FORESTRY

Silviculture : Forest ecosystem, classification of world's forest vegetation, productivity and vegetation forms of India, forest composition , structure , stand dynamics , forest succession, forest types, competition and tolerance, ecophysiology of tree growth, natural regeneration , artificial regeneration, silvicultural systems, intermediate treatments. Forest site management, salvage cutting, improvement felling, coppice forestry and enrichment planting. Weeds, locality factors, selection of tree species, precision silviculture, silviculture of important trees. Forest Nursery, Seed collection, processing and storage

Agroforestry: History in India, potential and scope, systems of the world and India, National Agroforestry Policy. Agroforestry Classification, agroforestry in food security, wasteland development, soil and water conservation, soil productivity enhancement and climate change mitigation. Principle and criteria for selection of agroforestry tree species ,Tree –crop interactions, crop planning and management, integrated farming system, fodder production, tropical home gardens, taungyas, alley cropping, Integrated Watershed Management. Biomass production for fuel wood, small timber & raw materials for cottage industries.

Forest Biometry: Measurement of tree parameters, modern tools and techniques, estimation of volume, growth and yield, stand structure, volume, yield and stand tables, forest inventory, sampling methods. Forest site – classification and evaluation, Use of GPS, remote sensing and GIS, stand density, simulation techniques, prediction models.

Forest Management : Principles, scope and object, ecosystem management, development of forest management in India, Concept of sustained yield, normal Forest, site quality evaluation and importance, classical approaches to yield regulation, salient features and strategies, forest valuation and appraisal, Carbon stock assessment.

Forest Products and Forest Industries: forest based industries, importance, chemistry of forest products, forest based industries, cell wall constituents, logging, wood conversion, seasoning, preservation, mechanical properties of wood, wood anatomy, composite wood, pulp, paper, charcoal, destructive distillation, use of wood of important forest species, plant sources and uses of gums, resins, katha, dyes, tannins, oils, fibres, raw drugs, bamboo and other non-wood products, extraction, processing and utilisation, chemical composition of oleoresin from major pine species,

structural difference among different gums, chemical nature and uses of volatile oils, tannins, katha, cutch, forest based dyes and pigments, use of wood of lesser known forest species, chemical composition of oleoresin, structural difference among different gums, chemical nature and uses of volatile oils, tannins, katha, cutch, forest based dyes and pigments.

Forest Ecology and Biodiversity Conservation: forest ecology, forest productivity, ecology of forest landscapes, spatial heterogeneity, Grassland type, Types of grazing, Grassland management, conservation of natural resources, forest genetic resources: timber and non timber species. Survey, exploration and sampling strategies. Biological diversity and its significance to sustainable use, assessment methodologies, biodiversity conservation programmes, biodiversity linked ecosystem services, intellectual property rights, quarantine laws.

Forest Resource Management and Economics: economics in forest management, application of micro and macro-economics, demand and supply, marketing, forest capital theory, trade in forest products. Impact of economics, externalities and property rights, natural and environmental resource accounting, ecosystem services assessment methods, application of operations research tools in forest management.

Forest Protection: Important diseases and insect pests and their management, assessment of losses, vertebrate pests, adverse weather, pollutants, forest fires, wildlife damage and weeds. Biodegradation of wood, role of mycorrhiza, natural regulation of insect populations, developing resistance trees.

Forest Policy And Laws And International Conventions: National Forest Policies, principles of criminal law; Bhartiya Nyay Sanhita (BNS), Bhartiya Nagrik Suraksha Sanhita (BNSS) , Bhartiya Sakshya Adhiniyam (BSA). Forest laws, case studies & landmark judgments. Agroforestry Policy, Wildlife act, Forest Conservation act, Biodiversity act.

Reproductive Biology and Tree Improvement: Reproductive Biology, artificial vegetative propagation, special modes of reproduction, mating system dynamics, environmental effects on Sex expression, mechanism of pollination. Fertilization, seed and fruit development, dispersal, Gene flow mechanics**,** forest tree breeding, tree improvement and forest genetics. Variation in trees, natural variation in tree improvement. Seed biology, seed orchards selective breeding methods, plus tree selection, selection strategies, estimating genetic parameters and genetic gain.

Heterosis breeding, species and racial hybridization. Polyploidy, aneuploidy and haploidy \, Biotechnology in tree improvement. mutation breeding, Economics of tree breeding. **Clonal Forestry**

Forests And People: Forests and its importance, forest societies, interactions with people, social and cultural factors, afforestation programmes , forest conflicts, wildlife and human conflicts, important forest movements, gender dimension, tribal economy, pastoralists, management of commons and Common Property Resources (CPRs) and open access resources, sustainable livelihood, food security, eco-tourism, land use change. Forest rights, customary rights of people, community participation, biodiversity and ethnobotany, global environmental change and land use, resettlement, poverty alleviation and forests, role of NGOs and other CBOs community based organizations.

Plantation Forestry : Role of plantation forestry , plantation forestry in India and abroad, , factors determining scale and rate, land suitability , choice of species, production technologies for quality planting stock, site preparation, planting, nutritional dynamics , irrigation, mechanization, protection , after care, pruning and thinning, rotation in plantation, failure of plantations. Impact of interaction and integration of plantation forestry, protective afforestation, afforestation of inhospitable sites, ecological factors and long term productivity, sustainable yield, post harvest practices. Wasteland plantation- Industrial Plantation- Corporate plantation- Contract plantation. Case studies in plantations of Eucalyptus, Casuarina, Poplars, Acacias, Pine, Silver Oak, Gmelina, Teak, Sandal, Bamboo, etc.

Environmental Conservation: Environmental degradation: pollution , environmental conservation, environment impact assessment, India's international obligation, International Conventions, global warming and Climate Change, impact of climate change and carbon sequestration**.**

Statistics (Research Methodology): Statistics, definition, object and scope, frequency distribution; mean, median, mode and standard deviation, introduction to correlation and regression, experimental designs; basic principles, completely randomized, randomized block, Latin square and split plot designs.