ANNEXURE-V

Syllabus

of

M.Sc. (Forestry)
Wildlife Management

Courses for M.Sc. (Forestry) in Wildlife Management

Course Code	Course Title	Cr. Hrs.
	Major courses (including core course*)	
WLM-511*	Mammalogy and Indian Mammals	3(2+1)
WLM-521*	Fundamentals of Conservation Biology	3(2+1)
WLM-512*	Advanced Wildlife Management	3(2+1)
WLM-522*	Invertebrate Biodiversity	3(2+1)
WLM-513	Wetland Ecology and Management	2(1+1)
WLM-523	Principles and Practice of *ex situ* Conservation	2(1+1)
WLM-514	Ecotourism - Concepts and Modern Approaches	3(2+1)
WLM-524	Remote Sensing and Geographic Information System	2(1+1)
	Total	**21(13+8)**
	Minor courses	
	Courses from any Dept. of FRM/FPU/SILV/FBTI	**06**
	Supporting Courses	
FOR- 511**	General Statistical Methods and Computer Applications	3(2+1)
STAT- 511	Experimental Designs	3(2+1)
STAT- 512	Basic Sampling Techniques	3(2+1)
STAT- 521	Applied Regression Analysis	3(2+1)
STAT- 522	Data Analysis Using Statistical Packages	3(2+1)
BIOCHEM- 501	Basic Biochemistry	4(3+1)
BIOCHEM- 505	Techniques in Biochemistry	4(2+2)
	(*Any 2 to be studied, * FOR-511 is compulsory*) **Total**	**6(4+2)**
	Common Courses (NC)	
PGS-501	Library and Information Services	1(0+1)
PGS-502	Technical Writing and Communications Skills	1(0+1)
PGS-503	Intellectual Property and its management in Agriculture	1(1+0)
PGS-504	Basic Concepts in Laboratory Techniques	1(0+1)
PGS-505	Agricultural Research, Research Ethics and Rural Development Programmes	1(1+0)
WLM- 591	Master's Seminar	1(0+1)
WLM- 599	Master's Research	30(0+30

*** Core courses, ** Compulsory course**

Note: Core & major courses opted as running in the Agriculture University Kerala

M.Sc. (Forestry) Wildlife Management
SEMESTER WISE COURSE DISTRIBUTION

SEMESTER-I

Code	Course Title	Cr. Hrs
Major courses (* core courses)		
WLM-511*	Mammalogy and Indian Mammals	3(2+1)
WLM-512*	Advanced Wildlife Management	3(2+1)
WLM-513	Wetland Ecology and Management	2(1+1)
WLM-514	Ecotourism - Concept and Modern Approaches	3(2+1)
2 Minor courses to be opted from major courses of the department of (FRM/FBTI/SAF/FPU)		
Supporting courses (Any 1 of the following)		
FOR- 511**	General Statistical Methods and Computer Application	3(2+1)
STAT- 511	Experimental Designs	3(2+1)
STAT- 512	Basic Sampling Techniques	3(2+1)
Compulsory PGS course		
PGS-501	Library and Information services	1(0+1)

SEMESTER-II

Major courses (* core courses)		
WLM-521*	Fundamentals of Conservation Biology	3(2+1)
WLM-522*	Invertebrate Biodiversity	3(2+1)
WLM-523	Principles and Practice of *ex situ* Conservation	2(1+1)
WLM-524	Remote Sensing and Geographic Information System	2(1+1)
Minor courses will be opted from any major courses of the department of FRM/FBTI/SAF/FPU)		
Supporting courses (Any 1 of the following)		
STAT-521	Applied Regression Analysis	3(2+1)
STAT-522	Data Analysis Using Statistical Packages	3(2+1)
Compulsory PGS course		
PGS-502	Technical Writing and Communication Skills	1(0+1)
PGS-504	Basic Concepts in Laboratory Techniques	1(0+1)

SEMESTER-III

Compulsory PGS courses		
PGS-503	Intellectual Property and its Management in Agriculture	1(1+0)
PGS -505	Agricultural Research, Research Ethics and Rural Development Programmes	1(1+0)
WLM-591	Master's Seminar	1(0+1)
WLM-599	Master's Research	10(0+10)

SEMESTER-IV

WLM-599	Master's Research	20(0+20)

***Compulsory Core Course ** compulsory course**

WLM-511 MAMMALOGY AND INDIAN MAMMALS 2+1

Theory

Unit I:

Evolution of mammals, early radiation, and classifications up to orders; Classification of Mammals, with particular emphasis on the Indian mammals.

Unit II

Biology, ecology and behaviour of Indian mammals, Proboscidea, Eulipotyphla, Scandentia, Chiroptera, Primata, Carnivora, Cetaceae, Sirenia, Perissodactyla, Artiodactyla, Pholidota, Rodentia and Lagomorpha

Practical:

Comparative studies of dentition; comparative studies of skull; zoogeography of mammals of Indian sub-continent; Distribution of primates, carnivores, ungulates and small mammals.

WLM-521 FUNDAMENTALS OF CONSERVATION BIOLOGY 2+1

Theory

Unit I

Introduction to Conservation Biology, Conservation of biodiversity, Patterns and processes; concepts of biodiversity, levels of biodiversity, patterns of losses. Conservation Genetics, Management and conservation of genetic variation in natural populations. Ex-situ conservation. Demographic issues, Population viability analysis, ecological restoration,

Unit II

Designing conservation reserve, Management to meet conservation goal; Control of invasive species, scales of management (on population level, habitat and landscape) of management and cultural context.

Practical:

Seminar-based discussion and paper analysis. Calculations of degree of inbreeding, MVP sizes, PHVA, etc. Evaluation of existing protected areas from the point of view of principles of conservation biology.

WLM-512 ADVANCED WILDLIFE MANAGEMENT 2+1

Theory

Unit I

History of wildlife management and conservation in India, Zoogeographic regions of the world, major biomes of the world, biogeographic zones of India. IUCN revised red list categories, Red Data Book and red listing, Wildlife census, radio telemetry in wildlife studies. Captive wildlife: Zoos and safari parks. Captive breeding for conservation. Central Zoo Authority of India. Wildlife (Protection) Act, 1972 and various amendments.

Unit II

Special projects for wildlife conservation. Project Tiger and Musk Deer Project. Captive breeding and reintroduction of threatened species. MAB, CITES, TRAFFIC. Protected area network of India, wildlife sanctuaries, national parks, biosphere reserves, world heritage sites, Ramsar sites etc.

Practical:

Visit to ex-situ and in-situ conservation approaches, Census techniques – Line transect survey, pitfall traps, Sherman trapping, mistnetting, camera trapping, pugmark analysis, funnel trapping, cover board survey, bat detectors, mark-recapture surveys, radio-collaring and telemetry studies.

WLM-522 INVERTEBRATE BIODIVERSITY 2+1

Theory

Unit I

Introduction - Definition and importance of biodiversity, biosafety and bioethics, Intellectual Property Rights. Systematics and detailed study of invertebrate groups relevant to forestry (Annelida, Acarina, Araneae, Arthropoda) - importance of tropics and invertebrate diversity - values of invertebrate diversity - scientific, recreational, ecological. diversity of invertebrates in the forest floor - predator dynamics in the litter ecosystem- attitudinal diversity of invertebrates- species diversity and population sizes of important forest insect groups- insect seasonality in different habitats- influence of ecological factors in distribution of insects.

Unit II

Threats to invertebrate diversity - effect of shifting cultivation, deforestation, fire, land use patterns- use of pesticides and toxins, protected areas and conservation of insects. Ecosystem functioning - insects as pollinators, biological indicators - insect bird relationship - insect diversity and vegetation inter-links. Role of soil invertebrates in nutrient cycling, soil processes etc. Ecological importance of butterflies in forests, invertebrate conservation.

Practical:

Survey and identification of invertebrate fauna from forest areas. Rearing of invertebrate. Methods of isolating soil invertebrate macro and micro fauna.

WLM-513 WETLAND ECOLOGY AND MANAGEMENT 1+1

Theory

Unit I

Definition and classification - Wetland functions and values - Physical - aesthetic and biological values of fish, herpetofauna and waterfowl - Natural process and anthropogenic values - The classification and distribution of wetlands of India – a review of physical and biological components of India's coastline. Mangroves, estuaries, mud, sand and rocky shores - coral and offshore waters - Coastal resources and conservation - Coastal erosion, pollution, mangrove exploitation and over-fishing.

Unit II

Introduction to key issues of freshwater ecology and limnology - Conservation issues of

Indian wetlands including detailed studies. Wetland Management Plan Preparation - Methods in wetland management - General principles - Management of migratory and resident waterfowl - Management of fishery resource. Management of other wetland dependent vertebrates such as amphibians, reptiles and mammals - management of ecotourism - Siltation and its control in wetlands. Pollution and its control - management of aquatic weeds - law and policy for wetland management.

Practical

Visit to different types of wetlands studies on wetland fauna. Study techniques on wetland ecology

WLM-523 PRINCIPLES AND PRACTICES OF *EX SITU* CONSERVATION 1+1

Theory

Unit I:

Evolution of zoological gardens, purpose of zoo, types of zoos, administrative structure, collection plan, different types of animal exhibits/enclosures – moated enclosures, exhibit design process, behavioural and environmental enrichment, mixed species exhibits.

Unit II:

Animal capture and management, animal transportation, genetic management, zoo animal nutrition, invertebrates in captivity, animal record keeping, studbook, quarantine measures to be taken during the procurement of new animals to zoos, National Zoo policy, Central Zoo Authority; rules and regulations, Captive breeding and reintroduction protocols and procedures of animals; Management of zoological gardens.

Practical

Visit to zoological gardens, exercise on enclosure design, schedule of feeding; cleaning and other management practices; documentation; identification of individual animals and different types of marking.

WLM-514 ECOTOURISM - CONCEPTS AND MODERN APPROACHES 2+1

Theory

Unit I:

Ecotourism - study the history of tourism, identify various forms of tourism and evolution of ecotourism. Dimensions of tourism and essential conditions for tourism to occur. Differences between tourism components. Mass tourism versus ecotourism. Understand the dimensions of ecotourism and the criteria to qualify for ecotourism. Quebec declaration. Different forms of ecotourism like hard and soft ecotourism. Ecotourism indicators and conceptual differences between developing and developed countries.

Unit II

Organized tours and Free Independent Travelers. World Tourism Organization. Problems with definition of ecotourism and criticisms. International organizations and NGOs promoting

ecotourism. Sociological implications of eco- tourism.

Practical:

Students should make detailed reference on the various forms of Ecotourism in the World. Visit to various ecotourism areas and identify the tourism components- suggest modifications. Exercises on the blending of local cultural and sociological heritage with the various forms of ecotourism. Debate on the concept to reach the most viable. Once they agree on a concept, then the debate. Problems on common property resources and facilitate group discussion for recommendations. Discuss the merits and demerits of the recommendations. Evaluation and monitoring of the various ecotourism activities of the region. Identify an area where ecotourism in vogue- Identity the various ecosystem activities in the selected area, evaluate in terms of economic feasibility, ecological adaptability and social acceptance. Climate change and its influence on carbon economy. Study the carrying capacity and impact of ecotourism activity on theecosystem, suggest recommendation to overcome the ill effects of ecotourism.

WLM-524 REMOTE SENSING AND GEOGRAPHIC INFORMATION SYSTEM 1+1

Theory

Unit I:

The use of aerial photography, satellite imagery and geographic information system for thecollection, storage and spatial analysis of georeferenced forest resources data and information. The integration of spatial data analysis systems with knowledge-based systems and/or simulation systems for the development of information/decision support systems for forest management; satellite systems; satellite imageries – techniques, uses and limitation;

Unit II

Future prospects of remote sensing in India; software used in remote sensing; GIS versus remote sensing; GIS Software used in forestry and environments; Analysis of data; Application of GIS in forestry.

Practical

Uses of various photogrammetry instruments, recognition and identification of objects on photography, compilation of maps and their interpretation, Hands on practice on remote sensing and GIS, software.