

Government Polytechnic, Balangir

Department of Department of Electrical Engineering

LESSON PLAN 2026-27(WINTER)

NAME OF THE Faculty : Guest Faculty-2

Subject: TH:5- RENEWABLE ENERGY POWER PLANTS

Program: Diploma in Electrical Engineering

Semester: 3rd

Total Contact Hours: 45

Total Marks: 100

Assessment: Internal Assessment – 30, End Term – 70

COURSE OUTCOMES:

CO1 Explain Solar PV and Concentrated Solar Power Plants.

CO2 Describe large Wind Power Plants.

CO3 Explain small Wind Turbines.

CO4 Discuss biomass fuels.

CO5 Prepare layouts of biomass-based power plants.

Period	Unit	Topic	Learning Objectives	Activity	Course Outcome	Learning Methodology	Homework
1 I		Introduction to Renewable Energy	Explain the importance of renewable energy sources	Interactive discussion	CO1	Lecture & PPT	Read syllabus and applications
2 I		Solar Map of India	Interpret solar radiation data	Map analysis	CO1	Lecture + ICT	Prepare notes
3 I		Global Solar Radiation	Explain solar energy availability	Numerical examples	CO1	Lecture	Solve problems
4 I		Solar PV Fundamentals	Explain PV principle	Video demonstration	CO1	PPT & Discussion	Draw PV cell diagram
5 I		CSP Introduction	Describe CSP technology	Classroom discussion	CO1	Lecture	Compare PV & CSP
6 I		Power Tower CSP	Explain construction & working	Animation	CO1	ICT Learning	Sketch diagram
7 I		Parabolic Trough CSP	Explain operation	Diagram explanation	CO1	Interactive lecture	Assignment
8 I		Parabolic Dish CSP	Explain working principle	Video	CO1	Demonstration	Prepare notes
9 I		Fresnel Reflector CSP	Explain construction	PPT	CO1	Lecture	Short notes
10 I		Solar PV Plant Components	Identify plant components	Model demonstration	CO1	Demonstration	Draw layout
11 I		Rooftop Solar PV System	Explain rooftop installation	Case study	CO1	Activity-based	Assignment
12 I		Unit-I Revision	Review solar technologies	Quiz	CO1	Discussion	Unit-I worksheet
13 II		Wind Map of India	Explain wind potential	Map analysis	CO2	Lecture	Study wind atlas
14 II		Wind Power Density	Calculate wind power	Numerical solving	CO2	Problem solving	Practice numericals
15 II		Lift & Drag Principle	Explain aerodynamic forces	Demonstration	CO2	Interactive lecture	Assignment
16 II		Long Path Theory	Explain wind energy conversion	Discussion	CO2	Lecture	Short notes
17 II		Geared Wind Turbine	Explain construction	Video demonstration	CO2	ICT Learning	Draw layout
18 II		Direct Drive Wind Turbine	Compare with geared system	PPT	CO2	Lecture	Comparison table
19 II		SCIG	Explain constant speed generator	Discussion	CO2	Lecture	Assignment
20 II		WRIG	Explain wound rotor generator	Board explanation	CO2	Interactive	Notes

	IG		Explain variable speed generator	Animation	CO2	ICT	Assignment
		WRSG	Explain operation	Lecture	CO2	Lecture	Prepare notes
23	II	PMSG	Explain construction & working	Discussion	CO2	Interactive	Comparison chart
24	II	Unit-II Revision	Revise wind power plants	Quiz	CO2	Discussion	Practice questions
25	III	Horizontal Axis Turbine (Direct Drive)	Explain construction	Video	CO3	Demonstration	Draw diagram
26	III	Horizontal Axis Turbine (Geared)	Explain working	Lecture	CO3	Interactive	Assignment
27	III	Vertical Axis Turbine	Explain components	PPT	CO3	Lecture	Notes
28	III	Vertical Axis Turbine Working	Explain operation	Discussion	CO3	Interactive	Assignment
29	III	Wind Turbine Towers	Explain tower types	Case study	CO3	Activity-based	Sketch tower types
30	III	Rooftop Installation	Explain installation procedure	Video	CO3	ICT	Assignment
31	III	Open Field Installation	Explain site selection	Discussion	CO3	Lecture	Prepare report
32	III	Small Wind Generators	Explain generator types	Lecture	CO3	PPT	Notes
33	III	Unit-III Revision	Review concepts	Quiz	CO3	Discussion	Unit assignment
34	IV	Biomass Energy	Explain biomass resources	Lecture	CO4	Interactive	Notes
35	IV	Solid Biomass Fuels	Describe bagasse, wood chips, rice husk	Sample demonstration	CO4	Lecture	Prepare comparison
36	IV	Municipal Waste	Explain waste-to-energy	Case study	CO4	Discussion	Assignment
37	IV	Liquid Biomass Fuels	Explain biodiesel	PPT	CO4	Lecture	Notes
38	IV	Gaseous Biomass Fuels	Explain biogas	Video	CO4	ICT	Assignment
39	IV	Bio-Chemical Power Plant	Explain layout	Diagram discussion	CO5	Interactive	Draw layout
40	IV	Thermo-Chemical Power Plant	Explain working	Lecture	CO5	PPT	Assignment
41	IV	Agro-Chemical Power Plant	Explain biodiesel plant	Case study	CO5	Discussion	Prepare report
42	IV	Comparison of Biomass Plants	Compare layouts	Group discussion	CO5	Collaborative learning	Comparison table
43	IV	Environmental Aspects	Explain advantages & limitations	Seminar	CO5	Activity-based	Short notes
44	IV	Comprehensive Revision	Revise complete syllabus	Question-answer session	CO1-CO5	Discussion	Prepare for test
45	All	Class Test & Feedback	Assess course outcomes	Written test & discussion	CO1-CO5	Assessment	Revise all units

Signature of Faculty

Ravik
01-07-26
Signature of HOD