



GOVERNMENT POLYTECHNIC, NAYAGARH DEPARTMENT OF ELECTRICAL ENGINEERING

Semester: 6TH DIPLOMA

AY-2023-24

Subject: Renewable Energy

No Of Period : 75 (5p/week)

Branch: Electrical Engineering

Name of Faculty: Gobinda Chandra Sahoo (GF)

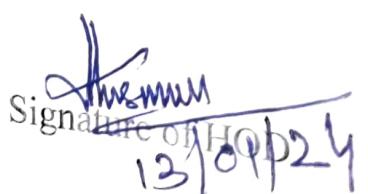
Week	Period	Topics to be covered
1 ST WEEK	1	1. INTRODUCTION TO RENEWABLE ENERGY 1.1. Environmental consequences of fossil fuel use. 1.2 Importance of renewable sources of energy.
	2	1.3. Sustainable Design and development.
	3	1.4 Types of RE sources.
	4	1.5. Limitations of RE sources.
	5	1.6. Present Indian and international energy scenario of conventional and RE sources
2 ND WEEK	6	2.SOLAR ENERGY 2.1. Solar photovoltaic system Operating principle.
	7	2.1. Solar photovoltaic system Operating principle.
	8	2.2. Photovoltaic cell concepts
	9	2.2. Photovoltaic cell concepts
	10	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).
3 RD WEEK	11	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).
	12	2.2.1. Cell, module, array, Series and parallel connections. Maximum power point tracking (MPPT).
	13	2.3. Classification of energy Sources.
	14	2.3. Classification of energy Sources.
	15	2.4. Extra-terrestrial and terrestrial Radiation.
4 TH WEEK	16	2.4. Extra-terrestrial and terrestrial Radiation.
	17	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	18	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	19	2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.
	20	2.6. Solar collectors, Types and performance characteristics, 2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.

5 TH WEEK	22	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.
	23	3.WIND ENERGY 3.1. Introduction to Wind energy.
	24	3.2. Wind energy conversion.
	25	3.3. Types of wind turbines
6 TH WEEK	26	3.5. Wind turbine control systems; conversion to electrical power:
	27	3.5. Wind turbine control systems; conversion to electrical power:
	28	3.6. Induction and synchronous generators.
	29	3.6. Induction and synchronous generators.
	30	3.6. Induction and synchronous generators.
	31	3.7. Grid connected and self excited induction generator operation.
7 TH WEEK	32	3.7. Grid connected and self excited induction generator operation.
	33	3.8. Constant voltage and constant frequency generation with power electronic control.
	34	3.9. Single and double output systems.
	35	3.10. Characteristics of wind power plant.
	36	3.10. Characteristics of wind power plant.
8 TH WEEK	37	4.BIOMASS ENERGY 4.1. Energy from Biomass.
	38	4.2. Biomass as Renewable Energy Source
	39	4.2. Biomass as Renewable Energy Source
	40	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	41	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
9 TH WEEK	42	4.4. Combustion and fermentation.
	43	4.5. Anaerobic digestion.
	44	4.6. Types of biogas digester.
	45	4.7. Wood gassifier.
	46	4.8. Pyrolysis.
10 TH WEEK	47	4.9. Applications: Bio gas, Bio diesel
	48	4.9. Applications: Bio gas, Bio diesel
	49	5.OTHER ENERGY SOURCES 5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	50	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	51	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.
	52	5.1. Tidal Energy: Energy from the tides, Barrage and Non Barrage Tidal power systems.

11 TH WEEK	53	5.2. Ocean Thermal Energy Conversion (OTEC).
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	55	5.2. Ocean Thermal Energy Conversion (OTEC).
12 TH WEEK	56	5.2. Ocean Thermal Energy Conversion (OTEC).
	57	5.3. Geothermal Energy – Classification
	58	5.3. Geothermal Energy – Classification
	59	5.4. Hybrid Energy Systems.
	60	5.5. Need for Hybrid Systems.
	61	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
13 TH WEEK	62	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	63	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	64	5.7. Electric and hybrid electric vehicles.
	65	5.7. Electric and hybrid electric vehicles.
	66	5.7. Electric and hybrid electric vehicles.
	67	REVISION OF INTRODUCTION TO RENEWABLE ENERGY
14 TH WEEK	68	REVISION OF SOLAR ENERGY
	69	REVISION OF SOLAR ENERGY
	70	REVISION OF SOLAR ENERGY
	71	REVISION OF WIND ENERGY
	72	REVISION OF WIND ENERGY
	73	REVISION OF BIOMASS ENERGY
15 TH WEEK	74	REVISION OF OTHER ENERGY SOURCES
	75	REVISION OF OTHER ENERGY SOURCES

Gobinda Chanchan Sahoo

Signature of Faculty


Signature of HOD
13/09/24