

## **RENEWABLE ENERGY SYSTEMS (Th 4)**

Date of Commencement of classes: 02.01.2024

Date of Closing of classes: 23.04.2024

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

<b>Sl. No.</b>	<b>Name of the Chapter</b>	<b>Periods as per Syllabus</b>	<b>Required period</b>	<b>Expected Marks</b>
01	<b>INTRODUCTION TO RENEWABLE ENERGY</b>	05	10	20
02	<b>SOLAR ENERGY</b>	15	15	20
03	<b>WIND ENERGY</b>	12	15	20
04	<b>BIOMASS POWER</b>	12	09	20
05	<b>OTHER ENERGY SOURCES</b>	16	11	20
	<b>TOTAL</b>	<b>60</b>	<b>60</b>	<b>100</b>

Sign of Lect.

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Sign of AIC

Sign of Principal

## LESSON PLAN

Class day	Art. No.	Name of the Faculty: PRAJNADIPTA SAHOO
		Theory Topics
1 <sup>st</sup>	1.1	<b>Chapter – 01(Introduction to Renewable energy)</b> Introduction
2 <sup>nd</sup>		Environmental consequences of fossil fuel use
3 <sup>rd</sup>	1.2	Importance of renewable sources of energy
4 <sup>th</sup>	1.3	Sustainable Design
5 <sup>th</sup>		Continue...
1 <sup>st</sup>		& Sustainable Development
2 <sup>nd</sup>	1.4	Types of RE sources
3 <sup>rd</sup>	1.5	Limitation of RE sources
4 <sup>th</sup>	1.6	Present Indian and international energy scenario of conventional and RE sources
5 <sup>th</sup>		Continue...
6 <sup>th</sup>	2.1	<b>Chapter – 02(Solar Energy)</b> Solar photovoltaic system- Operating Principle
7 <sup>th</sup>		Continue...
1 <sup>st</sup>	2.2	Photovoltaic cell concept
2 <sup>nd</sup>	2.2.1	Cell, Module & Array
3 <sup>rd</sup>		Series and parallel connections
1 <sup>st</sup>		Maximum power point tracking (MPPT).
2 <sup>nd</sup>	2.3	Classification of energy Sources.
1 <sup>st</sup>	2.4	Extra-terrestrial and terrestrial Radiation
2 <sup>nd</sup>	2.5	Azimuth angle, Zenith angle, Hour angle,
3 <sup>rd</sup>		Irradiance, Solar constant
4 <sup>th</sup>	2.6	Solar collectors & its Type
5 <sup>th</sup>		Solar Collectors performance Characteristic
6 <sup>th</sup>	2.7	Applications: Photovoltaic –i) battery charger, ii) domestic lighting,
1 <sup>st</sup>		iii) street lighting, iv) water pumping,
2 <sup>nd</sup>		v)Solar cooker, vi) Solar Pond,
3 <sup>rd</sup>	3.1	<b>Chapter – 03(Wind energy)</b> Introduction to wind energy.
4 <sup>th</sup>	3.2	Wind energy conversion
5 <sup>th</sup>	3.3	Types of wind turbines
		Continue

	3.4	Aerodynamics of wind rotors
3 <sup>rd</sup>	3.5	Wind turbine control systems
4 <sup>th</sup>		Wind energy to Electrical energy
5 <sup>th</sup>	3.6	Induction and synchronous generators
1 <sup>st</sup>		Continue
2 <sup>nd</sup>	3.7	Grid connected and self-excited induction generator operation
3 <sup>rd</sup>		Cont.
4 <sup>th</sup>		Continue
5 <sup>th</sup>	3.8	Constant voltage and constant frequency generation with power electronic control.
6 <sup>th</sup>	3.9	Single and double output systems
7 <sup>th</sup>	3.10	Characteristics of wind power plant
1 <sup>st</sup>	4.1	<b>Chapter – 04(Biomass Power)</b> Energy from Biomass
2 <sup>nd</sup>	4.2	Biomass as Renewable Energy Source
3 <sup>rd</sup>	4.3	Types of Biomass Fuels - Solid, Liquid and Gas
4 <sup>th</sup>	4.4	Combustion and fermentation
5 <sup>th</sup>	4.5	Anaerobic digestion
6 <sup>th</sup>	4.6	Types of biogas digester
1 <sup>st</sup>	4.7	Wood gasifier
2 <sup>nd</sup>	4.8	Pyrolysis
3 <sup>rd</sup>	4.9	Applications: Bio gas, Bio diesel
4 <sup>th</sup>	5.1	<b>Chapter- 05(Other Energy Sources)</b> Tidal Energy: Energy from the tides, Barrage and Non-Barrage Tidal power systems
5 <sup>th</sup>		Continue .....
1 <sup>st</sup>	5.2	Ocean Thermal Energy Conversion (OTEC)
2 <sup>nd</sup>	5.3	Geothermal Energy & its Classification
3 <sup>rd</sup>	5.4	Hybrid Energy Systems
4 <sup>th</sup>		Cont.
5 <sup>th</sup>	5.5	Need for hybrid system
1 <sup>st</sup>		Cont.
2 <sup>nd</sup>	5.6	Diesel-PV, Wind-PV, Micro hydel-PV
3 <sup>rd</sup>	5.7	Electric and hybrid electric vehicles
4 <sup>th</sup>		Cont.
5 <sup>th</sup>		Chapter 1 Revision
6 <sup>th</sup>		Chapter 2 Revision
1 <sup>st</sup>		Chapter 3 Revision
2 <sup>nd</sup>		Chapter 4 Revision

1 <sup>st</sup>		Chapter 4 Revision
2 <sup>nd</sup>		Chapter 5 Revision
3 <sup>rd</sup>		Chapter 5 Revision
1 <sup>st</sup>		Previous years question answer Discussion
2 <sup>nd</sup>		Previous years question answer Discussion
3 <sup>rd</sup>		Practice 1
4 <sup>th</sup>		Practice 2
5 <sup>th</sup>		Practice 3
6 <sup>th</sup>		Practice 4
7 <sup>th</sup>		Practice 5

### ***Learning Resources:***

<b>Sl. No.</b>	<b>Name of the Book</b>	<b>Author Name</b>	<b>Publisher</b>
01	Renewable Energy Sources & Emerging Technologies	D.P. Kothari, K.C. Signal, Rakesh Ranjan	PHI Learning Pvt. Ltd, New Delhi.
02	Non-Conventional Energy Resources	B.H.Khan	Tata Mc GrawHill
03	Non-Conventional Energy Resources	J.P.Navani & Sonal Sapra	S.Chand
04	Non-Conventional Energy Resources & Utilization	R.K. Rajput	S. Chand
05	Wind Electrical System	S.N. Bhadra, D. Kadstha, S. Banerjee	Ox ford Univ.Press, New Delhi.