



NILASAILA INSTITUTE OF SCIENCE & TECHNOLOGY  
SERGARH-756060, BALASORE (ODISHA)  
(Approved by AICTE& affiliated to SCTE&VT, Odisha)



## **LESSON PLAN**

**SUBJECT: Th-4 (RENEWABLE ENERGY)**

### **CHAPTER WISE DISTRIBUTION OF PERIODS**

Sl.No.	Name of the chapter as per the Syllabus	No. of Periods as per the Syllabus	No. of periods actually needed
1	Energy Situation and Renewable Energy Sources	5	5
2	Solar Radiation & Collectors	6	6
3	Low-Temperature Applications of Solar Energy	6	6
4	Passive Space Conditioning & Collectors	7	7
5	Solar Thermal Power Plants	8	8
6	Solar Photovoltaics	8	8
7	Wind Energy	5	5
8	Wind Energy Converters	8	8
9	Energy economics	7	7
10	Tutorial	15	15
	TOTAL	75	75

<b>Discipline:</b> ELECTRICAL ENGG.	<b>Semester:</b> 6TH	<b>Name of the Teaching Faculty: BIJAYA KUMAR BEHERA</b>
<b>Week</b>	<b>Class Day</b>	<b>Theory / Practical Topics</b>
<b>1<sup>st</sup></b>	<b>1<sup>st</sup></b>	<b>Energy Situation and Renewable Energy Sources</b> Renewable and Non-renewable Energy Sources
	<b>2<sup>nd</sup></b>	Energy and Environment
	<b>3<sup>rd</sup></b>	Origin of Renewable Energy Sources
	<b>4<sup>th</sup></b>	Potential of Renewable Energy Sources
	<b>5<sup>th</sup></b>	CLASS TEST
<b>2<sup>nd</sup></b>	<b>1<sup>st</sup></b>	Direct-use Technology
	<b>2<sup>nd</sup></b>	<b>Solar Radiation &amp; Collectors</b> Solar Radiation Through Atmosphere
	<b>3<sup>rd</sup></b>	Terrestrial Solar Radiation
	<b>4<sup>th</sup></b>	Measurement of Solar Radiation
	<b>5<sup>th</sup></b>	CLASS TEST
<b>3<sup>rd</sup></b>	<b>1<sup>st</sup></b>	Measurement of Solar Radiation
	<b>2<sup>nd</sup></b>	Classification of Solar Radiation Instruments
	<b>3<sup>rd</sup></b>	Flat Plate Collectors
	<b>4<sup>th</sup></b>	Optical Characteristics
	<b>5<sup>th</sup></b>	CLASS TEST

<b>4<sup>th</sup></b>	<b>1<sup>st</sup></b>	<b>Low-Temperature Applications of Solar Energy</b> Swimming Pool Heating
	<b>2<sup>nd</sup></b>	Solar water Heating Systems
	<b>3<sup>rd</sup></b>	Solar water Heating Systems
	<b>4<sup>th</sup></b>	Natural Convection water Heating Systems
	<b>5<sup>th</sup></b>	CLASS TEST
<b>5<sup>th</sup></b>	<b>1<sup>st</sup></b>	Solar Drying
	<b>2<sup>nd</sup></b>	Solar Pond
	<b>3<sup>rd</sup></b>	<b>Passive Space Conditioning &amp; Collectors</b> Principle Space conditioning
	<b>4<sup>th</sup></b>	Passive building concepts- Heating, Direct gain, Indirect Gain, Passive Cooling, Shading, Paints, Collings
	<b>5<sup>th</sup></b>	CLASS TEST
<b>6<sup>th</sup></b>	<b>1<sup>st</sup></b>	Passive building concepts- Heating, Direct gain, Indirect Gain, Passive Cooling, Shading, Paints, Collings
	<b>2<sup>nd</sup></b>	Passive building concepts- Heating, Direct gain, Indirect Gain, Passive Cooling, Shading, Paints, Collings
	<b>3<sup>rd</sup></b>	Construction of Concentrator
	<b>4<sup>th</sup></b>	Construction of Concentrator
	<b>5<sup>th</sup></b>	CLASS TEST

7 <sup>th</sup>	1 <sup>st</sup>	Energy losses
	2 <sup>nd</sup>	<b>Solar Thermal Power Plants</b> Introduction
	3 <sup>rd</sup>	Solar Collection System
	4 <sup>th</sup>	Solar Collection System
	5 <sup>th</sup>	CLASS TEST
8 <sup>th</sup>	1 <sup>st</sup>	Thermal Storage for Solar Power Plants
	2 <sup>nd</sup>	Thermal Storage for Solar Power Plants
	3 <sup>rd</sup>	Capacity Factor and Solar Multiple
	4 <sup>th</sup>	Capacity Factor and Solar Multiple
	5 <sup>th</sup>	CLASS TEST
9 <sup>th</sup>	1 <sup>st</sup>	Energy Conversion
	2 <sup>nd</sup>	<b>Solar Photovoltaics</b> Band Theory of Solids, Physical Processes in a Solar Cell ,
	3 <sup>rd</sup>	Solar Cell Characteristics
	4 <sup>th</sup>	Equivalent Circuit Diagram of Solar Cells
	5 <sup>th</sup>	CLASS TEST

<b>10<sup>th</sup></b>	<b>1<sup>st</sup></b>	Cell Types - Crystalline Silicon Solar Cell , Solar Cells for Concentrating Photovoltaic Systems , Dye –sensitized Solar Cell (DSC)
	<b>2<sup>nd</sup></b>	Solar Module
	<b>3<sup>rd</sup></b>	Further System Components -Solar inverters ,Mounting Systems,Storage Batteries ,Other System Components
	<b>4<sup>th</sup></b>	Grid-independent Systems -System Configuration
	<b>5<sup>th</sup></b>	CLASS TEST
<b>11<sup>th</sup></b>	<b>1<sup>st</sup></b>	Grid-connected Systems -Small Roof Top Systems ,Medium-scale PV Generator ,Centralized System
	<b>2<sup>nd</sup></b>	<b>Wind Energy</b> Wind Flow and Wind Direction
	<b>3<sup>rd</sup></b>	Wind Measurements Measurement of Pressure Head
	<b>4<sup>th</sup></b>	Hot wire Anemometer
	<b>5<sup>th</sup></b>	CLASS TEST
<b>12<sup>th</sup></b>	<b>1<sup>st</sup></b>	Cup Anemometer (Robinson’s Anemometer
	<b>2<sup>nd</sup></b>	Wind Direction Indicators
	<b>3<sup>rd</sup></b>	<b>Wind Energy Converters</b> Historical Development
	<b>4<sup>th</sup></b>	Aerodynamic of Rotor Blade -Wind Stream Profile -Buoyancy Coefficient and the Drag Coefficient
	<b>5<sup>th</sup></b>	CLASS TEST

<b>13<sup>th</sup></b>	<b>1<sup>st</sup></b>	Aerodynamic of Rotor Blade -Wind Stream Profile -Buoyancy Coefficient and the Drag Coefficient
	<b>2<sup>nd</sup></b>	Components of a Wind Power Plant -Wind Turbine -Tower -Electric Generators –Foundation
	<b>3<sup>rd</sup></b>	Components of a Wind Power Plant -Wind Turbine -Tower -Electric Generators –Foundation
	<b>4<sup>th</sup></b>	Power Control -Slow Rotors; Poor Control Mechanism -Control of Fast Rotors
	<b>5<sup>th</sup></b>	CLASS TEST
<b>14<sup>th</sup></b>	<b>1<sup>st</sup></b>	Power Control -Slow Rotors; Poor Control Mechanism -Control of Fast Rotors
	<b>2<sup>nd</sup></b>	Energy economics Present worth, Life cycle costing (LCC), Annual Life cycle costing(ALCC), Annual savings. calculations for Solar thermal system
	<b>3<sup>rd</sup></b>	Energy economics Present worth, Life cycle costing (LCC), Annual Life cycle costing(ALCC), Annual savings. calculations for Solar thermal system
	<b>4<sup>th</sup></b>	Energy economics Present worth, Life cycle costing (LCC), Annual Life cycle costing(ALCC), Annual savings. calculations for Solar thermal system
	<b>5<sup>th</sup></b>	CLASS TEST
<b>15<sup>th</sup></b>	<b>1<sup>st</sup></b>	Energy economics Present worth, Life cycle costing (LCC), Annual Life cycle costing(ALCC), Annual savings. calculations for Solar thermal system
	<b>2<sup>nd</sup></b>	Solar PV system,
	<b>3<sup>rd</sup></b>	Wind system
	<b>4<sup>th</sup></b>	Biomass system
	<b>5<sup>th</sup></b>	CLASS TEST