

Name of Faculty		DHEERAJ (Expert Lecture)		
Discipline		Electrical Engineering		
Semester		2nd(Even-semester)		
Subject		NON-CONVENTIONAL SOURCES OF ENERGY		
Lesson Plan		20 January 2025 to 02 May 2025		
Workload(Theory)		(02+02)		
Week	Day	Topics	No.	Practical
1 st	1	Introduction to Energy and Solar Energy ,Classification of Energy Resources: Conventional Energy Resources, Nonconventional Energy Resources	1	1. Visit the website of Ministry of New and Renewable Energy Sources and prepare the Datasheet of Potential, Present and Future Scenario of Renewable energy sources in India.
	2	Roles and responsibility of Ministry of New and Renewable Energy Sources. Needs of renewable energy. Targets and Present Status of Renewable Energy Sources in India		
2 nd	1	Solar Energy: Introduction, potential of solar energy in India, Solar Radiation, Principle of conversion of solar radiation into heat,	2	2. Familiarization with the different components used in solar PV plant (standalone and grid connected system), solar water heating system, solar cooker, solar lighting etc.
	2	Construction and working principle of photovoltaic cell. Solar cell materials,		
3 rd	1	Difference between solar cell, panel, array, module, Characteristics, important terms related to solar energy, Efficiency of Solar Cells.	3	3. Calculate power flow of a stand-alone PV system with DC load, AC load and battery.
	2	Applications of solar energy like solar PV system (standalone and grid connected), solar water		

		heating system, solar furnaces, solar cookers, solar lighting, solar water pumping system, solar still. Government schemes and policies.		
4th	1	Bio-Energy and Hydro Energy Bio-Energy: Introduction, Biomass energy, Photosynthesis process, Biomass fuels, Biomass energy conversion technologies and applications	4	4. To demonstrate "I-V Characteristics and Efficiency of 1kWp Solar PV System" with varying radiation and temperature level.
	2	, Biomass Gasification, Types and application of gasifier, Types of biogas plants, Factors affecting biogas generation, Environmental impacts and benefits, Future role of biomass, Biomass potential and programs in India.		
5th	1	Hydro Energy: Introduction, Capacity and Potential, Hydro Power Plant (mini and micro), Environmental and social impacts.	5	5. Assemble the components of solar home lighting system & study the system.
	2	Wind Energy and Geothermal Energy , Wind Energy: Introduction,		
6th	1	Wind energy conversion system, windmills, types of wind mills	6	6. Assemble the components of solar water heating system system & study the system.
	2	selection of site, electricity generation from wind energy, Wind Energy potential and Scenario in India		
7th	1	Geothermal Energy: Introduction , Geothermal Resource Utilization like hydrothermal, Geo-pressured hot dry rock, magma,	7	7. Identify Troubleshoot solar PV panel, inverter and solar smart metering system.

	2	Geothermal based Electric Power Generation,		
8th	1	Associated Problems, environmental Effects, prospects of geothermal energy in India.	8	8. Identify the specified components of a 1 KW Small Wind Turbine (SWT) system and study them.
	2	Tidal Energy and Mhd Tidal Energy: Introduction, Capacity and Potential, Principle of Tidal Power, Components of Tidal Power Plant, Classification of Tidal Power Plants.		
9th	1	Ocean Energy: Introduction, Ocean Thermal Energy Conversion (OTEC), Principle of OTEC system, Methods of OTEC power generation, prospects of OTEC in India.	9	9. Estimation of wind speed using anemometer.
	2	MHD power generation: Principle of working of Magneto Hydro Dynamic (MHD) Power Generation, materials for MHD generators and future prospects, performance and limitations.		
10th	1	Fuel Cell and Energy Storage Devices Fuel Cells: Fuel cell definition, difference between batteries and fuel cells, ..	10	10. Study of charging and discharging behavior of a capacitor.
	2	Principle of working of fuel cells ,types of fuel cell, power generation by fuel cell ,conversion efficiency		
11th	1	applications, advantages and disadvantages of fuel cell	11	11. Study of charging characteristics of a Ni-Cd battery using solar photovoltaic panel.
	2	Energy Storage: Need of energy storage, Different modes of		

		energy storage, Flywheel storage, Superconducting Magnet Energy Comparison and application.		
12th	1	Storage (SMES) systems, Capacitor, battery, Super capacitor.	12	12. Identify the prime mover /turbines used in different renewable energy sources for power generation and study them.
	2	Assignments		
13th	1	Class test	13	13. Study the Performance of fuel cell.
	2	Revision of Unit 1& Unit 2		
14th	1	Revision of Unit 3& Unit 4	14	14. Identify the routine maintenance parts of the micro hydro power plant after watching a video
	2	Revision of Unit 5		
15th	1	Previous Exam Papers Solved		Visit nearby renewable power plant and write specification of each components used in• that plant.
	2	Previous Exam Papers Solved		