MODULE 1 – FUNAMENTAL CONCEPTS OF ELECTRICAL ENGINEERING

About MEP – Roles and responsibilities of Electrical Design Engineers, Job opportunities, Growth and changes of MEP sector

Concepts in Electrical Engineering - Basic terms and Formulas, General concepts in Engineering, Fundamental of Electrical power system. Fundamental of Power generation, transmission, distribution & utilization. Basic wiring concepts and different types of loads [motors, HVAC system, starters, power electronic devices, Illuminations etc..] that consumes Electrical Energy and their impacts in supply systems including harmonics, reactive power and starting currents.

MODULE 2 - SYSTEM PLANNING & COST ESTIMATING

Basic design considerations - Planning guide for the supply and distribution system Power system modernization and evaluation studies/programs Voltage considerations. Voltage control in electric power systems Voltage selection, Voltage ratings for low-voltage utilization, equipment Voltage drop considerations in locating the low-voltage/ high-voltage. Calculation of voltage drops. Preparing the cost estimate, Classes of estimates Equipment and material costs installation costs other costs.

MODULE 3 – DESIGN OF ELECTRICAL SYSTEM BELOW 50KW AND LIGHTING DESIGN

Electrical Layout in residential building using AutoCAD - Selection of house wiring, Sizing and Selection of Conduit, Sizing and selection of Switch Socket, Calculation of load on circuit, Design of sub circuit (Lighting Circuit and Power Circuit) Distribution of Power Circuit, Calculation of fan, Calculation of Earthing for residential buildings, Sizing and selection of low voltage switchgears (MCB, MCCB, RCB, RCBO MPCB)

Lighting Design - Different entities of illuminating systems, Light sources: daylight, incandescent, electric discharge, fluorescent, arc lamp and Lasers. Luminaries, wiring, switching & control circuits. Laws of illumination; illumination from point, line and surface sources Photometry and spectrophotometry. Interior lighting – industrial, residential, office departmental stores, indoor stadium, theater and hospitals. Exterior lighting- flood, street, aviation and transport lighting, lighting for displays and signaling- neon signs, LED-LCD displays beacons and lighting for surveillance

MODULE 4 – DESIGN OF ELECTRICAL SYSTEM OF 11KV/33KV/66KV

Selection of Supply Voltage based on Load calculated. *Selection of transformers* – Winding considerations, protection devices and relays, type of cooling, tap changing methods. Different types of cables, *Selection of Cable sizing* - Current rating considerations, voltage drops, bending radius, short circuit ratings. Selection of protection devices [MCCB, ACB, SDF, VCB] and different types of Panel boards. Panel design concepts and general design criteria's to follow. Diesel generator selection and design of Generator control panel [GCP]. Interlocking methods of transformers and generator supplies in different panel boards. Fault level calculation and Earthing design. High tension side design of panels including protection devices, relays, metering devices etc...

MODULE 5 – VARIOUS PROJECT DESIGN STAGES OF ELECTRICAL DESIGN PROCEDURE

Concept design stage - Understanding the building plans, elevations & sections, Gathering specific data from the utilities (Electricity board), Understanding client's specific requirements Preparation of basis of design which should include the cost estimate.
Schematic design stage - Preparation of Load calculation to arrive maximum peak demand, Sizing of all Equipment's, cables, cable trays, Electrical design calculations, Preparation of single line schematic of electrical distribution system with metering options, Preparation of lighting, small power, earthing & miscellaneous layouts Preparation of technical specification
Detailed design stage - Preparation of detail layouts including sectional details wherever required Coordination with other services like HVAC, PHE & FF layouts Preparation of bill of quantities (BOQ) Preparation of shop drawings based on the tender drawings issued by Electrical consultants for installation as built drawings shall be prepared and handed over to client's representative

Final project submission and seminar on the done projects assessed by our MEP Engineers and an external engineer from respective industry, including Industrial Interaction Programme [IIP]

ADD ON CLASSES

- Basics of HVAC
- Basics of Plumbing
- Basics of Fire Fighting Design
- Coordination overview with all the systems in Revit-MEP