

**Course name** : Electrical Engineering Group  
**Course Code** : EE/EP  
**Semester** : Fourth  
**Subject Title** : Electrical Estimation & Costing  
**Subject Code** : 9063

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme						
TH	TU	PR	PAPER HRS	TH	TEST	PR	OR	TW	TOTAL
02	01	02	03	80	20	--	25@	--	125

**Rationale:**

This subject is classified under Technology subject. Electrical Diploma holders have to work as Technicians & Supervisors for Electrical Installations of various companies, commercial and Industrial electrification schemes and prepare estimates for these schemes. They also work as Independent electrical contractors and execute illumination and electrification schemes.

Knowledge of electrical engineering drawing, IE rules, NEC, different types of electrical Installation their design considerations equips the students with the capability to design and prepare working drawing of different Installation projects.

Similarly understanding of the methods and procedure of estimating the material required; developed the skill of preparing schedule of material; detailed estimates; costing of different types of Installation which leads to preparing of the tender documents, procedure for tendering, evaluation and billing of executed work of different types of electrical Installation Project.

**Objectives:**

Student will be able to:

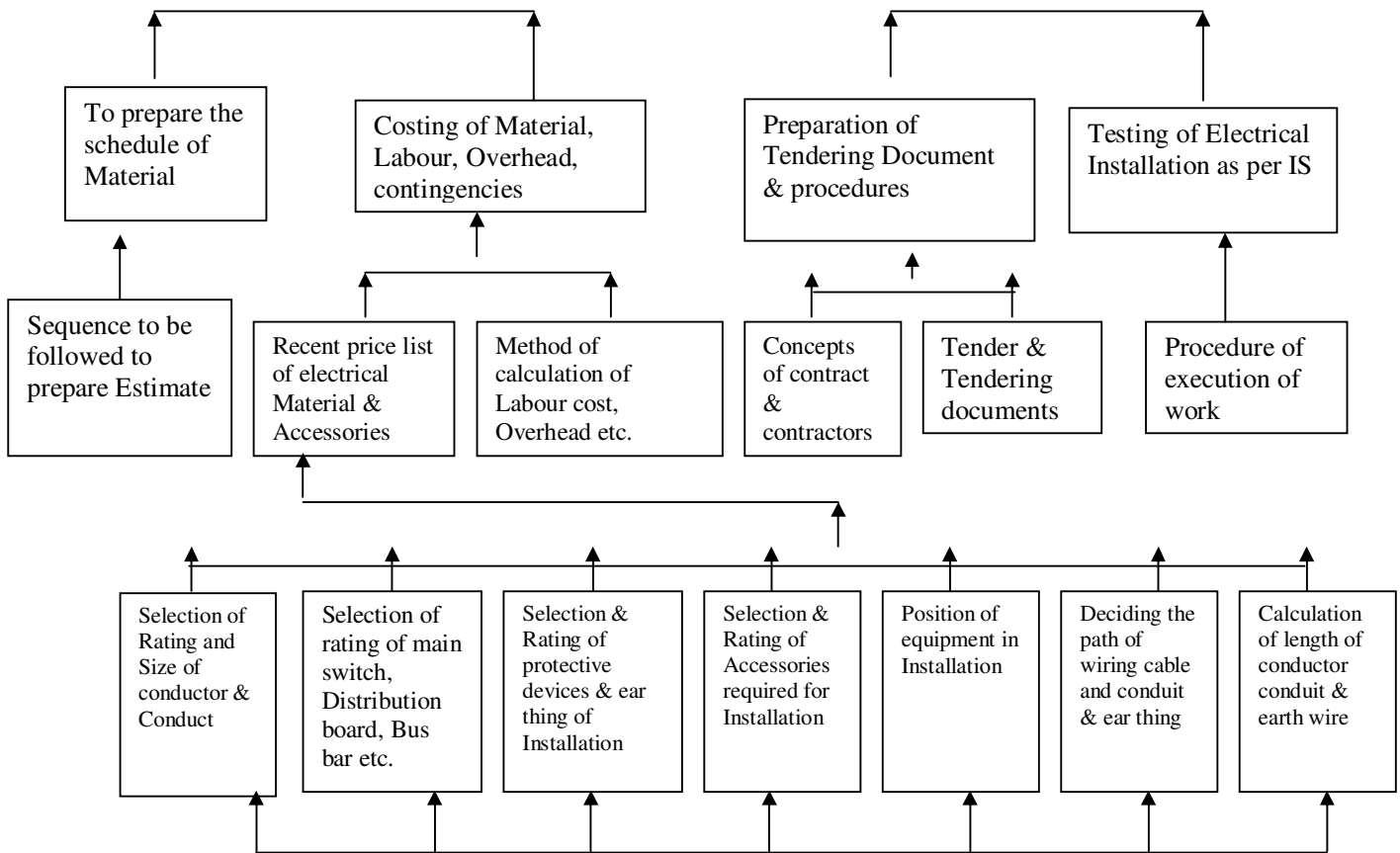
- 1) Define different types of Electrical Installation
- 2) Interpret the Electrical Engineering Drawing
- 3) State IE rules, NEC related to Electrical Installation and testing.
- 4) State and describe the basic terms, general rules, circuit design procedure, wiring design and design considerations of Residential Electrical Installations.
- 5) Explain the sequence to be followed in carrying out the estimate of Residential Installations.
- 6) Prepare detail estimate and costing of Residential Electrical Installations.
- 7) Test Industrial Electrical Installation.
- 8) Understand the concept of contracts, contractors, tender and tender document and its related procedures.

## Learning Structure:

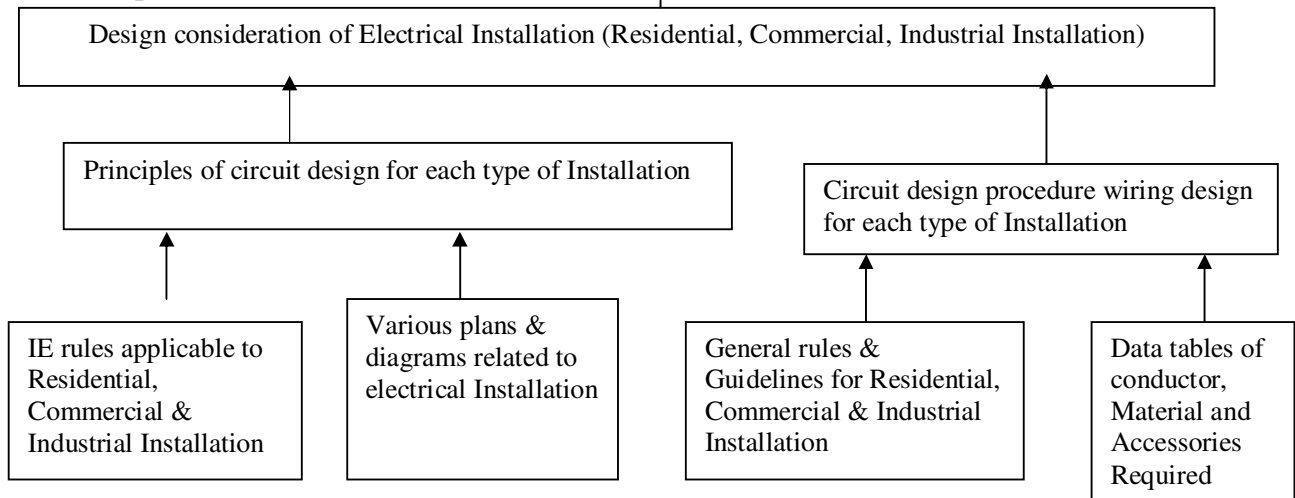
### Application:

Estimating & costing of Residential, Commercial & Industrial Electrical Installation and prepare tendering documents, Testing of Electrical Installation and Evaluation & billing of executed work

### Procedure:



### Concepts:



**Contents: Theory**

<b>Chapter</b>	<b>Topics</b>	<b>Hours</b>	<b>Marks</b>
<b>01</b>	<p><b>Drawing and IE rules</b></p> <p>1.1 Classification of Electrical Installation.            1.2 General requirement of Electrical Installation.            1.3 Reading and Interpretation of Electrical Engineering Drawings.                1.3.1. Various diagrams, plans and layout                1.3.2. Important definitions related to Installation            1.4 IE rules related to Electrical Installation &amp; Testing.</p>	<b>02</b>	<b>06</b>
<b>02</b>	<p><b>Service Connection</b></p> <p>2.1 Concept of service connection.            2.2 Types of service connection &amp; their features.            2.3 Methods of Installation of service connection.            2.4 Estimates of under ground &amp; overhead service connections.</p>	<b>02</b>	<b>06</b>
<b>03</b>	<p><b>Residential Building Electrification</b></p> <p>3.1 General rules guidelines for wiring of Residential Installation and positioning of equipments.            3.2 Principles of circuit design in lighting and power circuits.            3.3 Procedures for designing the circuits and deciding the number of circuits.            3.4 Method of drawing single line diagram.            3.5 Selection of type of wiring and rating of wires &amp; cables.            3.6 Load calculations and selection of size of conductor.            3.7 Selection of rating of main switch, distributions board, protective switchgear ELCB and MCB and wiring accessories.            3.8 Earthing of Residential Installation.            3.9 Sequence to be followed for preparing Estimate            3.10 Preparation of detailed estimates and costing of Residential Installation.</p>	<b>08</b>	<b>20</b>
<b>04</b>	<p><b>Electrification of commercial Installation</b></p> <p>4.1 Concept of commercial Installation.            4.2 Differentiate between electrification of Residential and commercial Installation.            4.3 Fundamental considerations for planning of an electrical Installation system for commercial building.            4.4 Design considerations of electrical Installation system for commercial building.                4.4.1 Load calculations &amp; selection of size of service connection and nature of supply.                4.4.2 Deciding the size of cables, busbar and busbar chambers.                4.4.3 Mounting arrangements and positioning of switchboards, distribution boards main switch etc.                4.4.4 Earthing of the electrical Installation</p>	<b>08</b>	<b>16</b>

Chapter	Topics	Hours	Marks
	4.5 Selection of type wire, wiring system & layout. 4.6 Sequence to be followed to prepare estimate. 4.7 Preparation of detailed estimate and costing of commercial Installation.		
<b>05</b>	<b>Electrification of factory unit Installation</b> 5.1 Concept of Industrial load. 5.2 Concept of Motor wiring circuit and single line diagram. 5.3 Important guidelines about power wiring and Motor wiring. 5.4 Design consideration of Electrical Installation in small Industry/Factory/workshop. 5.4.1. Motor current calculations. 5.4.2. Selection and rating of wire, cable size & conduct. 5.4.3 Deciding fuse rating, starter, distribution boards main switch etc. 5.4.4. Deciding the cable route, determination of length of wire, cable, conduit, earth wire, and earthing. 5.5 Sequence to be followed to prepare estimate. 5.6 Preparations of detailed estimate and costing of small factory unit/ workshop.	<b>08</b>	<b>20</b>
<b>06</b>	<b>Testing of Installation</b> Testing of wiring Installation for verification of current; earthing, insulation resistance and continuity as per IS	<b>02</b>	<b>04</b>
<b>07</b>	<b>Contracts, Tenders and Execution</b> 7.1 Concept of contracts and Tenders 7.1.1 Contracts, types of contracts, contractors. 7.1.2 Valid Contracts, Contract documents. 7.1.3 Tender and tender notices. 7.1.4 Procedure for submission and opening tenders. 7.1.5 Comparative statements, criteria for selecting contractors, General conditions in order form. 7.2 Principles of Execution of works 7.3.1 Administrative approval, Technical sanctions. 7.3.2. Billing of executed work.	<b>02</b>	<b>08</b>
<b>Total</b>		<b>32</b>	<b>80</b>

### Tutorials:

### Problems on estimation and costing:

1. Electrical Installation scheme for single flat, independent bungalow and small house. Draw wiring diagram and prepare detailed estimate and its costing
2. Electrical Installation scheme for commercial buildings. Draw wiring diagram and prepare detailed estimate and its costing.
3. Electrical Installation scheme for small factory unit. Draw single line layout and prepare detailed estimate and its costing  
1) Small factory unit 2) Workshop 3) Agriculture pump and floor mills etc.

## Assignments:

**Note: Use half imperial drawing sheets**

- 1) Design electrical Installation scheme for a flat scheme/ Independent bungalow/House. Draw detail wiring diagrams also prepare material schedule and detailed estimate and costing. Prepare report and Drawing sheets. (Minimum 2 Drawing sheets).
- 2) Design electrical Installation scheme for any one commercial complex having minimum 20KW load requirements. Draw detailed wiring diagram; prepare material schedule and detailed estimate and costing, prepare report and Drawing sheet (one Drawing sheet).
- 3) Design Electrical Installation scheme for agriculture pump/floor mill. Draw wiring diagram, prepare material schedule and detailed estimate and costing. Prepare report and Drawing sheet. (One Drawing sheet).
- 4) Design electrical Installation scheme for any two-factory/small unit/workshop having aggregate load of 30 KW. Draw wiring diagrams prepare material schedule & detail estimate and costing. Prepare report and Drawing sheet. (Two Drawing sheet).

## Learning Resources:

### 1. Books:

Sr. No.	Author	Title	Publisher & Address
1.	K.B. Raina S.K.Bhattacharya	Electrical Design; Estimating and costing	New Age International (p) Limited, New Delhi
2.	Surjit Singh	Electrical Estimating and costing	Dhanpat Rai and company, New Delhi
3.	N. Alagappan S. Ekambaram	Electrical Estimating and costing	Tata Mc Graw Hill Publication, New Delhi
4.	S.L. Uappal	Electrical wiring Estimating and costing	Khanna Publication.
5.	B.D.Arora	Electrical wiring, Estimating and costing	R.B. Publication, New Delhi

### 2. IS/International Codes : IS- 5909, 7733, 2174, 732,4648