



## Department of Electrical Engineering Govt. Polytechnic Jajpur, Ragadi

### LESSON PLAN FOR ACADEMIC SESSION - 2024-25 RENEWABLE ENERGY (Elective-B)

<b>Course Code : Th.4</b>	<b>Semester : 6th</b>
<b>Total Periods : 75 Periods</b>	<b>Examination : 3 Hours</b>
<b>Lecture Periods : 4 P/Week</b>	<b>Internal Assessment: 20 Marks</b>
<b>Tutorial : 1P/week</b>	<b>End Semester Examination : 80 Marks</b>
<b>Maximum Marks : 100</b>	
<b>Semester From Date : 04.02.2025 To 17.05.2025</b>	
<b>Name of Teaching Faculty : Mrs. Jyotirmayee Sethy</b>	

Week	Class Day	THEORY TOPICS
<b>1<sup>st</sup></b>	01	<b>Unit 1: Introduction to Renewable energy</b> 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
<b>2<sup>nd</sup></b>	01	Types of RE sources
	02	Limitations of RE sources
	03	Present Indian and international energy scenario of conventional and RE sources
	04	<b>Unit 2: Solar Energy</b> Solar photovoltaic system-Operating principle
	05	Solar photovoltaic system-Operating principle.
<b>3<sup>rd</sup></b>	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)

4 <sup>th</sup>	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
5 <sup>th</sup>	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, Solar Pond.
6 <sup>th</sup>	01	Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.
	02	<b>Unit 3: Wind Energy</b> Introduction to Wind energy.
	03	Wind energy conversion.
	04	Types of wind turbines
	05	Types of wind turbines
7 <sup>th</sup>	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.
8 <sup>th</sup>	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.
9 <sup>th</sup>	01	Characteristics of wind power plant.
	02	<b>Unit 4: Biomass Power:</b> Energy from Biomass.
	03	Energy from Biomass.
	04	Biomass as Renewable Energy Source
	05	Biomass as Renewable Energy Source
10 <sup>th</sup>	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.
11 <sup>th</sup>	01	Types of biogas digester
	02	Types of biogas digester
	03	Wood gassifier.
	04	Pyrolysis
	05	Applications: Bio gas, Bio diesel
12 <sup>th</sup>	01	Applications: Bio gas, Bio diesel
	02	<b>Unit 5: Other Energy Sources</b> 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.
<b>13th</b>	01	Ocean Thermal Energy Conversion (OTEC).
	02	Ocean Thermal Energy Conversion (OTEC).
	03	Geothermal Energy – Classification.
	04	Geothermal Energy – Classification.
	05	Hybrid Energy Systems.
<b>14th</b>	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.
<b>15th</b>	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

Tyoti K. Mayee Sethy  
 Dt - 04/02/2025