GOVERNMENT POLYTECHNIC ,NAYAGARH
DEPARTMENT OF ELECTRICAL ENGINEERING

Semester: 6TH DIPLOMA
Subject: Renewable Energy
Branch: Electrical Engineering

AY-2023-24
No Of Period :75 (5p/week)
Name of Faculty: Gobinda Chandra Sahoo (GF)

Week	Period	Topics to be covered
1ST WEEK	1	**1.INTRODUCTION TO RENEWABLE ENERGY** 1.1. Environmental consequences of fossil fuel use.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
2ND WEEK	6	**2.SOLAR ENERGY** 2.1. Solar photovoltaic systemOperating principle.
	7	2.1. Solar photovoltaic systemOperating 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).
3RD 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.
4TH 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,
	21	2.7. Applications: Photovoltaic - battery charger, domestic lighting, street lighting, water pumping, solar cooker, Solar Pond.

5TH 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
6TH 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.
7TH WEEK	31	3.7. Grid connected and self excited induction generator operation.
	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.
8TH WEEK	36	3.10. Characteristics of wind power plant.
	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.
9TH WEEK	41	4.3. Types of Biomass Fuels - Solid, Liquid and Gas.
	42	4.4. Combustion and fermentation.
	43	4.5. Anaerobic digestion.
	44	4.6. Types of biogas digester.
	45	4.7. Wood gassifier.
10TH WEEK	46	4.8. Pyrolysis.
	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 Tidal power systems.

11TH WEEK	53	5.2. Ocean Thermal Energy Conversion (OTEC).
	54	5.2. Ocean Thermal Energy Conversion (OTEC).
	55	5.2. Ocean Thermal Energy Conversion (OTEC).
12TH 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.
13TH WEEK	61	5.6. Diesel-PV, Wind-PV, Microhydel-PV.
	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.
14TH WEEK	66	5.7. Electric and hybrid electric vehicles.
	67	REVISION OFINTRODUCTION TO RENEWABLE ENERGY
	68	REVISION OF SOLAR ENERGY
	69	REVISION OFSOLAR ENERGY
	70	REVISION OFSOLAR ENERGY
15TH WEEK	71	REVISION OFWIND ENERGY
	72	REVISION OFWIND ENERGY
	73	REVISION OFBIOMASS ENERGY
	74	REVISION OFOTHER ENERGY SOURCES
	75	REVISION OFOTHER ENERGY SOURCES

Gobinda chandra Sahoo

Signature of Faculty

Signature of HOD

13/09/24