

# Forestry

## DEGREE STANDARD

### UNIT I

#### SILVICULTURE

Forests - Definition - Extent of forests in India and other countries - Role of forests - Factors of locality - climatic - edaphic - topographic - biotic - Interaction of Forests with the Environment. Silviculture - Objectives - Scope - General Principles - Regeneration - Natural and artificial - Nursery techniques - containerised seedling production - techniques and methods - vegetative propagation techniques and methods - maintenance of plantation - tending operations - weeding - cleaning - thinning - after care techniques - silvicultural systems - selection - uniform - shelter wood - clearfelling - coppice system - conversion system - Improvement felling. Silviculture techniques for some important species - *Acacia* spp (indigenous and exotics), *Albizia lebbek* and *A. falcata*, *Ailanthus excelsa*, *Azadirachta indica*, Bamboos, *Casuarina equisetifolia*, *Ceiba pentandra*, *Dalbergia latifolia*, *Eucalyptus* spp, *Grevillea robusta*, *Hardwickia binata*, *Leucaena leucocephala*, *Pongamia pinnate*, *Santalum album*, *Tecptona grandis*, *Terminalia* spp. and *Tamarindus indica*.

### UNIT II

#### FOREST MENSURATION AND MANAGEMENT

Definition and objectives of forest mensuration - measurement of diameter, girth, height and volume of trees - methods and principles - Tree stem form - age - basal area determinations - Forest Inventory - Sampling techniques and methods - measurement of crops - sample plot - Yield calculation - CAI and MAI - yield and stand tables preparation - Aerial photography and remote sensing - methods and techniques. Objectives and principles of forest management - forest organisation - sustained yield - concept - Arguments for and against sustained yield - Rotation - Normal Forests - Increment - Growth stock determination - Yield regulation - principles and concepts - yield regulation in regular and irregular forests - working plans - general considerations - preparation of working plans - Joint Forest management.

### UNIT III

#### FOREST UTILIZATION AND WOOD TECHNOLOGY

Logging - Extraction of timber - Felling rules and methods - Conversion methods - Implements used - Grading of timbers - Transportation of timbers - Major and minor transportation methods - storage and sales of logs. Forest products - timber industries - plywood - particle boards - fibre products - paper, hardboard, insulation board - production technology - non-timber forest products (NTFP) - Collection - Processing and storage of NTFP - fibres and flosses - bamboos and canes - katha and bidi leaves - essential oils - gums and resins, lac and shellac, tassar silk - Role of tribal co-operative societies. Macroscopic character of wood - Three dimensional structures - Structures of Heart wood and sap wood - composition and structure of wood - Chemical components, cell wall structure and formation, anatomical structures of heartwood and softwood, - reaction wood - wood and water relations - properties of wood - Physical properties - Specific gravity, density of wood - mechanical properties Gross features of wood - Defects in wood - Natural defects. Seasoning of wood - principles and objectives of seasoning - Seasoning methods - Air and kiln seasoning - Seasoning defects - Wood preservation - principles and methods wood preservatives - Definition - kinds of preservatives - method of preservative application - pressure and non - pressure processes - classification of wood, based on seasoning behaviour.

### UNIT IV

#### FOREST SURVEYING AND ENGINEERING

Surveying - Principles of surveying - errors in surveying - Scope of surveying in forestry - Different methods of surveying , chain, prismatic, compass, plain table and topographic survey - area calculation - maps and map reading, Principles of forest Engineering - Building materials and construction - Forest Roads, - Objectives, principles and types of forest roads - Causeways and Culverts - Bridges - Construction of Bridges - Construction of timber, RCC, Steel and suspension bridges - cable ropeways and winches.

### UNIT V

#### FOREST SOILS AND SOIL CONSERVATION AND WATERSHED MANAGEMENT

## **Forestry**

Forest Soils - Classification - Factors affecting soil formation - Podzolization and laterization - Physical, Chemical and biological properties of Forest soils - Problem soils - Classification of Waste lands - extent of waste lands in India - reclamation of alkaline, saline, water logged and other wastelands - sand dune stabilisation - wind breaks and shelter belts. Soil conservation - definition - objectives, problems, programmes and achievements - causes of erosion - wind - water - management of eroded region - Soil and water conservation measures. Watershed management - Concepts and methods - Forest treatments - Streamflow - Impact on water yield and quality.

### **UNIT VI**

#### **FOREST ECONOMICS, POLICIES AND LEGISLATIONS**

Fundamental principles of Forest Economics - Cost benefit analysis - Demand and supply estimation - Socio-economic analysis of Forest Productivity - Forest valuation - Project formulation - Project monitoring - evaluation - elements of time series analysis and forecasting - role of corporate financing. Forest Policy - Necessity - Formulation of National Forest Policy - History of Forest development in India - Indian Forest Policy of 1894, 1952 and 1988. NCA report on forestry - Role of ICFRE in Forest Research and Education - Constitution of National Mission on Wasteland development. Forest laws - Necessity - General Principles - Indian Forest Act 1927, Forest Conservation Act 1980, Wildlife Protection Act 1972, Tamil Nadu Forest Act 1882.

### **UNIT VII**

#### **FOREST BIOLOGY AND BOTANY**

Forest Ecology - Definition - Biotic and abiotic components - Forest Ecosystem - Forest community concepts - Succession - Primary productivity - Composition of forest types in India - Classification of India's Forests - Species composition association and diversity. Form of trees - structure and function - Physiology and reproduction of trees - Nutrient cycling and water relation - Physiology in stress environments (drought, waterlogging, alkalinity and salinity) - Seed technology - Collection - Processing - storage - handling techniques - pretreatment - Seed testing. Importance of Botany - Taxonomic classification of plant species - Identification of species - Composition and association - Dendrology - Principles and establishment of herbaria and arboreta - principles and concepts of Tree improvement - methods and techniques - Seed orchard - Types and establishment - use of provenances and Exotics - Role of Exotic forest trees in India - Application of bio-technological methods in forestry.

### **UNIT VIII**

#### **WILDLIFE BIOLOGY AND MANAGEMENT**

Introduction to Wildlife management - Ecology and biology of wildlife - Principles and techniques of management - Wildlife habitats - Census - Land tenure system - Major wildlife species in India and their broad study - Wildlife conservation - Policy and legal measures - Sanctuaries - national parks - Biosphere reserves - Ecotourism.

### **UNIT IX**

#### **FOREST PROTECTION**

Role of Forest Protection in Indian Forestry - Injuries caused by various agencies - Injuries caused by human being - Animals - Insects - Birds - Adverse climatic factors - Injuries caused by plants - Forest fire - Fire protection methods - Control measures for pest and diseases for major tree species - biological, chemical and integrated pest management methods.

### **UNIT X**

#### **AGROFORESTRY AND SOCIAL FORESTRY**

Definition - Objectives of agroforestry - Classification of agroforestry systems - benefits and constraints in agroforestry - competition for light, water and nutrients - Allelopathy - Ecological aspects of agroforestry. Social forestry - its components and implementation at local and national levels - social attitudes and community participation - choice of species for agro and social forestry.