**M.Sc. WildLifeBiology**

Syllabus

AFFILIATED COLLEGES

**Program Code:**

**2025 - 2026 onwards**



**BHARATHIARUNIVERSITY**

**(A State University, Accredited with “A” Grade by NAAC, Ranked 13th among Indian Universities by MHRD-NIRF,**

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

**Coimbatore – 641 046, Tamil Nadu, India**



|  |  |
| --- | --- |
| **Program Educational Objectives (PEOs)** | |
| The **M.Sc. Wildlife Biology** program describe accomplishments that graduates are expected to attain within 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 Ecologist ZSI, BSI, WII and field works in conservation. |
| PEO3 | They can enter into environment, forest ecosystems and pollution control  sectors |
| 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 |



|  |  |
| --- | --- |
| **Program Specific Outcomes (PSOs)** | |
| After the successful completion of **Wildlife Biology** program, the students are expected 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 revealing multiple 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 using  Them 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 frontier  Areas or research in Wildlife Biology and preparing them for carrying out advance research. |



|  |  |
| --- | --- |
| **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 forest ecosystems |
| 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. |

**BHARATHIAR UNIVERSITY: COIMBATORE - 641 046**

**M.Sc., WILDLIFE BIOLOGY DEGREE COURSE (COLLEGES - CBCS PATTERN) REVISED SCHEME OF EXAMINATION**

*(For the students admitted during the academic year 2025 – 26 onwards)*

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Paper** | **Title of the Course** | **Credits** | **Hours** | | **Maximum Marks** | | |
| **Theory** | **Practical** | **CIA** | **ESE** | **Total** |
|  |  | **FIRST SEMESTER** | | | | | | |
| 13A | Core I | Ichthyology and Herpetology | 4 | 5 | - | 25 | 75 | 100 |
| 13B | Core II | Ornithology | 4 | 5 | - | 25 | 75 | 100 |
| 13C | Core III | Mammalogy | 4 | 5 | - | 25 | 75 | 100 |
| 13EA | Elective I | Forestry, Silviculture and Forest Entomology | 3 | 3 | - | 25 | 75 | 100 |
| 13EB | Elective II | Wildlife Crime | 3 | 3 | - | 25 | 75 | 100 |
| 13SEC | SEC I | Biodiversity Conservation | 3 | 3 | - | 25 | 75 | 100 |
| 13P | Core Practical | I (Covering core papers I-III) | 5 | - | 6 | 25 | 75 | 100 |
|  |  | **Total** | **25** | 24 | 6 |  |  | **700** |
|  |  | **SECOND SEMESTER** | | | | | | |
| 23A | Core IV | Ecology | 4 | 5 | - | 25 | 75 | 100 |
| 23B | Core V | Ethology of Wildlife | 4 | 5 | - | 25 | 75 | 100 |
| 23C | Core VI | Conservation Genetics and Evolution | 4 | 5 | - | 25 | 75 | 100 |
| 2EA | Elective III | GIS and Data Visualization | 3 | 3 | - | 25 | 75 | 100 |
| 2EB | Elective IV | Climate Change and Wildlife Conservation | 3 | 3 |  | 25 | 75 | 100 |
| 23SEC | SEC II | Wetland conservation | 3 | 3 |  | 25 | 75 | 100 |
| 23Q | Core Practical | II (covering core papers V-VII) | 5 |  | 6 | 25 | 75 | 100 |
|  |  | **Total** | **26** | 24 | 6 |  |  | **700** |
|  |  | **THIRD SEMESTER** | | | | | | |
| 33A | Core VIII | Physiology and Health care of Wildlife | 4 | 5 | - | 25 | 75 | 100 |
| 33B | Core IX | Management of Zoos, Sanctuaries & National Parks | 4 | 5 | - | 25 | 75 | 100 |
| 33C | Core X | Wildlife Management Techniques | 4 | 5 | - | 25 | 75 | 100 |
| 33SEC | SEC III | Landscape Ecology | 3 | 3 | - | 25 | 75 | 100 |
| 3EA | Elective V | Biostatistics and Data Sciences | 3 | 3 | - | 25 | 75 | 100 |
| 3EB | Elective VI | Research Methodology, Application of Computing and Artificial Intelligence 4.0 | 3 | 3 | - | 25 | 75 | 100 |
| 33R | Core Practical | Practical III (Covering core papers VIII-X) | 5 | - | 5 | 25 | 75 | 100 |
| 25WB133 |  | Health and Wellness | 1 | 1 | - | 25 | 25 | 50 |
| 39SI |  | Summer Internship | 2 | - | - | 25 | 75 | 100 |
|  |  | Extension activity | 1 | - | - | 25 | 25 | 50 |
|  |  | **Total** | **30** | 25 | 5 |  |  | **900** |
|  |  | **FOURTH SEMESTER** | | | | | | |
| 47V | Paper XV | Project & viva-voce | 10 | - |  | 100 | 100 | 200 |
|  |  | **Total** | **91** | 73 | 22 |  |  | **200** |
|  |  | **Grand Total** | **91** | 73 | 22 |  |  | **2500** |

**E – Elective SEC – Skill Enhanced Course**

**Guidelines for awarding 100 marks of the summer Internship programme:**

After the second semester the student should attend a summer internship programme in any government or non-government institutions

Internal marks will be given by the host institution out of 25

External marks will be given by HOD and the concern guide of the student by evaluating his/her summer internship report out of 75

**Guidelines for awarding 50 marks of Extension Activities:**

Based on the certificate produced by the student on his/her participation in any wildlife population estimation activities, participation/presentation of workshop/seminar/conference/symposia, short-term training, etc. pertaining to wildlife studies

**Guidelines for awarding 50 marks of** **Health and Wellness**

Based on the health, attendance percentage and his/her attitudes in the classes both internal and external marks will be given by the HOD and concern class tutors

**Guidelines for awarding 200 marks of the Project:**

\*For Project 200 marks (Project work = 100 marks and Viva-voce = 100 marks).

Internal and external examiners will evaluate the project work and award marks out of 100.

Internal and external examiners will conduct viva-voce examination and award marks out of 100.

**\*\*\*\*\*\*\*\*\*\***



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | **13A** | **ICHTHYOLOGY AND HERPETOLOGY** | | **L** | **T** | | **P** | | **C** |
| **Core/Elective/Supportive** | | | **Core Paper I** | | **6** | **0** | | **0** | | **4** |
| **Pre-requisite** | | | Basic knowledge about Fishes, Amphibians and Reptiles and their functions | | **Syllabus**  **Version** | | **2025 –**  **2026** | | | |
| **Course Objectives:** | | | | | | | | | | |
| The main objectives of this course are:  To understand about the procedures and trends in taxonomy.  To understand important physiological functions in various vertebrate forms.  To know about the breeding behaviour of Fishes, Amphibians and Reptiles.  To know about the organization of Phylum Pisces, Amphibians and Reptiles and its characters. | | | | | | | | | | |
|  | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | |
| 1 | To understand concepts of the Taxonomy, its procedures, methods in collection and preservation  Of 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 and  Products of excretion, mechanism and its relation to osmoregulation. | | | | | | | | K2 | |
| 4 | To understand the organization and function of nervous system and its  Evolutionary advances. | | | | | | | | K4 | |
| 5 | Integrate the strategies and evolutionary significanc eof 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 | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:1** | | **ICHTHYOLOGY** | | | **15 hours** | | | | | |
| Methods to study fish taxonomy and identification. Characteristics and Classification of Pisces upto order with suitable examples. Accessory respiratory organs- Air breathing fishes – Osmoregulation in fishes– types of fins and functions – Migration and parental care in fishes. Fresh, brackish and marine water fishes and their adaptations. Types of scales in fishes and their functions. Evolutionary significance of pisces. Economic importances of fishes. Threatened fishes of India. | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:2** | | **CONSERVATION PERSPECTIVES OF FISHES** | | | **15 hours** | | | | | |
| Major groups and diversity of Indian fishes. Ichthyo-geography - Fishes of Major bio-geographic zones (Himalayas, Eastern Himalayas and Western Ghats). Marine Fishery resources of India. Fish community ecology – Fish communities, competition, resource use and partitioning. Biology and Ecology (movement and migration patterns) of threatened fishes of India. Threats and conservation perspectives of fish biodiversity in India as well as at global level. Species invasions and Overharvesting. | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:3** | | **PRINCIPLES & TAXONOMY OF AMPHIBIANS** | | **15 hours** | | | | | | |
| Methods to study Amphibians taxonomy and identification. Characteristics and Classification of Amphibians upto order with suitable examples. Salient features and distribution of South Indian amphibians. Respiratory system and their types in amphibians. Adaptation and adaptive radiation in amphibians. Parental care and Metamorphosis in Amphibians. Evolutionary significance of Amphibians. Ecological and Economic importance of Amphibians. Endemic amphibians of Western Ghats. | | | | | | | | | | |
| **Unit:4** | | **PRINCIPLES & TAXONOMY OF REPTILES** | | **15 hours** | | | | | | |
| Methods to study Reptiles taxonomy and identification. Characteristics and Classification of Reptiles upto order with suitable examples. Evolutionary significance and skull types in reptiles. Adaptive radiation in Reptiles. Parental care in Reptiles. Regenerations in Reptiles. Ecological adaptation in Reptiles. Endemic reptiles of India. Adaptation and adaptive radiation in Turtles and Tortoise. Venomous and non-venomous snakes. Types of crocodiles, status and  Distribution. | | | | | | | | | | |
|  | | | | | | | | | | |



|  |  |  |  |
| --- | --- | --- | --- |
| **Unit:5** | | **CONSERVATION PERSPECTIVES OF HERPATOLOGY** | **15 hours** |
| Major groups and diversity of Indian Herpatofauna. Endangered species of Western Ghats. Wildlife trade in Herpato-fauna. Threats: Impact of mining, usage of pesticides, climate change, deforestation and invasion of exotic species. Various aspects of migration and breeding biology of Marine Turtles. Distribution of snakes in India. Ecological and economic importance of reptiles. Conservation threats of Herpato-fauna | | | |
|  | | | |
| **Unit:6** | | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars – webinars, Conferences and Workshops Field trips/Field visit | | | |
|  | | | |
|  | | **Total Lecture hours** | **77 hours** |
| **Text Book(s)** | | | |
| 1 | Fishes An Introduction to Ichthyology, Moyle & Cechi. | | |
| 2 | John Richardson, Ichthyology | | |
| 3 | A Text book of Modern Chordata, Kothpal. | | |
| 4 | Herpetology: An Introductory Biology of Amphibians and Reptiles, Laurie J. Vitt, Janalee P. Caldwell, | | |
|  | | | |
| **Reference Books** | | | |
| 1 | General & Applied Icthyology: Fish and Fisheries June 2006, Gupta. | | |
| 2 | Textbook of Fish Biology and Fisheries 3rd Edition, SS Khanna. | | |
| 3 | Herpetology: An Introductory Biology of Amphibians and Reptiles, Laurie J. Vitt, Janalee P. Caldwell. | | |
| 4 | Cold Blood: Adventures with Reptiles and Amphibians, Kerridge. | | |
| 5 | Reptile, McCarthy. | | |
| 6 | Herpetology, Pough. | | |
| 7 | Venomous Snakes of the World, Mark O’Shea. | | |
|  | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | Systems Biology (NPTEL) webhttps: //nptel.ac.in/courses/102/106/102106035/ | | |
|  | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **13B** | **ORNITHOLOGY** | **L** | | **T** | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Core Paper II** | **6** | | **0** | **0** | **4** |
| **Pre-requisite** | | | | Basic knowledge about Birds, Anatomy and Physiology | **Syllabus Version** | | | **2025 –**  **2026** | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are | | | | | | | | | |
| To understand about Aves and its origin.  To study about structure and function of Aves.  To study about Avian classification, development, structure and function of integument types.  To understand the evolution of circulatory organs and process of respiration.  To know about the various aspects of skeletal system and evolution of urinogenital system.  To understand the working of nervous system and sense organs. | | | | | | | | | |
|  | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| 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** | | | |
| Methods to study Aves taxonomy and identification. Characteristics and Classification of Aves upto family with suitable examples. Structure and external Morphology of Birds. Modification in birds: Beak, Wing and feet. Evolutionary adaptations in aves - archaeopteryx - Endemism in Indian avifauna – Important Bird Areas of India. Economic Values of birds– Bird hazards in airports – recreation – aesthetics – hunting. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:2** | | | **FORAGING BEHAVIOUR IN BIRDS** | | | **15 hours** | | | |
| Physiology of digestive system in birds. Adaptation of birds based on Feeding habits: Insectivores – Fugivores, Nectarivores, Graminivores, Carnivores, Omnivores and scavengers. Habitat ecology of Indian birds: Coastal birds, Inland water birds, Birds of high altitude and deserts birds. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:3** | | | **SKELETAL SYSTEM AND MIGRATION** | | | **15 hours** | | | |
| Physiology of skeletal and respiratory system in birds. Evolution of flight in birds. Bird Migration: mechanism of migration – timing of migration – orientation and navigation. Bird nests: evolution, structure, & functions. Choice of Roost site, Choice of nesting sites, Selection of Nesting Materials, Colonial nesting, Types of nests and Unique nesting behaviours: Megapodes, edible-nest swiftlets, hornbills, & Weavers, Multiple Nests structures. | | | | | | | | | |
|  | | | | | | | | | |
| **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 Mating systems in birds: monogamy, polygyny, & polyandry – Lekking behavior – Promiscuity – Co-operative breeding – Brood parasites. | | | | | | | | | |
| **Unit:5** | | | **PARENTAL CARE IN BIRDS** | | | **15 hours** | | | |
| Physiology of Nervous system and Sense organs in Birds. Sense organs – Avian eye and vision – Ears & auditory sense – Echolocation in birds – Taste and olfactory sense – Tactile sense in birds. Avian eggs: size, structure, shape, colour, & texture – Determinate & indeterminate layers - Clutch size – Factors influencing clutch size & optimality – Incubation period & brood patch – Incubation behaviour - Role of sexes in incubation and Hatching asynchrony - Nidicolous & Nidifugous hatchlings – Parental care & role of sexes – Post-fledging dispersal. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:6** | | | **Contemporary Issues** | | | **2 hours** | | | |
| Expert lectures, Online seminars, webinars | | | | | | | | | |
|  | | | | | | | | | |
|  | | | **Total Lecture hours** | | | **77 hours** | | | |
| **Text Book(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 |  | | | | | | | | |
|  | | | | | | | | | |
| **Reference Books** | | | | | | | | | |
| 1 | Grimmet & Inskipp, Birds of Indian Subcontinent: India, Pakistan, SriLanka | | | | | | | | |
| 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. | | | | | | | | |
|  | | | | | | | | | |
| **Related Online Contents [MOOC,SWAYAM, NPTEL,Websitesetc.]** | | | | | | | | | |
| 1 | General Human Anatomy(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 | Evolutionary Biology:<https://onlinecourses.swayam2.ac.in/cec20_bt06/preview> | | | | | | | | |
|  | | | | | | | | | |
| Course Designed By: Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai and Dr. N. Ezhilarasi, Associate Professor, Government Arts College (Autonomous), Coimbatore | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | **13C** | **MAMMALOGY** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | **Core Paper III** | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | Basic knowledge about Mammal biodiversity and **S**  conservation | **Syllabus version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  Understand the classification of Mammals.  Acquire the knowledge of mammalian physiology.  Knowledge about different mammalian species.  Levels of organization in Mammals.  Analyze the ecological and evolutionary affinities of mammals. | | | | | | | | |
|  | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | |
| 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 acquire knowledge about ecological and evolutionary aspects. | | | | | K3 | | |
| 5. | To develop awareness about conservation of mammals. | | | | | K5 | | |
| **K1**-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create | | | | | | | | |
|  | | | | | | | | |
| **Unit:1** | | **TAXONOMY AND CLASSIFICATION OF MAMMALS** | | **15 hours** | | | | |
| Methods to study Mammals taxonomy and identification. Characteristics and Classification of mammals upto order with suitable examples. – Origin, evolution, and adaptive radiation in mammals. Physiology of mammals: digestion, reproduction, endocrine, excretory and skeletal system – skull and dental formulae. Evolutionary adaptations in mammals | | | | | | | | |
|  | | | | | | | | |
| **Unit:2** | | **CARNIVORES** | | **15 hours** | | | | |
| Description, Distribution, Skull & Dentitions, Behaviour, Diet & Foraging, Locomotion, Social Organisation, Vocalization & Communication, Reproductive Strategies, Threats and Conservation in Felids, Canids, Hyaenids, Viverrids, Herpestids, Prionodontids, Mustelids, Ursines and Ailurids | | | | | | | | |
|  | | | | | | | | |
| **Unit:3** | | **HERBIVORES** | | **15 hours** | | | | |
| Description, Distribution, Skull & Dentitions, Behaviour, Diet & Foraging, Locomotion, Social Organisation, Vocalization & Communication, Reproductive Strategies, Threats and Conservation in Proboscidean, Perissodactyl, Artiodactyl, Indian Lagomorph, Pangolin, Scandentian, Hedgehogs, Rodents, Tree Shrews, Shrews and Moles. | | | | | | | | |
|  | | | | | | | | |
| **Unit:4** | | **OMNIVORES AND AQUATIC MAMMALS** | | **15 hours** | | | | |
| Description, Distribution, Skull & Dentitions, Behaviour, Diet & Foraging, Locomotion, Social Organisation, Vocalization & Communication, Reproductive Strategies, Threats and Conservation in Primates, Mustelids, Suidae, Hominidae. Aquatic mammals: Cetaceans, Sirenia and Pinnipedia | | | | | | | | |
|  | | | | | | | | |
| **Unit:5** | | **MAMMALIAN ADAPTATION** | | **15 hours** | | | | |



|  |  |  |  |
| --- | --- | --- | --- |
| History of mammalogy. Adaptations in mammals; hibernation, torpor, aestivation, locomotion and water regulation. Metabolism and thermoregulation; ectothermy, homeothermy and cold stress, body size versus homeothermy. Body size variation in mammals and its influence on life history, metabolic rate, weight constraints, feeding behaviour, niche width and reproduction. Mammalian skin and its derivatives. Behaviour and social organization in mammals; social and mating systems; territories; communication. Economic importance of Mammals | | | |
|  | | | |
| **Unit:6** | | **Contemporary Issues** | **2 hour** |
| Expert lectures, online seminars, webinars, | | | |
|  | | | |
|  | | **Total Lecture hours** | **77 hours** |
| **Text Book(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. | Manual of Zoology–Egambaranatha Iyyer | | |
|  | | | |
| **Reference Books** | | | |
| 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 | | |
|  |  | | |
|  | | | |
| **Related Online Contents [MOOC,SWAYAM, NPTEL,Websitesetc.]** | | | |
| 1 | Ecology and Wildlife Conservation (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 | Wildlife Conservation :<https://nptel.ac.in/courses/102/104/102104068/> | | |
| 3 | Wildlife Ecology :<https://swayam.gov.in/nd1_noc20_bt38/preview> | | |
|  | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. N. Ezhilarasi, Associate Professor, Government Arts College (Autonomous), Coimbatore | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **13EA** | **FORESTRY, SILVICULTURE & FOREST ENTOMOLOGY** | | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Elective Paper I** | | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | | Basic understanding about Forest, Silvicultural aspects and importance of entomology | | **Syllabus**  **version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | | |
| The main objectives of this course are,  To explain the core concepts of ecology for a better understanding of the environment.  To motivate, identify and solve the problem regarding habitat loss.  To create awareness about the improvement and protection of the environment.  To make understand the need for conservation of biodiversity and natural resources.  To help understand the concepts of exobiology.  To develop awareness about the Forest Insects  To learn the taxonomy and classification of Insects | | | | | | | | | | |
|  | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | |
| 1 | Understand the ecological dynamics and the significance of environmental integrity.  Understanding the beneficial role of Insects. | | | | | | | | K2 | |
| 2 | Recognize various global and regional environmental concerns that affects the biosphere  And analyze the impact of human activities on the environment. | | | | | | | | K1 | |
| 3 | Appreciate the significance of the conservation of native biodiversity. The course will give an idea about management of forest insects | | | | | | | | K4 | |
| 4 | Scrutinize specific cases of environmental pollution and challenges, and their impacts on  ecology. | | | | | | | | K5 | |
| 5 | The learners will be trained in handling and preservation of insect specimen. | | | | | | | | 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 MENSURATION** | | | **15 hours** | | | | |
| Forest management techniques - Methods of measuring - diameter, girth, height and volume of trees- form-factor- volume estimation of stand, Sampling methods and sample plots. Yield calculation- forest cover monitoring through remote sensing - GIS management and modeling- Forest survey- map reading. | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:3** | | | **FOREST MANAGEMENT & WORKING PLAN** | | **15 hours** | | | | | |
| Forest types in India, identification - dendrology, Establishment of herbaria and arboreta. Agroforestry systems-Social/Urban Forestry–Joint Forest Management. Water shed management – Deforestation & Impacts. Forest Inventory. Working Plan: Planning-preparation-contents-presentation-submission. | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:4** | | | **FOREST ENTOMOLOGY** | | **15 hours** | | | | | |
| Organization of a typical insect – Characters and Classification of the following orders upto families with examples – Orthoptera – Hemiptera – Coleoptera – Lepidoptera – Hymenoptera. Bionomics of any two destructive insect for each of the above orders: Biology – life cycle, Feeding and reproductive behaviour of insects | | | | | | | | | | |
| **Unit : 5** | | **DESTRUCTIVE ENTOMOLOGY** | | | | | | | | |
| Detection and evaluation methods of insect infestation: Survey – estimation of insect abundance – devices for evaluation – methods for determining degree of hazard – biological evaluation – Control of forest insects: direct and indirect methods. Insect pests of Teak – Sandalwood – Bamboo. Forecasting, assesses risk of insect outbreaks. Insect Management- Insect Plant interaction. | | | | | | | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
|  | | | |
| **Unit:6** | | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars, webinars, workshops | | | |
|  | | | |
|  | | **Total Lecture hours** | **77 hours** |
| **Text Book(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 | | |
| 5 | Manikandan. K & Prabhu. S (2019). Indian Forestry*: A Breakthrough Approach to Forest*  *Service.* Jain Brother Publishers. | | |
|  |  | | |
|  | | | |
| **Reference Books** | | | |
| 1 | Controlled Ecological Life Support system –NASA conference publication (2378) (e-content) | | |
| 2 | Environmental Science: Earth as a Living Planet by Daniel B. Botkin, Edward A. Keller | | |
| 3 | Environmental Science: Systems and solutions – Michael L. McKinney &Robert M. Schoch. | | |
| 4 | Ecology and Environment - P.D. Sharma | | |
|  | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 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) | | |
|  | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **13EB** | **WILDLIFE CRIME** | | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Elective Paper II** | | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | | Basic understanding about wildlife crimes in India | | **Syllabus**  **version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | | |
| The main objectives of this course are,   1. To study about the types of wildlife crime like, poaching, illegal wildlife trade, illegal hunting 2. To acquire knowledge on the socio-economic factors that contribute to wildlife crime 3. To study about the effectiveness of existing laws, policies, and enforcement measures 4. To acquire knowledge on the wildlife crime and investigation, intelligence gathering, and organized crime 5. To Understand the impact of wildlife crimes, policy and law enforcement agencies | | | | | | | | | | |
|  | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | |
| 1 | Acquire the knowledge of various types of wildlife crimes such as poaching, illegal wildlife trade, illegal hunting | | | | | | | | K2 | |
| 2 | Learn about how the socioeconomic variables influencing wildlife crime in India | | | | | | | | K1 | |
| 3 | Know the existing laws and policies to conserve the flora and fauna conservation | | | | | | | | K4 | |
| 4 | Learn about the concept of wildlife crime, investigation of wildlife crime, intelligence gathering, investigation of organized wildlife crimes and networks | | | | | | | | K5 | |
| 5 | Understand the impact of wildlife crimes and law enforcement agencies | | | | | | | | K3 | |
| **K1**-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:1** | | | **DIMENSIONS AND CONSEQUENCES** **OF WILDLIFE CRIME** | | | **15hours** | | | | |
| 1) Poaching: Illegal hunting, killing or capturing of wild animals. 2) Illegal wildlife trade: global issue of ivory, tiger parts, leopard parts, rhino horns, 3) Parts of mammal, reptile, amphibian, bird, fish, coral reef, butterfly, molluska, red sander, medicinal plants, ornamental plants. | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:2** | | | **EFFECTIVENESS OF EXISTING LAWS, POLICIES, AND ENFORCEMENT AUTHORITIES** | | | **15 hours** | | | | |
| 1) Wildlife (Protection) Act 1972, 2) Foreign Trade (Development and Regulation) Act, 1992, 3) Customes Act 1962, 4) Indian Forest Act 1927, 5) WCCB, DRI, Convention of International Trade in Endangered Species of Wild Flora and Fauna (CITES)\*, 6) MIKE-IUCN, TRAFFIC, 7) Interpol | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:3** | | | **SOCIO-ECONOMIC FACTORS THAT CONTRIBUTE TO WILDLIFE CRIME** | | **15 hours** | | | | | |
| 1)Socio-economic aspects of wildlife crime issue in India, Criminal activities like, logging, mining, and growing illicit crops. 2) Cultural norms influence wildlife crime like, traditional medicine and animals’ parts. | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:4** | | | **WILDLIFE CRIME INVESTIGATION** | | **15 hours** | | | | | |
| 1)Concept of wildlife crime, 2) Collection of information, evidence, intelligence network, search and seizure, 3) Criminal investigation and complaints, investigation of organized crime syndicates and transnational networks. | | | | | | | | | | |
| **Unit : 5** | | **WILDLIFE FORENSICS** | | | | | | | | |
| 1) Forensic protocols for species identification, molecular markers used in forensics, 2) Species identification: Morphological identification, Molecular identification, 3) Role and functions of WCCB, case studies, 4) Significance of wildlife forensics. | | | | | | | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
|  | | | |
| **Unit:6** | | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars, webinars, workshops | | | |
|  | | | |
|  | | **Total Lecture hours** | **77 hours** |
| **Text Book(s)** | | | |
| 1 | Anon., A Manual on Wildlife Species in Trade, 2011. Wildlife Crime Control Bureau, Ministry of Environment, Forests and Climate Change, Govt. of India | | |
| 2 | Moreto, W.D, 2018. Wildlife Crime from Theory to Practice. Temple University Press | | |
| 3 | Wildlife Crime Investigation “A Hand book for Wildlife Crime Investigation Officers” Wildlife Crime Control Bureau, Government of India (2013). 1st edition | | |
| 4 | Menon,V. and A. Kumar, 1999. Wildlife Crime “An enforcement guide”. Natraj publishers, New Delhi | | |
| 5 | Anon., A Manual on Wildlife Species in Trade, 2011. Wildlife Crime Control Bureau, Ministry of Environment, Forests and Climate Change, Govt. of India | | |
|  |  | | |
|  | | | |
| **Reference Books** | | | |
| 1 | Chandran, A.R. 2023. Wildlife Crime in India: A multi-faced analysis. ILE Monthly Review, 1 (2) of 2023, Pp.38-45. | | |
| 2 | X-Ray images of wildlife products, (2012). A catalogue of Wildlife Contraband Community Carried in personal Personal Baggage. Wildlife Crime Control Bureau, Government of India. | | |
| 3 | Jota Baptista, C.; Seixas, F.; Gonzalo-Orden, J.M.; Oliveira, P.A. Wildlife Forensic Sciences: A Tool to Nature Conservation towards a One Health Approach. Forensic Sci. 2022, 2, 808–817. | | |
|  | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | |
| 1 | <https://swayam.gov.in/> | | |
| 2 | https:/[/www.mooc.or](http://www.mooc.org/)g[/](http://www.mooc.org/) | | |
| 3 | <https://nptel.ac.in/> | | |
| 4 | https://doi.org/10.3390/forensicsci2040058 | | |
|  | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | |

**Mapping**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PSO/ CO** | **PSO**  **1** | **PSO**  **2** | **PSO**  **3** | **PSO**  **4** | **PSO**  **5** |
| **CO1** | S | H | S | S | H |
| **CO2** | S | M | S | S | H |
| **CO3** | H | M | S | S | H |
| **CO4** | H | M | S | S | H |
| **CO5** | H | M | S | S | H |

S - Strong H-High M - Medium L-Low

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **13SEC** | **BIODIVERSITY CONSERVATION** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Skill Enhanced Course** | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | | Basic knowledge about Techniques Conservation of biodiversity in Wildlife | **Syllabus version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  To make understand the basic wildlife organizations.  To understand the significance of Biodiversity.  To gain knowledge about conservation of wildlife.  To understand the wildlife laws and legislation. | | | | | | | | | |
|  | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | | To make understand the basic wildlife organizations. | | | | | | K4 | |
| 2 | | Learn the significance of biodiversity | | | | | | K3 | |
| 3 | | Understanding the different conservation methods | | | | | | K2 | |
| 4 | | To understand the wildlife laws and legislation | | | | | | K2 | |
| **K1**-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:1** | | | **BIODIVERSITY** | | **18 hours** | | | | |
| 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** | | **18 hours** | | | | |
| Spatio-temporal impacts of climate change on biological and ecological systems: physiological and  behavioural responses – Impacts on migration and breeding phenology – Range shifts and species  distributions – Changes in community composition and dynamics – Extinction risk - Species invasions –  Habitat disturbances - Loss of critical wildlife habitats – human animal conflicts and mitigation. Ecosystem responses: tropical forests, grasslands, montane forests, tree lines & alpine vegetation, and coastal & marine ecosystems. Wetland Habitats of India: Definition and types of wetlands, important wetlands of India and their conservation issues. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:3** | | | **IMPACT OF CLIMATIC FACTORS** | | **16 hours** | | | | |
| Introduction to the Earth’s climate – Palaeoclimate: reconstruction from CO2 – Dendro climatology – Natural climate change – Anthropogenic climate change – Rising CO2 & greenhouse effect – Global carbon cycle – Climate projections - General Circulation Models – Approaches for studying impacts of climate change: observational, experimental, and statistical – Carbon footprints – Measuring climate change vulnerability of species and habitats. Exploitation of natural resources. Pollution and after effects- Carbon sequestration and net primary productivity –Evolutionary responses – Interactive effects and positive feedbacks - Climate change & human ecology - Agricultural production and food security – Extreme weather phenomena - Climate justice – Climate change scenario for India: potential impacts and threats – Policy responses: mitigation and adaptation – National and International conventions and policies on climate change – IPCC & UNFCCC - Limitations of climate change studies and projections – Need of future research in conservation | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:4** | | | **ORGANISATIONS INVOLVED IN WILDLIFE CONSERVATION** | | **18hours** | | | | |
| Organization at State level- State Biodiversity Board, National level –NBA, ZSI, BSI, FRI, FSI. International level - CITES, IUCN, CBD and WWF. NGOs - BNHS, WTI, Zoo outreach organization, WCT and WPSI. International agreements for conserving marine life. Convention on wetlands of International Importance (Ramsar convention). | | | | | | | | | |
| **Unit:5** | | | **WILDLIFE LAWS AND FORENSICS** | | **18hours** | | | | | |
| History of wildlife laws in India – wildlife protection act, 1972 and its amendments- declarations and regulations of sanctuaries, national parks and protected areas. Central zoo authority and recognition of zoos- preventions of wildlife trade and schedule I – VI species. IUCN red list and CITES. Biological diversity act, 2002 and Biological diversity rules, 2004. Wildlife Forensics- Overview, various forensic protocols for species identification, Molecular markers used in wildlife forensics; Wildlife forensics based on DNA analysis and morphometry; Wildlife Crime – Role and functions of WCCB, case studies. Significance of wildlife forensics | | | | | | | | | | |
|  | | | | | | | | | | |
| **Unit:6** | | | **Contemporary Issues** | | **2 hours** | | | | | |
| Expert lectures, online seminars, webinars, workshops and conferences | | | | | | | | | | |
|  | | | | | | | | | | |
|  | | | **Total Lecture hours** | | **90 hours** | | | | | |
| **Text Book(s)** | | | | | | | | | | |
| 1 | Asthana. D.K. and Meera Asthana. (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 | Robinson, Wl. and Eric, G. Bolen, 1984. Wildlife Ecology and Management Mac Millan Publishing Co, New York. Pp 478. | | | | | | | | | |
| 6 | Dasmann R. F. 1964.*Wildlife Biology*, John Wiley & Sons, New York, p231 | | | | | | | | | |
|  | | | | | | | | | | |
| **Reference Books** | | | | | | | | | | |
| 1 | Warning, R. H and Schlesinger, W. H, 1985. *Forest Ecosystems: Concepts and Management*.  Academic Press, New York. | | | | | | | | | |
| 2 | Robinson, W. l. 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 | | | | | | | | | |
|  | | | | | | | | | | |
| **Related Online Contents [MOOC,SWAYAM, NPTEL, Websites, etc.]** | | | | | | | | | | |
| 1 | https://swayam.gov.in/ | | | | | | | | | |
| 2 | https:/[/www.mooc.or](http://www.mooc.org/)g[/](http://www.mooc.org/) | | | | | | | | | |
| 4 | https://nptel.ac.in/ | | | | | | | | | |
|  | | | | | | | | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | **23P** | **ICTHYOLOGY & HERPETOLOGY, ORNITHOLOGY AND MAMMALOGY** | **L** | | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | **CORE PRACTICAL – I** | **0** | | **0** | | **2** | **4** |
| **Pre-requisite** | | | Fundamental knowledge on animal anatomy  and Biodiversity | **Syllabus**  **Version** | | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  To understand important physiological functions in various vertebrate forms.  To understand the working of nervous system and sense organs.  Acquire the knowledge of biodiversity in different geographical areas. | | | | | | | | | |
|  | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Attain knowledge about locomotory organs, locomotion in  Various vertebrates. | | | | | | | K2 | |
| 2 | Understand the origin of Chordata, concept of Protochordata, importance of  Vertebrate morphology and biology of some chordates. | | | | | | | K1 | |
| 3 | Gain knowledge about Vertebrate classification, as well as structure and function  Of integument and its derivatives. | | | | | | | K2 | |
| 4 | 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** | | | | | **12 hours** | | | | |
| **Major**  Culture of fishes in laboratory to identify the stages (Demonstration only)  Study of scales in fishes: cycloid, ctenoid, placoid and Ganoid scales (Based on the availability of fish).  Identification of frogs and toads based on their unique calls  Identification of venomous and non-venomous snakes  Identification and Morphological structure of Eggs in Birds (Demonstration only)  Study of prey predator relationship (Scat analysis)  Identification minimum 10 bird calls and write in detail about the bird species  Demographical structure of Elephants | | | | | | | | | |
| **ANATOMY OF CHORDATES** | | | | | **12 hours** | | | | |
| **Minor**  Morphometric study of fishes in laboratory.  Study of epidermal derivatives: Skins, Nails, Claws, Scales, Feathers.  Taxidermy (Demonstration only).  Types of feathers in the birds (Quill feather, Down Feathers, Filo plume Feathers)  Types of beak in the birds (flower probing-sunbird, tearing- kite, cracking-hornbill)  Types of feet in the birds (parrot, patridge, kite)  Dentition in mammals (elephant, deer, wild boar, leopard) | | | | | | | | | |
| **SPOTTERS**   1. Skull of frog (Amphibians), 2. Skull of birds (Aves), 3. Skull of rabbit (Mammals) 4. Different types of horns in mammals 5. Digit structure of mammals 6. Identification of Asian elephants and African elephants 7. Tongue of different vertebrates 8. Identification of tiger and leopard skin | | | | | | | | | |

**SUBMISSIONS**

1. Submit an album of amphibians, reptiles, birds and mammals at least one per order of classification and ecological importance / field trip.
2. Bonafide Record

**TEXT BOOKS**

1. Khanna, S.S, and Singh H.R. (2014). Textbook of Fish Biology and Fisheries 3rd Edition
2. Prater, S. H. (1997). The book of Indian mammals. Bombay Natural History Society.
3. Sinha, J., Chatterjeee A.K., Chattopadhyay P. (2011). Advanced Practical Zoology Arunabha Sen Publishers.
4. Kashyap, V. (2020) A text book of vertebrate Zoology. Kedar Nath Ram Nath publishers
5. Whitaker, R and A. Captain (2006). Common Indian snakes: a field guide. Macmillan.
6. Daniels, R. R. (2005). Amphibians of peninsular India. Universities Press.268

**REFERENCES**

1. Menon, V. (2023). Indian mammals: a field guide. Hachette India.544p.
2. Menon, V and A.Kumar (1999) Wildlife Crime: An Enforcement Guide. Natraj Publisher, Delhi. 110p.
3. Grimmett, R., Inskipp, C., & Inskipp, T. (2016). Birds of the Indian subcontinent. Chistopher helm, London.
4. Salim Ali, (2003) The Book of Indian Birds. BNHS. Mumbai
5. Preeti Guptha and Mridula Chaturvedi. (2000). Modern Experimental Zoology
6. Verma. (2000). Manual of Practical Zoology: *Chordates* S. Chand Publishing
7. Pough, F. H., Andrews, R. M., Cadle, J. E., Crump, M. L., Savitzky, A. H., & Wells, K. D. (2016). Herpetology. Sinauer Associates, Incorporated, Publishers.

**Mapping**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **PSO/ CO** | **PSO**  **1** | **PSO**  **2** | **PSO**  **3** | **PSO**  **4** | **PSO**  **5** |
| **CO1** | H | S | M | M | S |
| **CO2** | S | S | S | S | S |
| **CO3** | S | S | S | M | S |
| **CO4** | M | S | M | M | S |
| **CO5** | S | S | M | S | S |

S - Strong H-High M - Medium L-Low

**Duration:** **3 Hours** **Max**. **Marks**: **75 Marks**

**BREAK UP OF MARKS**

**Core Practical 1: Ichthyology & Herpetology, Ornithology and Mammalogy**

**S. No Distribution Component Marks**

|  |  |
| --- | --- |
| 1. Major Experiment (1No) 2. Minor Experiment (2 Nos) 3. Spotters (5 Nos) 4. Submissions 5. Record Work | 25  15  15  10  10 |
| TOTAL | 75 Marks |



Second Se Semester



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | **23A** | **ECOLOGY** | | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | **Core Paper IV** | | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | Basic knowledge about Ecology | | **Syllabus**  **version** | | **2025 -**  **2026** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  To understand basics of Ecology.  To elucidate the interaction of animals with ecosystem. | | | | | | | | | |
|  | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be 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 Ecological factors. | | | | | | | K3 | |
| 4 | To understand the various methods in pollution control. | | | | | | | K4 | |
|  |  | | | | | | |  | |
| **K1**-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:1** | | **HABITAT ECOLOGY** | | | **15 hours** | | | | |
| Habitat concepts – Biotic and abiotic components of habitats – Scale issue – Macro and micro habitats – Habitat structure – Vertical and horizontal heterogeneity – Floristics & physiognomy - Habitat edges, ecotones and interiors – Habitat patches & corridors – Habitat quality – Factors affecting habitat quality – Habitat suitability indices and measurements – Habitat use, selection and preference – Environmental perturbations and wildlife habitats: fire, flood, drought, herbivory and diseases – Habitat degradation and fragmentation – Monitoring of habitats – Habitat surveys and mapping – Ecology of major wildlife habitats: forests, grasslands, deserts, wetlands and coastal landforms – Biology of unique habitats: caves, tree-holes, sub-terranean burrows, termite mounds, etc | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:2** | | **COMMUNITY ECOLOGY** | | | **15 hours** | | | | |
| Definition and nature of communities; scale and approaches. Historical perspective in community ecology studies. Measurement of species richness; diversity; evenness. Community structure, organization and its stability (guilds, resource partitioning, niche, competitive exclusion). Factors governing species diversity. Models of competition; simple community models. Concept and measurement of niche. Trophic interactions; top-down and bottom- up processes. Null models and their application in ecology. Energy flow and productivity and its implications for species diversity. Functional diversity and food webs. Evolution of communities and neutral theory. Species-area relationship, Theory of Island Biogeography, Global and local scale patterns in body size, species range size, species abundance, species richness and species turnover. Diversity - Productivity - Stability. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:3** | | **BEHAVIOURAL ECOLOGY** | | **15 hours** | | | | | |
| An interconnected approach understanding proximate and ultimate mechanisms and causal and functional explanations in animal behaviour. Group living: costs, benefits and optimal group size - Selfishness. Evolutionarily stable strategies; predator prey relationships and evolutionary arms race. Competition for resources: ideal free distributions and resource defense. Concept of optimality in decision making in animals; optimal foraging theory and other models. Testing hypotheses in behavioural ecology. Cooperation and helping in mammals, birds and fishes. Ecology and evolution of signals and communication pathways. Behavioural patterns in captivity and animal welfare issues. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:4** | | **POPULATION ECOLOGY** | | **15 hours** | | | | | |
| Monitoring population and other demographic, evolution of life history parameters: r & K selection, allometry, aging and sexing, life tables, age and stage structures models, methods of estimation of life history parameters, population, Predator Prey Dynamics, Population Genetics, Estimation of Survival, Recruitment, and other transition states using Mark-Recapture models, Modeling Occupancy. Bayesian models in Abundance Estimation (Spatial and Non Spatial). Dynamics: exponential, logistic and other forms of growth of population, density dependent and independent growth, population simulation, predator-prey systems, carrying capacity, Sampling designs for population estimation, population estimation methods: Distance based Sampling Methods, Mark-Recapture for Closed Population, Indices, and Estimation of Demographic parameters. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:5** | | **LANDSCAPE ECOLOGY** | | **15 hours** | | | | | |
| Concept of Space, Basics of Cartography, Principles of Remote Sensing, Sensors, Image interpretation and Digital Image Processing, Global Positioning System, Geographical information Systems: Data Entry and Preparation, Spatial Data Generation, Concept of Database and Metadata, Spatial Modelling and Data Visualization. Basics of Landscape Ecology. | | | | | | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **Unit:6** | | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars, webinars | | | |
|  | | | |
|  | | **Total Lecture hours** | **77 hours** |
| **Text Book(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. | | |
|  | **REFERENCES** | | |
| 1 | Yadav, P. R. 2003. Fossils. Discovery Publishers | | |
| 2 | Arora, M. P. (1992). An Introduction to palaeontology. Himalaya Publishers. | | |
|  |  | | |
|  | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites, etc.]** | | | |
| 1 |  | | |
| 2 |  | | |
|  |  | | |
|  | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. N. Ezhilarasi Associate Professor, Government Arts College (Autonomous), Coimbatore | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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



|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **23B** | **ETHOLOGY OF WILDLIFE** | | | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Core Paper V** | | | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | | Basic knowledge about Animal Behaviour | | | **Syllabus**  **version** | | **2025-**  **2026** | | |
| **Course Objectives:**  To provide overview of introduction to behaviour in Wild Animals.  To learn the fundamental concepts of Animal Behaviour.  To make aware of hormonal actions in Animal Behaviour.  To understand the social behaviour of Mammals. | | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | | |
| 1 | | To understand and apply the principles of Animal 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 | |
| **K1**-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create | | | | | | | | | | | |
|  | | | | | | | | | | | |
| **Unit:1** | | | **CONCEPT AND CLASSIFICATION** | | | | **15 hours** | | | | |
| Behaviours in Animals: Types of Behaviours - classical and modern concepts-fixed action pattern and ritualization. Learning – Imprinting - habituation. Analysis of behavior pattern: taxis, kinesis and reflexes. Analysis of behaviour – Ethogram | | | | | | | | | | | |
| **Unit:2** | | | **HORMONES AND PHEROMONES** | | | | **15 hours** | | | | |
| Physiological mechanism of behavior – Neural behaviour – Perceptual mechanism, Role of hormones and Pheromones in behaviour of Animals, predator detection, predator tactics. Altruism and evolution –Methods of studying behavior. | | | | | | | | | | | |
| **Unit:3** | | | **BEHAVIOURAL PATTERN** | | | **15 hours** | | | | | |
| Biological rhythms: Circadian, Lunar, Tidal and animal rhythms. Animal communication: Visual, Auditory, Chemical and Vocalization in Mammals, Birds and Insects. Foraging behaviour in Mammals and Birds, Origin and significance of play. | | | | | | | | | | | |
| **Unit:4** | | | **BREEDING BEHAVIOUR OF ANIMALS** | | | **15 hours** | | | | | |
| Courtship, display – sexual selection – pair bond – sexual dimorphism – polymorphism - polyandry, polygamy - promiscuity – cooperative breeding –brood parasites –parental care in Amphibians, Reptiles and Mammals. | | | | | | | | | | | |
| **Unit:5** | | | **SOCIAL BEHAVIOURS IN ANIMALS** | | **15 hours** | | | | | | |
| Aggression – Competition – Social spacing – Territory – Dominance. Social commensalism –  mutualism – Parasitism. Social behavior of Elephants, Lion and Primates. | | | | | | | | | | | |
| **Unit:6** | | | **Contemporary Issues** | | **2 hours** | | | | | | |
| Expert lectures, online seminars, webinars | | | | | | | | | | | |
|  | | | | | | | | | | | |
|  | | | **Total Lecture hours** | | **77 hours** | | | | | | |
| **Text Book(s)** | | | | | | | | | | | |
| 1 | Agarwal, V.K. (2009). *Animal Behaviour (ETHOLOGY).*S. Chand Publishing. | | | | | | | | | | |
| 2 | Leshner, A. I. (1978). An Introduction to Behavioural Endocrinology, Oxford University Press,  NewYork. | | | | | | | | | | |
| 3 | McFarland, D. (ed.),1981. *The Oxford Companion to Animal Behaviour*, Oxford University  Press, Oxford. | | | | | | | | | | |
| 4 | Ridley, M.1968. *Animal Behaviour – A concise Introduction, Blackwell* Scientific Publications, Oxford. | | | | | | | | | | |
|  | | | | | | | | | | | |
| **Reference Books** | | | | | | | | | | | |
| 1 | Slater, P. J. B.1985. *An Introduction to Ethology*, Cambridge University Press, Cambridge. | | | | | | | | | | |
| 2 | Natarajan, P and Arumugam, N. *Animal Behaviour – Ethology.* Saras Publication | | | | | | | | | | |
| 3 | Wallace, R. A.1979.*The Ecology and Evolution of Animal Behaviour*, Good year Publishing  Company Inc., Santa Monica, California. | | | | | | | | | | |
| 4 | Wilson, E.O.1978. *Sociobiology*, The Belknap Press, Harvard University Press, Cambridge, | | | | | | | | | | |
| 5 | Tristram, D.Wyatt. *Pheromones and Animal Behaviour.* Cambridge University Press | | | | | | | | | | |
|  | | | | | | | | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites, etc.]** | | | | | | | | | | | |
| 1 |  | | | | | | | | | | |
| 2 |  | | | | | | | | | | |
| 3 |  | | | | | | | | | | |
|  | | | | | | | | | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. N. Ezhilarasi, Associate Professor, Government Arts College (Autonomous), Coimbatore | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **23C** | **CONSERVATION GENETICS AND EVOLUTION** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Core Paper VI** | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | | Basic information on genetics and evolution | **Syllabus Version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  To make aware of the students about the theories, concepts and basics of conservation genetics.  To provide knowledge about genetics.  To acquire knowledge about evolution. | | | | | | | | | |
|  | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | The learner will be able to understand methodological approach to the study of genetics | | | | | | | 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 principle  Mechanisms of the genetic and molecular elements that are involved. | | | | | | | K4 | |
| **K1**-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:1** | | **POPULATION GENETICS** | | | | **15 hours** | | | |
| Population genetics: Mendelian Genetics- Mendal’s Laws, Mendelian Population and scope of population genetics, Gene and genotype frequencies. Genetic Variation in natural populations; Mating patterns: Random and Non-random mating. Hardy-Weinberg principle, Factors affecting Hardy Weinberg Equilibrium. Quantitative Genetics: (a) Traits controlled by two loci, three loci and multiple loci (b) Heritability, measurement of variability. Heterosis, transgressive inheritance; Inbreeding and Inbreeding coefficient. Loss of genetic diversity, Application of genetics for wildlife conservation, Resolving taxonomic uncertainties. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:2** | | **MOLECULAR GENETICS** | | | | **15 hours** | | | |
| Introduction to Bio-molecules-DNA, RNA and Proteins; Central Dogma of Molecular Biology- Replication, Transcription and Translation; Genetic Code- Characteristics and feature of genetic code. Chromosomal and protein polymorphism, Balanced polymorphism. • Protein and nucleotide sequence analysis and construction of phylogentic tree using tools of Bioinformatics. Markers – DNA, RNA, microsatellite, mtDNA COI a&b DNA barcoding: Identification of species | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:3** | | **BIOLOGICAL DATA BASES AND TOOLS** | | | | **15 hours** | | | |
| Biological data bases – Scope and importance -Biological data bases – Protein sequence data bases: NCBI, PROSITE, Swiss-Prot and Nucleic acid data bases: NCBI, DDBJ, EMBL and GenBank – pair-wise alignment technique– multiple sequence analysis. Tools for conservation genetics: BLAST, - Clustal Omega, - Phylogenetic analyses (PHYLIP)- overview and types of phylogenetic tree– MEGA XI- Human Genome Project (HGP). | | | | | | | | | |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit:4** | | **EVOLUTIONARY GENETICS** | | **15 hours** |
| Natural Selection, types of selection - Balancing Selection, Mutation–Selection Balance, Mutation– Drift Balance. Concept of fitness in natural selection. Isolating mechanisms and Classification – (a) Geographic isolation (b) Reproductive isolation – (i) Pre-mating isolation – Climatic, Seasonal, Habitat, Ethological (ii) Post-mating isolation – gametic mortality, zygotic mortality, hybrid inviability and hybrid sterility. Evidence for speciation, Mode of speciation: Allopatric, Parapatric, Sympatric; Cospeciation: sexual selection, Co-evolution and convergent evolution. | | | | |
|  | | | | |
| **Unit:5** | | **EVIDENCES AND THEORIES OF ORGANIC EVOLUTION** | | **15 hours** |
| Evidences of Organic Evolution: Evidence from Paleontology – Morphological – Embryological – Physiological and Biochemical – Geographical and Genetical evidences. Theories of Evolution: Recapitulation theory, Lamarckism - Neo Lamarckism, DeVries theory of mutation - Modern concept of mutation; Darwinism – Darwin’s finches - Neo Darwinism and Modern synthetic theory of evolution.. | | | | |
|  | | | | |
| **Unit:6** | | **Contemporary Issues** | | **2 hours** |
| Expert lectures, online seminars, webinars | | | | |
|  | | | | |
|  | | **Total Lecture hours** | **77hours** | |
| **Text Book(s)** | | | | |
| 1 | Hall, B.K. and B. Hallgrimson. 2014. Strickbergers Evolution. Jones and Bartlett Publishers ltd., New Delhi, India. | | | |
| 2 | Bergstrom, Carl T. and Lee Alan Dugatkin, 2016. Evolution (Second Edition), W.W. Norton and company, New York, USA. | | | |
| 3 | Li. W. and Graur (1990): Fundamental of Molecular evolution. Sinauer associates Sunderland bd, USA. | | | |
| 4 | Molecular Biology and Genetic Engineering, N. Arumugam, A. Thangamani, L. M. Narayanan, Padmalatha Singh. Saras Publication. 2012 | | | |
| 5. | PierrenTaberlet, Aruelle Bonin and Etienne Petit, Conservation Biology: Evolutionary Perspectives | | | |
| 6. | C. Frank W. Allendorf and Gordon Luikart, Conservation Biology. | | | |
|  | | | | |
|  | | | | |
| **Reference Books** | | | | |
| 1 | Fred W. Allemdorf, W. Chris Funk and Sally N. Aitken, Conservation and Genomics of Population. | | | |
| 2 | Charles Darwin, On the Origin of Species. | | | |
| 3 | Principle of Genetics. Gardner, Wiley India, 2006 | | | |
| 4 | Genetic Engineering, Smita Rastogi, Oxford Univerisy Press, 2009 | | | |
|  | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites, etc.]** | | | | |
| 1 | NOC:IntroductiontoDevelopmentalBiology,Prof.SubramaniamK,IITMadras,  https://nptel.ac.in/courses/102/106/102106084/] | | | |
|  | | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **23EA** | **GIS AND DATA VISUALISATION** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Elective III** | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | | Basic information about GIS and Data Visualization | **Syllabus**  **Version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  To develop awareness about the GIS, Mapping and Data science  To learn the about the Landscape and Mapping  . | | | | | | | | | |
|  | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Understanding the beneficial role of GIS in Wildlife. | | | | | | | K2 | |
| 2 | To elucidate various aspects of mapping. | | | | | | | K5 | |
| 3 | The course will give an idea about Creating Maps. | | | | | | | K4 | |
| 4 | The students will be capable of interpreting and  Understanding the knowledge about the GIS and techniques in Mapping. | | | | | | | K2 | |
| 5 | The learners will be trained in handling the computer based projects. | | | | | | | K4 | |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:1** | | **GIS APPLICATIONS** | | | | **18 hours** | | | |
| GIS: Components of GIS – Brief history of GIS –Elements of GIS – Application of GIS – Integration of GIS, web 2.0 and Mobile technology. Coordinate systems: Geographic Co ordinate system – Map projections – Commonly used map projections – Projected Coordinate systems. GIS Data Acquisition – Existing GIS data – Metadata – Conversion of Existing Data – Creating of New Data. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:2** | | **VECTOR DATA MODEL** | | | | **18 hours** | | | |
| Representation of Spatial features – Topology – Topology rules - Geo relational Data Model – Object based data model – Representation of Composite Features – Buffering - Overlay – Distance Measurement – Pattern analysis - Use of Arc GIS, Q GIS | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:3** | | **RASTER DATA MODEL** | | | | **16 hours** | | | |
| Elements of the Raster Data Model – Satellite Images – Digital Elevation Model – Types of Raster data Raster data structure – Raster data Compression – Data Conversion and Integration – Data Analysis Environment – Local operations – Neighborhood operation – Zonal operation – Physical Distance Measure operation – Raster data operation – Comparison of Vector and Raster-Based data analysis – Raster data analysis | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:4** | | **DATA VISUALISATION TOOLS AND PRINCIPLES** | | | | **18 hours** | | | |
| Data Visualization – Overview of Data visualization – importance and applications – Brief history and Evolution – process. Data preparation: Data types and formats – Data cleaning and preprocessing – Data transformation and aggregation – Handling missing data. Visualization tools: Colour theory and palettes- Chart types – Visualization best practices – Design principles. | | | | | | | | | |



|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Unit:5** | | **TECHNIQUES IN VISUALIZATION** | | **18 hours** |
| Data story telling – Interactive visualizations – Advanced visualization techniques – Geospatial visualization. Real world examples and applications – student projects and presentations – Peer feedback and review – Visualization Challenges. Big data visualization – Machine learning and visualization – Web-based visualization – Best practices for visualization | | | | |
|  | | | | |
| **Unit:6** | | **Contemporary Issues** | | **2 hours** |
| Expert lectures, online seminars, webinars, Conferences and Workshops and internship programmes | | | | |
|  | | | | |
|  | | **Total Lecture hours** | **90 hours** | |
| **Text Book(s)** | | | | |
| 1 | Introduction to Geographic Information Systems – Kang – Tsung Chang – McGrawHill | | | |
| 2 | Data visualization: A Hand book for Data Driven Design by Andy Krik | | | |
| 3 | The TruthfulArt: Data, Chart and maps for communication by Alberto Cairo | | | |
| 4 | GIS Fundamentals: A First Text on Geographic Information Systems by Bojan Savric. | | | |
| 5 | GIS for Environmental Management by Timothy Hodgson. | | | |
| 6 | Introduction to Geographic information Systems by Kang-tsung Chang | | | |
|  | | | | |
| **Reference Books** | | | | |
| 1 | Introduction to Geographic Information Systems – Kang – Tsung Chang – Mc Graw Hill | | | |
| 2 | Principles of Geograpic Inormation Systems: A Guide to the Technology by John A.Longley | | | |
| 3 | Mastering Arc GIS by Maribeth Price | | | |
| 4 | Effective Visualization: The Right Chart for the Right Data by Stephanie Evergreen. | | | |
|  | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites, etc.]** | | | | |
| 1 | https:// Esri Virtual Campus, GIS Lounge, QGIS Tutorials, Flowing Data, Data Camp | | | |
|  | | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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



|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **23EB** | **CLIMATE CHANGE AND WILDLIFE CONSERVATION** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **Elective IV** | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | | | Basic information about climate change and its impact on wildlife | **Syllabus**  **Version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | |
| The main objectives of this course are to:  Learn the concept of climate change, greenhouse gases and their sources.  Acquire insights on carbon systems, carbon cycle and carbon trading programmes.  Learn the concept of wind, pressures and their significances, and consequences.  Develop idea on the natural and man-made disasters along with mitigation measures on global warming.  Comprehend knowledge about the organizations work with climate change.  . | | | | | | | | | |
|  | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | |
| 1 | Understand the various aspects of climatology and greenhouse effects | | | | | | | K2 | |
| 2 | Comprehend the current evidences of global warming and its consequences. | | | | | | | K5 | |
| 3 | Grasp insights on biogeochemistry, carbon reservoirs and carbon offset projects | | | | | | | K4 | |
| 4 | Realize the growing scientific consensus established by the IPCC and WMO | | | | | | | K2 | |
| 5 | Understand the mechanisms by ecosystems are to be affected by climate change | | | | | | | K4 | |
| **K1**-Remember; **K2**-Understand; **K3**-Apply; **K4**-Analyze; **K5**-Evaluate; **K6**–Create | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:1** | | **CLASSIFICATION OF CLIMATES: GENETIC AND EMPIRICAL CLASSIFICATIONS, KOPPEN AND THRONTHWAITE’S SCHEMES** | | | | **18 hours** | | | |
| Introduction and concepts of climate change; Global climate change – past and present scenario; Causes of Climate Change- Solar Variability- Volcanic Activity-Tectonic Activity, Orbital Variation- Greenhouse Effects- Green House Gases- Water Vapor- Carbon dioxide, Methane, Nitrous oxide, Chlorofluorocarbon, Hydrofluorocarbons; Anthropogenic sources of Green House Gases | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:2** | | [**BIOGEOCHEMISTRY**](http://earthguide.ucsd.edu/virtualmuseum/Glossary_Climate/gloss_a-f.shtml#biogeochemistry) | | | | **18 hours** | | | |
| Atmospheric Carbon [Reservoir](http://earthguide.ucsd.edu/virtualmuseum/Glossary_Climate/gloss_m-r.shtml#reservoir) - Carbon Cycle- Marine [carbon cycle](http://earthguide.ucsd.edu/virtualmuseum/Glossary_Astro/gloss_a-f.shtml#carbonCycle) – Blue Carbon- Terrestrial carbon cycle – Carbon Sequestration- Physical Carbon Pump- Biological Carbon Pump- Carbon Emission- Carbon trading- Carbon Cap Trading Programme- Carbon Offsets- Carbon Offset Projects in India. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:3** | | **CLASSIFICATION OF WIND SYSTEMS** | | | | **16 hours** | | | |
| Katabatic – Anabatic – Planetary- Trade- Westerlies-Periodic- Local wind- Significances and consequences Wind systems; Thermohaline Circulations and Ocean Gyres; Atmospheric drivers of marine climate change; Sea Surface Temperature (SST); Ocean acidification; Effects of climate change on marine life; Monsoon and Significances- Erratic monsoon- Direct and indirect effects on wildlife/ biodiversity. | | | | | | | | | |
|  | | | | | | | | | |
| **Unit:4** | | **CLIMATE CHANGE AND NATURAL DISASTERS** | | | | **18 hours** | | | |
| Natural and Man-made - cloudburst –hurricanes, cyclones- droughts; El Niño and La Nino effects - tsunami- Himalayan glacier effects and Himalayan tsunami; Elements of climate change: Temperature – precipitation – ice sheet melting – sea level rise - acid rain - ozone depletion; Different concerns of climate changes in developed and developing countries. Mitigation and adaptation of global warming.  . | | | | | | | | | |
| **Unit:5** | | **CLIMATE CHANGE AND FOREST FIRE AND THEIR IMPACT ON INDIAN WILDLIFE** | | | | **18 hours** | | | |
| Climate change and diapauses in insects (pollinators); Climate change: Policies and governance; Role of IPCC (Intergovernmental Panel on Climate Change)- IPCC Reports – Working Groups; WMO (World Meteorological Organization) on climate change- WMO and Membership- Climate impacts on society.  . | | | | | | | | | |

**Text books**

1. Chophel, Y., 2021. Global Warming and Climate Change (GWCC) Realities. In *The Nature, Causes, Effects and Mitigation of Climate Change on the Environment*. IntechOpen.
2. Sivaramanan, S., 2015. Global Warming and Climate change, causes, impacts and mitigation. *Central Environmental Authority*, *2*.
3. Singh (2010). Global Warming and Climate Change, APH Publications, pp.320.
4. Metz, B., 2009. *Controlling climate change*. Cambridge University Press.

**Reference books**

1. Tziperman, E., 2022. *Global Warming Science: A Quantitative Introduction to Climate Change and Its Consequences*. Princeton University Press.
2. Harris, S. ed., 2022. *The Nature, Causes, Effects and Mitigation of Climate Change on the Environment*. BoD–Books on Demand.
3. Cracknell, A.P. and Varotsos, C.A., 2021. *Understanding Global Climate Change: Modelling the Climatic System and Human Impacts*. CRC Press.
4. Letcher, T.M., 2021. Global warming—a complex situation. In *Climate Change* (pp. 3-17). Elsevier.
5. Ting, D.K. and Stagner, J.A. eds., 2021. *Climate Change Science: Causes, Effects and Solutions for Global Warming*. Elsevier.
6. Laffoley, D. and Baxter, J.M., 2018. Ocean connections. *An introduction to rising risks from a warming*.
7. Smerdon, J., 2018. *Climate change: the science of global warming and our energy future*. Columbia University Press.
8. Laffoley, D., Baxter, J.M., Turley, C. and Lagos, N.A., (editors). 2017. An introduction to ocean acidification: What it is, what we know, and what may happen. IUCN, Gland, Switzerland, 24 pp.
9. Singh, B.R. ed., 2012. *Global warming: Impacts and future perspective*. BoD–Books on Demand.
10. O'Hare, G., 2002. Global Warming: The science of climate change. *The Geographical Journal*, *168*, p.83.

|  |  |
| --- | --- |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites, etc.]** | |
| 1 | https:// Esri Virtual Campus, GIS Lounge, QGIS Tutorials, Flowing Data, Data Camp |
|  | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | | | | **23SEC** | **WETLAND CONSERVATION** | **L** | | | **T** | | | **P** | **C** |
| **Core/Elective/Supportive** | | | | | | | **Skill Enhanced Course II** |  | | | **0** | | | **0** |  |
| **Pre-requisite** | | | | | | |  | **Syllabus**  **Version** | | | | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | | | | | | | | |
| The main objectives of this course are to:  To acquire knowledge about Ramsar Sites.  To learn the To understand the significance of wetlands and Environmental biology.  To acknowledge the legislative acts relating to Wetlands.  To realize the environmental pollution and its degradation.  To gain knowledge about various impacts of Environmental health. | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | | | | | | |
| 1 | Acquire primary knowledge on wetlands and their characteristics. | | | | | | | | | | | | | K | |
| 2 | Appreciate the legislative laws made for wetland and environment. | | | | | | | | | | | | | K | |
| 3 | Recognize the significance of Environmental movements in India. | | | | | | | | | | | | | K | |
| 4 | Realize the environmental pollution and its degradation. | | | | | | | | | | | | | K | |
| 5 | Gain knowledge about various impacts of Environmental health. | | | | | | | | | | | | | K | |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Unit:1** | | | | |  | | | | | | **12 hours** | | | | |
| **Introduction to Wetlands:** Characteristics of wetlands - Physical and chemical factors of fresh water, estuary and Mangroove wetlands; Values of wetlands: Socio Economic, Cultural. Esthetic and Recreational values –Ecosystem services.  **Kinds of wetlands** :1. Man made - KNP and Harika and 2. Natural wetlands - Freshwater-. Pallikarani and Kolleru; Estuary- Chilika lake and Pulicat lake; Mangroove - Pointcalimere and Sundarban.  **Ramsar declaration** 1971: Important South Indian Ramsar sites and their biodiversity values. | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Unit:2** | | | | |  | | | | | | **12 hours** | | | | |
| **Environmental Biotechnology –** Biotechnological approach of environmental pollution abatement – bio-degradation of pollutants, Toxic site reclamation, reduces environmental impact of herbicides, pesticides and fertilizers, biosensors to detect environmental pollution.  **Agricultural production management –** Bio-fertilizer, Bio- pesticides, Vermi-composting technology.  **Bio-remediation –** key factors and kinds, solid phase bioremediation, bio-venting, land farming, bio-reactors, In situ and Ex situ bioremediation and phyto remediation. | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Unit:3** | | | | |  | | | | | | **12 hours** | | | | |
| **Environmental Science:** Man and Environmental interaction; Global environmental problems. Environmental priorities in India; Environmental crisis.  **Major Environmental Movements in India –** The Chipko movement and Appiko movement**.**  **Conflicts over sharing of water resources -** Interstate conflicts- Tamil Nadu**-**Karnataka; Punjab-Haryana-Rajasthan; International disputes – India –Pakistan; Indo-Bangaladesh.  **Environmental awareness** - Member of NGOs; Conferences and International agreements | | | | | | | | | | | | | | | |
| **Unit:4** | | | | |  | | | | | | **12 hours** | | | | |
| **Environmental degradation:** Wasteland-causes of wasteland formation; Reclamation of wasteland; biogas -energy from wastes; use of biogas.  **Environmental Toxicology** - Impact of pesticides; pesticide persistence, bioaccumulation and biomagnifications; case study- DDT in the environment; general effects pollutants.  **Pollution –** Monuments damaged by air pollution; water reuse and recycling; incineration at sea; oil pollution; Effects of noise pollution – hearing noise from noise exposure pathological and psychological disorders and noise Mapping. | | | | | | | | | | | | | | | |
| **Unit:5** | | | |  | | | | | | | | **12 hours** | | | |
| **Legislation relating to wetland**: 1. The Environment (Protection) Act, 1986; 2. The Tamil Nadu Aquaculture (Regulation) Act: III; Wetland Conservation and Management Rules 2017; 4. National River Conservation Plan (NRCP); 5. National lake Conservation Plan (NLCP).  **Environmental Laws**: 1. Biological diversity Act, 2002; 2. Water prevention and control of Pollution Act 1974; 3. Biomedical waste (Management and Handling) Rules, 1998. | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Unit:6** | | | **Contemporary Issues** | | | | | | | **2 hours** | | | | | |
| Expert lectures, online seminars, webinars | | | | | | | | | | | | | | | |
|  | | | | | | | | |  | | | | | | |
|  | | **Total Lecture hours** | | | | | | | **hours** | | | | | | |
| **Text Book(s)** | | | | | | | | | | | | | | | |
| 1 | | Santra.S.C.2013.Environmental Science, National Central Book Agency (P) Ltd, London. | | | | | | | | | | | | | |
| 2 | | Zafar Ali, S.  2019, **Environmental Biology,**Akhand Publishing House, | | | | | | | | | | | | | |
| **Reference Books** | | | | | | | | | | | | | | | |
| 1 | | Chaudhuri, Daya, A.B. 2018. **Endangered Wetlands.** | | | | | | | | | | | | | |
| 2 | | Abbasi, S.A. 1997. Wetlands of India; Ecology and threats. (Vol I & II). Discovery Publishing Company, New Delhi. | | | | | | | | | | | | | |
| 3 | | Yadav, P.R. and S.R. Mishra. 2004. Environmental Biodiversity. Discovery Publishing, Company, Delhi. | | | | | | | | | | | | | |
| 4 | | Hosetti, B.B. 2002. Glimpses of Biodiversity. Daya Publishing Company, Delhi. | | | | | | | | | | | | | |
| 5 | | Willoughby, L.G. 1976. Freshwater Biology. Hutchinson, London. | | | | | | | | | | | | | |
| 6 | | Wetzel, R.G. 1983. Limnology. Saunders College Publishing, New York. | | | | | | | | | | | | | |
| 7 | | Cowardin. Et al . 1979. Classification of Wetlands and Deepwater habitats of the United  States. US. Fish and Wildlife Service | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites, etc.]** | | | | | | | | | | | | | | | |
| 1 | | <http://moef.gov.in/wp-content/uploads/2020/01/final-version-and-printed-wetland->  guidelines-rules-2017-03.01.20.pdf | | | | | | | | | | | | | |
| 2 | | <https://byjus.com/free-ias-prep/wetland-conservation-management-rules-2017/>  (Wetland Conservation and Management Rules 2017) | | | | | | | | | | | | | |
| 3 | | <http://moef.gov.in/wp-content/uploads/2019/09/Ramsaar-Factsheets_2020-Final-8-May-2020.pdf>(Ramsar Sites in India) | | | | | | | | | | | | | |
| 4 | | <https://www.youtube.com/watch?v=zMK35FA1BHw>(wetland characteristics (UPSC) | | | | | | | | | | | | | |
| 5 | | <https://www.youtube.com/watch?v=USA-ZgSKjk> (wetland classification) | | | | | | | | | | | | | |
| 6 | | <https://lotusarise.com/biosphere-reserves-in-india-upsc/>(Biospherereserves in India (UPSC)) | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | | | | | | | | | | | | |



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | **23Q** | **ECOLOGY, ETHOLOGY OF WILDLIFE AND CONSERVATION GENETICS AND EVOLUTION** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | **PRACTICAL-II** | **0** | **0** | | **2** | **4** |
| **Pre-requisite** | | | Basic information on Ecology & Ethology of Wildlife and Conservation Genetic Evolution | **Syllabus Version** | | **2025-**  **2026** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  Explain core concepts in ecology, and summarize our ecological understanding of environmental problems.  To train how the biological data are processed and interpretations are made.  To develop skill in understanding & handling molecular science & instrumentation.  To elucidate its interaction of molecules.  To provide an overview of mapping techniques. | | | | | | | | |
|  | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Investigate specific cases of environmental pollution or natural challenges &  Their impact molecular issues | | | | | K5 | | |
| 2 | The students will be capable of interpreting and understanding the basis of  molecular biology and will be trained in preparing solutions and handling instruments at basic level. | | | | | K2 &K4 | | |
| 3 | Understand the physical and chemical concepts in biology. | | | | | K2 | | |
| 4 | Understand evolutionary aspects of conservation. | | | | | K2 | | |
| 5 | Understand and apply the principles and techniques of Behavioural study in animals | | | | | K3 | | |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create | | | | | | | | |
|  | | | | | | | | |
| **I** | | | | | **12hours** | | | |
| **MAJOR**  Determination of CO2  Determination of O2.  Focal animal sampling and preparation of ethogram (Video clipping can be used as a model)  Scan Sampling and preparation of ethogram. (Video clipping can be used as a model)  Extraction of DNA from animal tissue (demonstration only)  Inbreeding and its effects on populations (Case study –Elephant)  Estimation of Carrying Capacity of an Area.  Population Viability Analysis (PVA)  Population Habitat Viability Analysis (PHVA)  **MINOR**  Estimation of pH and Temperature  Food web and Nutrient Cycling (Demonstration only).  Analysis of Climate Change and its Impact on Biodiversity (Demonstration only).  Foraging Strategies in Mammals.  Paleo-evolution of mammoth (Demonstration only)  Forelimb modification in chordates  Anti-predatory strategies of birds  Water quality analysis  **SPOTTERS**  Types of Ecosystems  Communication in Chordates  Vocalization of birds (10 bird calls)  Parental care in chordates  Equipments used in DNA analysis  Identification of planktons | | | | | | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **FIELDTRIPS** | | | |
| **Submission at the time of Practical Examination**  Report on the Field study and Field trips of different ecosystems  Report on Muesum visit.  Report on Zoo visit.  Bonafide Record | | | |
|  | | **Total Lecture hours** | **88 hours** |
| **Text Book(s)** | | | |
| 1 | Advanced Practical Zoology by Sinha, J., Chatterjeee A.K., Chattopadhyay P.2011. Arunabha  Sen Publishers. | | |
| 2 | Environmental biology and ecology laboratory manual by Lynn.(2003).Kendall Hunt  Publishing | | |
|  | | | |
| **Reference Books** | | | |
| 1 | Modern Experimental Zoology by Preeti Guptha and Mridula Chaturvedi.2000 | | |
| 2 | Fundamentals of Biochemistry by Jain J.L, Sunjay Jain, Nitin Jain. 2007. | | |
| 3 | Toxicology Laboratory Lab Manual by 5.Oberdorster Eva. 2009.Kendall Hunt Publishing | | |
|  | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. N. Ezhilarasi, Associate Professor, Government Arts College (Autonomous), Coimbatore | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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







Third

Semester



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | **33A** | **PHYSIOLOGY AND HEALTHCARE OF WILDLIFE** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | **Core Paper IX** | **6** | **0** | | **0** | **5** |
| **Pre-requisite** | | | Basic knowledge about the physiological  activities of all the systems in both non-  chordates and chordates | **Syllabus**  **Version** | | **2025 – 2026** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  To study about the adaptive characters in animals  To acquire knowledge on the physiological aspects about all organ systems.  To acquire knowledge on the osmo and thermo regulatory mechanisms.  Understand the concepts of hormonal activities  To understand the role of hormones in the biological activities such as pregnancy and lactation | | | | | | | | |
|  | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | Acquire the knowledge of organisms surviving in various environments. | | | | | | K4 | |
| 2 | Learn the significance of osmo and thermo regulations to cope well with the  Ecological tress | | | | | | K3 | |
| 3 | Understand the physiological responses of the meditation practices in human | | | | | | K2 | |
| 4 | Factors involved in the mechanism of respiratory, excretory physiology, neural  And muscular physiology and their influence of hormones in reproduction. | | | | | | K2 | |
| 5 | Evaluate the various mode of life and adaptive modification of their organ  Systems in animals | | | | | | K6 | |
| **K1**-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create | | | | | | | | |
|  | | | | | | | | |
| **Unit: I** | | **FUNDAMENTALS OF PHYSIOLOGY AND ENERGY** | | **18 hours** | | | | |
| Animals and Environments: Function on the Ecological Stage. Molecules and Cells in Animal Physiology Genomics, Proteomics & Related Approaches to Physiology, Physiological Development & Epigenetics, Transport of Solutes and Water. Energy Metabolism , Aerobic and Anaerobic Forms of Metabolism , The Energetics of Aerobic Activity ,Thermal Relations. | | | | | | | | |
|  | | | | | | | | |
| **Unit: II** | | **MECHANISM OF OSMOREGULATION AND RESPIRATION** | | **18hours** | | | | |
| Introduction to Oxygen and Carbon Dioxide Physiology, External Respiration: The Physiology of Breathing Transport of Oxygen and Carbon Dioxide in Body Fluids (with an Introduction to Acid-Base Physiology) Circulation , Oxygen, Carbon Dioxide, and Internal Transport at Work: Diving by Marine Mammals. Water and Salt Physiology: Introduction and Mechanisms, Water and Salt Physiology of Animals in Their Environments , Kidneys and Excretion (with Notes on Nitrogen Excretion) Water, Salts and Excretion at Work: Mammals of Deserts and Dry Savannas | | | | | | | | |
|  | | | | | | | | |
| **Unit: III** | | **INTEGRATING SYSTEMS** | | **16 hours** | | | | |
| Neurons – Synapses, Sensory Processes, Nervous System Organization and Biological Clocks, Endocrine and Neuro endocrine Physiology , Reproduction -Integrating Systems at Work - Animal Navigation | | | | | | | | |
|  | | | | | | | | |



|  |  |  |  |
| --- | --- | --- | --- |
| **Unit: IV** | | **INFECTIOUS AND NON- INFECTIOUS DISEASE** | **18 hours** |
| Infectious diseases and Non- Infectious diseases: Bacterial diseases, Viral diseases, Fungal diseases, Auto immune diseases, Genetical disorders in animals. Cardiovascular diseases, Gastro intestinal diseases, Musculo skeletal disorders, Skin and coat disorders. | | | |
|  | | | |
| **Unit: V** | | **TREATMENT OF DISEASES** | **18 hours** |
| Treatment in animal- handling the animals –avoiding the spreading of diseases. Isolating the infected animal from the forest, Antibiotic therapy, Anti-parasitic therapy, Pain management, Immuno modulatory therapy, Alternative and Complementary therapies and Supportive care. | | | |
|  | | | |
| **Unit: VI** | | **Contemporary Issues** | **2 hours** |
| Expert lectures, online seminars, webinars, workshops and conferences. | | | |
|  | | | |
|  | | **Total Lecture hours** | **90 hours** |
| **Text Book(s)** | | | |
| 1 | Animal Physiology Vol I&II by Chatterjee | | |
| 2 | Animal Physiology by Verma & Agarwal | | |
| 3 | Essential of ANIMAL Physiology by Rastogi | | |
| 4 | Principles of Animal Physiology by Christopher Moyes and Patricia Schulte | | |
|  | | | |
| **Reference Books** | | | |
| 1 | Comparative Animal physiology by Philip C Withers | | |
| 2 | Comparative Physiology: Primitive Mammals” by Knut Schmidt-Niel senand Liana Bolis | | |
| 3 | Advances in Comparative and Environmental Physiology: Animal Adaptation to Cold ”by  J A Boulant and R J Brooks | | |
| 4 | “Advances in Comparative and Environmental Physiology” by J Machinand SH Wright | | |
|  | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites, etc.]** | | | |
| 1 | https://swayam.gov.in/ | | |
| 2 | https:/[/www.mooc.or](http://www.mooc.org/)g[/](http://www.mooc.org/) | | |
| 3 | https://nptel.ac.in/ | | |
|  | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. N. Ezhilarasi, Associate Professor, Government Arts College (Autonomous), Coimbatore | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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** | | | | **2025-2026** | | |
| **Course Objectives:** | | | | | | | | | | | | | | | |
| The main objectives of this course are to:  To introduce the evolutionary concepts among various animal groups.  To make them understand how life originated.  To realize the current working of evolution. | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **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** | | | | | **TECHNIQUES IN WILDLIFE SANTUARIES** | | | | | | **18 hours** | | | | |
| Animal enclosures , Animal handling and Restraint, Wildlife rehabilitation, Nutrition and dietary management, Enrichment and behavioural stimulation, Conservation breeding programmes, Visitor education & outreach, Research and Collabration – Periyar Wildlife Santuary, Sundarbans. | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Unit:2** | | | | | **NATIONAL PARKS** | | | | | **16 hours** | | | | | |
| National parks: Definition, importance of National parks, History of National parks, overview of biodiversity in National parks – National park management and administration, Conservation strategies and techniques, conflict mitigation, sustainable development in national parks, community- based ecotourism, Education and awareness programs. Role of Government and NGO’s in conservation. Eravikulam, Gir, Bandipur, Kahna, Guindy, Corbett, Silent Valley, and Mukkuruthi, Kaziranga. Marine National Park: Rann of Kutch, Biosphere Reserves. | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |
| **Unit:3** | | | | | **ZOOLOGICAL PARKS** | | | **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. 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: Identifying 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** | | | | | | | | |
| Diseases of Zoo animals – viral, bacterial and fungal diseases; Techniques of tranquilization and translocation of problematic animals; Wildlife administration and legislation**:** Administrative set up - Advisory bodies- National Board for Wildlife –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 | DevraG. , 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. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | | | |



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **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 wildlife management practices in India and across the world | **Syllabus Version** | | | | **2025-2026** | | |
| **Course Objectives:** | | | | | | | | | | | | | |
| The main objectives of this course are to:  To make understand the applications and basic wildlife equipments.  To acquire the knowledge on handling the equipment related to wildlife.  To learn GIS and Remote sensing uses and its applications on wildlife management.  To sensitize the students on wildlife population estimation techniques.  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** | | | | | **EQUIPMENTS USED IN WILDLIFE MANAGEMENT** | | | | **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. Use of GIS and Remote sensing in Wildlife. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:3** | | | | | **POPULATION ESTIMATION OF WILD ANIMALS** | | | | **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** | | | | | **RESCUE AND REHABILITATION OF PROBLEMATIC ANIMALS** | | | | **18 hours** | | | | |
| Identification of problematic individuals, Capturing methods, Translocation, Release of problematic animals, Captive animal management, Monitoring activities. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:6** | | | | | **Contemporary Issues** | | | | **2 hours** | | | | |
| Expert lectures, online seminars – webinars, workshops and conferences | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
|  | | | | | **Total Lecture hours** | | | | **90 hours** | | | | |
| **Text Book(s)** | | | | | | | | | | | | | |
| 1 | Agarwal 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, Associate Professor in Wildlife Biology, GAC, Ooty. | | | | | | | | | | | | | |



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | | **33SEC** | | **LANDSCAPE ECOLOGY** | **L** | | | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | | | **SKILL ENHANCED COURSE III** |  | | | **0** | | **0** |  |
| **Pre-requisite** | | | | | |  | **Syllabus Version** | | | | **2025-2026** | | |
| **Course Objectives:** | | | | | | | | | | | | | |
| The main objectives of this course are to:  To Understand how to define and detect landscape patterns  Learn landscape structure and factors affect ecological processes (population, community, and ecosystem levels).  Inculcate the knowledge of ecosystem process and its importance in biodiversity conservation  Understand the various drivers influence the landscape ecology  Enrich the knowledge of the conservation management of human dominated landscape with proper methods. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | | | | |
| 1 | | | Many of the key concepts in landscape ecology and various issues in the field. | | | | | | | | | K4 | |
| 2 | | | Different scale, environmental heterogeneity, and ecological processes at levels of organization from population, to community, to ecosystem processes. | | | | | | | | | K3 | |
| 3 | | | Wildlife and metapopulation dynamics and their management | | | | | | | | | K2 | |
| 4 | | | Various ecological factors and their impact on landscape ecology | | | | | | | | | K2 | |
| 5 | | | Manage the human dominated landscape and wildlife conservation | | | | | | | | | K6 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:1** | | | | |  | | | | **9 hours** | | | | |
| Definition-scope**-f**oundations of landscape ecology**:** history and scope of landscape ecology; the important concept of scale; measuring landscape pattern. landscape and urban planning; From Ecosystem ecology to Landscape Ecology | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:2** | | | | |  | | | **9 hours** | | | | | |
| Spatial Heterogeneity and Landscape; History of Landscape Ecology; Concept of Scale and technological advances; Patch – Corridor – Matrix model – Disturbance, remnant, environmental, and introduced patches. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:3** | | | | |  | | | | **9 hours** | | | | |
| Land Use/Cover Change; Ecosystem and biodiversity impacts; Inventory and Tools for wasteland assessment and evaluation; Land Reclamation and Restoration; Natural hazard mitigation/erosion; Concept of ecological land degradation – desertification, deforestation, water logging, salinization and soil erosion. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:4** | | | | |  | | | | **9 hours** | | | | |
| Approaches of landscape Ecology: Critical concepts in landscape ecology ; Drivers of landscape patterns; Characterization and description of landscape patterns; Effects of landscape patterns on populations, communities, and ecosystems ; Management of landscapes | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:5** | | | | |  | | | | **9 hours** | | | | |
| Patches as Islands–Patch Size and Edge effect; Habitat Fragmentation and Nonnative Species; Metapopulation Dynamics and Appropriate Management; Understanding Landscape Structure Using Landscape Metrics. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:6** | | | | | **Contemporary Issues** | | | | **2 hours** | | | | |
| Expert lectures, online seminars – webinars, workshops and conferences | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
|  | | | | | **Total Lecture hours** | | | | **hours** | | | | |
| **Text Book(s)** | | | | | | | | | | | | | |
| 1 | Turner MG Gardner, RH, 2015. Landscape Ecology in Theory and Practice, 2nd Edition, Springer Nature. | | | | | | | | | | | | |
| 2 | Lopez, RD, Frohn, RC, 2017. Remote Sensing for Landscape Ecology: New Metric Indicators CRC Press; 2nd edition 3. Forman RTT, and M Godron. 1986. Landscape ecology. Wiley, New York | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Reference Books** | | | | | | | | | | | | | |
| 1 | Turner, M.G., and R.H. Gardner. 2015. Landscape ecology in theory and practice, 2nd edition. Springer, New York. 482 pp. | | | | | | | | | | | | |
| 2 | Gergel, S.E., and M.G. Turner (eds.) 2017. Learning Landscape Ecology, 2nd Edition. Springer, New York. 347 pp. | | | | | | | | | | | | |
| 3 | Risser PG< JR Karr, and RTT Forman 1984. Landscape ecology: directions and approaches. Special Publ. No. 2, I11. Natural Hist. Surv., Champaign. | | | | | | | | | | | | |
| 4 | Forman RTT. 1995. Land mosaics: the ecology of landscapes and regions. Cambridge University Press, Cambridge England. | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | | | | | | | | | | | |
| 1 | | <https://www.sciencedirect.com/topics/earth-and-planetary-sciences/landscape-ecology> | | | | | | | | | | | |
| 2 | | <https://link.springer.com/book/10.1007/978-1-4939-6374-4> | | | | | | | | | | | |
| 3 | | <https://www.amazon.com/Landscape-Ecology-Theory-Practice-Pattern/dp/1493927930> | | | | | | | | | | | |
| 4 | | <https://link.springer.com/book/10.1007/b97434> | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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 |

-Strong;M-Medium;L-Low

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | | **3EA** | | **BIOSTATISTICS AND DATA SCIENCES** | **L** | | | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | | | **ELECTIVE V** | **6** | | | **0** | | **0** | **4** |
| **Pre-requisite** | | | | | |  | **Syllabus Version** | | | | **2025-2026** | | |
| **Course Objectives:** | | | | | | | | | | | | | |
| The main objectives of this course are to:  To make the students to understand statistical methods.  To understand the methods of analyzing the raw datas.  . | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | | | | |
| 1 | | | To learn about basics of statistical methods. | | | | | | | | | K4 | |
| 2 | | | To understand various aspects in statistics. | | | | | | | | | K3 | |
| 3 | | | To learn about interpretation of raw datas in research. | | | | | | | | | K2 | |
| 4 | | | To know basic knowledge about datascience. | | | | | | | | | K2 | |
| 5 | | | To apply data science in aspects of biology. | | | | | | | | | K6 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:1** | | | | | **DATA COLLECTION AND TABULATION** | | | | **18 hours** | | | | |
| Sampling methods. 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. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **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** | | | | | **DATA SCIENCES** | | | | **16 hours** | | | | |
| Introduction to Data Science, Data Processing, machine learning Fundamentals Regression and classification – Regression, classification, clustering and dimensionality reduction, Advance machine learning topics – neural networks and deep learning – natural language processing and text analysis. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:5** | | | | | **BIG DATA PROGRAM** | | | | **18 hours** | | | | |
| Data mining and Big data – introduction, association rule mining and clustering, Big data and NoSQL databases. Stasticial Inference and Modelling – Probability theory and statisticial inference, hypothesis testing and confidence interval Linear regression and generalized linear models. Data wrangling and Feature Engineering – Case studies and Project work. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:6** | | | | | **Contemporary Issues** | | | | **2 hours** | | | | |
| Expert lectures, online seminars, webinars, workshops and conferences | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
|  | | | | | **Total Lecture hours** | | | | **90 hours** | | | | |
| **Text Book(s)** | | | | | | | | | | | | | |
| 1 | Biostatistics: Foundation for analysis in the Health sciences, Wayne W. LaMorte | | | | | | | | | | | | |
| 2 | Biostatistics, Arumugam | | | | | | | | | | | | |
| 3 | Python Data Science Handnook, Jake Vanderplas. | | | | | | | | | | | | |
| 4 | Pattern Recognition and Machine Learning Tools and Techniques, Ian H. Witten and Eibke Frak | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Reference Books** | | | | | | | | | | | | | |
| 1 | Biostatistics for Biological and Health Sciences, Marc M., Triola and Mario F. Triola | | | | | | | | | | | | |
| 2 | Biostatistics: The Bare Essentials by Geoffrey, R. Norman and David L. Streiner. | | | | | | | | | | | | |
| 3 | Big Data, The Missing Manual , Tim O’Reilly | | | | | | | | | | | | |
| 4 | R for Datta Science Handbook, Fueld Cady | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **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, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | | | | | | | | | | |



|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | | **3EB** | | **RESEARCH METHODOLOGY, APPLICATION OF COMPUTING AND ARTIFICIAL INTELLIGENCE 4.0** | **L** | | | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | | | **ELECTIVE VI** | **6** | | | **0** | | **0** | **4** |
| **Pre-requisite** | | | | | | Basic knowledge about behavior of animals | **Syllabus Version** | | | | **2025-2026** | | |
| **Course Objectives:** | | | | | | | | | | | | | |
| The main objectives of this course are to:  To understand about research.  To acquire the knowledge on thesis writing.  To learn the methodology about the research work.  To understand the data interpretation.  To sensitize the students to study about research. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | | | | | | |
| 1 | | | Acquire the knowledge on research | | | | | | | | | K4 | |
| 2 | | | Learn significance of writing literature. | | | | | | | | | K3 | |
| 3 | | | Understanding the data interpretation. | | | | | | | | | K2 | |
| 4 | | | Evaluate the results of interpreted data. | | | | | | | | | K2 | |
| 5 | | | Understand the significance of research. | | | | | | | | | K6 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:1** | | | | | **BASIC OF RESEARCH AND LITERATURE COLLECTION** | | | | **18 hours** | | | | |
| Topic selection - Research Design – Planning research – defining objectives –Preparation of work plans. Identification of suitable methodology – Preparation of project proposal – Funding agencies –Student project. Collection of literature – News articles – Newsletters – Peer reviewed Journal articles. Digital library and search of articles – Key words and search – Internet – Google Scholar –Pubmed – Inflibnet – Medline – Agricola –Science direct – Open access Journals – virtual sources – other sources. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:2** | | | | | **DATA ANALYSIS** | | | **hours** | | | | | |
| Collection of samples/data – Processing and Analysis of data – Sampling Fundamentals – Testing of Hypothesis (Parametric or Standard Tests of Hypothesis) - Testing of Hypothesis (Non-Parametric or Distribution free tests)- Role of computer in Research - Microsoft Office –Construction of tables–headings  Footer –Test of Significance – Tabulation – Presentation of results. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:3** | | | | | **PROPOSAL WRITING AND THESIS STRUCTURE** | | | | **18 hours** | | | | |
| Proposal Writing: Introduction, literature review, objectives, methodology, outcomes, timeline and milestones, budget & resources, conclusion and Appendices. Thesis structure – Components – Writing Introduction –review of literature – Study Area-Materials & Methods –Presentation of results – Discussion of Results based on literatures –Arrangement of Bibliography and how to quote reference in thesis – Appendix, Photo Plate preparation and Index in maps | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:4** | | | | | **PUBLISHING ARTICLE** | | | | **18 hours** | | | | |
| Publishing of Articles in newspapers/newsletters – Selection of journals –ISSN Number – Peer  Reviewed Journals –Science citation index–impact factor and importance. Manuscripts preparation for Journals – components – Submission and Publication. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Unit:5** | | | | | **ARTIFICIAL INTELLEGENCE 4.0** | | | | **18 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. 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. Machine learning, Natural language processing, computer vision, Ronotics, ethics and safety. | | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **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 & Polle1,1970:Thesis and assignment, writing Wiley Eastern Limited | | | | | | | | | | | | |
| 2 | Fisher, R. A,1950: Statistical methods of research workers | | | | | | | | | | | | |
| 3 | Freumd, J. E.1967: Modern elementary statistics, Prentice Hall, Inc. Englewood cliffs, N J | | | | | | | | | | | | |
| 4 | Paneerselvam, R. Research Methodology., Kindle Edition, 2013 | | | | | | | | | | | | |
| 5 | Sansanwal D N, Research Methodology and Applied Statistics, Shipra Publications, 2020 | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Reference Books** | | | | | | | | | | | | | |
| 1 | Malter, K. 1972: Statistical analysis in Biology, Chapmen Hall, London. | | | | | | | | | | | | |
| 2 | Rajendrakumar, C. 2008 Research Methodology S B Nanja for APHA Publishing Corporation  New Delhi | | | | | | | | | | | | |
| 3 | Kothari S R, Research Methodology Methods and Techniques, Pragun Publication, 2012 | | | | | | | | | | | | |
|  |  | | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| **Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]** | | | | | | | | | | | | | |
| 1 | | Research Methodology: 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-course | | | | | | | | | | | |
|  | | | | | | | | | | | | | |
| Course Designed By: Dr. B. Ramakrishnan, Associate Professor, Government Arts College, Udhagamandalam and Dr. J. Pandiyan, Associate Professor, A.V.C. College (Autonomous), Mayiladuthurai | | | | | | | | | | | | | |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Mapping with Programme Outcomes** | | | | | | | | | | |
| **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

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | | **33R** | **PHYSIOLOGY AND WILDLIFE HEALTH, MANAGEMENT OF ZOO’S, SANCTUARIES AND NATIONAL PARKS & WILDLIFE MANAGEMENT TECHNIQUES** | **L** | | | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | | **CORE PRACTICAL - III** | **0** | | | **0** | | **2** | **4** |
| **Pre-requisite** | | | | Basic information on physiology and wildlife management techniques of animals | **Syllabus Version** | | | | **2025-2026** | | |
| **Course Objectives:** | | | | | | | | | | | |
| The main objectives of this course are to:  To make them understand physiology through practical | | | | | | | | | | | |
|  | | | | | | | | | | | |
| **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 above physiology and health assessment of wild animals | | | | | | | | K3 | |
| 4 | | Knowledge about wildlife diseases | | | | | | | | K4 | |
| 5 | | Know about various technologies in wildlife studies | | | | | | | | K5 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6**– Create | | | | | | | | | | | |
|  | | | | | | | | | | | |
|  | | | | | | **12 hours** | | | | | |
| **Major**  Effect of temperature on the opercular movement of fish and calculation of Q10.  Determination of the specific gravity of the blood in vertebrate animal by copper sulphate method.  Active uptake of Na+ and Cl- of a fish from the environmental water.  Effects of salinity on oxygen consumption by fishes and plot on graph.  Analysis of ammonia, urea and uric acid from excretory product of animals.  Change in weight of Earthworm in various osmotic media conditions (Demonstration )  Determination of LD-50 and LC-50  Estimation of diversity and species richness of an area  Geo-referencing of an image file to create better image using Q-GIS/Map-Info/ARC-GIS  Estimating herbivore population using Distance Software  Estimating Elephant population using dung density  **Minor**  Estimation of Haemoglobin content in fish blood.  Marking major National Parks and Tiger Reserves of India.  Marking major Wildlife Sanctuaries of Tamil Nadu.  Marking Biodiversity Hotspots of India.  Food preparation of zoo and tamed animals.  Designing of animal cages.  Restraining of animals using drugs and equipments.  Ecto-parasite in wild animals.  Endo-parasite in wild animals  Identification of an Elephant Corridor  Spot the location of important sanctuaries on a map  Spot the location of important National Parks on a map  Spot the location of important Zoological Parks on a map  **Spotters**   1. pH meter 2. Centrifuge 3. Heamoglobino meter 4. Spectrophoto meter 5. Sphygmomano meter 6. ECG Recorded strip 7. GPS 8. Field Campus 9. Altimeter 10. Range Finder 11. Clinometer | | | | | | | | | | | |
| **SUBMISSION:**  Submit a report on Visit to Zoos, Sanctuaries National Parks.  Submit a report on Captive Animal Management.  Visit to animal breeding centers. | | | | | | | **12 hours** | | | | |
| **Total Lecture hours** | | | | | | | **86 hours** | | | | |
| **TEXT BOOK** | | | | | | | | | | | |
| 1 | Arunabha Sen Publishers | | | | | | | | | | | |
| 2 |  | | | | | | | | | | | |
|  | | | | | | | | | | | |
| **Reference Books** | | | | | | | | | | | |
| 1 | Wildlife Management Techniques – Rajesh Gopal | | | | | | | | | | |
| 2 |  | | | | | | | | | | |
| 3 |  | | | | | | | | | | |



Fourth

Semester



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Course code** | | **47V** | **PROJECT & VIVA-VOCE** | **L** | **T** | | **P** | **C** |
| **Core/Elective/Supportive** | | | **Paper XV** | **6** | **0** | | **0** | **4** |
| **Pre-requisite** | | |  | **Syllabus Version** | | **2025-2026** | | |
| **Course Objectives:** | | | | | | | | |
| The main objectives of this course are to:  To make the students to understand proposal writing  To make the students to understand statistical methods.  To understand the methods of analyzing the raw datas  To make the students in dissertation writing. | | | | | | | | |
|  | | | | | | | | |
| **Expected Course Outcomes:** | | | | | | | | |
| On the successful completion of the course, student will be able to: | | | | | | | | |
| 1 | To learn about basics of statistical methods. | | | | | | K4 | |
| 2 | To understand various aspects in statistics. | | | | | | K3 | |
| 3 | To learn about interpretation of raw datas in research. | | | | | | K2 | |
| 4 | To know basic knowledge about data science. | | | | | | K2 | |
| 5 | To apply data science in aspects of biology. | | | | | | K6 | |
| **K1** - Remember; **K2** - Understand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** – Create | | | | | | | | |

**Guidelines for awarding 200 marks of the Project:**

\*For Project 200 marks (Project work = 100 marks and Viva-voce = 100 marks).

Internal and external examiners will evaluate the project work and award marks out of 100.

Internal and external examiners will conduct viva-voce examination and award marks out of 100.











Annexure

**General Instructions:**

**Elective Courses:** Minimum Two for Each Semester.

**Skill Enhanced Courses:** Minimum One for first three Semesters.

**Value Added Courses:** Minimum 2 and maximum 5 for Each Department for Entire Program

**Job Oriented Certificate Courses:** Two Courses (Each one on First and Second Year)

All the Board of Studies are requested to follow the same template and use the TIMES NEW ROMAN FONT with the Size of 12.

The Course Designer should be mentioned in each of the courses.

**Details for the Certificate Course**

|  |  |  |
| --- | --- | --- |
| **1** | **Name of the Course** |  |
| **2** | **Name of the Department** |  |
| **3** | **Name of the Faculty Member** |  |
| **4** | **Inter/Intra Department** |  |
| **5** | **Objectives of the Course** |  |
| **6** | **Topics to be Covered** |  |
| **7** | **Duration of the Course** |  |
| **8** | **Eligibility** |  |
| **9** | **Registration** |  |
| **10** | **Description of the Course** |  |
| **11** | **Job Opportunities** |  |
| **12** | **Number of Candidates** |  |
| **13** | **Course Fee** |  |

**BHARATHIAR UNIVERSITY: COIMBATORE 641 046 POST GRADUATE PROGRAM IN 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-qualityeducation 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.