Govt. Polytechnic, Sambalpur,Rengali.

LESSON PLANFOR ACADEMIC SESSION - 2024
RENEWABLE ENERGY

Course Code : Th.4	**Semester : 6th**
Total Periods : 75 Periods	**Examination : 3 Hours**
Lecture Periods : 4 P/Week	**Internal Assessment:20 Marks**
Name of Teaching Faculty : Miss. Monalisha Chowdhury.	

Week	Class Day	Theory Topics
1st	01	**Unit 1: Introduction to Renewable energy** Introduction
	02	Environmental consequences of fossil fuel use
	03	Importance of renewable sources of energy.
	04	Sustainable Design and development.
	05	Types of RE sources
2nd	01	Types of RE sources
	02	Limitations of RE sources
	03	Present Indian and international energy scenario of conventional and RE sources
	04	**Unit 2: Solar Energy** Solar photovoltaic system-Operating principle
	05	Solar photovoltaic system-Operating principle.
3rd	01	Solar photovoltaic system-Operating principle
	02	Photovoltaic cell concepts
	03	Photovoltaic cell concepts
	04	Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT)
	05	Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT)
4th	01	Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT)
	02	Classification of energy Sources
	03	Classification of energy Sources
	04	Extra-terrestrial and terrestrial Radiation
	05	Extra-terrestrial and terrestrial Radiation
5th	01	Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	02	Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	03	Solar collectors, Types and performance characteristics

	04	Solar collectors, Types and performance characteristics
	05	Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, SolarPond.
6th	01	Applications: Photovoltaic - battery charger, domestic lighting,street lighting, water pumping, solar cooker, Solar Pond.
	02	**Unit 3: Wind Energy** Introduction to Wind energy.
	03	Wind energy conversion.
	04	Types of wind turbines
	05	Types of wind turbines
7th	01	Aerodynamics of wind rotors.
	02	Wind turbine control systems; conversion to electrical power
	03	Induction and synchronous generators
	04	Induction and synchronous generators
	05	Grid connected and self excited induction generator operation.
8th	01	Grid connected and self excited induction generator operation.
	02	Constant voltage and constant frequency generation with power electronic control.
	03	Constant voltage and constant frequency generation with power electronic control.
	04	Single and double output systems.
	05	Characteristics of wind power plant.
9th	01	Characteristics of wind power plant.
	02	**Unit 4: Biomass Power:** Energy from Biomass.
	03	Energy from Biomass.
	04	Biomass as Renewable Energy Source
	05	Biomass as Renewable Energy Source
10th	01	Types of Biomass Fuels - Solid, Liquid and Gas.
	02	Types of Biomass Fuels - Solid, Liquid and Gas.
	03	Combustion and fermentation.
	04	Combustion and fermentation.
	05	Anaerobic digestion.
11th	01	Types of biogas digester
	02	Types of biogas digester

	03	Wood gassifier.
	04	Pyrolysis
	05	Applications: Bio gas, Bio diesel
12th	01	Applications: Bio gas, Bio diesel
	02	**Unit 5: Other Energy Sources** Introduction
	03	Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	04	Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	05	Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
13th	01	Ocean Thermal Energy Conversion (OTEC).
	02	Ocean Thermal Energy Conversion (OTEC).
	03	Geothermal Energy – Classification.
	04	Geothermal Energy – Classification.
	05	Hybrid Energy Systems.
14th	01	Hybrid Energy Systems.
	02	Need for Hybrid Systems.
	03	Need for Hybrid Systems.
	04	Diesel-PV, Wind-PV, Microhydel-PV.
	05	Diesel-PV, Wind-PV, Microhydel-PV.
15th	01	Electric and hybrid electric vehicles
	02	Electric and hybrid electric vehicles
	03	Revision, Q&A discussion, Doubt Clearing
	04	Revision, Q&A discussion, Doubt Clearing
	05	Revision, Q&A discussion, Doubt Clearing