Discipline:- **Electrical Engineering**	Semester:- 6th	Name of the teaching faculty:- **PRADEEP KUMAR MOHANTY**
Subject:- **RENEWABLE ENERGY**	No. of days/ per week class allotted:-5	From 04-02-2025 to 17.05.2025
Week	**No. Of Class**	**Topic To Be Taught**
1st	1st	**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. 1.5. Limitations of RE sources.
	5th	Tutorial
2nd	1st	1.6. Present Indian and international energy scenario of conventional and RE sources
	2nd	**2. Solar Energy**: 2.1. Solar photovoltaic system-Operating principle.
	3rd	2.2. Photovoltaic cell concepts
	4th	2.2. Photovoltaic cell concepts
	5th	Tutorial
3rd	1st	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).
	2nd	2.3. Classification of energy Sources.
	3rd	2.3. Classification of energy Sources.
	4th	2.4. Extra-terrestrial and terrestrial Radiation.
	5th	Tutorial
4th	1st	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	2nd	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	3rd	2.6. Solar collectors, Types and performance characteristics,
	4th	2.6. Solar collectors, Types and performance characteristics,
	5th	Tutorial
5th	1st	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.
	2nd	**3. Wind Energy:** 3.1. Introduction to Wind energy.
	3rd	3.2. Wind energy conversion.
	4th	3.3. Types of wind turbines
	5th	Tutorial
6th	1st	3.3. Types of wind turbines
	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	Tutorial
7th	1st	3.6. Induction and synchronous generators.
	2nd	3.7. Grid connected and self excited induction generator operation.
	3rd	3.7. Grid connected and self excited induction generator operation.
	4th	3.8. Constant voltage and constant frequency generation with power electronic control.
	5th	Tutorial
8th	1st	3.9. Single and double output systems.
	2nd	3.10. Characteristics of wind power plant.
	3rd	**4. Biomass Power:** 4.1. Energy from Biomass.
	4th	4.2. Biomass as Renewable Energy Source
	5th	Tutorial
9th	1st	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	2nd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	3rd	4.4. Combustion and fermentation.
	4th	4.5. Anaerobic digestion.
	5th	Tutorial
10th	1st	4.5. Anaerobic digestion.
	2nd	4.6. Types of biogas digester.
	3rd	4.6. Types of biogas digester
	4th	4.8. Pyrolysis,.
	5th	Tutorial
11th	1st	4.7. Wood gassifier.
	2nd	4.8. Pyrolysis,.
	3rd	4.9. Applications: Bio gas, Bio diesel
	4th	4.9. Applications: Bio gas, Bio diesel
	5th	Tutorial
12th	1st	**5. Other Energy Sources** 5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	2nd	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	3rd	5.2. Ocean Thermal Energy Conversion (OTEC).
	4th	5.2. Ocean Thermal Energy Conversion (OTEC).
	5th	Tutorial
13th	1st	5.3. Geothermal Energy – Classification.
	2nd	5.3. Geothermal Energy – Classification.
	3rd	5.4. Hybrid Energy Systems.
	4th	5.4. Hybrid Energy Systems.
	5th	Tutorial

14th	1st	5.5. Need for Hybrid Systems.
	2nd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	3rd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	4th	5.7. Electric and hybrid electric vehicles.
	5th	Tutorial
15th	1st	Revision
	2nd	Revision
	3rd	Revision
	4th	Revision
	5th	Revision

P. Mohanty 4/02/25

Teaching Faculty

H.O.D E.E 4/02/2025