GOVT. POLYTECHNIC BALANGIR

Department of Electrical Engineering

LESSON PLAN: 2025-26

Name of the Faculty: Sujata Bhoi

Subject: ELECTRIC POWER TRANSMISSION AND DISTRIBUTION

Program: Diploma in Electrical Engineering

Semester: 4th

Total Contact Hours: 45 Total

Marks: 100

Assessment: Progressive –30, End Term – 70

Credits: 3

COURSE OBJECTIVES:

After completion of the course, the students will be able to

- Explain the optimized working of the thermal power plant
- Describe the efficient operation of large hydropower plants.
- Describe the efficient operation micro hydropower plants.
- Select the adequate mix of power generation based on economic operation.

Unit 1: Basics of Transmission and Distribution (Total Classes-8)				
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	transmission and distribution systems	1.1 Single line diagrams with components of the electric supply transmission and distribution systems	Chalkboard definition writing, students repeat definitions, discussion on transmission and distribution systems	CO1
2	Classification of transmission lines	1.2 Classification of transmission lines	Chalkboard definition and discussion and video clip	CO1
3	transmission	1.3 Primary and secondary transmission	discussion on Primary and secondary transmission	CO1
4	Voltage level	1.4 Standard voltage level used in India	Group discussion and PPT slides	CO1
5	Classification of transmission lines	1.5 Classification of transmission lines: based on type of voltage, voltage level, length and others	PPT slides, short video clip	CO1
6	Characteristics	1.6 Characteristics of high voltage for power transmission	Chalk board summary	CO1
7	Method of construction of electric supply transmission system	1.7 Method of construction of electric supply transmission system- 110 kV, 220 kV, 400 kV	Class discussion and note making	CO1

8	Method of construction of electric supply distribution systems	Method of construction of electric supply distribution systems- 220 V, 400V, 11 kV, 33 kV	PPT slide and presentation	CO1

Unit 2: Transmission Line Parameters and Performance (Total Classes-05)				
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	Line Parameters	2.1 Line Parameters: Concepts of R, L and C of line parameters and types of lines	Chalkboard definition writing, students repeat definition	CO2
2	Performance of short line	2.2 Performance of short line: Efficiency, regulation and its derivation, effect of power factor, vector diagram for different power factor	definitions, discussion on Performance of short line	CO2
3	Performance of medium line	2.3 Performance of medium line: representation, nominal 'T', nominal 'π' and end condenser methods	students repeat definition	CO2
4	Transposition	2.4 Transposition of conductors and its necessity	discussion on Transposition	CO2
5	Skin effect and proximity effect	2.5 Skin effect and proximity effect	PPT slide and presentation	CO2

Unit 3: Extra High Voltage Transmission (Total Classes-10)				
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	Extra High Voltage AC (EHVAC) transmission line	3.1 Extra High Voltage AC (EHVAC) transmission line: Necessity, high voltage substation components such as transformers and other switchgears	Chalkboard definition writing, students repeat definitions,	CO3
2	Advantages, limitations and applications	3.1.1 Advantages, limitations and applications of EHVAC	discussion on Advantages, limitations and applications	CO3
3	EHVAC	3.1.2 EHVAC lines in India	Chalkboard definition writing	CO3
4	Ferranti and Corona	3.2 Ferranti and Corona effect	Chalkboard definition writing	CO3
5	High Voltage DC (HVDC) Transmission Line	3.3 High Voltage DC (HVDC) Transmission Line: Necessity components, advantages, limitations and applications	PPT slide and presentation	CO3
6	HVDC	3.3.1 Layout of monopolar, bi-Polar and homo-polar transmission lines of HVDC	PPT slide and presentation	CO3
7	HVDC	3.3.2 HVDC Lines in India	Short video clip	CO3

8	Features	3.4 Features of EHVAC and HVDC transmission line	Class discussion and note0 making	CO3
9	Flexible AC Transmission line	3.5 Flexible AC Transmission line: Features, types of FACTS controller	PPT slide and presentation	CO3
10	New trends	3.6 New trends in wireless transmission of electrical power	Class discussion and note0 making	CO3
Unit 4:A.C Distribution System (Total Classes-08)				
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	AC distribution	4.1 AC distribution: Components classification, requirements of an ideal distribution system, primary and secondary distribution system	Chalkboard definition writing, students repeat definitions, discussion on AC distribution	CO4
3	Feeder and distributor	4.2 Feeder and distributor, factors to be considered in design of feeder and distributor	PPT slides	CO4
4	Types of different distribution schemes	4.3 Types of different distribution schemes: radial, ring, and grid, layout, advantages, disadvantages and applications	PPT slides	CO4
5	Voltage drop	4.4 Voltage drop, sending end and receiving end voltage	PPT slide and presentation	CO4
6	Distribution Sub-Station	4.5 Distribution Sub-Station: Classification, site selection, advantages, disadvantages and applications	Chalkboard definition writing	CO4
7	Single Line diagram	4.6 Single Line diagram (layout) of 33/11KV Sub-Station, 11KV/400V sub-station	Chalkboard definition writing	CO4
8	Symbols and functions	4.7 Symbols and functions of their components	PPT slide and presentation	CO4
		Unit 5: Components of Transmission and Distribution Line(Total Classes-10)		
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	Overhead Conductors	5.1 Overhead Conductors : Properties of material, types of conductor with trade names, significance of sag	Chalkboard definition writing, students repeat definitions, discussion on Overhead Conductors	CO5
2	Line supports	5.2 Line supports: Requirements, types of line structures and their specifications, methods of erection	PPT slides	CO5
3	Line Insulators	5.3 Line Insulators	PPT slides	CO5
4	Properties	5.3.1 Properties of insulating material	PPT slide and presentation	CO5

5	Selection of material	5.3.2 Selection of material	Class discussion and note making	CO5
6	Types of insulators and their applications	5.3.3 Types of insulators and their applications	Class discussion and note making	CO5
7	Causes of insulator failure	5.3.4 Causes of insulator failure	Class discussion and note making	CO5
8	Derivation of equation	5.3.5 Derivation of equation of string efficiency for string of three suspension insulator	PPT slide and presentation	CO5
9	Methods of improving string efficiency	5.3.6 Methods of improving string efficiency	PPT slide and presentation	CO5
10	Underground Cables	5.4 Underground Cables: Requirements, classification, construction, comparison with overhead lines, cable laying and cable jointing.	PPT slide and presentation	CO5

Sujata Bhoi

Signature of the Faculty

Signature of the HOD

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