Community College of Skill Development

Lesson Plan: POWER PLANT ENGINEERING

Program: B.VOC ELECTRICAL **Semester: IIIrd** **Course Code: ELV-201-V**
Credits: 3

Course Objectives: The objective of this course is to provide students with a comprehensive understanding of power systems, including the principles of power generation, transmission, and distribution. Students will explore various energy sources, both conventional and non-conventional, and gain insights into the design, operation, and combined working of different types of power plants. The course will equip students with the knowledge necessary to evaluate the merits and demerits of different power generation methods and understand the coordination required in power systems.

Course Outcomes: After the successful completion of the course, students will be able to:

CO1: Define and explain the key concepts in power generation, transmission, and distribution, and identify the various sources of energy.

CO2: Describe the operational principles, design, site selection, and environmental impacts of hydroelectric, thermal, and nuclear power plants.

CO3: Discuss the principles, advantages, and challenges of generating power from solar, wind, tidal, geothermal, and biodiesel sources.

CO4: Explain the advantages of combined working of different types of power plants and the need for coordination in power systems, including the roles of base load and peak load stations.

Equipment required in Classroom/ Laboratory/ Workshop

i. Whiteboard

Assessment Scheme

S.No.	Criteria	Marks
1	End Term Examination	75
2	Internal Evaluation Scheme	25
2a	Class Tests	15
2a (i)	Class Test-I	7.5
2a (ii)	Class Test-II	7.5
2(b)	Teacher Assessment (Continuous Evaluation)	10
2b (i)	Attendance	5
2b (ii)	Assignment / Presentation	5

Lecture No.	Topic Covered	Pedagogy	Date of Implementation	Course Outcomes Covered	Faculty Sign
1	Introduction to Power System – Overview and Importance	Whiteboard	30-7-25	CO1	VINOD
2	Definition and Functions of Generation, Transmission, and Distribution	Whiteboard	30-7-25	CO1	VINOD
3	Block Diagram of an Electrical Power System	Whiteboard	7-78-25	CO1	VINOD
4	Overview of Energy Sources	Whiteboard	13-8-25	CO1	VINOD
5	Conventional Sources of Energy (Coal, Oil, Gas, Hydro, Nuclear)	Whiteboard	13-8-25	CO1	VINOD
6	Non-Conventional Sources of Energy (Solar, Wind, Biomass, etc.)	Whiteboard	20-8-25	CO1	VINOD
7	Comparison: Conventional vs. Non-Conventional Power Generation	Whiteboard	20-8-25	CO1	VINOD
8	Revision and Short Quiz on Unit I	Whiteboard	20-8-25	CO1	VINOD
9	Introduction to Hydroelectric Power Plant	Whiteboard	21-8-25	CO2	VINOD

10	Schematic Arrangement of a Hydroelectric Power Station	Whiteboard	21-8-25	CO2	VINOD
11	Site Selection and Constituents	Whiteboard	28-8-25	CO2	VINOD
12	Merits, Demerits, and Classification of Hydroelectric Plants	Whiteboard	3-9-25	CO2	VINOD
13	Numerical Problems and Revision	Whiteboard	3-9-25	CO2	VINOD
14	Introduction and Layout of Thermal Power Plant	Whiteboard	4-9-25	CO2	VINOD
15	Combustion Process and Ash Disposal Problems	Whiteboard	10-9-25	CO2	VINOD
16	Circulating Water Schemes, Economizer, Air Preheater	Whiteboard	10-9-25	CO2	VINOD
17	Feed Water Heaters and Dust Collection Techniques	Whiteboard	11-9-25	CO2	VINOD
18	Site Selection, Merits, and Demerits of Thermal Plants	Whiteboard	17-9-25	CO2	VINOD
19	Introduction and Principle of Nuclear Power Generation	Whiteboard	17-9-25	CO2	VINOD
20	Nuclear Reactor Components: Moderator, Control Rods, Coolants	Whiteboard	18-9-25	CO2	VINOD
21	Schematic Arrangement of a Nuclear Power Plant	Whiteboard	18-9-25	CO2	VINOD
22	Merits, Demerits, and Site Selection for Nuclear Plants	Whiteboard	8-10-25	CO2	VINOD
23	Revision and Quiz on Conventional Sources	Whiteboard	8-10-25	CO2	VINOD
24	Introduction to Non-Conventional Energy	Whiteboard	8-10-25	CO3	VINOD
25	Concept and Working of Solar Power Generation	Whiteboard	9-10-25	CO3	VINOD
26	Applications and Limitations of Solar Energy	Whiteboard	15-10-25	CO3	VINOD
27	Wind Energy – Principles and Types of Wind Turbines	Whiteboard	15-10-25	CO3	VINOD
28	Tidal Energy – Working and Site Requirements	Whiteboard	16-10-25	CO3	VINOD
29	Geothermal Energy – Sources and Power Generation	Whiteboard	29-10-25	CO3	VINOD
30	Biomass and Biodiesel Energy	Whiteboard	29-10-25	CO3	VINOD

31	Comparison of Various Non-Conventional Sources	Whiteboard	30-10-25	CO3	VINOD
32	Revision	Whiteboard	30-10-25	CO3	VINOD
33	Introduction to Combined Working of Power Plants	Whiteboard	6-11-25	CO4	VINOD
34	Advantages of Combined Operation	Whiteboard	12-11-25	CO4	VINOD
35	Need for Coordination Between Power Plants	Whiteboard	12-11-25	CO4	VINOD
36	Concept of Base Load and Peak Load Stations	Whiteboard	13-11-25	CO4	VINOD
37	Methods of Coordination and Load Scheduling	Whiteboard	26-11-25	CO4	VINOD
38	Case Studies: Combined Hydro-Thermal, Solar-Wind Systems	Whiteboard	26-11-25	CO4	VINOD
39	Revision and Discussion on Modern Trends in Power Systems	Whiteboard	27-11-25	CO4	VINOD
40	Comprehensive Test / Final Review			CO4	VINOD

Text Books:

1. Subir Roy; *Electrical Power System*, Prentice Hall.
2. Nagrath & Kothari; *Power System Engineering*, TMH.
3. C. L. Wadwa; *Elements of Power System Analysis*, New Age International.
4. Ashfaq Hussain; *Electrical Power System*, CBS Publishers & Distributors.

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