

Centre for Rural Development and Technology

Indian Institute of Technology New Delhi

II Semester -- 2022–2023

RDL722 Rural Energy Systems (3-0-0)

Concept of “Rural Energy Systems (RES)” for “Gram Urjha Swaraj”. Eco-friendly nature of RES. Role of energy in Human development and need for native energy systems.

Origin and distribution of energy systems on earth. Classification and development of RES:

Biomass based energy systems, scope for production multi-fuel systems and energy systems. Bio-liquid and bio-gaseous fuel systems.

Biodiesel: potential and scope in India, Biodiesel production technology: Uses and Advantages, Ethanol as Alternate fuel, Ethanol production Technologies, Uses and Advantages.

Biogas generation systems, Techniques to use various biomass substrates. Types of digesters and feed materials, Biogas power generation, biogas enrichment and bottling technology, Entrepreneurship avenues in Biogas sector. Pyrolysis: Concept, Types, Technology & bio-waste Management, thermochemical gasification: Concept, Technology, Design, Operation and Uses. Avenues for production of Green Hydrogen.

Cook Stoves, Multifuel and biomass cook stoves, improved chulhas.

Micro Hydel RES: Site characterization, Hydro potential estimation, Micro Turbines-Classification, design, sizing analyses, Hydel power utilities, Techno economic feasibility and social issues.

Animal power: Application and power generation.

Solar Energy Technologies, Solar Pond, Solar Photovoltaic, Concept of Hybrid energy system: Value proposition and benefits.

Microscale Windmills for mechanical and electrical applications.

Creation of renewable energy-based livelihood and micro-enterprises Integrated Rural Energy Planning: Objectives, Technical options Benefits, Financial Incentives.

Books & References:

Lecture slides & Reading material will be uploaded on my website.