CONCEPT

Electrical Installation Design Course for Buildings: LV Cable Sizing, Earthing and Protection

15 – 26 August 2027
Jeddah - Corniche four-star



Electrical Installation Design Course for Buildings: LV Cable Sizing, Earthing and Protection

Ref: 1561_25166 **Date:** 15 – 26 August 2027 **Location:** Jeddah - Corniche four-star **Fees:** 35100 SAR

Introduction:

Electrical installation design for buildings, covering LV cable sizing, earthing and protection, is the subject of this 2-week course for building services and MEP electrical design staff, who produce an Electrical Design Package for a case building. Projects lose time when load estimates are inflated, cables are undersized for derating or fault duty, and protective devices fail to discriminate, so redesign surfaces at contractor submittal or testing. Nominees already prepare or check electrical layouts for commercial, residential, hospital or mixed-use projects, and teaching is by modelling build of calculation sheets. CoreConcept Training Center delivers this electrical installation design course.

Course Objectives:

- Prepare building load schedules and estimate maximum demand with diversity and demand factors for different occupancies
- Select supply arrangements, earthing systems and bonding for a building and size protective conductors to IEC 60364
- Size cables for current-carrying capacity, derating, voltage drop and fault withstand and record the results in a cable schedule
- Choose overcurrent devices and RCDs that disconnect faults in time and discriminate between distribution levels
- Design lighting, small power, safety services, standby power, EV charging, PV and surge protection arrangements, including special locations
- Issue single-line diagrams, schedules, specifications and verification records that let contractors build and hand over the installation

Target Audience:

- Building services engineers responsible for the electrical design of commercial and residential developments
- MEP consultancy designers who prepare load schedules, single-line diagrams and cable calculations for tender
- Contractor design staff responsible for shop drawings and design checks before installation
- Healthcare project engineers responsible for supplies to wards, theatres and critical care areas
- Design reviewers and electrical inspectors who check calculations and test records before handover

Course Outline:

Day 1: Building Electrical Design Brief and Load Assessment

- Electrical Design Brief Inputs From Architects and Clients
- Building Load Schedule for Lighting, Power and HVAC
- Maximum Demand Estimation With Diversity and Demand Factors
- Supply Authority Application Data and Intake Capacity
- Commercial, Residential, Hospital and Mixed-Use Load Profiles

Day 2: IEC 60364 Framework, Supply Arrangements and Earthing Systems

- IEC 60364 Part Structure for Building Design Decisions
- TN-S, TN-C-S, TT and IT Earthing System Selection
- IEC 60364-5-54 Earthing Arrangements and Protective Conductor Sizing
- Main Equipotential Bonding of Services and Structural Steelwork
- Transformer Substation Versus LV Intake Supply Options

Day 3: Cable Selection and Sizing Calculations

- IEC 60364-5-52 Installation Methods and Current-Carrying Capacity Tables
- Grouping, Ambient Temperature and Thermal Insulation Derating Factors
- Voltage Drop Limits for Final Circuits and Submains
- Adiabatic Fault Withstand Check for Live and Protective Conductors
- Cable Containment Fill for Trays, Trunking and Conduits

Day 4: Protective Devices, Shock Protection and Design Software

- IEC 60364-4-43 Overload and Short-Circuit Protection Rules
- MCB, MCCB and Fuse Selection by Breaking Capacity
- Selectivity Tables and Cascading Between Distribution Levels
- IEC 60364-4-41 Automatic Disconnection and Earth Fault Loop Impedance
- Electrical Design Software for Cable and Protection Calculations

Day 5: Guided Case Study on Week-One Distribution Design

- Case Building Load Schedule and Maximum Demand Sheet
- Case Main Switchboard and Sub-Distribution Board Hierarchy
- Case Submain Cable Sizing and Voltage Drop Register
- Case Building RCD Type and 30 mA Placement Decisions
- Week-One Distribution Single-Line Diagram Peer Review

Day 6: Final Circuits, Safety Services and EV Charging

- Lighting and Socket-Outlet Final Circuit Arrangements
- IEC 60364-5-56 Safety Services Supplies for Life Safety Systems
- Emergency Escape Lighting Central Battery Versus Self-Contained Luminaires
- Fire Alarm Panel and Smoke Control Power Interfaces
- IEC 60364-7-722 EV Charging Point Circuit Design

Day 7: Standby Power, Rooftop PV, Lightning and Surge Protection

- Standby Generator Sizing for Essential Building Loads
- UPS Topology and Battery Autonomy for Critical Loads
- ATS Transfer Sequences and Mains-Generator Interlocking Logic
- IEC 60364-7-712 Rooftop PV Connection and DC Isolation
- IEC 62305 Lightning Risk Assessment and Surge Protective Devices

Day 8: Special Locations, Specifications and Trade Coordination

- IEC 60364-7-701 Bathroom Zones and Supplementary Bonding
- IEC 60364-7-710 Medical Location Groups and IT Systems
- Isolation Monitoring Devices for Operating Theatre Supplies
- Electrical Specification Clauses for Contractor Tender Packages
- MEP Coordination Drawings and Clash Review With Other Trades

Day 9: Verification, Design Review and Handover Records

- IEC 60364 Part 6 Initial Verification Test Sequence
- Insulation Resistance, Continuity and RCD Trip Time Records
- Electrical Installation Certificate and Schedule of Test Results
- Design Review Checklist and Calculation Audit Trail
- As-Built Drawings and Operation Manual Handover Content

Day 10: Capstone Modelling Build of an Electrical Design Package

- Capstone Mixed-Use Case Building Brief and Load Schedule
- Capstone Cable and Protective Device Calculation Schedules
- Capstone Earthing, Standby Power and Special Location Drawings
- Capstone Single-Line Diagram and Distribution Board Schedules
- Electrical Design Package Completion and Peer Presentation

Skills You Will Gain:

- Maximum Demand Estimation
- Earthing System Selection
- Cable Derating Calculation
- Fault Loop Impedance Checking
- Emergency Power Planning
- Special Location Design
- Electrical Specification Writing
- Installation Verification Planning

Why Attend This Course:

- Deliver an Electrical Design Package for a case building to the lead MEP engineer and the project design manager
- Decide earthing system, cable size, device rating and RCD type for each circuit with calculations a reviewer can follow
- Avoid redesign at contractor submittal, failed loop impedance tests and nuisance tripping caused by unchecked design assumptions
- Share load schedule, cable calculation and design review templates with drafting and site teams

Conclusion:

Back at work, the participant hands the Electrical Design Package to the lead MEP engineer and the project design manager, who use it to issue tender drawings, approve contractor shop drawings and agree the verification plan before energisation. Site teams take the cable and distribution board schedules into installation, and commissioning staff use the test record templates at handover. After the first project designed with this method, the unit should compare measured loop impedances, voltage drops and maximum demand with the design figures and update its load factors and calculation templates.

Frequently Asked Questions FAQ:

What should participants know before an electrical installation design course for buildings?

Participants should already read electrical layouts and single-line diagrams and understand three-phase circuits. Experience preparing or checking building electrical drawings helps. Bringing an anonymised load schedule or layout from a current project lets them apply the calculation sheets to familiar work.

How does electrical installation design for buildings differ from an industrial power distribution or power system studies course?

It concentrates on LV building services: load schedules, earthing, cable sizing, final circuits, safety services and special locations. Plant networks, relay grading, load flow and switchboard construction belong to neighbouring courses and appear here only where a building designer needs their results.

Why does cable sizing in electrical installation design need derating factors?

Derating factors reduce a cable's tabulated current-carrying capacity when cables are grouped, run in high ambient temperatures or enclosed in thermal insulation. Ignoring them lets conductors overheat, shortens insulation life and can force rework after installation.

What do participants take back from the electrical installation design course for buildings?

Participants take back an Electrical Design Package for a case building, holding the load schedule, earthing and supply decision, cable and device calculation schedules, standby power and special location drawings, a single-line diagram and verification record templates.