III Year - I Semester | **L T P C**
20EE5432 | **3 0 0 3**

ESTIMATING AND COSTING OF ELECTRICAL SYSTEMS
(OPEN ELECTIVE – I)

Preamble: This course enables the students to understand about Design, estimating and Costing of electrical power system.

Course Objectives
1. To emphasize the estimation and costing aspects of all electrical equipment ,installation and designs on the cost viability.
2. To design and estimation of wiring
3. To design overhead and underground distribution lines ,substations and illumination

Course Outcomes
1. Understand the design considerations of electrical installations.
2. Design electrical installation for building and small industries.
3. Identify and design the various types of light sources for different applications.

UNIT-I : GENERAL PRINCIPLES OF ESTIMATION:
Introduction to estimation & costing, Electrical Schedule, Catalogues, Market Survey and source selection, Recording of estimates, Determination of required quantity of material, Labor conditions, Determination of cost material and labour, Contingencies, Overhead charges, Profit, Purchase system, Purchase enquiry and selection of appropriate purchase mode, Comparative statement, Purchase orders, Payment of bills, Tender form, General idea about IE rule, Indian Electricity Act and major applicable I.E rules.

UNIT–II: RESIDENTIAL BUILDING ELECTRIFICATION:
General rules guidelines for wiring of residential installation and positioning of equipments, Principles of circuit design in lighting and power circuits, Procedures for designing the circuits and deciding the number of circuits, Method of drawing single line diagram, Selection of type of wiring and rating of wires and cables, Load calculations and selection of size of conductor.

ELECTRIFICATION OF COMMERCIAL INSTALLATION:
Concept of commercial installation, Differentiate between electrification of residential and commercial installation, Fundamental considerations for planning of an electrical installation system for commercial building, Design considerations of electrical installation system for commercial building, Load calculation and selection of size of service connection and nature of supply

UNIT-III: DESIGN AND ESTIMATION OF OVERHEAD TRANSMISSION & DISTRIBUTION LINES:
Introduction, Typical AC electrical power system, 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, Conductors configuration spacing and clearances, Span lengths, Overhead line insulators, Insulator materials, Types of insulators, Lightning Arrestors, Points to be considered at the time of erection of overhead lines, Erection of supports, Fixing of cross arms and insulators, Conductor erection, Repairing and jointing of conductor , Dead end clamps, Positioning of conductors and attachment to insulators, Jumpers, Tee-offs, Earthing of transmission lines, Guarding of overhead lines,Testing and commissioning of overhead distribution lines.

UNIT- IV: DESIGN AND ESTIMATION OF SUBSTATIONS:

Introduction, Classification of substation, Indoor substations, Outdoor substations, Selection and location of site for substation, Main Electrical Connections, Graphical symbols for various types of apparatus and circuit elements on substation main connection diagram, Key diagram of typical substations, Equipment for substation and switchgear installations, Substation auxiliaries supply, Substation Earthing.

UNIT-V: LIGHTING INSTALLATIONS:

Interior Wiring types and their applications, factors to be considered while selecting the type of wiring system, materials required for Interior wiring and their specifications, method of deciding the number of sub-circuits, calculating the quantity of wiring materials and accessories for the Interior Wiring, load calculations for a residential buildings, size of conductors, main switch, sub switches and protective devices. Prepare the schedule of materials for providing lighting and heating circuits and their estimates.

Text Books

1. "K. B. Raina, S. K. Bhattacharya", "Electrical Design Estimating and Costing", New Age International Publisher, 2010.
2. "Er. V. K. Jain, Er. Amitabh Bajaj", "Design of Electrical Installations", University Science Press.

Reference Books

1. Code of practice for Electrical wiring installations,(System voltage not exceeding 650 volts), Indian Standard Institution, IS: 732-1983.
2. Guide for Electrical layout in residential buildings, Indian Standard Institution, IS: 4648-1968.
3. Electrical Installation buildings Indian Standard Institution, IS: 2032.
4. "Gupta J. B., Katson, Ludhiana", "Electrical Installation, estimating and costing", S. K. Kataria and sons, 2013