

ELECTRICAL DESIGN

Module :1

- ❖ Module 1: Introduction to electrical design
- ❖ Basics of Electrical power system
- ❖ Over view of Generation Transmission and Distribution System
- ❖ Power transmission fundamentals
- ❖ Why electrical in MEP Design?
- ❖ Standards – NBC,IEC,IS,NEC,DEWA,ADEWA,NEMA

Module 2:

- ❖ Understanding 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 types
- ❖ 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
- ❖ Practical example on lighting design

Modules 3:

- ❖ Approval for power supply from service provider
- ❖ To estimate the total connected load(w or kw)
- ❖ To calculate the total demand(w or kw)
- ❖ Diversity factor calculation
- ❖ Applying for approval to service provider(BESCOM,TNEB,BRPL & more)
- ❖ Thumb rule calculation

Module 4:

- ❖ Power Network design
- ❖ Power flow from distribution to appliances
- ❖ Importance of circuits
- ❖ Circuit types
- ❖ Light circuit design
- ❖ Power circuit design
- ❖ Module 10: Power network Distribution
- ❖ Importance of phase distribution
- ❖ When to select single phase and three phase system
- ❖ Load distribution to each phase
- ❖ Balancing 3 phase

Module 05:

- ❖ Power network protection
- ❖ Introduction to Circuit Breakers

- ❖ Properties and Types of Circuit Breakers
- ❖ Difference between circuit breakers and isolators
- ❖ Circuit breaker selection
- ❖ Power system design with ELCB
- ❖ Short circuit current calculation
- ❖ Module 12: Panel board design
- ❖ Introduction to panel boards
- ❖ Panel board wiring
- ❖ Selection of panel board
- ❖ Types of panel boards
- ❖ Panel board sizing

Module 06:

Wires and Cables

- ❖ Introduction to wires and cables
- ❖ Types of cables
- ❖ Difference between cables and wires
- ❖ Selection of cables
- ❖ De-rating current calculation
- ❖ Cable sizing
- ❖ Bus bar sizing
- ❖ Selection of cable insulation
- ❖ Voltage drop calculation(VD)

Module 07:

Conduits and cable tray

- ❖ Conduit types
- ❖ Conduit sizing
- ❖ Calculating with spacing factor
- ❖ Different types of cable tray
- ❖ Cable tray sizing
- ❖ Trench design

Module 08:

Transformer selection

- ❖ Brief introduction to transformers
- ❖ Types of transformers
- ❖ Types of transformer connection
- ❖ Transformer sizing (kva)
- ❖ HT yard design
- ❖ Module 16: DG design
- ❖ Need for a DG
- ❖ Working of DG
- ❖ Synchronizing DG to Power System
- ❖ DG Sizing methods
- ❖ Calculating diesel requirement
- ❖ Diesel tank sizing

Module 09:

Power factor improvement

- ❖ Why power factor to be improved?
- ❖ Difference between reactive power and real power
- ❖ Need for reactive power
- ❖ Capacitor bank sizing

- ❖ Implementation of capacitor bank

Module 10 :

Electrical secondary protection systems

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

Module 11:

Lightning protection

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

Module 12:

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

Module 13:

UPS System

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

Module 14:

Power system control and operation

- ❖ ATS system
- ❖ MTS System
- ❖ Tap changers