



**GOVERNMENT POLYTECHNIC KORAPUT
DEPARTMENT OF ELECTRICAL ENGINEERING**

Th4. RENEWABLE ENERGY SYSTEMS (Elective – B)

Name of the Course: Diploma in Electrical Engineering		Date: 14/2/23	
Faculty: Mr Ruhia Hansda			
Course code:	Th.4 (Elective – B)	Semester:	6 th
Total Period:	75 Periods	Examination:	3 Hrs
Theory periods:	4P / Week	Internal Assessment:	20
Tutorial:	1P/week	End Semester Examination:	80
Maximum marks:	100		

VISION:

To create competent & industry ready Electrical Diploma Engineers with professional and social values to meet future challenges.

MISSION:

- To prepare diploma holders through "qualitative competency based education system" to compete with national requirement along with core values.
- To produce dynamic Electrical Engineers to serve the society and industry.
- To develop leadership qualities, communication skills, critical thinking and attitude for lifelong learning.

PROGRAM EDUCATIONAL OBJECTIVES:

PEO1	Apply technical knowledge and skills learned in the field of Electrical Engineering to excel in Professional and/or higher education.
PEO2	To provide students an excellent academic environment and make them aware the needs of Society and Industry to become a successful Professional/Entrepreneur.
PEO3	To engage in lifelong learning, career enhancement to adopt emerging technologies

Course outcomes:-

Co1	Understand of renewable and non-renewable sources of energy
Co2	Gain knowledge about working principle of various solar energy systems
Co3	Understand the application of wind energy and wind energy conversion system
Co4	Understand the applications of different renewable energy sources like ocean thermal, hydro, geothermal energy etc.

TOPIC WISE DISTRIBUTION OF PERIODS

Sl. No.	Topics	Periods
1.	Introduction to Renewable energy	5
2.	Solar Energy	15
3.	Wind Energy	12
4.	Biomass Power	12
5.	Other Energy Sources	16
	Total	60



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LESSON PLAN

Week	Day	Theory topic
1 st	1 st	Introduction to Renewable energy , Environmental consequences of fossil fuel use
	2 nd	Importance of renewable sources of energy
	3 rd	Sustainable Design and development.
	4 th	Types of RE sources
	5 th	Tutorial
2 nd	1 st	Limitations of RE sources. Present Indian and international energy scenario of conventional and RE sources
	2 nd	Solar Energy: Solar photovoltaic system-
	3 rd	Operating principle
	4 th	Photovoltaic cell concepts Cell, module, array
	5 th	Tutorial
3 rd	1 st	Photovoltaic cell concepts Cell, module, array
	2 nd	Series and parallel connections.
	3 rd	Maximum power point tracking (MPPT).
	4 th	Classification of energy Sources
	5 th	Tutorial
4 th	1 st	Extra-terrestrial and terrestrial Radiation
	2 nd	Azimuth angle, Zenith angle, Hour angle
	3 rd	, Irradiance, Solar constant
	4 th	Solar collectors, Types and performance characteristics
	5 th	Tutorial
5 th	1 st	Applications: Photovoltaic - battery charger
	2 nd	domestic lighting, street lighting
	3 rd	water pumping, solar cooker, Solar Pond.
	4 th	Doubt clear class
	5 th	Tutorial
6 th	1 st	Wind Energy: Introduction to Wind energy
	2 nd	Wind energy conversion.
	3 rd	Types of wind turbines
	4 th	Aerodynamics of wind rotors
	5 th	Tutorial
7 th	1 st	Wind turbine control systems; conversion to electrical power:
	2 nd	Wind turbine control systems; conversion to electrical power:
	3 rd	Induction and synchronous generators.
	4 th	Grid connected and self excited induction generator operation.
	5 th	Tutorial
8 th	1 st	Constant voltage and constant frequency generation with power electronic control.
	2 nd	Constant voltage and constant frequency generation with power electronic control.
	3 rd	Single and double output systems.
	4 th	Characteristics of wind power plant
	5 th	Tutorial
9 th	1 st	Biomass Power: Energy from Biomass
	2 nd	Biomass as Renewable Energy Source
	3 rd	Types of Biomass Fuels - Solid, Liquid and Gas



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	4 th	Types of Biomass Fuels - Solid, Liquid and Gas
	5 th	Tutorial
10 th	1 st	Combustion and fermentation
	2 nd	Anaerobic digestion
	3 rd	Types of biogas digester
	4 th	Types of biogas digester
	5 th	Tutorial
11 th	1 st	Wood gassifier
	2 nd	Pyrolysis,
	3 rd	Applications: Bio gas, Bio diesel
	4 th	Applications: Bio gas, Bio diesel
	5 th	Tutorial
12 th	1 st	Other Energy Sources Tidal Energy: Energy from the tides,
	2 nd	Barrage and Non Barrage
	3 rd	Tidal power systems
	4 th	Ocean Thermal Energy Conversion (OTEC).
	5 th	Tutorial
13 th	1 st	Geothermal Energy – Classification
	2 nd	Geothermal Energy – Classification
	3 rd	Hybrid Energy Systems
	4 th	Need for Hybrid Systems
	5 th	Tutorial
14 th	1 st	Diesel-PV
	2 nd	Wind-PV
	3 rd	Microhydel-PV.
	4 th	Electric and hybrid electric vehicles.
	5 th	Tutorial
15 th	1 st	Electric and hybrid electric vehicles.
	2 nd	Revision
	3 rd	Previous year question discusion
	4 th	Previous year question discusion
	5 th	Tutorial


Signature of faculty concerned


13/02/23
H.O.D. Electrical