GOVERNMENT POLYTECHNIC, PURI

DEPARTMENT OF ELECTRICAL ENGINEERING

Discipline: **ELECTRICAL ENGG**	Semester:6TH	Name of the Teaching Faculty: **MR JASOBANTA BARIK, LECTURER IN ELECTRICAL ENGG.**
Subject: **RENEWABLE ENERGY SYSTEMS**	No. of days/per week class allotted: **05**	Semester From date: **16.01.2024** To Date: **26.04.2024** No. of weeks:15
PRE - REQUISITE	Knowledge of electrical drawing Specification of different wires, cables,accessories etc. Components used in Substations(HT,LT)	
COURSE OUTCOMES	CO1: Understand the detailed specification and numbers required of different materials. CO2: Undersatnd ton to determine the size and material of conductor and cable from electrical and mechanical consideration. CO3:Preparing and esitimating of materials required of different types wiring systems for domestic and industrial purpose. CO4: Understand the IE rules, calculation of load, calculating size of fuse wire CO5: Preparing material estimate of pole mounted and plinth mounted substation	

Week	Class Day	Theory / Practical Topics	DELIVERY METHOD
1st	1st	Introduction to Renewable energy: 1.1. Environmental consequences of fossil fuel use. 1.2. Importance of renewable sources of energy.	whiteboard
	2nd	1.3. Sustainable Design and development.	whiteboard
	3rd	1.4. Types of RE sources.	whiteboard
	4th	1.5. Limitations of RE sources.	whiteboard
	5th	1.6. Present Indian and international energy scenario of conventional and RE sources	whiteboard
2nd	1st	Solar Energy: 2.1. Solar photovoltaic system-Operating principle.	whiteboard
	2nd	2.2. Photovoltaic cell concepts	whiteboard
	3rd	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).	whiteboard
	4th	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).	whiteboard
	5th	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).	whiteboard
3rd	1st	2.3. Classification of energy Sources.	whiteboard
	2nd	2.4. Extra-terrestrial and terrestrial Radiation.	whiteboard
	3rd	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.	whiteboard
	4th	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.	whiteboard
	5th	2.6. Solar collectors, Types and performance characteristics,	whiteboard
4th	1st	2.6. Solar collectors, Types and performance characteristics,	whiteboard
	2nd	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.	whiteboard
	3rd	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.	whiteboard
	4th	**Assignment & class test**	whiteboard
	5th	Wind Energy:	whiteboard
5th	1st	3.1. Introduction to Wind energy.	whiteboard
	2nd	3.2. Wind energy conversion.	whiteboard
	3rd	3.3. Types of wind turbines	whiteboard
	4th	3.4. Aerodynamics of wind rotors.	whiteboard
	5th	3.5. Wind turbine control systems; conversion to electrical power:	whiteboard
6th	1st	3.6. Induction and synchronous generators.	whiteboard
	2nd	3.7. Grid connected and self excited induction generator operation.	whiteboard
	3rd	3.8. Constant voltage and constant frequency generation with power electronic control.	whiteboard
	4th	3.9. Single and double output systems.	whiteboard
	5th	3.9. Single and double output systems.	whiteboard
7th	1st	3.10. Characteristics of wind power plant.	whiteboard
	2nd	3.10. Characteristics of wind power plant.	whiteboard
	3rd	3.10. Characteristics of wind power plant.	whiteboard
	4th	**assignment & class test**	whiteboard
	5th	Biomass Power:	whiteboard
8th	1st	4.1. Energy from Biomass.	whiteboard
	2nd	4.2. Biomass as Renewable Energy Source	whiteboard
	3rd	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.	whiteboard

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	4th	4.4. Combustion and fermentation.	whiteboard
	5th	4.5. Anaerobic digestion.	whiteboard
9th	1st	4.6. Types of biogas digester.	whiteboard
	2nd	4.6. Types of biogas digester.	whiteboard
	3rd	4.7. Wood gassifier.	whiteboard
	4th	4.8. Pyrolysis,.	whiteboard
	5th	4.9. Applications: Bio gas, Bio diesel	whiteboard
10th	1st	4.9. Applications: Bio gas, Bio diesel	whiteboard
	2nd	**assignment & class test**	whiteboard
	3rd	Other Energy Sources	whiteboard
	4th	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.	whiteboard
	5th	5.2. Ocean Thermal Energy Conversion (OTEC).	whiteboard
11th	1st	5.3. Geothermal Energy – Classification.	whiteboard
	2nd	5.3. Geothermal Energy – Classification.	whiteboard
	3rd	5.4. Hybrid Energy Systems.	whiteboard
	4th	5.4. Hybrid Energy Systems.	whiteboard
	5th	5.5. Need for Hybrid Systems.	whiteboard
12th	1st	5.5. Need for Hybrid Systems.	whiteboard
	2nd	5.5. Need for Hybrid Systems.	whiteboard
	3rd	5.6. Diesel-PV, Wind-PV, Microhydel-PV.	whiteboard
	4th	5.6. Diesel-PV, Wind-PV, Microhydel-PV.	whiteboard
	5th	5.6. Diesel-PV, Wind-PV, Microhydel-PV.	whiteboard
13th	1st	5.6. Diesel-PV, Wind-PV, Microhydel-PV.	whiteboard
	2nd	5.7. Electric and hybrid electric vehicles.	whiteboard
	3rd	5.7. Electric and hybrid electric vehicles.	whiteboard
	4th	5.7. Electric and hybrid electric vehicles.	whiteboard
	5th	**assignment & class test**	whiteboard
14th	1st	**Assignment & class test**	whiteboard
	2nd	**Revision**	whiteboard
	3rd	**Revision**	whiteboard
	4th	**Revision**	whiteboard
	5th	**Revision**	whiteboard
15th	1st	**previous year questions**	whiteboard
	2nd	**previous year questions**	whiteboard
	3rd	**previous year questions**	whiteboard
	4th	**previous year questions**	whiteboard
	5th	**previous year questions**	whiteboard

LEARNING RESOURCES:

1.Renewable Energy Sources and Emerging Technologies,D.P.Kothari, K.C Singal, Rakesh Ranjan,PHI Learning Pvt.Ltd, New Delhi
2.Non-Conventional Energy Resources,B.H.Khan,Tata McGrawHill
3.Non-Conventional Energy Resources,J.P Navani & Sonal Sapra,S chand
4.Non Conventional Energy sources and Utilisation,R K Rajput,S Chand

WEBSITE RESOURCES:

1 https://www.youtube.com/watch?v=Cl23xQrvFhk&list=PLyqSpQzTE6M8-wda5vbgHkMQTmu-21hRK (NPTCL)
2 https://www.youtube.com/watch?v=7LZSjgZz-Qw&list=PLxn52v8fxX5l5tGzU1NAxRDkgqxK0k5UZ (NPTCL)

10/01/2024

Sign. of Faculty concerned

10.1.24

Principal
G.P Puri

10/01/24

Sign. of HOD

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