GOVT. POLYTECHNIC BALANGIR

Department of Electrical Engineering

LESSON PLAN: 2025-26
Name of the Faculty: Tapas Panigrahi
Subject: ELECTRICAL INSTALLATION AND ESTIMATING Program: Diploma in Electrical Engineering Semester: 6TH Total Contact Hours: 60 Total Marks: 100 Assessment: Progressive –20, End Term – 80 Credits: 5

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: Indian electricity rules (Total Classes-6)				
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	IE rules	1.1 Definitions, Ampere, Apparatus, Accessible, Bare, cable, circuit, circuit breaker, conductor voltage (low, medium, high, EH), live, dead, cut-out, conduit, system, danger, Installation, earthing system, span, volt, switch gear, etc	Chalkboard definition writing, students repeat definitions	CO1
2	IE rules	1.2 General safety precautions, rule 29, 30, 31, 32, 33, 34, 35, 36, 40, 41, 43, 44, 45,46	Chalkboard definition and discussion and video clip	CO1
3	IE rules	1.2 General safety precautions, rule 29, 30, 31, 32, 33, 34, 35, 36, 40, 41, 43, 44, 45,46	discussion on General safety of IE rules	CO1
4	IE rules	1.3 General conditions relating to supply and use of energy : rule 47, 48, 49, 50, 51, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70..	Group discussion and PPT slides	CO1
5	IE rules	1.3 General conditions relating to supply and use of energy : rule 47, 48, 49, 50, 51, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70.	PPT slides, short video clip	CO1

6	IE rules	1.4 OH lines : Rule 74, 75, 76, 77, 78, 79, 80, 86, 87, 88, 89, 90, 91.	students repeat definitions, discussion	CO1

Unit 2: Electrical installations (Total Classes-12)

Class No.	Topic	Subtopic (Elaborated)	Simple Teaching Aids/Activities	Course Objective
1	Electrical installation	2. 1 Electrical installations, domestics, industrial, Wiring System	Chalkboard definition writing, students repeat definition	CO2
2	Electrical installation	Internal distribution of Electrical Energy	Chalkboard definition	CO2
3	Methods of wiring	Methods of wiring, systems of wiring, wire and cable, conductor materials used in cables, insulating materials mechanical protection.	students repeat definition	CO2
4	Types of cable and their use	Types of cables used in internal wiring, multi-stranded cables, voltage grinding of cables, general specifications of cables.	discussion on working of large hydropower	CO2
5	Different accessories of electrical installation	2. 2 ACCESSORIES: Main switch and distribution boards, conduits, conduit accessories and fittings	PPT slide and presentation	CO2
6	Lighting accessories	lighting accessories and fittings, fuses, important definitions, determination of size of fuse – wire, fuse units	Class discussion and note making	CO2
7	Earthing specification	Earthing conductor, earthing, IS specifications regarding earthing of electrical installations, points to be earthed. Determination of size of earth wire and earth plate for domestic and industrial installations. Material required for GI pipe earthing	PPT slide and presentation	CO2
8	LIGHTING SCHEME	2. 3 LIGHTING SCHEME: Aspects of good lighting services.	PPT slide and presentation	CO2
9	Types of lighting schemes	Types of lighting schemes, design of lighting schemes	PPT slide and presentation	CO2
10	Types of lighting	factory lighting, public lighting installations, street lighting, general rules for wiring	Class discussion and note making	CO2
11	Calculation of lighting points	determination of number of points (light, fan, socket, outlets),.	Class discussion and note making	CO2

12	Calculation of lighting loads	determination of total load, determination of Number of subcircuits	Class discussion and note making	Co2

Unit 3: Internal wiring (Total Classes-12)				
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	Types of internal wining	3 . 1 Type of internal wiring, cleat wiring, CTS wiring, wooden casing capping	Chalkboard definition writing, students repeat definitions,	CO3
2	Types of internal wining	metal sheathed wiring, conduit wiring,	discussion Types of internal wining	CO3
3	Types of internal wining	their advantage and disadvantages comparison and applications.	Chalkboard definition writing	CO3
4	Estimate of materials of CTS wiring	3 . 2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m2 with given light, fan & plug points .	PPT slide and presentation	CO3
5	Estimate of materials of CTS wiring	3. 2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m2 with given light, fan & plug points	PPT slide and presentation	CO3
6	Estimate of materials of domestic installation	3. 2 Prepare one estimate of materials required for CTS wiring for small domestic installation of one room and one verandah within 25 m2 with given light, fan & plug points	PPT slide and presentation	CO3
7	Estimates of material for domestic installation	3 . 3 Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m2 with given light, fan & plug points.	PPT slide and presentation	CO3
8	Estimates of material for conduit wiring	3 . 3 Prepare one estimate of materials required for conduit wiring for small domestic installation of one room and one verandha within 25 m2 with given light, fan & plug points.	PPT slide and presentation	CO3
9	Estimates of material for domestic installation	3 . 4 Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine, bath, kitchen &verandah within	PPT slide and presentation	CO3

		80m2 with given light, fan & plug points.		
10	Estimates of material for domestic installation	3 . 4 Prepare one estimate of materials required for concealed wiring for domestic installation of two rooms and one latrine, bath, kitchen &verandah within 80m2 with given light, fan & plug points.	PPT slide and presentation	CO3
11	Estimates of material for workshop installation	3 . 5 Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m2 and load within 10 KW.	PPT slide and presentation	CO3
12	Estimates of material for workshop installation	3 . 5 Prepare one estimate of materials required for erection of conduct wiring to a small workshop installation about 30m2 and load within 10 KW.	PPT slide and presentation	CO3
Unit 4: Overhead installation (Total Classes-12)				
Class No.	**Topic**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	Components of Overhead lines	4.1. Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.	Chalkboard definition writing, students repeat definitions,	CO4
2	Determination of size of conductor and length of overhead line	4.1. Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of	PPT slide and presentation	CO4

		jumpers, jumpers, tee-offs, guarding of overhead lines.		
3	Insulators and their types	4.1. Main components of overhead lines, line supports, factors Governing Height of pole, conductor materials, determination of size of conductor for overhead transmission line, cross arms, pole brackets and clamps, guys and stays, conductors configurations, spacing and clearances, span lengths, overhead line insulators, types of insulators, lighting arresters, danger plates, anti-climbing devices, bird guards, beads of jumpers, jumpers, tee-offs, guarding of overhead lines.	PPT slide and presentation	CO4
4	Estimation of materials of overhead lines	4.2.Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation VI Sem Electrical consideration using ACSR.	PPT slide and presentation	CO4
5	Estimation of materials of overhead lines	4.2.Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation VI Sem Electrical consideration using ACSR.	PPT slide and presentation	CO4
6	Estimation of materials of overhead lines	4.2.Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation VI Sem Electrical consideration using ACSR.	PPT slide and presentation	CO4
7	Estimation of materials for LT distribution line	4.3.Prepare an estimate of materials required for LT distribution line within load of	PPT slide and presentation	CO4

		100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR.		
8	Estimation of materials for LT distribution line	4.3.Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR.	PPT slide and presentation	CO4
9	Estimation of materials for LT distribution line	4.3.Prepare an estimate of materials required for LT distribution line within load of 100 KW maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consideration using ACSR.	PPT slide and presentation	CO4
10	Estimation of materials of HT distribution line	4.4.Prepare an estimate of materials required for HT distribution line (11 KV) within 2 km and load of 2000 KVA maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consider action using ACSR.	Chalkboard definition, PPT slide	CO4
	Estimation of materials of HT distribution line	4.4.Prepare an estimate of materials required for HT distribution line (11 KV) within 2 km and load of 2000 KVA maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consider action using ACSR.	Chalkboard definition, PPT slide	CO4

	Estimation of materials of HT distribution line	4.4.Prepare an estimate of materials required for HT distribution line (11 KV) within 2 km and load of 2000 KVA maximum and standard spans involving calculation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation of the size of conductor (from conductor chart), current carrying capacity and voltage regulation consider action using ACSR.	Chalkboard definition, PPT slide	CO4
Unit 5: OVER HEAD SERVICE LINES (Total Classes-12)				
CLASS NO	**TOPIC**	**Subtopic (Elaborated)**	**Simple Teaching Aids/Activities**	**Course Objective**
1	**Components of service line**	**5. 1 Components of service lines, service line (cables and conductors),**	Chalkboard definition writing, students repeat definitions,	**CO5**
2	**Components of service line**	**bearer wire, lacing rod. Ariel fuse, service support, energy box and meters etc.**	PPT slide and presentation	**CO5**
3	**Estimation of materials for single stored residential building**	**5. 2 Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building**	PPT slide and presentation	**CO5**
4	**Estimation of materials for single stored residential building**	**5. 2 Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building**	PPT slide and presentation	**CO5**
5	**Estimation of materials for single stored residential building**	**5. 2 Prepare and estimate for providing single phase supply of load of 5 KW (light, fan, socket) to a single stored residential building**	PPT slide presentation	**CO5**
6	**Estimation of materials of a double stored building**	**5. 3 Prepare and estimate for providing single phase supply load of 3KW to each floor of a double stored building having separate energy meter.**	PPT slide presentation	**CO5**
7	**Estimation of materials of a double stored building**	**5. 3 Prepare and estimate for providing single phase supply load of 3KW to each floor of a double stored building having separate energy meter.**	PPT slide and presentation	**CO5**
8	**Estimation of materials of a double stored**	**5. 3 Prepare and estimate for providing single phase supply load of 3KW to each**	PPT slide and presentation	**CO5**

	building	floor of a double stored building having separate energy meter.		
9	Estimation of materials of factory building using insulated conductors	5. 4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire	PPT slide and presentation	CO5
10	Estimation of materials of factory building using insulated conductors	5. 4 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using insulated wire	PPT slide and presentation	CO5
11	Estimation of materials of factory building using bare conductors	5. 5 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using bare conductor and insulated wire combined	PPT slide and presentation	CO5
12	Estimation of materials of factory building using bare conductors	5. 5 Prepare one estimate of materials required for service connection to a factory building with load within 15 KW using bare conductor and insulated wire combined	PPT slide and presentation	CO5
Unit 6: Estimating for distribution substations (Total Classes-06)				
1	Different components of substation	6. 1 Prepare one material estimate for transformer substations.	Chalkboard definition writing, students repeat definitions,	CO6
2	Estimation of material for substation	6. 1 Prepare one material estimate for transformer substations.	Chalkboard definition writing, students repeat definitions,	CO6
3	Estimation of material for pole mounted substation	6.1.1 Pole mounted substation	PPT slide and presentation	CO6
4	Estimation of material for pole mounted substation	6.1.1 Pole mounted substation	PPT slide and presentation	CO6
5	Estimation of material for plinth mounted substation	6.1.2 Plinth Mounted substation.	PPT slide and presentation	CO6
6	Estimation of material for plinth mounted substation	6.1.2 Plinth Mounted substation.	PPT slide presentation	CO6

2					

Tapas Panigrahi

Signature of the Faculty

13/11/26

Signature of the HOD

H.O.D.
Deptt. of Electrical Engg.
Govt. Polytechnic
Bolangir