ACT MEP

Competency Certificate
IN
Electrical Design

Course Description

The Electrical Design course at ACTMEP Training Institute is expertly designed to cater to both aspiring freshmen eager to launch their careers and seasoned professionals transitioning from electrical project roles to electrical design engineering. This comprehensive course provides foundational knowledge and advanced skills necessary to design, analyze, and manage electrical systems in various construction projects.

Course Objectives:

- Introduce the basics of electrical design and engineering principles.
- Equip students with the skills to create detailed electrical designs using industry-standard software.
- Enhance the ability to analyze and optimize electrical systems for various applications.
- Provide practical training on software tools like AutoCAD Electrical
- Prepare seasoned professionals to transition smoothly into electrical design roles.
- Foster a deep understanding of safety standards and sustainable practices in electrical design.

Number of Days

60 Days

Who Should Attend

Aspiring Freshmen

- **Recent graduates and diploma holders in electrical engineering or related fields**
- **Individuals looking to start a career in electrical design**

Experienced Professionals:

- **Electrical project engineers transitioning to design roles**
- **Professionals seeking to upskill and advance their careers in electrical design**

Continuing Education Hours

70 Hours

Course Completion Certificate

Yes

Software Used

Software Used: AutoCAD, Basics of ETAPS Dialux

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Electrical Design Course

Course Outline

MODULE - 1 : Introduction to Electrical Design

- Basics of electrical power system
- Overview of generation, Transmission, and distribution
- Power transmission fundamentals
- Why electrical in MEP design
- Standards -NBC, IEC, IEE, IS, NEC, DEWA, ADEWA, KAHRAMA, NEMA

MODULE -2 : Undersatanding Building Orientation

- Introduction to architectural Layouts
- Different types of false ceiling
- Work Plane
- Brief introduction to elevation view

MODULE -3 : Luminare Calculation

- Introduction to lighting system
- Lamps and luminaries system
- Concepts of lighting design
- Selection of lux for lighting design
- Room index calculation
- Calculating COU for lighting design
- Manual calculation for interior lighting
- Manual calculation for exterior lighting
- Manual calculation for emergency lighting
- Practice example of lighting design
- Selection of luminaries

MODULE -4 : DIALUX Software for Interior Lighting Design

- Introduction to Dialux Software
- First lighting system design
- Second lighting system design
- Dialux bathroom design
- Emergency lighting design
- Interior lighting design using blue icon in Dialux
- Practical example on dialux software

Module -5 : DIALUX Software for Exterior Lighting Design

- Selection of luminaire for exterior lighting in Dialux
- Basics of street light design
- Basics of playground lighting
- Playground lighting design

Module -6 : Approval of Power Supply from Service Provider

- To estimate the total connected load (w or kw)
- To calculate the total demand (w or kw)
- Selection of cables
- De-rating current calculation
- Cable Sizing
- Bus bar sizing
- Selection of cable insulation
- Voltage drop calculation

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Module-7: Power Network Design

- Power flow form distribution to appliances
- Importance of circuits
- Circuits types
- Light circuit design
- Power circuit design

Module-8 : Power Network Distribution

- Importance of phase distribution
- When to select single phase and three phase system
- Load distribution to each phase
- Distribution board schedule
- Balancing 3 phases
- Preparation of Load schedule

Module-9 : Power Network Protection

- Introduction to circuit breakers
- Properties and types of circuit breakers
- Differences between circuit breakers and isolators
- Circuit breaker sizing &selection
- Power system design with ELCB
- Short circuit current calculation

Module-10 : Panel Board Design

- Introduction to panel boards
- Panel board wiring
- Selection of panel board
- Types of panel boards
- Panel board sizing
- Motor Control Centers& Starters
- Control panels design and wiring

Module-11 : Wires and Cables

- Introduction to wires and cables
- Types of cables
- Differences between cables and wires
- Bus Ducts

Module-12 : Earthing

- Need for earthing in power system
- Types of earthing
- Earthing pit design
- Earthing system design
- Earthing cable sizing

Module-13 : Conduits, Trunking and Cable Tray

- Conduit types
- Conduit Sizing
- Calculating with spacing factor
- Different types of cable trays
- Cable tray sizing
- Cable Trunking sizing
- Trench design
- Cable Containment layout

Module-14 : Transformer Selection

- Brief introduction to transformers
- Types of transformers
- Types of transformer connection
- Transformer sizing (kva)
- HT yard design

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Module-15 :DG Design

- Need for DG design
- Working of DG
- Synchronizing DG to power system
- DG sizing methods
- Calculating diesel requirements
- Diesel tank sizing

Module-16 :Power Factor Improvement

- Why is the power factor to be improved?
- Difference between reactive power and real power
- Need for reactive power
- Capacitor bank sizing
- Implementation of capacitor bank

Module-17 : Electronic Secondary Protection Systems

- Sizing the PV modules
- Inverter sizing
- Battery Sizing using DOD values
- Solar charger controller sizing

Module-18 : Lightning Protection

- To calculate the total coverage area
- Materials used for lightning protection
- Lightning protection design
- Lightning arrestor calculation
- Termination of lightning protection

Module-19 : Solar Energy

- Introduction to solar energy
- Advantages and disadvantages of PV cells
- Can I install solar panels by myself?
- Off grid solar system
- Determine power consumption demand load

Module-20 : Basics of ETAP Medium Voltage Network Design

- Load Flow studies
- Short circuit current calculation
- Relay Protection co-ordination setting
- Voltage drop calculation

Module-21 : UPS System

- Need for an UPS
- Synchronizing UPS with power system
- Inverter sizing
- Battery sizing

Module-22 : Power System Control and Operation

- Brief introduction to transformers
- Types of transformers
- Types of transformer connection
- Transformer sizing (kva)
- HT yard design

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Electrical Drafting Using AutoCAD

Module-1 :Understanding Civil Layouts

- Introduction and area calculation
- Main walls and partition walls
- Stair case
- Doors and Hinges
- Dimensions
- Elevation view and section views
- Plotting

Module-2 :2D Electrical Shematic

- Introduction
- Legends creation- Part 1
- Legends creation-Part 2
- Legends creation-Part 3
- Legends creation-Exercise
- Panel Creation
- Enclosures and name plates
- Inserting panel boards into project

Module-3 : Implementing Legends in Project

- Light Stocks
- Power stocks
- Ceiling Stocks
- Exhaust Stocks
- Air Conditioner points

Module-4 : Buses representation in 2D

- Drafting light circuit layouts
- Drafting Power circuit layouts
- Light abd power circuit routing
- Cable tray routing
- Conduits routing
- Supports for conduits and cable tary

Module-5 : Electrical Panels

- Join
- Panel Creartion
- Enclousers and name plates
- Inserting panel

Module-6 : AutoCAD Lighting Design

- Load Flow studies
- Short circuit current calculation
- Relay Protection co-ordination setting
- Voltage drop calculation

Module-7 :Earthing Design

- Earthing pit design
- Creating pipes
- Filleting
- Trimming

Module-8: Plotting

- Brief introduction to transformers
- Types of transformers
- Types of transformer connection
- Transformer sizing (kva)
- HT yard design

Module-9: . Electrical Template Creation

- Editing the title block
- Adding the tables
- Adding legends

Drafting Power circuit layouts
Light abd power circuit routing
Cable tray routing
Conduits routing
Supports for conduits and cable tary