RURAL TECHNOLOGIES FOR ENVIRONMENTAL PROTECTION

Course Code	**EVS07E504**				
Course Title	Rural Technologies for Environmental Protection				
Type of Course	DSE A-2 (Elective – Open)				
Semester	I				
Academic Level	500				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4			60
Pre-requisites	Basic knowledge of Rural and Urban sectors, agricultural practices, rural households and their day-to-day use pattern of natural resources. Interest in various innovative technologies which are cost effective and environmentally sustaining				
Course Summary	This course provides a comprehensive overview of rural technologies and their role in offering environmental protection and sustainable development. It covers a range of topics, including sustainable practices of agriculture, land, water and waste management and certain agriculture allied practices along with certain innovative methods of energy conservation.				

Detailed Syllabus:

Chapters	Content	60 Hrs
01	Rural and urban segmentation: definition and characterization, International and national statistics on rural / urban segmentation, Reasons for rural – urban segmentation, Socio-economic and Environmental implications of urbanization. Introduction to the Three Tier Panchayati Raj System; Integrated Rural Development Programme (IRDP), and Saansad Adarsh Gram Yojana (SAGY).	4
02	Introduction to Rural Technologies for Environmental Protection: Definition and scope of rural technologies, Importance of rural technologies in environmental protection; Relationship between rural development and environmental sustainability	3
03	Agriculture in Indian context: extent, activities, ancillary businesses, employment support, economic outputs and environmental services. Sustainable Agricultural Technologies: Conservation Agriculture- zero tillage, crop rotation and diversification, natural pest control methods, Drought-Resistant and High-Yielding Crops, organic farming, integrated farming, and other innovative methods in agriculture.	5
04	Water and energy management in Agriculture: Watershed management (concept, characteristics and method); Techniques for energy-efficient water pumping and irrigation (Channel systems, Sprinkler systems, Drip systems, etc.), solar water pumps, wind-powered irrigation.	3
05	Soil and Land Management: Techniques for soil conservation- soil fertility management through organic inputs, land reclamation and restoration methods. Soil conservation and erosion control: Contour cultivation, contour and staggered trenching, gully control structures, check dams and bench terracing.	5
06	Housing and Construction Technologies - Eco-Friendly Building Materials: Adobe, Cob, and Rammed Earth; Renewable materials for construction - bamboo and timber; Green Roofing- components of green roof, types of green roof (extensive, intensive, and semi-intensive).	5

07	Water Conservation and treatment methods at household/ community levels: Low-flow fixtures, Greywater recycling; Rainwater Harvesting System - Collection, Storage, Filtration: mesh screens, sand filters, and first flush diverters; Water Purification methods: ceramic filters, biosand filters; Solar Water Disinfection (SODIS); Chemical Disinfection- chlorination, iodine tablet; Biochar filtration; DIY filter systems; Use of biological materials in water purification; Small-scale water treatment plants for community level; constructed wetlands; Borehole and Well Protection; Solar Water Purification Systems; Point-of-Use (POU) Systems.	7
08	Energy-efficient practices and technologies - Overview of renewable energy sources: solar, wind, biogas (principles, practices and types), small-scale hydroelectric systems. Implementation of solar energy systems (solar panels, solar cookers, solar dryers). Energy-efficient cooking methods; Insulation; Energy- Efficient Windows; LED Lighting; Energy-Efficient Appliances. Bio Fuels: Biomass, its classification, characteristics and utilization, techniques for biomass assessment, biomass estimation, Properties of biomass. Types of biofuels (liquid, solid and gas), Importance of production processes and technology, biofuels applications, bio-fuels for transportation. Biomass Gasifier and Biogas, Bio-briquetting.	7
09	Waste Management and Recycling- Types and sources of rural waste (agricultural, household, etc.); Principles of waste management and recycling; Techniques for composting and vermicomposting (materials, methods, types, process, organisms involved, conditions of operation, chemical composition, use pattern and advantages); Farm yard manure (FYM), NADEP Compost (design, materials and methods), Pipe composting, Organic farming.	6
10	Innovative allied activities: Mushroom cultivation - Types, Nutritional and Medicinal values, Production techniques of Button Mushroom (*Agaricus*), Oyester Mushroom (*Pleurotus)*, Paddy Straw Mushroom (*Volvariella*). Apiculture: Types of bees, equipment and appliances, optimum conditions, disease and pest management, and processing.	5
11	Integrated rural technology for biodiversity conservation - Agroforestry Systems: Silvipasture, Alley Cropping, Forest Farming; Community-Based Resource Management: Participatory Mapping, Community Forest Management, and Biodiversity Registers. Habitat Restoration: Artificial nesting sites and types, habitat corridors and its types, reforestation and afforestation initiatives.	5
12	Policy and Governance: Overview of policies supporting rural technologies, role of government, NGOs, and international organizations, Policy framework for sustainable rural development	5

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