

Siruseri IT park, OMR, Chennai - 603103

Suggested Activity: Assignment / Case Studies / Tutorials/ Quiz / Mini Projects / Model Developed/others Planned if any :
Assignment

<b>Evaluation method :</b> <b>Marks Out of 10</b>							
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## UNIT II WIND ENERGY

10	Power in Wind - Important Terms and Definitions	T1/R2	1	PPT	L1	CO1, CO4	PO1
11	Types of Wind Power Plant - Horizontal Axis Wind Turbine - Components and Working	T1/R2	1	PPT	L2	CO1	PSO1
12	Vertical Axis Wind Turbine - Components and Working Functions	T1/R2	1	PPT	L2	CO1	PSO2
13	Wind Turbine Operation - Power versus Wind Speed	T1/R2	1	PPT	L3	CO1	PO4
14	Components of Wind Power Plant	T1/R2	1	PPT	L2	CO4	PO4
15	Working Principles of Wind Turbine	T1/R2	1	PPT	L2	CO4	PO2
16	Turbine Height and Site Selection	T1/R2	1	PPT	L2	CO2	PO2
17	Grid Integration Issues of Wind Power Plants	T1/R2	1	PPT	L2	CO2	PO1
18	Power, Frequency and voltage fluctuations due to random wind speed variation	T1/R2	1	PPT	L2	CO2	PO1

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**Quiz**

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## UNIT III SOLAR PV AND THERMAL SYSTEMS

19	Solar Radiation, Solar Radiation Geometry	T2/R1	1	PPT	L2	CO3	PO1
20	Measurement of Solar Radiation - Different Methods	T2/R1	1	PPT	L3	CO3	PO1
21	Solar Thermal Power Plant - Components and Working	T2/R1	1	PPT	L2	CO4	PO12
22	Basic Principles of SPV Conversion	T2/R1	1	PPT	L1	CO3	PSO1
23	Types of Solar Cells	T2/R1	1	PPT	L2	CO4	PO1
24	Types of Solar PV Systems	T2/R1	1	PPT	L2	CO4	PO1
25	Solar Cell, Module, Arrey - Components and Working	T2/R1	1	PPT	L2	CO4	PO2
26	I-V Characteristics, Efficiency of solar cells and Photovoltaic Panels	T2/R1	1	PPT	L3	CO3	PO2
27	Maximum Power Point Tracking - Applications	T2/R1	1	PPT	L2	CO3	PO2

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**Seminar**

<b>Evaluation method : Marks Out of 10</b>							
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## UNIT IV BIOMASS ENERGY

28	Different types of Biomass Resources	T3/R2	1	PPT	L1	CO5	PO1
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29	Biomass energy Conversion Process	T3/R2	1	PPT	L2	CO5	PO12
30	Geothermal Energy - Basics - Advantages and Disadvantages	T3/R2	1	PPT	L2	CO1	PO12
31	Geothermal Electricity	T3/R2	1	PPT	L2	CO4	PO12
32	Geothermal Energy - Direct Use	T3/R2	1	PPT	L1	CO1	PO12
33	Hydropower - Advantages and Disadvantages	T3/R2	1	PPT	L1	CO4	PO2
34	Classifications of Hydropower - Components of Small Hydro Power Plant	T3/R2	1	PPT	L2	CO4	PO2
35	Classifications of Water Turbine	T3/R2	1	PPT	L2	CO4	PO1
36	Turbine Theory - Problems	T3/R2	1	PPT	L3	CO4	PO1

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Assignment

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## UNIT V OTHER ENERGY SOURCES

37	Tidal Energy, Resources, Tidal Power Generation in India	T2/R2	1	PPT	L2	CO1	PO12
38	Calculation of Tidal Power, Tidal Power Basin - Types	T2/R2	1	PPT	L3	CO4	PO4
39	Wave energy, Power Associated with Sea Waves	T3/R2	1	PPT	L2	CO1	PO12
40	Principles of Ocean Thermal Energy Conversion	T3/R2	1	PPT	L2	CO1	PO12
41	Closed, Open and Hybrid Ocean Thermal energy Conversion	T3/R2	1	PPT	L2	CO4	PO3
42	Different Methods of Hydrogen Production	T3/R2	1	PPT	L2	CO4	PO1
43	Hydrogen Storage and Delevary	T3/R2	1	PPT	L2	CO4	PO1
44	Fuel Cells, Fuel Functionality - Hydrogen - Oxygen Fuel Cells	T2/R2	1	PPT	L1	CO5	PO12
45	Schematic and working functins of different fuel cells	T2/R2	1	PPT	L2	CO5	PO1

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Quiz

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## Content Beyond the Syllabus Planned

1	Solar energy connection for residential purpose
2	Environment Impact and consequence of Nuclear power accidents in the world

## Text Books

1	Joshua Earnest, Tore Wizeliu, Wind Plants and Project development, PHI Learning Pvt Ltd, New Delhi, 2011.
2	D.P.Kothari, K.C.Signal, Rakesh Ranjan "Renewable energy sources and Emerging Technologies", PHI Learning Pvt Ltd, New Delhi, 2013.
3	Scott Grinnell, "Renewable energy & Sustaibnable Design", CENGAGE Learning, USA, 2016.

## Reference Books

1	A.K.Mukerjee and Nivedita Thakur, "Photovoltoic System: Analysis and Design", PHI Learning Private Limited, New Delhi, 2011.
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2	Richard A, Dunlap, "Sustainable Energy Cengage Learning India Private Limited,Delhi, 2015.													
3	Chetan Singh Solanki, " Solar Photovoltoicz : Fundamentals Technologies and Applications, " PHI Learning Private Limited, New Delhi, 2011													
Website / URL References														
1	<a href="https://www.youtube.com/watch?v=6soloSTti00">https://www.youtube.com/watch?v=6soloSTti00</a>													
2	<a href="https://www.energy.gov/eere/wind/how-do-wind-turbines-work">https://www.energy.gov/eere/wind/how-do-wind-turbines-work</a>													
3	<a href="https://www.energy.gov/eere/fuelcells/fuel-cell-basics">https://www.energy.gov/eere/fuelcells/fuel-cell-basics</a>													
Blooms Level														
Level 1 ( L1 ) : Remembering		Lower Order Thinking	Fixed Hour Exams	Level 4 (L4) : Analysing					Higher Order Thinking	Projects / Mini Projects				
Level 2 (L2) : Understanding				Level 5 (L5) : Evaluating										
Level 3 (L3) : Applying				Level 6 (L6) : Creating										
Mapping syllabus with Bloom’s Taxonomy LOT and HOT														
Unit No	Unit Name		L1	L2	L3	L4	L5	L6	LOT	HOT	Total			
Unit 1	Renewable Energy Resources		4	5	0	0	0	0	9	0	9			
Unit 2	Wind Energy		1	7	1	0	0	0	9	0	9			
Unit 3	Solar PV and Thermal Systems		1	6	2	0	0	0	9	0	9			
Unit 4	Biomass Energy		3	5	1	0	0	0	9	0	9			
Unit 5	Other Energy Sources		1	7	1	0	0	0	9	0	9			
Total			10	30	5	0	0	0	45	0	45			
Total Percentage			22.2222	66.6667	11.1111	0	0	0	100	0	100			
CO PO Mapping														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1	1		1	1					3	2	1
CO2	3	1	1	1		1	1					3	2	1
CO3	3	1	1	1		1	1					3	2	1
CO4	3	1	1	1		1	1					3	2	1
CO5	3	1	1	1		1	1					3	2	1
CO6	3	1	1	1		1	1					3	2	1
Avg	3	1	1	1		1	1					3	2	1
Justification for CO-PO mapping														
CO1	Understanding the various renewable energy sources stronngly correlated with PS1 (Apply knowledge of Maths, Science and Engineering) and PS12 (Life long learnig)													
CO2	Understanding about the principle, Components and working of wind power plant strongly correlated with PS1 (Apply knowledge of Maths, Science and Engineering) and PS12 (Life long learnig)													
CO3	Students acquired knowledge about solar cells correlate with Engineeing Knowledge (PS1), Life long learning(PS12) and Design and development of Solution (PS3)													
CO4	Understanding about the biomass correlate Engineering Knowlwdge (PS1), Life long learning(PS12) and Design and development of Solution (PS3)													
CO5	Gained knowledge about the various renewable energy sources stronly correlated with Engineering Knowledge (PO1), Life long Learnign(PS12).													
3		High level			2		Moderate level			1		Low level		
Name & Sign of Faculty Incharge : Mr. C. Venkatesh														
Name & Sign of Subject Expert : Dr.J.Jeha														
Head of the Department :Dr.J.Jeha														