Ramgarhia Polytechnic College, Phagwara

Electrical Engineering Department

Head of Department: S. Jasvir Singh

Name of the Faculty: Er. Varun Shingari

Discipline: Electrical Engineering Department

Semester: 5th

Subject: ESTIMATING AND COSTING IN ELECTRICAL ENGINEERING

Lesson Plan Duration: 16 Weeks

RATIONALE

A diploma holder in electrical engineering should be familiar to Indian Standards and relevant Electricity Rules. Preparation of good estimates is a professional's job, which requires knowledge of materials and methods to deal with economics. The contents of this subject have been designed keeping in view developing requisite knowledge and skills of estimation and costing in students of diploma in electrical engineering.

Learning Outcomes

After undergoing this course, the students will be able to:

CO1. Determine various types of wiring systems and how they are being used

CO2. Practice and execute any type of wiring

CO3. Estimate and determine the cost of wiring installation

CO4. Estimate the material required for HT and LT lines

CO5. Prepare a tender document for a particular job

CO6. Estimate the material required for pole-mounted sub-stations

PO ⇨ / CO ⇩	PO1	PO2	PO3	PO4	PO5	PO6	PO7
CO1	✓						
CO2		✓					
CO3		✓					
CO4		✓					
CO5	✓						
CO6		✓	✓				

Syllabus

Units	Details	Hours
1.	Introduction	(04 hrs)

	Purpose of estimating and costing, proforma for making estimates, preparation of materials schedule, costing, price list, preparation of tender document (with 2-3 exercises), net price list, market survey, overhead charges, labour charges, electrical point method and fixed percentage method, contingency, profit, purchase system, enquiries, comparative statements, orders for supply, payment of bills.	
2.	Types of Wiring Cleat, batten, casing capping and conduit wiring, comparison of different wiring systems, selection and design of wiring schemes for particular situation (domestic and Industrial). Selection of wires and cables, wiring accessories and use of protective devices i.e. MCB, ELCB etc. Use of wire-gauge and tables (to be prepared/arranged)	(04 hrs)
3.	Estimating and Costing 3.1 Domestic installations; standard practice as per IS and IE rules. Planning of circuits, sub-circuits and position of different accessories, electrical layout, preparing estimates including cost as per schedule rate pattern and actual market rate (single storey and multi-storey buildings having similar electrical load) 3.2 Industrial installations; relevant IE rules and IS standard practices, planning, designing and estimation of installation for single phase motors of different ratings, electrical circuit diagram, starters, preparation of list of materials, estimating and costing exercises on workshop with singe-phase, 3-phase motor load and the light load (3-phase supply system) 3.3 Service line connections estimate for domestic and Industrial loads (overhead and under ground connections) from pole to energy meter.	(20 hrs)
4.	Estimating Material Required 4.1 Transmission and distribution lines (overhead and underground) planning and designing of lines with different fixtures, earthing etc. based on unit cost calculations 4.2 Substation: Types of substations, substation schemes and components, estimate of 11/0.4 KV pole mounted substation up to 200 KVA rating, earthing of substations, Key Diagram of 66 KV/11KV Substation. 4.3 Single line diagram, layout sketching of outdoor, indoor 11kV sub-station or 33kV sub-station	(12 hrs)
5.	Preparation of Tender Documents	(08 hrs)

	Atleast 2-3 exercises, tender – constituents finalization, specimen tender	

Reference Books:

1. Electrical Installation, Estimating and Costing by JB Gupta, SK Kataria and Sons, New Delhi

2. Estimating and Costing by SK Bhattacharya, Tata McGraw Hill, New Delhi

3. Estimating and Costing by Surjeet Singh, Dhanpat Rai & Co., New Delhi

4. Estimating and Costing by Qurashi

5. Estimating and Costing by SL Uppal, Khanna Publishers, New Delhi

6. Electrical Estimating and Costing by N Alagappan and B Ekambaram, TMH, New Delhi

Delivery/Instructional Methodologies

Sr.No.	Description
1.	Chalk and Talk
2.	PowerPoint Presentation

Assessment Methodologies

Sr. No.	Description	Type
1.	Student Assignment	Direct

2.	Test	Direct
3.	Board Examination	Direct
4.	Student Feedback	Direct

Gaps in the syllabus - to meet industry/profession requirements

S.NO.	DESCRIPTION	PROPOSED ACTIONS	PO MAPPING
	N/A	N/A	N/A

Topics beyond syllabus/advanced topics

Units	Details	Hours
N/A	N/A	N/A

Web Source References

Sr. No.	URL
1.	https://nptel.ac.in/

Lesson Plan

Week	Theory		Practical	
	Lecture Day		Practical Day	

1st	1st	Purpose of estimating and costing, proforma for making estimates, preparation of materials schedule, costing, price list	1.	Prepare detailed tender specifications.
	2nd	Preparation of tender document (with 2-3 exercises), net price list, market survey		
	3rd	Overhead charges, labour charges, electrical point method and fixed percentage method, contingency		
2nd	4th	Profit, purchase system, enquiries, comparative statements, orders for supply, payment of bills.	2.	Prepare purchase orders.
	5th	Cleat, batten, casing capping and conduit wiring		
	6th	Comparison of different wiring systems, selection and design of wiring schemes for particular situation (domestic and Industrial)		
3rd	7th	Selection of wires and cables, wiring accessories and use of protective devices i.e. MCB, ELCB etc	3.	Estimating and costing of a domestic installation cost (Residential building, laboratory room or drawing hall etc) using concept of illumination design.
	8th	Use of wire-gauge and tables (to be prepared/arranged)		
	9th	Domestic installations; standard practice as per IS and IE rules		

4th	10th 11th 12th	Planning of circuits, sub-circuits and position of different accessories, electrical layout	4.	Estimating and costing of an industrial installation (work shop, agriculture, flour mill etc.)
5th	13th 14th 15th	Preparing estimates including cost as per schedule rate pattern and actual market rate (single storey and multi-storey buildings having similar electrical load)	5.	Estimating and costing of overhead service connection (single phase and three phase).
6th	16th 17th 18th	Industrial installations; relevant IE rules and IS standard practices **REVISION** **1st Sessional Test (Tentative)**	6.	Estimating and costing of overhead, 440V, 3-phase, 4/3 wire distribution line.
7th	19th 20th 21st	Planning, designing and estimation of installation for single phase motors of different ratings, electrical circuit diagram,	7.	Estimating and costing of underground service connection (single phase and three phase).
8th	22nd 23 24th	Starters Preparation of list of materials	8.	Estimating and costing of underground, distribution line using 3 core or 4 core cable for a connected load.

9th	25th 26th 27th	Estimating and costing exercises on workshop with singe-phase, 3-phase motor load and the light load (3-phase supply system)	9.	Estimating and costing of any one electrical product/equipment.
10th	28th 29th 30th	Service line connections estimate for domestic and Industrial loads (overhead and under ground connections) from pole to energy meter.	10.	Estimating and costing of repairs and maintenance of any one domestic appliance.
11th	31st 32nd 33rd	Transmission and distribution lines (overhead and underground) planning and designing of lines with different fixtures, earthing etc. based on unit cost calculations **REVISION**	11.	Prepare tender notices for given projects
12th	34th 35th 36th	**PTM** **2nd Sessional Test (Tentative)** Transmission and distribution lines (overhead and underground) planning and designing of lines with different fixtures	12.	**REVISION**

13th	37th	Earthing etc. based on unit cost calculations	13.	**REVISION**
	38th	Types of substations, substation schemes and components, estimate of 11/0.4 KV pole mounted substation up to 200 KVA rating,		
	39th			
14th	40th	Single line diagram, layout sketching of outdoor, indoor 11kV sub-station or 33kV sub-station	14	**REVISION**
	41st			
	42nd	Preparation of Tender Documents		
15th	43rd	Atleast 2-3 exercises, tender – constituents finalization, specimen tender	15.	**REVISION**
	44th			
	45th			
16th	46th	**PTM**	16	**REVISION**
	47th	**REVISION**		
	48th	**3rd Sessional Test (Tentative)**		

NBA has defined the following seven POs for an Engineering diploma graduate:

i) **Basic and Discipline specific knowledge**: Apply knowledge of basic mathematics, science and engineering fundamentals and engineering specialization to solve the engineering problems.

ii) **Problem analysis:** Identify and analyze well-defined engineering problems using codified standard methods.

iii**)** **Design/ development of solutions**: Design solutions for well-defined technical problems and assist with the design of systems components or processes to meet specified needs.

iv) **Engineering Tools, Experimentation and Testing**: Apply modern engineering tools and appropriate technique to conduct standard tests and measurements.

v) **Engineering practices for society, sustainability and environment**: Apply appropriate technology in context of society, sustainability, environment and ethical practices.

vi) **Project Management**: Use engineering management principles individually, as a team member or a leader to manage projects and effectively communicate about well-defined engineering activities.

vii) **Life-long learning**: Ability to analyze individual needs and engage in updating in the context of technological changes.

Program Specific Outcomes (PSOs)

PSOs are a statement that describes what students are expected to know and be able to do in a specialized area of discipline upon graduation from a program. Program may specify 2-4 program specific outcomes, if required.

These are the statements, which are specific to the particular 11 program. They are beyond POs. Program Curriculum and other activities during the program must help in the achievement of PSOs along with POs.