbrand. Analysis of vertebrate structure(1988). IV. Ed. John Wiley and Sons Inc., New York. |
| 3 | Romer, A.S. Vertebrate body (1949), IIIrd Ed. W.B. Saunders Co., Philadelphia. |
| 4 | Montagna, W. Comparative anatomy (1960). John Wiley and Sons Inc. |
| 5 | Walters, H.E. and Sayles, L.D. Biology of vertebrates (1959). Macmillan & Co., New York |
| 6 | Torrey, T.W. Morphogenesis of vertebrates (1963), John Wiley and Sons Inc.,New York and London |
| 7 | Colbert, E.H. Evolution of the vertebrates (1969), John Wiley and Sons Inc., New York. |
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| **Related Online Contents [MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | GeneralHumanAnatomy(WMA):[https://www.mooc-list.com/course/general-human-anatomy-](https://www.mooc-list.com/course/general-human-anatomy-wma)[wma](https://www.mooc-list.com/course/general-human-anatomy-wma) |
| 2 | EvolutionaryBiology:<https://onlinecourses.swayam2.ac.in/cec20_bt06/preview> |
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| Course Designed By:Dr. A Veeramani, Assistant Professor, and Dr. S Vidya, Guest Faculty,GAC, Ooty. |

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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | M | M | L | S | S | S | L | S | M |
| **CO2** | S | M | L | L | S | S | S | S | S | M |
| **CO3** | M | L | M | L | S | S | S | S | S | M |
| **CO4** | S | M | M | L | S | S | S | S | S | M |
| **CO5** | S | M | M | L | S | S | S | S | S | M |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **13C** | **MAMMALOGY** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **Core PaperIII** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basic knowledge about Mammal biodiversity and **S**conservation  | **Syllabus as on** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives of this courseareto:1. Acquire the knowledge of mammals in different geographical areas.
2. Understand the strategies evolved to conserve Mammals in their habitats.
3. Know the measures in vogue to restore the biodiversity and environment.
4. Levels of organization in Mammals.
5. Analyze the evolutionary affinities of vertebrates.
6. Create awareness against wildlife crimes and Laws in conserving biodiversity.
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| **ExpectedCourseOutcomes:** |
| On the successful completion of the course, student will be able to: |
| 1. | To understand the significance of Mammals and its Classification. | K2 |
| 2. | To appreciate the various strategies to protect the Endemic and Endangered Mammals. | K4 |
| 3. | To know the comparative anatomy and evolutionary affinities of various Mammals. | K2 |
| 4. | To admire the values of ethical committee in animal research | K3 |
| 5. | To develop awareness against wildlife crimes and wildlife degradation | K5 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
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| **Unit:1** | **TAXONOMY AND CLASSIFICATION OF MAMMALS** | **15hours** |
| Classification of mammals uptoorder with suitable examples – economic importance of Mammals – Common Marine Mammals of India, Order Primata – Apes – Gibbon, Monkey,Bonnet, Rhesus, Assamese, Lion-tailed, Langurs- common, capped, Golden, Nilgiris. Loris – Slender and slow loris Order Pholidota, Pangolins – Indian |
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| **Unit:2** | **ORDER CARNIVORA** | **15hours** |
| Major Cats – Tiger, Lion, Leopard and Snow Leopard, Lesser Cats – Golden, Leopard, Fishing, Jungle. Civet – Tiger civet, Large Indian Civet, Small Indian Civet, Palm Civet, Binturong or Bear Cat, Hyena- Stripped, Mongoose, Common Mongoose, Small Indian, Stripped necked, Crab-eating. Dogs- Wolf, Jackal, Red Fox, Indian Fox, Dhole, Bears- Sloth Beaat, Himalayan Black Bear, Brown Bear, Wweasels- Common and Smooth Indian Otter. |
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| **Unit:3** | **ORDER PERISSODACTYLA** | **15hours** |
| Horses- wild Ass, Rhinoceros- one horned Rhinoceros. Order Artidactyla: Deer- Kashmir stag, brown- antlered deer, swamp deer, hog deer, spotted deer, barking deer, musk deer,mouse deer, sambar deer, antelope –black buck, four horned antelope. Goat- Himalayan Thar, Nilgiri thar, Oxen, Guar, Pig- Wild Boar |
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| **Unit:4** |  | **15hours** |
| India-thecountryofmegawildlifebiodiversity-Objectivesofwildlifeconservation-Biodiversitylossandcausesofwildlifedepletion-Biodiversityand climatechange-Economicimportanceofwildlife. |
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| **Unit:5** | **MODERNCONCEPTSINWILDLIFECONSERVATION** | **15hours** |
| Wildlife Crimes:Wildlife forensics and its applications in detecting wildlife crimes-Wildlife toxicology: |



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| Types of contaminants, concentration, bio accumulation and bio magnifications in wildlife populations -Environmental Impact Assessment (EIA) Methods and their role in wildlife conservation – Geographical information system-Biodiversity exploration & conservation -Artificial intelligence technology inConserving biodiversity-Environmental policy of India and legislations. |
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| **Unit:6** | **ContemporaryIssues** | **2hour** |
| Expertlectures,onlineseminars–webinars, |
|  |
|  | **TotalLecturehours** | **77hours** |
| **TextBook(s)** |
| 1. | Mammals of India, Vivek Menon, 2009. |
| 2. | The life of Mammals, David Attenborough, 2002. |
| 3. | Mammals: 300 Amazing Animals, Chris McNab, 2016 |
| 4. | Mammals: A compare and Contrast Book, Katharine Hall, Kindle Edition,  |
| 5. | Mammalogy: Adaptation, Diversity& Ecology, Feldhamer, Merritt, Krajewski,Rachlow and Stewart, 2020 |
| 6. | Manualof Zoology–EgambaranatharIyyer |
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| **ReferenceBooks** |
| 1. | Current Mammalogy, Genoways, 2013 |
| 2. | Mammalogy Techniques, Ryan, 2018 |
| 3. | Mammals of the World, Ronald, 1999 |
| 4. | A manual of Mammalogy, Martin, Pine &Deblase, 1974 |
| 5. | Physiological Mammalogy, Mayer1963 |
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| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | EcologyandWildlifeConservation(FutureLearn):[https://www.mooc-list.com/course/ecology-and-](https://www.mooc-list.com/course/ecology-and-wildlife-conservation)[wildlife-conservation](https://www.mooc-list.com/course/ecology-and-wildlife-conservation) |
| 2 | WildlifeConservation:<https://nptel.ac.in/courses/102/104/102104068/> |
| 3 | WildlifeEcology:<https://swayam.gov.in/nd1_noc20_bt38/preview> |
|  |
| Course Designed By: Dr. H. Mohanakrishnan, Assistant Professor and Head ,Department of Wildlife Biology, GAC, Ooty and Dr. S. Vidya, Guest Faculty, Department of Wildlife Biology, GAC, Ooty. |

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| **Mapping with Programme Outcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | S | S | M | M | M | S |
| **CO2** | S | S | S | L | S | S | M | M | M | S |
| **CO3** | S | S | S | L | S | S | S | S | S | S |
| **CO4** | S | S | S | L | S | M | M | M | S | S |
| **CO5** | S | S | S | L | S | S | S | S | S | S |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **13D** | **FORESTRY AND SILVICULTURE** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **Core PaperIV** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basic understanding about Forest **Ve** | **Syllabus****version** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives of this course are,1. To explain the core concepts of ecology for a better understanding of the environment.
2. To motivate, identify and solve environmental problems.
3. To create awareness about the improvement and protection of the environment.
4. To make understand the need for conservation of biodiversity and natural resources.
5. To help understand the concepts of exobiology.
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| **ExpectedCourseOutcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | Understand the ecological dynamics and the significance of environmental integrity | K2 |
| 2 | Recognize various global and regional environmental concerns that affects the biosphereAnd analyze the impact of human activities on the environment. | K1 |
| 3 | Appreciate the significance of the conservation of native biodiversity. | K4 |
| 4 | Scrutinize specific cases of environmental pollution and challenges, and their impacts onecology. | K5 |
| 5 | Apply knowledge of chemistry, biology, molecular biology and micro biology to arrive atInnovative solutions to environment issues and extra-terrestrial habitats | K3 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **Unit:1** |  **REGENERATION OF FOREST** | **15hours** |
| Natural and artificial regeneration of forests - nursery and planting techniques. Clear felling, Uniform shelter wood selection, coppice and conversion systems. Silviculture management -Mangroves- Cold desert & Plantations . Tree improvement & Seed Technology (collection, storage, pre-treatment and germination, establishment and tendings) – Non timber forest products – Wood seasoning and preservation - Anatomical structure of wood, defects and abnormalities of wood, timber identification. |
|  |
| **Unit:2** | **FOREST WORKING PLAN** | **15hours** |
| Forest working Plan–Planning,evaluation,monitoring and forest industries.Silvicultural systems - Indian forestact 1927); forest conservation act(1980); Biodiversity Act, HACA |
|  |
| **Unit:3** | **FOREST MENSURATION** | **15hours** |
| Forest management techniques - Methods of measuring - diameter, girth, height and volume of trees- form-factor- volume estimation of stand Sampling method sand sample plots.Yield calculation-forest cover monitoring through remote sensing-GIS management and modeling- Forest survey-map reading. |
|  |
| **Unit:4** |  | **15hours** |
| Forest types in India, identification- dendrology, Establishment of herbaria and arboreta. Agro forestry systems - Social/Urban Forestry – Joint Forest Management. Watershed management – Deforestation & Impacts. Forest Inventory. |

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| **Unit:5** |  | **15hours** |
| Role of Forest in soil Conservation: erosion- reclamation – role of microorganisms –Watershed management –forest hydrology–river channel stabilization –avalanche and landslide control–ground water recharge. Check dam – Percolation pond – Impact of invasive alien species in Forest Management. |
|  |
| **Unit:6** | **ContemporaryIssues** | **2hours** |
| Expert lectures, online seminars –webinars, Workshop |
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|  | **TotalLecturehours** | **77hours** |
| **TextBook(s)** |
| 1 | Odum:Fundamentals of Ecology(1953) |
| 2 | Odum:Basic Ecology(1983) |
| 3 | Turkand Turk:Environmental Science |
| 4 | Environmental biology–Dr.P.S.Verma & Dr.V.K.Agarwal |
|  |
| **ReferenceBooks** |
| 1 | Controlled Ecological Life Support system –NASA conference publication (2378)(e-content) |
| 2 | Environmental Science:Earthasa Living Planet by Daniel B.Botkin,EdwardA.Keller |
| 3 | Environmental Science:Systems and solutions–MichaelL.McKinney & Robert M.Schoch. |
| 4 | Ecology and Environment–P.D. Sharma |
|  |
| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | Primark:A Primer of Conservation Biology |
| 2 | Calabrese: Pollutants and High-Risk Groups |
| 3 | Controlled Ecological Life Support system –NASA conference publication(2378)(e-content) |
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| Course Designed By: Dr.B. Ramakrishnan, Assistant Professor in Wildlife Biology, GAC, Ooty and Dr. A.VeeraMani, Assistatnt Professor in Zoology, GAC Kumbakonam. |

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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | S | S | S | S | S | S |
| **CO2** | S | S | S | L | S | S | M | S | L | S |
| **CO3** | S | S | S | L | S | S | M | S | L | S |
| **CO4** | S | S | S | L | L | M | L | M | S | S |
| **CO5** | S | S | S | L | S | S | S | S | S | S |

\*S-Strong;M-Medium;L-Low



SecondSemester



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| **Coursecode** | **23A** | **ECOLOGY AND EVOLUTION** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **CorePaperVI** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | BasicknowledgeaboutBiochemistry **Ve** | **Syllabus****rsion** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives of this course are to:1. To understand basics of Ecology.
2. To elucidate the interaction of animals with ecosystem.
3. To understand the basic Phylogeny of animals.
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| **ExpectedCourseOutcomes:** |
| On the successful completion of thecourse,student willbe able to: |
| 1 | To understand the Ecological concepts in Wildlife Biology. | K2 |
| 2 | To learn the properties and functions of Eco-system. | K2 |
| 3 | To analyze the concept of Phylogenetics | K3 |
| 4 | To understand the various methods in pollution control. | K4 |
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| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **Unit:1** | **LIMITING FACTORS IN ECOLOGY** | **15hours** |
| Light, Temperature, Soil, Law of minimum, Law of tolerance. **Population ecology**- Density, Natality,Mortality, Growth curves, Equilibrium fluctuation, Biotic potential, Regulation. **Community ecology**-Structure, Stratification, Ecotone and Edge effect, Ecological niche, Ecological succession. |
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| **Unit:2** | **ECOLOGICAL FACTORS** | **15hours** |
| Structure, dynamics, energy flow, Primary production and decomposition. Structure and function of ecosystems-terrestrial (forest, grassland) and aquatic (freshwater, estuarine, marine), **Biogeochemical****cycles**-gaseous (Carbon, Nitrogen, Oxygen), Sedimentary (Sulphur, Phosphorus). |
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| **Unit:3** | **POLLUTION IN THE ECO-SYSTEM** | **15hours** |
| Air, Water, Land, Noise, Thermal, Radioactive - Conservation of Natural Resources. Environmental Impact Assessment (EIA). **Remote Sensing**-Aerial Photography, Satellite images, Thermal, Infra Red, Radar Images. Geographical Information System (GIS) and its application; Space Ecology. |
|  |
| **Unit:4** | **NATURAL SELECTION AND** **ADAPTATION IN EVOLUTION** | **15hours** |
| Origin of life on earth, Abiotic synthesis of organic monomers and polymers, concept of Oparin andHaldane; Evolution of prokaryotes and eukaryotes; Evolutionary time scale – Eras, Periods and Epoch,Variations and its concept; Hardy Weinberg Law-Genetic drift, Speciation- Evolution of man-Fossil records of man, Cultural evolution of man, Future evolution of man.Geological Time Scale, Fossils and Fossilization. |
|  |
| **Unit:5** | **MOLECULAR PHYLOGENETICS** | **15hours** |
| Role of gene in evolution - Evolution of gene families Construction of phylogenetic trees-Phylogenetic inference –Distance methods, parsimony methods, maximum likelihood method-Immunological techniques – DNA – DNA hybridization and molecular clocks. Impact of DNA barcoding in modern evolutionary studies. |

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| **Unit:6** | **Contemporary Issues** | **2hours** |
| Expertlectures,onlineseminars –webinars |
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|  | **Total Lecturehours** | **77hours** |
| **TextBook(s)** |
| 1 | Verma, P.S. and V.K. Agarwal, 1983. Environmental Biology (Principles of Ecology), S. Chand & Co., New Delhi. |
| 2 | Eugene Odum, P., 1971. Fundamentals of Ecology. Third Edition. Nataraj Publishers, Dehradun |
| 3 | Clarke, G.L., (1954). Elements of Ecology. John Wiley & Sons. Inc Toppan Company Ltd. |
| 4 | Ananad, P.H. and Rajesh Kumar, V. (2003). Principles of Remote Sensing and GIS Sri Venkateswara Publishers, Kumbakonam. |
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| **ReferenceBooks** |
| 1 | Yadav, P. R. 2003. Fossils. Discovery Publishers |
| 2 | Arora, M. P. (1992). An Introduction to palaeontology. Himalaya Publishers. |
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| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 |  |
| 2 |  |
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| CourseDesigned By:Dr.Senthil Kumar,Assistant Professor of Zoology, SVC, Erode and Dr. A. Jeyashankar, Assistant Professor in Zoology, GAC,Coimbatore. |

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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | L | L | M | M | L | S |
| **CO2** | S | S | S | M | L | L | M | M | L | S |
| **CO3** | S | S | S | M | L | L | M | M | L | S |
| **CO4** | S | S | S | M | L | L | M | M | L | S |
| **CO5** | S | S | S | M | L | L | M | M | L | S |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **23B** | **ETHOLOGY OF WILDLIFE** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **CorePaperVII** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | BasicknowledgeaboutAnimal Behaviour **Ve** | **Syllabus****rsion** | **2022-****2023** |
| **CourseObjectives:**1. To provide overview of introduction to behaviour in Wild Animals.
2. To learn the fundamental concepts of Animal Behaviour.
3. To make aware of hormonal actions in Animal Behaviour.
4. To understand the social behaviour of Mammals.
 |
| **ExpectedCourseOutcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | To understand and apply the principles ofAnimal Behaviour. | K3 |
| 2 | To gain knowledge about Hormonal Regulation in Animal Behaviour. | K2 |
| 3 | To analyze the Biological rhythms in Animals. | K4 |
| 4 | Students will learn about the mechanisms and regulation of social communication in Animals. | K4 |
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| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
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| **Unit:1** | **BEHAVIOURPATTERN** | **15hours** |
| Instinctive behaviour- classical and modern concepts-fixed action pattern and ritualization.Learning-Imprinting-habituation.Analysis of behaviour pattern-taxis,kinesis andreflexes. |
| **Unit:2** | **HORMONESANDPHEROMONES** | **15hours** |
| Physiologica lmechanism of behaviour–Perceptual mechanism-Role of hormones-Pheromones – predator detection, predator tactics. Altruism and evolution-Methods of studying behavior. |
| **Unit:3** | **FORAGINGBEHAVIOUR** | **15hours** |
| Biological rhythms - Circadian, Lunar,Tidal and animal rhythms. Animal communication-Visual, Auditory, Chemical and Vocalisation In Mammals, Birds and Insects. ForagingBehaviour. Origin and significance of play. |
| **Unit:4** | **BREEDINGBEHAVIOUROFANIMALS** | **15hours** |
| Courtship, display-sexual selection – pair bond – sexual dimorphism - polymorphism-polyandry, polygamy- promiscuity – cooperative breeding –brood parasites –parental care in Mammals & Birds. |

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| **Unit:5** | **COMMUNICATIONINANIMALS**  | **15hours** |
| Aggression – Competition – Social spacing – Territory – Dominance. Social commensalim–mutalism – Parasitism. Social behaviour of Elephants, Lion and Primates. |
| **Unit:6** | **ContemporaryIssues** | **2hours** |
| Expert lectures, online seminars –webinars |
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|  | **TotalLecturehours** | **77hours** |
| **TextBook(s)** |
| 1 | AgarwalV.K.(2009).*AnimalBehaviour(ETHOLOGY).*S.ChandPublishing. |
| 2 | LeshnerAI,1978.An Introduction to Behavioural Endocrinology,Oxford UniversityPress,NewYork. |
| 3 | McFarlandD (ed.),1981.*The Oxford Companion to Animal Behaviour*, OxfordUniversityPress,Oxford. |
| 4 | RidleyM,1968. *Animal Behaviour –A concise Introduction,* Blackwell Scientific Publications, Oxford. |
|  |
| **ReferenceBooks** |
| 1 | SlaterPJB,1985.*An Introduction to Ethology*, Cambridge University Press, Cambridge. |
| 2 | Natarajan P and Arumugam N.*A imalBehaviour–Ethology.*SarasPublication |
| 3 | WallaceRA,1979.*TheEcologyandEvolution of Animal Behaviour*, Good year PublishingCompany Inc.,Santa Monica, California. |
| 4 | WilsonE O,1978.*Sociobiology*, TheBelknap Press, Harvard University Press, Cambridge,MA. |
| 5 | TristramD.Wyatt. *Pheromones and Animal Behaviour.* Cambridge University Press |
|  |
| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 |  |
| 2 |  |
| 3 |  |
|  |
| CourseDesigned By:Dr.S.Vidya, Guest Faculty in Wildlife Biology, GAC, OOty and Dr. H. Mohanakrishnan, Assistatnt Professor of Wildlife Biology, GAC, Ooty |

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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | L | L | M | M | L | M |
| **CO2** | S | S | S | S | L | L | M | M | L | M |
| **CO3** | S | S | S | S | L | L | M | M | L | M |
| **CO4** | S | S | S | S | L | L | L | L | L | M |
| **CO5** | S | S | S | S | L | L | L | L | L | M |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **23C** | **BIOTECHNOLOGY AND GENETIC** **ENGINEERING** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **CorePaperVIII** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basic information on Biotechnology and GE | **SyllabusVersion** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives ofthis course are to:1. To make aware of the students about the theories, concepts and basics of Biotechnology.
2. To provide students the idea of sex determination, differentiation and development of organs.
3. To make aware of the induction, organizers and development of Genetic Engineering.
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| **ExpectedCourseOutcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | The learner will be able to understand methodological approache to the study of Biotechnology. | K2 |
| 2 | The students will be able to identify and understand the sex of the animals. | K5 |
| 3 | The students will able to develop an idea, how to arrange sequences of DNA. | K4 |
| 4 | The learner will be able to understand the Recombinant Techniques. | K2 |
| 5 | The students will attain a basic conceptual knowledge of the principleMechanisms of the genetic and molecular elements that are involved. | K4 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
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| **Unit:1** | **TISSUE CULTURE AND MEDIA PREPARATION** | **15hours** |
| Introduction to Animal Tissue Culture: Background, Advantages, Limitations and applications. Culture Environment, Esssential Equipment’s required for animal tissue culture, Aseptic Technique and general safety. Media: Physicochemical properties, Balanced Salt Solutions, Complete media, serum, Advantage and Disadvantages of serum, free media. |
|  |
| **Unit:2** |  **PRESERVATION OF CULTURE** | **15hours** |
| Contamination: Sourse of contamination, Types of Microbial contamination, Monitoring, Eradication of contamination, Cross-contamination. Cryopreservation; Need of cryopreservation, Apoptosis and its determination: cytotoxicity assays. Application of animal cell culture; Vaccine production; Tissue engineering; |
|  |
| **Unit:3** |  **RECOMBINANT TECHNIQUES** | **15hours** |
| In vitro Fertilization and Embryo Transfer: Composition of IVF media, steps involved in IVF, Fertilization by means of micro insemination, PZD, ICSI, SUZI, MESA, stem cell culture, embryonic stem cell and their applications. Ethical issues in animal biotechnology. |

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| **Unit:4** | **GENE MANIPULATION** | **15hours** |
| Genomic and cDNA libraries; PCR; Principle and types; Site directed mutagenesis; DNA sequencing, Micro arrays – cDNA and protein chips. DNA finger printing; SNPs, VNTRs and microsatellites, Molecular Marker techniques; RFLP, RAPD, STS, SSR, ISSR, SCAR,SSCP AND AFLP. Importance of molecular markers assisted selection. |
|  |
| **Unit:5** | **ENZYMES INVOLVED IN GENETICAL ENGINEERING** | **15hours** |
| Enzymes used in manipulation; Polymerases and types; nucleases: endonucleases, exonucleases and restriction enzymes; ligases; topoisomerases, methylases; other modifying enzymes. Electrophorosis. |
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| **Unit:6** | **ContemporaryIssues** | **2hours** |
| Expert lectures ,onlineseminars –webinars |
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|  | **TotalLecturehours** | **77hours** |
| **TextBook(s)** |
| 1 | Animal Biotechnology by N. Arumugam, V. Kumaresan . Saras Publication, 2019 |
| 2 | Texbook of Animal Biotechnology by B. Sing, S.K.Goutham. The Energy and Resources Institute, TERI, 2013 |
| 3 | Genetic Engineering A Primer. Yamagami T. Auris Publishing 2017 |
| 4 | Molecular Biology and Genetic Engineering, N. Arumugam, AThangamani, L M. Narayanan, Padmalatha Singh. Saras Publication. 2012 |
|  |
| **ReferenceBooks** |
| 1 | Animal Biotechnology. AshisVerma, Anchal Singh, 2nd Edition, Academic 2020 |
| 2 | Animal Biotechnology. P. K. Gupta. Rastogi Publications, 2020 |
| 3 | Principle of Genetics. Gardner, Wiley India, 2006 |
| 4 | Genetic Engineering, Smita Rastogi, Oxford Univerisy Press, 2009 |
|  |
| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | NOC:IntroductiontoDevelopmentalBiology,Prof.SubramaniamK,IITMadras,https://nptel.ac.in/courses/102/106/102106084/] |
|  |
| Course Designed By: Dr. A.Jeyashankar, GAC Coimbatiore. and Dr. Senthil Kumar, GAC, Erode |

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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | L | M | M | L | S |
| **CO2** | S | S | S | S | M | L | M | M | L | S |
| **CO3** | S | S | S | S | M | L | M | M | L | S |
| **CO4** | S | S | S | S | M | L | M | M | L | S |
| **CO5** | S | S | S | S | M | L | M | M | L | S |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **23D** | **FOREST ENTOMOLOGY** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **Elective I** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basicinformationabout Forest Insects | **Syllabus****Version** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives ofthis course are to:1. To develop awareness about the Forest Insects
2. To learn the taxonomy and classification of Insects.
3. To study about economic importance of Insects and health care of wildanimals.
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| **ExpectedCourseOutcomes:** |
| Onthesuccessful completionofthecourse,student willbe ableto: |
| 1 | Understanding the beneficial role of Insects. | K2 |
| 2 | To elucidate various insects affect Wild Fauna. | K5 |
| 3 | The course will give an idea about management of forest insects. | K4 |
| 4 | The students will be capable of interpreting and understanding about insects of forest. | K2 |
| 5 | The learners will be trained in handling and preservation of insect specimen. | K4 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **Unit:1** | **TAXONOMYANDANATOMY** | **18hours** |
| Taxonomy&IdentifyingCharactersofFishes,AmphibiansandReptiles(uptoorders).Fishmigration-Hillstreamadaptations.Parentalcareinamphibians&Fishes–Venomous,mildly-venomous&Non venomoussnakes–EconomicimportanceofReptiles&fishes. |
|  |
| **Unit:2** | **TAXONOMYANDIDENTIFYINGCHARACTEROFBIRDSandMAMMALS** | **18hours** |
| Principles of insect taxonomy- Classification of insects up to order. Morphology and anatomy of insects-segmentation and divisions of the body. Head-Mouth parts and its types. Thorax-legs-Modifications of the basic leg structure. Exoskeleton-integument-Basic structure of cuticle-wings and flight. Insect collection, preservation and culture techniques. |
|  |
| **Unit:3** | **PHYSIOLOGY OF INSECTS** | **16hours** |
| Biology of Honey bee, silk moth and Lac insect –Culture methods for honey bee and silk worm –Appliances used and problems related to these cultures. Beneficial insects – Pollinators, predators, parasitoids – scavengers – weed killers. |
|  |
| **Unit:4** | **DESTRUCTIVE INSECTS** | **18hours** |
| Biology – Life cycle – control measures – damages caused – Insect Pest of a) Teak, b) Sandalwood, c) Bamboo. Mode of Insect attack on trees: Leaf eaters, sapsuckers – Meristematic Tissue feeders Wood destroyers |

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| **Unit:5** | **DETECTION AND EVALUATION OF INSECTS** | **18hours** |
| Detection and evaluation methods of insect infestation: Survey – estimation of insect abundance – devices for evaluation method for determining degree of hazards – Biological evaluation – control of forest insects, direct and indirect methods. |
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| **Unit:6** | **ContemporaryIssues** | **2hours** |
| Expert lectures, online seminars –webinars, Conferences and Workshop and internshipProgrammes |
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|  | **TotalLecturehours** | **90hours** |
| **TextBook(s)** |
| 1 | R.L.Kotpal.(2007).*Modern Text Book of Zoology –Invertebrates* |
| 2 | M.S. Nalinasundari and R. Santhi. 2008. Entomology, MJP Publishers, Chennai |
| 3 | Ambrose, Dunston P. 2004. The Insects; Structure, function and Biodiversity. Kalyani publishers, Ludhiana, New Delhi, Chennai. |
| 4 | Nayar, K.K., Ananthakrishnan, T.N. and David, B.V. 1986. General and applied entomology, Tata McGraw Hill Publications, New Delhi. |
| 5 | Vasantharaj David, B. 2001. Elements of Economic Entomology, Popular Book Depot. Chennai – 15. |
| 6 | Chapman.R.F.1998.The insects .structure and function .4th edition, Cambridge University Press, UK. |
|  |
| **ReferenceBooks** |
| 1 | ImmsAD,1965.*A GeneralTextbookofEntomology*,ELBS,London. |
| 2 | MetcalfeCLandFlintW P,1973.*DestructiveandUsefulInsects*,McGraw-Hill,NewYork. |
| 3 | Snodgrass, R.E. 1985. Principles of Insect Morphology, McGraw Hill and Co., New York. |
|  |
| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | [**https://canterbury.libguides.com/biol**](https://canterbury.libguides.com/biol) |
|  |
| CourseDesigned By:Dr. A. Jeyashankar, Assistant Professor of Zoology, GAC, Coimbatore and Dr. D.Jeyabalan, Assistant Professor in Zoology, GAC, Ooty |

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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | L | M | M | L | S |
| **CO2** | S | S | S | S | M | L | M | M | L | S |
| **CO3** | S | S | S | S | M | L | M | M | L | S |
| **CO4** | S | S | S | S | M | L | M | M | L | S |
| **CO5** | S | S | S | S | M | L | M | M | L | S |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **23P** | **ICTHYOLOGY & HERPETOLOGY, ORNITHOLOGY AND MAMMALOGY** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **PRACTICAL–I** | **0** | **0** | **2** | **4** |
| **Pre-requisite** | Fundamentalknowledgeon animal anatomyandbiodiversity | **Syllabus****Version** | **2022-****2023** |
| **CourseObjectives:** |
| Themain objectives ofthis courseareto:1. To understand important physiological functions in various vertebrate forms.
2. To understand the working of nervous system and sense organs.
3. Acquire the knowledge of biodiversity in different geographical areas.
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|  |
| **ExpectedCourseOutcomes:** |
| Onthesuccessful completionofthecourse,student willbe ableto: |
| 1 | Attain knowledge about locomotory organs, locomotion,feeding and digestion inVarious Invertebrates. | K2 |
| 2 | Integrate the strategies and evolutionary significance of free living and parasiticLarval forms of Invertebrates as well as organization and characters of Minor Phyla groups. | K5 |
| 3 | Understand the origin of Chordata, concept of Protochordata, importance ofVertebrate morphology and biology of some chordates. | K1 |
| 4 | Gain knowledge about Vertebrate classification, as well as structure and functionOf integument and its derivatives. | K2 |
| 5 | Appreciate the various conservation strategies to protect biodiversity. | K4 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **STRUCTUREAND FUNCTIONS OF VERTEBRATA** | **12hours** |
| 1. Comparative study of system:vertebrata(any two animals)

Appendages,external morphology,digestivesystem,nervous system and reproductive system.1. Culture of fishes in laboratory to identify the stages.
2. Culture and identification of morphology of Egg.
 |
| **COMPARATIVEANATOMYOFCHORDATES** | **12hours** |
| 1. Comparativestudyofsystem:chordate(anytwoanimals)Externalmorphology,digestiveandreproductivesystem.
2. Identification of Beak and feet in different birds (anylocallyavailablebirds)Photography of Beak and feet.
3. Comparative study of scales of any preserved fish Cycloid, ctenoid, placoid and

 Ganoid scales.1. Comparative study of different types of chordate bones(any four animals)Skull, forelimb, hind limb.
2. Morphological modification of limb in fish, amphibia, reptiles, birds and mammals.
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|  | **12hours** |
| 1. Plankton identification of from fresh/marine water(5slidespreparation).
2. Quantitative estimation of plankton using haemocytometer.
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| **SPOTTERS(Non-chordateandchordate)(eachanyfivespecimens)** | **12hours** |
| 1. Biological importance
2. Medical importance
3. Beneficial pests
4. Evolutionary significance
5. Economic importance
 |
| **FIELDSTUDYAND FIELD TRIP**–Zoologicalvisit, biodiversityarea |
| **SubmissionatthetimeofPracticalExamination**1. Plankton:5 slides
2. Report on the Field study and Field trip
3. Bonafide Record
 |
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|  | **TotalLecturehours** | **88hours** |
| **TextBook(s)** |
| 1 | Advanced Practical Zoology by Sinha, J., Chatterjeee A.K., Chattopadhyay P. 2011.Arunabha SenPublishers. |
| 2 | Practical Zoology Invertebrate by H.S. Bhamrah.2003.Dominant Publishers. |
| 3 | KV.Krishnamurthy. *An Advanced Textbook on Biodiversity Principles and Practice.*Oxford & IBH Publishing CoPvt. Ltd. |
|  |
| **ReferenceBooks** |
| 1 | Preeti Guptha and Mridula Chaturvedi.(2000). *Modern Experimental Zoology* |
| 2 | Verma.(2000).*Manual of Practical Zoology*: *Chordates* S.ChandPublishing |
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| Course DesignedBy:Dr. A. Veeramani, Assistant Professor, Government Arts College, Kumbakonam. And Dr. H. Mohanakrishnan, Assistant Professor in Wildlife Biology, GAC, Ooty. |

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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | M | S | S | L | S | M | S | S | M | L |
| **CO2** | S | M | M | L | S | S | S | M | S | M |
| **CO3** | S | M | M | L | S | S | S | M | S | M |
| **CO4** | L | L | L | L | S | M | S | M | S | S |
| **CO5** | M | M | S | L | S | S | S | S | S | S |

\*S-Strong;M-Medium;L-Low



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| **Coursecode** | **23Q** | **ECOLOGY & EVOLUTION, ETHOLOGY OF WILDLIFE AND BIOTECHNOLOGY& GENETIC ENGINEERING** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **PRACTICAL-II** | **0** | **0** | **2** | **4** |
| **Pre-requisite** | Basicinformationonecology, **Ecology & Evolution, Ethology Of Wildlife And Biotechnology& Genetic Engineering** | **SyllabusVersion** | **2022-****2023** |
| **CourseObjectives:** |
| Themain objectives ofthis courseareto:1. Explain core concepts in ecology,and summarize our ecological understanding of environmental problems.
2. To train how the biological data are processed and interpretations are made.
3. To develop skill in understanding & handling molecular science & instrumentation.
4. To elucidate its interaction o fmolecules.
5. To provide an overview of cell structure, basic components of cells and their function.
6. To provide students the idea of sex cells ,fertilization, cleavage, differentiation and development of organs.
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| **ExpectedCourseOutcomes:** |
| Onthesuccessfulcompletion ofthe course, studentwill beable to: |
| 1 | Investigate specific cases of environmental pollution or natural hallenges &Their impact molecularissues | K5 |
| 2 | Thestudents willbe capableofinterpretingandunderstandingthebasis ofmolecular biology and will be trained in preparing solutions and handlinginstrumentsat basiclevel. | K2 &K4 |
| 3 | Understandthephysicalandchemicalconceptsin biology. | K2 |
| 4 | Understandmetabolismofnucleicacid, aminoacidand lipid. | K2 |
| 5 | Understand and apply the principles and techniques of molecular biology in basicresearchandensuringaccurate unityand diversityat themolecular and cellularlevels | K3 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **I.ANALYSIS OFWATER** | **12hours** |
| **Determination of:**1. pH
2. Totaldissolved solids
3. Turbidity/ light penetration
4. CO2and O2
5. Hardness(Temporaryandpermanent)
6. CalciumandMagnesium
 |
|  | **12hours** |
| 1. Qualitative and quantitativeestimationof Carbohydrates, ProteinsandLipids fromthe givensamples.
2. PreparationofHaemin crystals.
3. QuantitativeestimationofHaemoglobin.
4. Separationofplasma,Serumandcellsfromblood.
5. Colorimetricestimationofglucosefromblood
6. Estimationofcholesterol intheblood
7. Estimationofalkalineandacidphosphatases
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|  | **12hours** |
| 1. Mounting of Polytenechromosomefromthe salivaryglandofa*Chironomus*larva.
2. Squash preparation of onion root tip to study the stages of Mitosis.
3. Isolation of DNA and RNA from ananimal tissue(Demonstrationonly)
4. Study of different cells from the vertebrate animal (Brain,Liver,Gonad, Kidneyand Muscle)
 |
| **FIELDTRIPS**1.Visi tto–Drinking water treatment plant;Industrialeffluenttreatmentplant;Pollutioncontrollab. |
| **SubmissionatthetimeofPracticalExamination**1. Reporton theFieldstudyandField trips
2. BonafideRecord
 |
|  | **TotalLecturehours** | **88hours** |
| **TextBook(s)** |
| 1 | AdvancedPracticalZoologybySinha,J., ChatterjeeeA.K., ChattopadhyayP.2011. ArunabhaSenPublishers. |
| 2 | Environmental biologyand ecologylaboratorymanual byLynn.(2003).Kendall HuntPublishing |
|  |
| **ReferenceBooks** |
| 1 | Modern Experimental ZoologybyPreetiGupthaandMridula Chaturvedi.2000 |
| 2 | Fundamentals of BiochemistrybyJain J.L, SunjayJain, Nitin Jain. 2007. |
| 3 | ToxicologyLaboratoryLab Manualby5. OberdorsterEva.2009.KendallHuntPublishing |
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| CourseDesignedBy:Dr. Dr. Senthil Kumar, Assistant Professor in Zoology, GAC, Erode and Dr. A. Jeyashankar, Assistant Professor in Zoology, GAC, Coimbatore. |

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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | S | S | S | S | S | S |
| **CO2** | S | S | S | L | S | S | M | S | L | S |
| **CO3** | S | S | S | L | S | S | M | S | L | S |
| **CO4** | S | S | S | L | L | M | L | M | S | S |
| **CO5** | S | S | S | L | S | S | S | S | S | S |

\*S-Strong;M-Medium;L-Low



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| **Course code** | **23R** | **FORESTRY & SILVICULTURE AND FOREST ENTOMOLOGY** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **PRACTICAL-III** | **0** | **0** | **2** | **4** |
| **Pre-requisite** | Basic understanding on and Forestry and Entomology | **SyllabusVersion** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives of this course are to:1. To provide students the idea of Forest Silviculture and Forest Insects
2. To understand the taxonomy, healthcare, administration, legislation and Insect Damages
 |
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| **ExpectedCourseOutcomes:** |
| On the successful completion of the course,student will be able to: |
| 1 | The learner will able to understand methodological approaches to the study ofConserving Forest. | K2 |
| 2 | Understand Damages caused by the destricitive insects. | K2 |
| 3 | To make understand the students about beneficial forest insect. | K3 |
| 4 | The learner will be able to gain knowledge on ex-situ conservation and captiveBreeding of wildanimals. | K5 |
| 5 | Mapping of Zoosacross thecountry. | K4 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create |
|  |
|  | **12hours** |
| 1. Regeneration study in Forest
2. Study the life cycle of Bee/Lac/silk worm*.*
3. Effect of Deforestation
 |
|  | **12hours** |
| **SUBMISSIONATTHETIMEPRACTICAL EXAMINATION** | **12hours** |
| **(Shouldnotexceed20% of totalmarks)**1. Training report of Forest management.
2. Study report of eco-tourism.
3. Study report of eco-development programme.
4. Study report of interpretation centre.
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| **TotalLecturehours** | **88hours** |

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| **TextBook(s)** |
| 1 | Wildlifemanagement techniquesbyRejesh Gopal. |
| 2 | AManual of PracticalZoologybyVermaP. S.,2000. S. Chand Publication. |
|  |
| **ReferenceBooks** |
| 1 | ClinicalEmbryology:APracticalGuideby1. ZsoltPeterNagy,AlexC.Varghese,AshokAgarwal.2013.Springer-VerlagNewYork Inc |
| 2 | ModernTextBookofZoology:Vertebrates,2007.R.L.Kotpal. |
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| CourseDesignedBy:Dr. B.Ramakrishnan, Assistant Professor in Wildlife Biology, GAC, Ooty |

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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | L | L | M | M | L | S |
| **CO2** | S | S | S | M | L | L | M | M | L | S |
| **CO3** | S | S | S | M | L | L | M | M | L | S |
| **CO4** | S | S | S | M | L | L | M | M | L | S |
| **CO5** | S | S | S | M | L | L | M | M | L | S |

\*S-Strong;M-Medium;L-Low



Third

Semester



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| **Coursecode** | **33A** | **PHYSIOLOGY AND HEALTHCARE OF WILDLIFE** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **CorePaperIX** | **6** | **0** | **0** | **5** |
| **Pre-requisite** | Basic knowledge about the physiologicalactivities of all the systems in both non- **Ve**chordatesandchordates | **Syllabus****rsion** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives ofthis course areto:1. To study about the adaptive characters in animals
2. To acquire knowledge on the physiological aspects about all organ systems.
3. To acquire knowledge on the osmo and thermo regulatory mechanisms.
4. Understand the concepts of hormonal activities
5. To understand the role of hormones in the biological activities such as pregnancy and lactation
 |
|  |
| **ExpectedCourseOutcomes:** |
| Onthesuccessful completionofthecourse,student willbe ableto: |
| 1 | Acquire the knowledge of organisms surviving in various environments. | K4 |
| 2 | Learn the significance of osmo and thermo regulations to cope well with theEcological tress | K3 |
| 3 | Understand the physiological responses of the meditation practices in human | K2 |
| 4 | Factors involved in the mechanism of respiratory, excretory physiology, neuralAnd muscular physiology and their influence of hormones in reproduction. | K2 |
| 5 | Evaluate the various mode of life and adaptive modification of their organSystems in animals | K6 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **Unit:I** | **ADAPTATIONANDHOMEOSTASIS** | **18hours** |
| Adaptation - Levels and Mechanism of adaptation - Significance of body size – Adaptation, acclimation and acclimatization - Concepts of homeostasis. Physiological adaptations of different environments: Marine - Shores and Estuaries – Freshwater - Extreme aquatic environments -Terrestrial life. Extreme terrestrial environments - Parasitic habitats. Stress Physiology - Basicconcept of environmental stress and strain; concept of elastic and plastic strain; stress resistance,stressavoidanceand stress tolerance. |
|  |
| **Unit:II** | **MECHANISM OF THERMO AND OSMOREGULATIONS** | **18hours** |
| Physiological mechanism of thermo regulation. Physiological adaptation to osmatic and ionic stress; mechanism of cell volume regulation. Osmo regulation in aquatic and terrestrial environments. Physiological response to oxygen deficient stress. Physiological effects of physical exercises and yogic practices– Meditation &Yoga |
|  |
| **Unit:III** | **RESPIRATORYPHYSIOLOGY** | **16hours** |
| Respiratory physiology–Respiratory organs-Structure and function.Respiratory gases–uptake–respiratorypigments–O2&CO2 dissociationcurves–transport of respiratory gases. |
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| **Unit:IV** | **EXCRETORYPHYSIOLOGYANDENDOCRINOLOGY** | **18hours** |
| Excretory physiology –Excretory organs– mechanism of excretion– physiology – adaptations of excretion to environment – Excretory products: synthesis and elimination. Endocrine glands –Feedback regulation –Pituitary– gonadal axis. Role of reproductive hormones –gamete formation–fertilization-embryonic development–parturition–lactation-neuro endocrineregulation |
|  |
| **Unit:V** | **NEURALANDMUSCULARPHYSIOLOGY** | **18hours** |
| Neuralphysiology –Neuron sstructure and types. Nerve impulse transmission-resting and action potential –– neurotransmitters – mechanism of neural transmission. Neuro- degenerative diseases.Muscular physiology-Muscle contraction–theories–molecular mechanism of musclecontraction. |
|  |
| **Unit:VI** | **ContemporaryIssues** | **2hours** |
| Expertlectures,onlineseminars –webinars,workshopsandconferences. |
|  |
|  | **TotalLecturehours** | **90hours** |
| **TextBook(s)** |
| 1 | AnimalPhysiologyVolI &IIbyChatterjee |
| 2 | AnimalPhysiologybyVerma &Agarwal |
| 3 | Essentialof ANIMALPhysiologybyRastogi |
| 4 | PrinciplesofAnimal PhysiologybyChristopherMoyesand PatriciaSchulte |
|  |
| **ReferenceBooks** |
| 1 | Comparative Animal physiology by Philip C Withers |
| 2 | Comparative Physiology: Primitive Mammals”byKnutSchmidt-NielsenandLianaBolis |
| 3 | Advances in Comparative and Environmental Physiology: Animal Adaptation to Cold”byJABoulantandRJBrooks |
| 4 | “Advances in Comparative and Environmental Physiology ”by J Machinand S H Wright |
|  |
| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | https://swayam.gov.in/ |
| 2 | https:/[/www.mooc.or](http://www.mooc.org/)g[/](http://www.mooc.org/) |
| 3 | https://nptel.ac.in/ |
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| Course Designed By: Dr. H. Mohanakrishnan, Assistant Professor in Wildlife Biology, GAC, Ootyand Dr. A. Veeramani, Assistant Professor in Zoology, GAC, Kumbakonam. |

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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | M | S | S | L | S |
| **CO2** | S | S | S | S | M | M | S | S | L | S |
| **CO3** | S | S | S | S | M | M | S | S | L | S |
| **CO4** | S | S | S | S | M | M | S | S | L | S |
| **CO5** | S | S | S | S | M | M | S | S | L | S |

\*S-Strong;M-Medium;L-Low

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| **Course code** | **33B** | **MANAGEMENT OF ZOO’S, SANCTUARIES AND NATIONAL PARKS** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **Core Paper XII** | **6** | **0** | **0** | **4** |
| **Pre-requisite** |  | **Syllabus Version** | **2022-2023** |
| **Course Objectives:** |
| The main objectives of this course are to: 1. To introduce the evolutionary concepts among various animal groups.
2. To make them understand how life originated.
3. To realize the current working of evolution.
 |
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| **Expected Course Outcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | To understand the prehistoric life and its origin of animals. | K2 |
| 2 | To evaluate the impact of evolution on animals. | K4 |
| 3 | To analyze how the higher animals evolved. | K5 |
| 4 | To understand the evolution of genes among animals. | K2 |
| 5 | To imagine how the future evolution will be | K6 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create |
|  |
| **Unit:1** |  | **18 hours** |
| Wildlife Sanctuaries: Definition, formation, management and administration. Periyar, Mudumalai, Chinnar, Nagharhole, Indira Gandhi, Kalakad, Vedanthangal and Parambikkulam. |
|  |
| **Unit:2** | **MOLECULAR EVOLUTION** | **16 hours** |
|  National parks: Definition, formation, management and administration - Eravikulam, Gir, Bandipur, Khana, Guindy, Corbett, SilentValley, and Mukkurithi. Marine National Park: Rann of Kutch, Biosphere Reserves.Wildlife Projects: Tiger – Lion- Elephant. Tiger Reserves - Definition, formation, management and administration – Badra Tiger Reserve and Manas Tiger Reserve. |
|  |
| **Unit:3** |  | **18 hours** |
| Zoos and Zoological Parks: Definition- Aims of Zoos- Formation and Management of Zoos and Zoological Parks - Central Zoo Authority of India. Enclosures- Designing, Engineering and Enrichment. Zoo animal nutrition : Food and feeding management. Zoo sanitation: Principles and management of zoo. Diseases of Zoo animals. Zoo veterinary services. Animal restraint: principles and methods, release of restrained animals. Transport of animals Pests and parasites – nutritional disorders Zoo education: Internship techniques and Zoo research. Captive breeding: Aims, Principles, methods and case studies. |
|  |
| **Unit:4** |  | **18 hours** |
| **Habitat Restoration and Animal Conservation**: Indentifying the key species, Assessment of Carrying capacity, Corridor management – Case studies. **Exotic and Invasive Species:** Principles and Problems- Case Studies. Introduction and re-introduction of a species- Case Studies- Lion, Tiger, Rhinoceros. Role of Government, NGO’s and Educational Institutes involved in Wildlife Conservation. |
|  |
| **Unit:5** |  | **18 hours** |
| **Wildlife administration and legislation:** Administrative set up - Advisory bodies- National Board for Wildlife –Wildlife (Protection) Act, 1972 and its Amendments. Wildlife trade and regulations Biodiversity Act 2000 Eco-Development, Eco- Restoration and Ecotourism programmes. |
|  |
| **Unit:6** | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars – webinars, workshops and conferences. |
|  |
|  | **Total Lecture hours** | **90 hours** |
| **Text Book(s)** |
| 1 | Saharia, V.B. 1982 Wildlife in India, Nataraj Publishers, Dehra Dun |
| 2 | Seshadri, B.1986 India’s Wildlife reserves , Sterling Pub’rs Pvt. Ltd., New Delhi |
| 3 | Geoff Hosey, Vicky Melfe., Zoo Animals: Behaviour, Management and welfare, Kindle Edition |
|  |
| **Reference Books** |
| 1 | Devra G. , Katerina V & Charlotte., Wild Mammals in Capitivity; Principles and Rechniques for Zoo Management., University of Chicago Press., 2010. |
| 2 | Jacob V. Cheeran., Textbook of Wild and Zoo Animals: Care and Management., Enlarged Edition., 2007 |
|  |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** |
| 1 |  |
| 2 |  |
|  |
| Course Designed By:Dr.A. Veeramani, Assistant Professor in Zoology, GAC, Kumbakonam, Dr. H. Mohanakrishnan, Assistant Professor and Head, Department of Wildlife Biology, GAC, OOty. |



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| **Mapping with Programme Outcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | L | L | M | M | M | S |
| **CO2** | S | S | S | L | L | L | M | M | M | S |
| **CO3** | S | S | S | L | L | L | M | M | M | S |
| **CO4** | S | S | S | L | L | L | M | M | M | S |
| **CO5** | S | S | S | L | L | L | M | M | M | S |

\*S-Strong;M-Medium;L-Low

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| **Course code** | **33C** | **WILDLIFE MANAGEMENT TECHNIQUES** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **Core Paper XI** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basic knowledge about Genes and Chromosomes which have learned in undergraduate course | **Syllabus Version** | **2022-2023** |
| **Course Objectives:** |
| The main objectives of this course are to: 1. To make understand the applications and basic wildlife equipments.
2. To acquire the knowledge on handling the equipment related to wildlife.
3. To learn GIS and Remote sensing uses and its applications on wildlife management.
4. To sensitize the students on wildlife population estimation techniques.
5. To understand drugs related to chemical restraints the animals.
 |
|  |
| **Expected Course Outcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | Acquire the knowledge in wildlife and equipments usage in the field | K4 |
| 2 | Learn the significance of various field equipments | K3 |
| 3 | Understanding molecular methods in wildlife | K2 |
| 4 | Appreciate the mechanism of GIS, Remote sensing and Radio Collaring methods in wildlife | K2 |
| 5 | Evaluate various types of population estimation, mapping techniques and wild animals health monitoring and postmortem techniques | K6 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create |
|  |
| **Unit:1** | **EQUIPMENT IN WILDLIFE** | **18 hours** |
| Making observations and records – field notes & datasheets - Planning wildlife management Investigations and projects – funding agencies. Wildlife Photography - types of cameras & binoculars - camera traps – altimeter – pedometer - field compass. Sound recording & Media players - activity recording - weight measurement. |
|  |
| **Unit:2** | **TRACKING OF ANIMALS** | **18 hours** |
| Radio isotopes - radio collaring – GPS – GIS & Remote sensing. Q GIS – Map Info –Arch view (outlines only). Molecular methods in Wildlife; Impact and removal of invasive alien species; Habitat manipulation: food, water and shade improvement. |
|  |
| **Unit:3** | **ESTIMATION OF POPULATION** | **16 hours** |
| Planning census – sample counts – Block counts – Roadside counts – Dung count – Pugmark & waterhole census – Identifying animals based on indirect signs – Capture recapture techniques – tiger, co-predator monitoring census methods. – Distance software – Creation of capture matrix and softwares used in wildlife sciences. |
|  |
| **Unit:4** | **CONSERVATION OF FOREST** | **18 hours** |
| Survey & mapping water sources – rain gauge setting – supplementary water source – providing access to natural & artificial water sources –Fire as a tool. Wildlife damage control – assessment methods – reasons for conflicts – Fences – trenches & other methods – Human pressure classification – Trail survey in boundary – Forest product collection – Village survey – Anti poaching operations –VFC. |
|  |
| **Unit:5** | **INSECTS AND THEIR ECONOMIC IMPORTANCE** | **18 hours** |
| Classification of insects up to order with example. Feeding and reproductive behaviour of insects, Forecasting, assesses risk of insect outbreaks. Insect Management- Insect Plant interaction. |
|  |
| **Unit:6** | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars – webinars, workshops and conferences |
|  |
|  | **Total Lecture hours** | **90 hours** |
| **Text Book(s)** |
| 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 & Prabhu S. (2019).  *Indian Forestry A Breakthrough Approach to Forest Service.*  Jain Brother Publishers. |
| 6 | Vasanthraj David. B & Ramamurthy V V. (2016).  *Elements of Economic Entomology.*  Brillion Publishing |
|  |
| **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. |
|  |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** |
| 1 | https://swayam.gov.in/ |
| 2 | https://www.mooc.org/ |
| 4 | https://nptel.ac.in/ |
|  |
| Course Designed By: Dr. B. Ramakrishnan, Assistant Professor in Wildlife Biology, GAC, Ooty, and Dr. H.Mohanakrishnan, Assistant Professor in Wildlife biology, GAC, Ooty |



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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | S | M | L | L | M | S | S |
| **CO2** | S | S | S | S | M | L | L | M | S | S |
| **CO3** | S | S | S | S | M | L | L | M | S | S |
| **CO4** | S | S | S | S | M | L | L | M | S | S |
| **CO5** | S | S | S | S | M | L | L | M | S | S |

\*S-Strong;M-Medium;L-Low

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| **Course code** | **33D** | **BIOSTATISTICS, APPLICATION OF COMPUTING & ARTIFICIAL INTELLIGENCE 4.0** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **Core Paper XI** | **6** | **0** | **0** | **4** |
| **Pre-requisite** |  | **Syllabus Version** | **2022-2023** |
| **Course Objectives:** |
| The main objectives of this course are to: 1. To make the students to understand Forestry, Silviculture practice and insect pest.
2. To study forest working plan, forest management techniques.
3. To identify various forest types in India.
 |
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| **Expected Course Outcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | To learn about natural and artificial regeneration of forest. | K4 |
| 2 | To understand various working plans of forest | K3 |
| 3 | To learn about forest management techniques | K2 |
| 4 | To know basic classification of insects | K2 |
| 5 | To learn the feeding behavior of various forest insects. | K6 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create |
|  |
| **Unit:1** | **Data collection and Tabulation:** | **18 hours** |
| Primary data collection and secondary data collection. Processing data: classification and tabulation. Organising of data: individual, discrete and continuous series. Diagrammatic representation of data: line diagram, bar diagram and pie diagram. Graphic representation of data: histogram, frequency polygon, frequency curve and ogive. |
|  |
| **Unit:2** | **Measures of central tendencies and Deviations:** | **18 hours** |
| Mean, Median, Mode. Measures of dispersion: range, standard deviation, variance, standard error, Skewness and kurtosis. Correlation: Types and methods of correlation, correlation coefficient. Regression analysis: Regression lines and equations. |
|  |
| **Unit:3** | **Testing of Hypothesis** | **18 hours** |
| Null and alternative hypothesis – chi square test , student ‘t’ test, F test (ANOVA) with experimental samples (one way & two way). Probability; Basic Principles - apriori and aposteriori probabilities – addition and multiplication rules of probability - conditional probability. |
|  |
| **Unit:4** | **Introduction toComputer** | **16 hours** |
| Introduction, Advantages of using computer, Generation of computers, Computer codes - BCD code, ASCII code, Functional units of a computer; Types of computers: Desktop, Laptop, palmtop, PDA etc. Definition: Hardware, Software and Firmware, ROM, RAM, CD-ROM, DVD, Pendrive, Hard disc, LCD projector. |
|  |
| **Unit:5** | **Software programs and Tools** | **18 hours** |
| MS Word processor, MS Excel for Charts, MS PowerPoint and Multimedia. Viruses and Worms, Software packages in Biostatistics: Applications of MINITAB and SPSS. Communication networking and Computer networking. |
|  |
| **Unit:6** | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars – webinars, workshops and conferences |
|  |
|  | **Total Lecture hours** | **90 hours** |
| **Text Book(s)** |
| 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. |
|  |
| **Reference Books** |
| 1 | Tiwari K M and Singh R V, 1980. Social Forestry Plantations. Oxford and IBH Publishing Co., New Delhi. |
| 2 | Warning R H and Schlesinger W H, 1985. Forest Ecosystems: Concepts and Management. Academic Press, New York. |
| 3 | Imms A D, 1965. A General Textbook of Entomology, ELBS, London. |
| 4 | Metcalfe C L and Flint W P, 1973. Destructive and Useful Insects, McGraw-Hill, NewYork. |
|  |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** |
| 1 | https://swayam.gov.in/ |
| 2 | https://www.mooc.org/ |
| 4 | https://nptel.ac.in/ |
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| Course Designed By: Dr. Senthilkumar, Assistant Professor in Zoology, GAC, Erode and Dr. A. Jeyashankar, Assistant Professor in Zoology, GAC, Coimbatore. |



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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | S | S | M | S | S | S |
| **CO2** | S | S | S | L | S | S | M | S | S | S |
| **CO3** | S | S | S | L | S | S | M | S | S | S |
| **CO4** | S | S | S | L | S | S | M | S | S | S |
| **CO5** | S | S | S | L | S | S | M | S | S | S |

\*S-Strong;M-Medium;L-Low



Fourth

Semester



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| **Coursecode** | **43A** | **Conservation in Biodiversity of Wildlife** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **Elective-III** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basic knowledge about Techniques Conservation of biodiversity in Wildlife | **yllabusrsion** | **2022-****2023** |
| **Course Objectives:** |
| The main objectives ofthis courseareto:1. To make understand the applications and basic wildlife equipments.
2. To acquire the knowledge on handling the equipment related to wildlife.
3. To learn GIS and Remote sensing uses and its applications on wildlife management.
4. To sensitize the students on wildlife population estimation techniques.
5. To understand drugs related to chemical restraints the animals.
 |
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| **ExpectedCourseOutcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | Acquire the knowledge in wildlife and equipments usage in the field | K4 |
| 2 | Learn the significance of various field equipments | K3 |
| 3 | Understanding molecular methods in wildlife | K2 |
| 4 | Appreciate the mechanism of GIS, Remote sensing and Radio Collaring methodsIn wildlife | K2 |
| 5 | Evaluate various types of population estimation, mapping techniques and wildAnimal shealth monitoring and postmortem techniques | K6 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **Unit:1** | **BIODIVERSITY** | **18hours** |
| Definition - Types - Genetic, Species and Ecosystem diversity. Values of biodiversity. Biogeographical classification of India. Biodiversity measurements, mega diversity centers. Loss of biodiversity. Hotspots, Biosphere Reserves, Threats, Endangered and Endemic species. Conservation strategies: *In-situ -* National Parks, Wildlife Sanctuaries, Community Reserve and conservation Reserves. *Ex-situ* – Cryopreservation, gene banks, sperm banks, DNA banks and tissue culture, Zoo, Zoological Park, Arboretum. |
|  |
| **Unit:2** | **CONSERVATION OF NATURAL RESOURCES** | **18hours** |
| Resources types - Food, water, energy and minerals. Human impact on Terrestrial and Aquatic resources –Distribution and conservation of Forest, Grasslands and semi-arid habitats of India. Wetland Habitats of India: Definition and types of wetlands, important wetlands of India and their conservation issues. |
|  |
| **Unit:3** | **ORGANISATIONS** | **16hours** |
| Organization at State level- State Biodiversity Board, National level –NBA, ZSI, BSI, FRI, FSI. International level - CITES, IUCN, CBD and WWF. NGOs - BNHS, Zoo outreach organization, WCT and WPSI. International agreements for conserving marine life. Convention on wetlands of International Importance (Ramsar convention).National Forest Policy –1988, Biodiversity Act - 2002 |
|  |
| **Unit:4** | **WILDLIFE IN INDIA** | **18hours** |
| Protected Area concept: National parks, Wildlife Sanctuaries, Biosphere Reserves – Core, buffer and tourism zones. Exclusive Economic Zone; Wildlife wealth of India and threatened wildlife. Reasons for wildlife depletion in India. Wildlife conservation approaches and limitations - Wildlife Habitat - Characteristic, Fauna and Adaptation with special reference to Tropical |



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| **Unit:5** |  **MANAGEMENT OF WILDLIFE** | **18hours** |
| Wildlife Trade and legislation - Assessment, documentation, Prevention of trade. Wildlife laws and ethics. Human – wildlife conflict management –Human death, cattle lifting, crop damage – Mitigation measures and corridor. Techniques of tranquilization and translocation of problematic animals. Important projects for the conservation of wildlife – Project Tiger and Project Elephant. Wild Life (Protection) Act, 1972. Use of GIS and Remote sensing in Wildlife field. |
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| **Unit:6** | **ContemporaryIssues** | **2hours** |
| Expertlectures,onlineseminars –webinars,workshopsandconferences |
|  |
|  | **TotalLecturehours** | **90hours** |
| **TextBook(s)** |
| 1 | Asthana. D.K. and MeeraAsthana. (2010). A text book of Environmental Studies. S. Chand and Company LTD, New Delhi. |
| 2 | Saharia, V.B. 1982 Wildlife in India, Nataraj Publishers, Dehra Dun |
| 3 | Seshadri, B.1986 India’s Wildlife Reserves , Sterling Publishers Pvt. Ltd., New Delhi |
| 4 | Giles, R.H. Jr.(Ed) 1984. Wildlife Management Techniques 3rd edition. The wildlife Society, Washington. D.C. Nataraj Publishers, Dehradun. India.. |
| 5 | Manikandank&PrabhuS. (2019).*Indian Forestry A Break through Approach to Forest**Service.*Jain Brother Publishers. |
| 6 | Robinson, Wl. and Eric, G. Bolen, 1984. Wildlife Ecology and Management Mac Millan Publishing Co, New York. Pp 478. |
| 7 | Dasmann R F, 1964.*Wildlife Biology*, JohnWiley&Sons, New York, p231 |
|  |
| **ReferenceBooks** |
| 1 | WarningRH andSchlesinger WH, 1985. *Forest Ecosystems:Conceptsand Management*.AcademicPress,New York. |
| 2 | Robinson, Wl. and Eric, G. Bolen, 1984. Wildlife Ecology and Management Mac Millan Publishing Co, New York. Pp 478. |
| 3 | Seshadri, B.1986 India’s Wildlife Reserves , Sterling Publishers Pvt. Ltd., New Delhi |
|  |
| **RelatedOnlineContents[MOOC,SWAYAM, NPTEL,Websitesetc.]** |
| 1 | https://swayam.gov.in/ |
| 2 | https:/[/www.mooc.or](http://www.mooc.org/)g[/](http://www.mooc.org/) |
| 4 | https://nptel.ac.in/ |
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| CourseDesigned By:Dr. A. Veeramani, Assistant Professor in Zoology, GAC, Kumbakonam and Dr. B.Ramakrishnan, Assistant Professor in Wildlife Biology, GAC, Ooty |

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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | S | S | M | S | S | S |
| **CO2** | S | S | S | L | S | S | M | S | S | S |
| **CO3** | S | S | S | L | S | S | M | S | S | S |
| **CO4** | S | S | S | L | S | S | M | S | S | S |
| **CO5** | S | S | S | L | S | S | M | S | S | S |

\*S-Strong;M-Medium;L-Low



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| **Course code** | **43B** | **RESEARCH METHODOLOGY** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **ELECTIVE III** | **6** | **0** | **0** | **4** |
| **Pre-requisite** | Basic knowledge about behavior of animals | **Syllabus Version** | **2022-2023** |
| **Course Objectives:** |
| The main objectives of this course are to: 1. To understand behavior pattern of animals.
2. To acquire the knowledge on animal communications.
3. To learn the methodology of studying animal behaviour.
4. To understand parental care of animals.
5. To sensitize the students to study social behavior of animals.
 |
|  |
| **Expected Course Outcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | Acquire the knowledge on behaviour of various wild animals. | K4 |
| 2 | Learn significance of wild animals behaviour for their management. | K3 |
| 3 | Understanding behavior pattern, hormones and pheromones of wild animals | K2 |
| 4 | Evaluate various biological rhythms, foraging and courtship behaviour of various wild animals | K2 |
| 5 | Understand the seasonal breeding behaviour of animals  | K6 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create |
|  |
| **Unit:1** | **BASIC OF RESEARCH** | **18 hours** |
| Topicselection-Planningresearch–definingobjectives-Preparationofworkplans.Identificationofsuitablemethodology-Preparationofprojectproposal–Fundingagencies–Studentproject |
|  |
| **Unit:2** | **COLLECTION OF LITERATURE** | **16 hours** |
| Collectionofliterature-Newsarticles–Newsletters–Journals.Digitallibraryandsearchofarticles-Keywordsandsearch-Internet–GoogleScholar–Pubmed–Inflibnet–Medline–Agricola–Sciencedirect-OpenaccessJournals-virtualsources-othersources. |
|  |
| **Unit:3** | **DATA ANALYSIS** | **18 hours** |
| Collectionofsamples/data–Dataanalysis–MicrosoftExcel–Constructionoftables–headingsfooter-hypothesistesting–TestofSignificance–Tabulation–Presentationofresults. |
|  |
| **Unit:4** | **THESIS STRUCTURE** | **18 hours** |
| Thesisstructure–Components-WritingIntroduction–reviewofliterature–Materials&Methods–Presentationofresults–DiscussionofResultsbasedonliterature–ArrangementofBibliographyandhowtoquotereferenceinthesis-Appendix. |
|  |
| **Unit:5** | **PUBLISHING ARTICLES** | **18 hours** |
| PublishingofArticlesinnewspapers/newsletters-Selectionofjournals–ISSNNumber–PeerreviewedJournals–Sciencecitationindex–impactfactorandimportance.ManuscriptspreparationforJournals–components–SubmissionandPublication. |
|  |
| **Unit:6** | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars – webinars, workshops and conferences |
|  |
|  | **Total Lecture hours** | **90 hours** |
| **Text Book(s)** |
| 1 | Anderson,Durston&Polle1970:Thesisandassignment,writingWileyEasternLimited |
| 2 | FisherR.A,1950:Statisticalmethodsofresearchworkers |
| 3 | FreumdJE,1967:Modernelementarystatistics,PrenticeHall,Inc.Englewoodcliffs,NJ |
| 4 | Paneerselvam R; Research Methodology., Kindle Edition, 2013 |
| 5 | Sansanwal D N, Research Methodology and Applied Statistics, Shipra Publications, 2020 |
|  |
| **Reference Books** |
| 1 | MalterK,1972:StatisticalanalysisinBiology,ChapmenHall,London. |
| 2 | RajendrakumarC2008ResearchMethodologySBNanjaforAPHApublishingCorporationNewDelhi |
| 3 | Kothari S R, Research Methodology Methods and Techniques, Pragun Publication, 2012 |
|  |  |
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| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** |
| 1 |  ResearchMethodology:https://swayam.gov.in/nd2\_cec20\_hs17/preview |
| 2 | Understanding Research Methods: https://[www.mooc-list.com/course/understanding-](http://www.mooc-list.com/course/understanding-)research-methods-coursera |
|  |
| Course Designed By: Dr. S. Vidya, Guest Faculty in Wildlife, GAC, Ooty and Dr. H. Mohanakrishnan, Assistant Professor in Wildlife biology, GAC, Ooty |

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| **MappingwithProgrammeOutcomes** |
| **Cos** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | L | S | S | M | S | S | S |
| **CO2** | S | S | S | L | S | S | M | S | S | S |
| **CO3** | S | S | S | L | S | S | M | S | S | S |
| **CO4** | S | S | S | L | S | S | M | S | S | S |
| **CO5** | S | S | S | L | S | S | M | S | S | S |

\*S-Strong;M-Medium;L-Low

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| **Course code** | **43P** | **PHYSIOLOGY AND WILDLIFE HEALTH, MANAGEMENT OF ZOO’S, SANCTUARIES ANDNATIONAL PARKS** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** |  **PRACTICAL-IV** | **0** | **0** | **2** | **4** |
| **Pre-requisite** | Basic information on physiology and evolution of animals | **Syllabus Version** | **2022-2023** |
| **Course Objectives:** |
| The main objectives of this course are to: 1. To make them understand physiology through practicals
 |
|  |
| **Expected Course Outcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | Understand about the National parks | K1 |
| 2 | To understand about the feeding of zoo animals | K4 |
| 3 | Know about the captive breeding | K3 |
| 4 | Knowledge about wildlife diseases | K4 |
| 5 | Analyse about the conflict  | K5 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create |
|  |
| **COMPARATIVE ANIMAL PHYSIOLOGY****(Use any two cultured species which are not in endangered list)** | **12 hours** |
| 1. Marking major National Parks and Tiger Reserves of India
2. Marking major Wildlife Sanctuaries of Tamil Nadu
3. Marking Biodiversity Hotspots of India
4. Calculating capture and recapture method of estimating animals using beans seeds.
5. Spotters: Compass, Binocular, GPS, Camera Trap, Tranquilizer Gun
 |
|  | **12 hours** |
| **Total Lecture hours** | **86 hours** |
| **TEXT BOOK** |
| 1 |  |
| 2 |  |
|  |
| **Reference Books** |
| 1 |  |
| 2 |  |
| 3 |  |

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| **Course code** | **43Q** | **Wildlife Management Techniques** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** |  **PRACTICALV** | **0** | **0** | **2** | **4** |
| **Pre-requisite** | Basic knowledge about Genetics in Animals | **Syllabus Version** | **2022-2023** |
| **Course Objectives:** |
| The main objectives of this course are to: 1. To make the students understand planning and usage of various field equipments including GPS,GIS and Remote Sensing
2. To know the principle of wild animal population estimation techniques and methods applied in animal capturing
3. To know the principles of survey and mapping techniques
4. To make the students to understand Forest Techniques
5. To learn about sampling techniques involved investigation analysis
 |
|  |
| **Expected Course Outcomes:** |
| On the successful completion of the course, student will be able to: |
| 1 | To obtain knowledge on field equipment used in wildlife management. | K1 |
| 2 | Integrate the strategies involved in various population estimation techniquesIncluding molecular methods | K4 |
| 3 | To gain knowledge on survey and mapping techniques | K3 |
| 4 | To learn about current forest management practices | K4 |
| 5 | To understand about Forest and its management | K5 |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create |
|  |
|  |  |
| 1. Estimation of diversity and specie srichness of an area
2. Estimation of carrying capacity of an area
3. Population Viability Analysis(PVA) and Population HabitatViabilityAnalysis(PHVA)
4. Geo-referencing of animage file to create better image using Q-GIS/Map-Info/ARC-GIS
5. Estimating herbivore population using Distance Software
6. Estimating Tiger population using M-STRIPE software
7. Identification o fan Elephant Corridor
8. Preparation of EIA of an area
9. Usage of drone Cameras in Wildlife management.
10. Estimation of Canopy volume
11. Preparation of Quadarts and Transects to estimate vegetative analysis in an area
12. Preparation of Quadarts and Transects to estimate vegetative analysis in an area
13. Identification of various forest types
14. Estimation of tree height
15. Estimation of log volume
16. Estimation of Canopy volume
17. Forest cover monitoring,map reading and surveying techniques of forest area
 |
| **Total Lecture hours** | **36 hours** |
| **TEXT BOOK** |
| 1 | Arunabha Sen Publishers. |
| 2 |  |
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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | S | L | M | S | S | S |
| **CO2** | S | S | S | M | S | L | M | S | S | S |
| **CO3** | S | S | S | M | S | L | M | S | S | S |
| **CO4** | S | S | S | M | S | L | M | S | S | S |
| **CO5** | S | S | S | M | S | L | M | S | S | S |
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\*S-Strong;M-Medium;L-Low





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| **Coursecode** | **43R** | **Conservation in Biodiveristy of Wildlife** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **PRACTICAL VI** | **0** | **0** | **2** | **4** |
| **Pre-requisite** | Understanding recent developments in Wildlife Management Techniques | **SyllabusVersion** | **2022-****2023** |
| **CourseObjectives:** |
| The main objectives ofthis course are to:1. To make the students understand planning and usage of various field equipments including GPS,GIS and Remote Sensing
2. To know the principle of wild animal population estimation techniques and methods appliedin animal capturing
3. To know the principles of survey and mapping techniques
4. To make the students to understand Forestr Techniques
5. To learn about sampling techniques involved investigation analysis
 |
|  |
| **ExpectedCourseOutcomes:** |
| On the successful completion of the course, student willbe able to: |
| 1 | To obtain knowledge on field equipment used in wildlife management. | K1 |
| 2 | Integrate the strategies involved in various population estimation techniquesIncluding molecular methods | K4 |
| 3 | To gain knowledge on survey and mapping techniques | K3 |
| 4 | To learn about current forest management practices | K4 |
| 5 | To understand about Forest and its management | K5 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **WILDLIFEMANAGEMENTTECHINQUES:** | **12hours** |
| 1. Estimation of diversity and species richness of an area
2. Estimation of carrying capacity of an area
3. Population Viability Analysis(PVA) and Population Habitat Viability Analysis(PHVA)
4. Geo-referencing of animage file to create better image using Q-GIS/Map-Info/ARC-GIS
5. Estimating herbivore population using Distance Software
6. Estimating Tiger population using M-STRIPE software
7. Identification o fan Elephant Corridor
8. Preparation of EIA of an area
9. Usage of drone Cameras in conservation of endangered animals.
10. Estimation of Canopy volume
11. Preparation of Quadarts and Transects to estimate vegetative analysis in an area
 |
| 1. Preparation of Quadarts and Transects to estimate vegetative analysis in an area
2. Identification of various forest types
3. Estimation of tree height
4. Estimation of log volume
5. Estimation of Canopy volume
6. Forest cover monitoring, map reading and surveying techniques of forest area
 |



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| **SUBMISSIONSATTHETIMEOFPRACTICALEXAMINATIONS** |
| 1. Report on the field study and field trips
2. Bonafied record
3. A report on GIS training
4. A report on various softwares used in wildlife management
5. Report on the participation of Tiger / Wildlife census
6. Report of visit to a Nursery
7. Report of visit to a Timberdepot
8. Report of visit to different Forest types
 |
| **TotalLecturehours** | **86hours** |
| **TEXTBOOK** |
| 1 | DasmannR F, 1964.*Wildlife Biology*, JohnWiley&Sons,New York, |
| 2 | GilasRHJr.(ed.),1984. *WildlifeManagementTechniques*,3rded.TheWildlifeSociety,WashingtonD.C.,NatarajPublishers,DehraDun. |
| 3 | RobinsonW LandEricGBolen, 1984.*Wildlife Ecology andManagement*,MaxmillanPublishingCompany,NewYork |
| 4 | RodgersWA,1991.*Techniquesfor WildlifeCensusinIndia*-AFieldManual:TechnicalManual-T M -2. WII. |
| 5 | *Silviculture*bySS Negi |
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| **ReferenceBooks** |
| 1 | SahariaV B,1982.*WildlifeofIndia*,NatrajPublishers,DehraDun |
| 2 | TeagueRD(ed.),1987.*AManualofWildlifeConservation*(TheWildlifeSociety,WashingtonD.C.).NatarajPublishers,DehraDun |
| 3 | WII.*A Guide toChemical Restraint of Animals*. |
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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | S | L | M | S | S | S |
| **CO2** | S | S | S | M | S | L | M | S | S | S |
| **CO3** | S | S | S | M | S | L | M | S | S | S |
| **CO4** | S | S | S | M | S | L | M | S | S | S |
| **CO5** | S | S | S | M | S | L | M | S | S | S |

\*S-Strong;M-Medium;L-Low



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| **Course code** | **43S** |  **Biostatiscs & Computer**  **Application And**  **Research Methodology** | **L** | **T** | **P** | **C** |
| **Core/Elective/Supportive** | **PRACTICAL VII** | **0** | **0** | **2** | **4** |
| **Pre-requisite** | Basic information on Behaviour of animals | **SyllabusVersion** | **2022-****2023** |
| **Course Objectives:** |
| The main objectives of this course are to:1. To make the students understand Collection and interpreting the datas
2. To know the influence of various software to analyse the date
3. To understand the use of computer utilization in research
 |
|  |
| **Expected Course Outcomes:** |
| On the successful completion of the course ,student will be able to: |
| 1 | To understand the usage of internets | K1 |
| 2 | To understand the writing of thesis | K4 |
| 3 | To analyse the significance of Equipments used in field  | K3 |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create |
|  |
| **ETHOLOGY:** | **12hours** |
| 1. Writing the thesis
2. Analyzing the data
3. Usage of graph
4. Plotting the graphs
 |
| **Total Lecture hours** | **90hours** |
| **TEXTBOOK** |
| 1 | Robinson, Wl. and Eric, G. Bolen, 1984. Wildlife Ecology and Management Mac Millan Publishing Co, New York. Pp 478. |
| 2 | Maiti.P.K and Maiti.P. 2011. Biodiversity – perception, peril and preservation. PHI, Learning Pvt. Ltd., New Delhi. |
| 3 | Giles, R.H. Jr.(Ed) 1984. Wildlife Management Techniques 3rd edition. The wildlife Society, Washington. D.C. Nataraj Publishers, Dehradun. India. |
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| **MappingwithProgrammeOutcomes** |
| **COs** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** |
| **CO1** | S | S | S | M | S | L | M | S | S | S |
| **CO2** | S | S | S | M | S | L | M | S | S | S |
| **CO3** | S | S | S | M | S | L | M | S | S | S |
| **CO4** | S | S | S | M | S | L | M | S | S | S |
| **CO5** | S | S | S | M | S | L | M | S | S | S |
|  |  |  |  |  |  |  |  |  |  |  |

\*S-Strong;M-Medium;L-Low



Annexure

**COURSECODE 23P**

**STRUCTURE AND FUNCTION OF INVERTEBRATES, COMPARATIVE ANATOMYOFCHORDATES AND ANIMAL BIODIVERSITY &ORGANIZATION**

**MAJOR (Marks15)**

* 1. Comparative study of Vertebrate-Pisces, Ampbians and Reptiles. Eg.Fishes, Frogs and Crocodiles
	2. Fish culture in laboratory
	3. Comparative study of Chordates- Aves and Mammals Eg. Pigeon and Rabbit
	4. Morphological modification of limbs in Fish Eg.Cutla, Amphibians Eg. Frog, Reptiles Eg Lizard, Birds Eg. Pigeon or Chicken and mammals Eg. Rabbit or Gunieapig

**MINOR (Marks10)**

1. Comparative study of Scales of Fishes
2. Comparative study of different types of bones Eg. Frog, Snake, Pigeon and Elephant or Rabbit
3. Estimation of plankton using Haemocytometer**.SPOTTERS(Marks 15)**
4. **Biologicalimportance**
	1. Frog,
	2. Barnowl,
	3. Flycatchers,
	4. Tiger
	5. Snakes
5. **MedicalImportance**
	1. Honeybee
	2. Wax insect
6. **Beneficialpest**
	1. Ladybeetle
	2. Groundbeetle
	3. MunitePirateBug
	4. Green Lacewing
7. **Evolutionary SignificanceFourleg modification**
	1. Fishes
	2. Snakes
	3. Frogs
	4. Birds
	5. Mammals
8. **Economicimportance**
	1. Silkworm
	2. Honeybees
	3. Lacinsect
	4. Frog
	5. Gardenlizard
	6. InsectivoresBirds

**GeneralInstructions:**

1. **ElectiveCourses:**MinimumTwo for Each Semester.
2. **SupportiveCourses:**Minimum One for first three Semesters.
3. **ValueAddedCourses:**Minimum2andmaximum5forEachDepartmentforEntireProgram
4. **JobOrientedCertificateCourses:** TwoCourses(EachoneonFirstandSecondYear)
5. AlltheBoardofStudiesarerequestedtofollowthesametemplateandusetheTIMES NEW ROMAN FONT with the Size of 12.
6. The Course Designer should be mentioned in each of the corses.

**DetailsfortheCertificateCourse**

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| --- | --- | --- |
| **1** | **Nameof theCourse** |  |
| **2** | **Nameof theDepartment** |  |
| **3** | **NameoftheFacultyMember** |  |
| **4** | **Inter/IntraDepartment** |  |
| **5** | **Objectivesof theCourse** |  |
| **6** | **TopicstobeCovered** |  |
| **7** | **Duration of theCourse** |  |
| **8** | **Eligibility** |  |
| **9** | **Registration** |  |
| **10** | **DescriptionoftheCourse** |  |
| **11** | **JobOpportunities** |  |
| **12** | **Numberof Candidates** |  |
| **13** | **CourseFee** |  |

**BHARATHIAR UNIVERSITY: COIMBATORE 641046POST GRADUATE PROGRAM INZOOLOGY(WILDLIFE BIOLOGY)**

**VISION**

To increase the knowledge in the area of Wildlife(Both Fauna and Flora) for understanding the value of wildlife biology and conservation of ecosystem and societal oriented applied research using ecosystem management by students through high-quality education and research.

**MISSION**

* To create awareness for understanding the importance of animal diversity and conservation of biodiversity.
* To mold the students in the field of Wildlife sciences in both theory and practical to equip themselves in the area of wildlife biology and its related field for their employment opportunities. To involve the students in activities of conservation of wildlife and its related research activities.