

LESSON PLAN FOR RENEWABLE ENERGY SYSTEMS[Th4]

Discipline: Electrical Engineering	Semester:6th	Name of the Teaching Faculty: Mr. Sarat Kumar Sahoo (Sr. Lect. In ETC)	
Subject: RENEWABLE ENERGY SYSTEMS	Numbers of classes per week:5	Semester from date: 16/01/2024	To date: 26/04/2024
		No. of weeks: 15	
week	Class day	Theory	
1st	1st	1. Introduction to Renewable energy:	
		1.1. Environmental consequences of fossil fuel use.	
	2nd	1.2. Importance of renewable sources of energy.	
	3rd	1.3. Sustainable Design and development.	
	4th	1.4. Types of RE sources	
	5th	1.5. Limitations of RE sources.	
2nd	1st	1.6. Present Indian and international energy scenario of conventional and RE sources	
	2nd	Tutorial	
	3rd	2. Solar Energy:	
	4th	2.1. Solar photovoltaic system-Operating principle.	
	5th	2.2. Photovoltaic cell concepts	
3rd	1st	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).	
	2nd	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).(contd.)	
	3rd	Tutorial	
	4th	2.3. Classification of energy Sources.	
	5th	2.3. Classification of energy Sources(contd.)	
4th	1st	2.4. Extra-terrestrial and terrestrial Radiation.	
	2nd	2.4. Extra-terrestrial and terrestrial Radiation.(contd.)	
	3rd	Tutorial	
	4th	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.	
	5th	2.5. Azimuth angle	
5th	1st	Zenith angle	
	2nd	Hour angle	
	3rd	Irradiance	
	4th	Solar constant.(contd.)	
	5th	2.6. Solar collectors, Types and performance characteristics,	
6th	1st	2.7. Applications: Photovoltaic - battery charger	
	2nd	domestic lighting, street lighting,	
	3rd	water pumping,	
	4th	solar cooker, Solar Pond.	
	5th	Tutorial	
7th	1st	3. Wind Energy:	
	2nd	3.1. Introduction to Wind energy.	
	3rd	3.2. Wind energy conversion.	
	4th	3.3. Types of wind turbines	
	5th	3.3. Types of wind turbines(contd.)	
8th	1st	Tutorial	
	2nd	3.4. Aerodynamics of wind rotors.	
	3rd	3.5. Wind turbine control systems; conversion to electrical power:	
	4th	3.6. Induction and synchronous generators.	

	5th	3.7. Grid connected and self-excited induction generator operation
9th	1st	Tutorial
	2nd	3.8. Constant voltage and constant frequency generation with power electronic control.
	3rd	3.8. Constant voltage and constant frequency generation with power electronic control.
	4th	3.9. Single and double output systems.
	5th	3.10. Characteristics of wind power plant.
10th	1st	4. Biomass Power:
	2nd	4.1. Energy from Biomass.
	3rd	4.2. Biomass as Renewable Energy Source
	4th	Tutorial
	5th	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
11th	1st	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.(contd.)
	2nd	4.4. Combustion and fermentation.
	3rd	4.5. Anaerobic digestion
	4th	Tutorial
	5th	4.6. Types of biogas digester.
12th	1st	4.7. Wood gassifier.
	2nd	4.8. Pyrolysis,.
	3rd	4.9. Applications: Bio gas, Bio diesel
	4th	(Tutorial) 5. Other Energy Sources
	5th	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
13th	1st	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.(contd.)
	2nd	5.2. Ocean Thermal Energy Conversion (OTEC).
	3rd	5.2. Ocean Thermal Energy Conversion (OTEC)(contd.)
	4th	5.3. Geothermal Energy – Classification.
	5th	Tutorial
14th	1st	5.3. Geothermal Energy – Classification(contd.)
	2nd	5.4. Hybrid Energy Systems.
	3rd	5.4. Hybrid Energy Systems.(contd.)
	4th	5.5. Need for Hybrid Systems.
	5th	Tutorial
15th	1st	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	2nd	5.6. Diesel-PV, Wind-PV, Microhydel-PV(contd.)
	3rd	5.7. Electric and hybrid electric vehicles.
	4th	5.7. Electric and hybrid electric vehicles(contd.)
	5th	Tutorial

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Signature of Faculty