

## ELECTRICAL DESIGN AND DRAFTING

**Course fee - 25000/- rs**

**Eligibility:** Basically edu.Qualification - Diploma in Electrical / Electronics , B.E/B.Tech in Electrical/Electronics.

**Pre requisites:**

### Objectives of Design Engineer are as follows-

Undertaking research  
Testing and measuring the performance of systems  
Designing and implementing systems to improve efficiency and sustainability  
Keeping up to date with the latest building regulations  
Solving complex problems  
Liaising with suppliers, clients, architects and contractors  
Analyzing and interpreting data and information  
Recommending modifications for systems  
Creating reports and documentation  
Going out on site

### Course Objectives:

Identify the steps in electrical design process.  
Determine the scope of an electrical design project.  
Interpret the various components of an electrical plan, including general and specialized loads, lighting systems and distribution systems.  
Recognize the symbols used in electrical plan design.  
Identify the electrical standard and regulations that guide the electrical design process.

**Duration:60hrs**

COURSE	MODE	DURATION
Electrical Design Course	Regular Mode	35 Days
Electrical Design Course	Part Time	2 - 3 Months
Electrical Design Course	Sundays	4 Months
Electrical Design Course	Correspondence / Distance	4 Month

**Lesson Plan or Logsheets :** Daywise breakup of lectures- 2 hours/day

### Content: Details of all topics in course

Electrical Design manual for commercial & residential projects Upto 33KV voltage level

#### 1. General : Fundamentals of electrics-10 hrs

- Types of electricity
- Source of electricity
- Generation, Transmission & distribution of electricity
- Ohms law
- Symbols
- Definitions, Terms & terminologies
- Important formulas

#### 2. Codes & Standards to be followed-2 hrs

- Indian electricity rules
- National electrical code of India (NEC)
- National building code of India (NBC)
- Applicable standards issued by Bureau of Indian standards (BIS)

- Institute of Electrical & Electronics Engineers (IEEE)
- Regulations of local fire authorities.

### 3. Electrical equipments and it's application used in the installation-18 hrs

- Transformers
- Diesel generators
- UPS/Inverter& Battery banks
- Capacitors
- Bus ducts, Busbars, Cables (HT/LT) & wires
- AC CALCULATION

#### • **Luminaries – General & Emergency**

- Isolators & socket outlets
- Earthing or Grounding
- Lightning arrestor
- Building Management Systems(BMS)

### 3. TEST (50 MARKS) -2hrs

### 4. Means of electrical distribution for installation-4 hrs

- Panels(HT/LT)/Switch Board/Motor control centers (MCC's)/Final

#### **Distribution boards (DB's)**

- Cable trays,trunking or raceways, conduits & underground
- Pipes (Concrete/PVC)

### 5. Major electrical loads used in the installation-4 hrs

- **Lighting load – Internal & external**
- Utility power load
- **HVAC loads like Chillers, AHU's, FCU's, Pumps, Fans etc.**
- PHE & FF loads like Water transfer pumps, Booster pumps, Fire
- Fighting pumps, Jockey pumps etc.
- Lifts (Elevator) load
- Computer & data centre (Server) loads for office building

## 6. Electrical design calculations-16 hrs

- Load & maximum demand calculation
- Transformer sizing calculation
- DG sizing calculation
- Short circuit calculation
- Voltage drop calculation
- Capacitor sizing calculation
- Cable sizing calculation
- Earthing calculation
- Lighting calculation
- UPS/Inverter sizing calculation
- Battery sizing calculation

## 7. Various design stages & Sequence of electrical design procedure- 2 hrs

- Understanding the building plans, elevations & sections
- Gathering specific data from the utilities(Electricity board)
- Understanding clients specific requirements
- Assessment of the type of installation like outdoor/indoor substation(Point of supply)
- Preparation of basis of design which should include the cost estimate.
- Preparation of Load calculation to arrive maximum peak demand
- Sizing of all Equipments,cables,cable trays
- Electrical design calculations
- Preparation of single line schematic of electrical distribution system with metering options
- Preparation of equipment layouts like Substation, plant rooms.
- Preparation of lighting, small power, earthing & miscellaneous layouts
- Preparation of technical specification
- Preparation of detail layouts including sectional details wherever required
- Coordination with other services like HVAC,PHE & FF layouts

- Preparation of bill of quantities(BOQ)
- Issue for tender

(Generally this stage is performed by electrical Contractors)

- Preparation of shop drawings based on the tender drawings issued by Electrical consultants for installation.
- After installation the entire installation shall be tested & commissioned with the respective authorities.
- **As built drawings shall be prepared and handed over to client's representative.**

#### **8. Project execution of all security and safety equipment -1 hrs**

#### **9. Liasioning with MSEDC and PWD- 1hrs**

##### **Telecom field - 9 hrs**

types of telecom towers with specification.  
various types of equipments used in telecom tower.  
fullscope audit,eb audit,SHA audit.  
various types of earthing used.  
various types of test performed in telecom infra projects.

**Student material: Hard copy, Soft copy and one sample of project design report.**

**Slides for delivery: will be provided later.**

**project/Assignments:- A final project to be completed by students which may be a residential,commercial or industrial project with in 1**

**Assessment method and Data:**

**Starting salary: depends upon the post you qualify- (1.44-2.4)lakhs/annum**

**Job designation post course: Design Engineer, Project Engineer, Maintainence Engineer, Quality Audit Engineer,Technical officer, Projec**

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