

GOVT. POLYTECHNIC BALANGIR

Department of Electrical Engineering

LESSON PLAN: 2025-26

Name of the Faculty: MD SAMSUDDIN ANSARI

Subject: RENEWABLE ENERGY SYSTEMS

Program: Diploma in Electrical Engineering

Semester: 6th

Total Contact Hours: **75** Total

Marks: 100

Assessment: Progressive –20, End Term – 80

Credits: 5

B. OBJECTIVE:

After completion of this subject the student will be able:

1. Power production from pollution free forces and environment friendly resources.
2. Production of power from nature at free of cost.
3. Solar energy conversion is noiseless and cheap

Unit 1:Renewable Energy systems (Total Classes-6)

Class No.	Topic	Subtopic (Elaborated)	Simple Teaching Aids/Activities	Course Objective
1	Introduction to Renewable energy	1.1. Environmental consequences of fossil fuel use.	Chalkboard definition writing, students repeat definitions	CO1
2	Importance of Renewable energy	1.2. Importance of renewable sources of energy	discussion and PPT Slide	CO1
3	Sustainable energy	1.3. Sustainable Design and development.	PPT slide and presentation	CO1
4	Types	1.4. Types of RE sources.	Class discussion and note making	CO1
5	Limitation	1.5. Limitations of RE sources.	Chalkboard definition writing, students repeat definitions	CO1
6	Conventional energy	1.6. Present Indian and international energy scenario of conventional and RE sources.	students repeat definitions	CO1

Unit 2:Solar Energy(Total Classes-9)

Class No.	Topic	Subtopic (Elaborated)	Simple Teaching Aids/Activities	Course Objective
1	Solar PV	2.1. Solar photovoltaic system- Operating principle.	Chalkboard definition writing, students repeat definition	CO2
2	Components of PV cell	2.2. Photovoltaic cell concepts 2.2.1. Cell, module, array	definitions, discussion on working of PV	CO2

3	Photovoltaic cell	2.2. Photovoltaic cell concepts 2.2.1. Cell, module, array,	students repeat definition	CO2
4	MPPT	Series and parallel connections. Maximum power point tracking (MPPT).	discussion on working of MPPT	CO2
5	Classification	2.3. Classification of energy Sources.	PPT slide and presentation	CO2
6	Azimuth Angle	2.4. Extra-terrestrial and terrestrial Radiation. 2.5. Azimuth angle, Zenith angle, Hour angle, Irradiance, Solar constant.	Class discussion and note making	CO2
7	performance characteristics	2.6. Solar collectors, Types and performance characteristics,	PPT slide and presentation	CO2
8	Applications	2.7. Applications: Photovoltaic - battery charger, domestic	short video clip	CO2
9	Application of solar	lighting, street lighting, water pumping, solar cooker, Solar Pond.	PPT slide and presentation	CO2

Unit 3: Wind Energy (Total Classes-09)

Class No.	Topic	Subtopic (Elaborated)	Simple Teaching Aids/Activities	Course Objective
1	Introduction	3.1. Introduction to Wind energy.	Chalkboard definition writing, students repeat definitions,	CO3
2	Types of wind turbine	3.2. Wind energy conversion. 3.3. Types of wind turbines	discussion on working of Wind turbine	CO3
3	Types of rotors	3.4. Aerodynamics of wind rotors.	Chalkboard definition writing	CO3
4	Conversion	3.5. Wind turbine control systems; conversion to electrical power:	Chalkboard definition writing	CO3
5	Types of Generators	3.6. Induction and synchronous generators.	PPT slide and presentation	CO3
6	Generator operation.	3.7. Grid connected and self excited induction generator operation.	PPT slide and presentation	CO3
7	Constant voltage control	3.8. Constant voltage control	Short video clip	CO3
8	Constant freq. constant frequency generation	3.8.1 constant frequency generation with power electronic control.	Chalkboard definition writing	CO3
9	Types of system	3.9. Single and double output systems.	Short video clip	CO3

Unit 4: Biomass power(Total Classes-11)

Class No.	Topic	Subtopic (Elaborated)	Simple Teaching Aids/Activities	Course Objective
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1	Introduction of Biomass	4.1. Energy from Biomass.	Chalkboard definition writing, students repeat definitions, discussion on Biomass	CO4
3	Biomass	4.2. Biomass as Renewable Energy Source	PPT slides	CO4
4	Types of Biomass Fuels	4.3. Types of Biomass Fuels - Solid, Liquid and Gas. 4.4. Combustion	Chalkboard definition writing	CO4
5	Types of combustion	fermentation.	PPT slide and presentation	CO4
6	Digestion	4.5. Anaerobic digestion.	Chalkboard definition writing	CO4
7	Types of Biogas	4.6. Types of biogas digester.	Chalkboard definition writing	CO4
8	Biogas	4.7. Woodgasifier.	PPT slide and presentation	CO4
9	Types of biogas	4.8. Pyrolysis.,	Short video clip, presentation	CO4
10	Application	4.9. Applications: Bio gas,	Short video clip, Chalkboard definition	CO4
11	Bio Diesel	4.10 Bio diesel	Chalkboard definition, PPT slide	CO4

Unit 5: Other Energy Sources (Total Classes-09)

Class No.	Topic	Subtopic (Elaborated)	Simple Teaching Aids/Activities	Course Objective
1	Introduction of Tidal energy	5.1. Tidal Energy: Energy from the tides, Barrage	Chalkboard definition writing, students repeat definitions,	CO5
2	Types of Tidal energy	5.1.1 Non Barrage Tidal power systems.	discussion on working of Tidal Energy	CO5
3	Types of conversion	5.2. Ocean Thermal Energy Conversion (OTEC).	Chalkboard definition writing	CO5
4	Geothermal energy	5.3. Geothermal Energy	Chalkboard definition writing	CO5
5	Classification of energy system	5.4. Hybrid Energy Systems.	PPT slide and presentation	CO5
6	Hybrid system	5.5. Need for Hybrid Systems.	PPT slide and presentation	CO5
7	Hybrid wind-PV.	5.6. Diesel-PV, Wind-PV, Microhydel-PV.	Discussion and definition	CO5

8	Application of Hybrid system	5.7. Electric vehicles	Short video clip	CO5
9	Application	5.7.1 Hybrid electric vehicles.	Chalkboard definition writing	CO5

Md Samsuddin Ansari

Signature of faculty

*S. S. Ansari
12/1/12*

Signature of H.O.D.

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