

Electrical Drawing & Design

Professional Training Course

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Course Description

Introduction

The Electrical Drawing & Design course is a comprehensive professional training program designed to develop the technical capabilities required to interpret, create, review, and manage electrical drawings and design documentation for industrial, commercial, infrastructure, and utility projects. The course bridges electrical engineering principles with practical drawing techniques, design calculations, documentation standards, and real-world project requirements.

For organizations, accurate electrical design is essential to project safety, regulatory compliance, cost control, equipment reliability, construction efficiency, and long-term maintainability. This course provides professionals with a structured understanding of electrical schematics, single-line diagrams, wiring diagrams, power distribution layouts, load calculations, cable sizing, protection systems, grounding, lighting design, and electrical design documentation.

The executive-level value of this program lies in strengthening technical governance and reducing design-related risks throughout the project lifecycle. Participants learn how to translate engineering requirements into clear, coordinated, and implementation-ready electrical drawings while improving design quality, technical communication, constructability, and compliance.

Through practical exercises, engineering examples, drawing interpretation activities, and design scenarios, participants develop skills that can be applied directly to electrical engineering projects, EPC environments, facilities, utilities, industrial plants, government infrastructure, and large-scale capital projects.

Course Objectives

The Electrical Drawing & Design course aims to enable participants to:

- Understand the principles and conventions used in professional electrical drawings and design documentation.

- Interpret electrical symbols, schematics, layouts, diagrams, schedules, and technical notes.
- Develop and review single-line diagrams for electrical power distribution systems.
- Understand electrical load estimation and demand calculations for design applications.
- Apply fundamental principles for transformer, switchgear, feeder, and distribution system selection.
- Perform practical cable sizing and voltage drop considerations.
- Understand short-circuit levels and electrical protection coordination concepts.
- Develop electrical layouts for lighting, power, grounding, and equipment installations.
- Interpret control, wiring, interconnection, and termination diagrams.
- Improve the quality, consistency, and accuracy of electrical engineering drawings.
- Apply recognized electrical engineering standards and design practices.
- Coordinate electrical drawings with architectural, mechanical, civil, instrumentation, and process requirements.
- Identify common electrical design errors, inconsistencies, and constructability issues.
- Strengthen technical review and quality assurance processes for electrical design packages.
- Prepare clearer and more reliable electrical documentation for construction, operation, and maintenance.

Course Content

Day 1: Electrical Drawing Fundamentals and Engineering Documentation

- Overview of electrical drawing and design processes.
- Electrical engineering documentation throughout the project lifecycle.
- Types of electrical drawings used in industrial and commercial projects.
- Electrical symbols, abbreviations, legends, notes, and drawing conventions.
- Understanding schematic diagrams and block diagrams.
- Reading electrical plans and equipment layouts.
- Introduction to single-line diagrams.
- Understanding drawing numbering and document identification systems.
- Drawing scales, dimensions, references, revisions, and title blocks.

- Electrical equipment identification and tagging principles.
- Understanding technical specifications and equipment schedules.
- Relationship between drawings, specifications, calculations, and data sheets.
- Introduction to applicable electrical codes and engineering standards.
- Practical electrical drawing interpretation exercises.

Day 2: Power Distribution Design and Single-Line Diagrams

- Fundamentals of electrical power distribution system design.
- Understanding utility supply and incoming electrical systems.
- Low-voltage and medium-voltage distribution concepts.
- Electrical load identification and classification.
- Connected load, demand load, diversity, and maximum demand.
- Preparing electrical load schedules.
- Transformer selection and capacity considerations.
- Main switchboards and distribution boards.
- Motor control centers and industrial power distribution.
- Feeder configuration and distribution architecture.
- Busbar and switchgear representation on electrical drawings.
- Development and interpretation of single-line diagrams.
- Normal, emergency, and standby power arrangements.
- Generator and uninterruptible power supply integration concepts.
- Practical development and review of a power distribution single-line diagram.

Day 3: Cable Sizing, Protection, Grounding, and Electrical Calculations

- Electrical cable types and selection criteria.
- Current-carrying capacity and cable sizing fundamentals.
- Cable derating considerations.
- Voltage drop calculations and design limits.

- Cable routing and installation considerations.
- Understanding cable schedules.
- Introduction to short-circuit calculations.
- Fault current considerations in electrical design.
- Circuit breaker and fuse selection principles.
- Electrical protection concepts and coordination fundamentals.
- Protection requirements for feeders, transformers, motors, and distribution systems.
- Grounding and earthing system design principles.
- Protective grounding and equipment bonding.
- Grounding layouts and documentation.
- Lightning protection fundamentals and drawing requirements.
- Practical cable sizing, voltage drop, and protection selection exercises.

Day 4: Electrical Layouts, Lighting, Wiring, and Control Drawings

- Principles of electrical equipment layout development.
- Power outlet and small power layouts.
- Industrial power distribution layouts.
- Lighting design fundamentals.
- Indoor and outdoor lighting considerations.
- Emergency and escape lighting principles.
- Lighting fixture schedules and circuit allocation.
- Reading and developing wiring diagrams.
- Control circuit fundamentals.
- Understanding ladder diagrams.
- Motor starter and control circuit drawings.
- Interconnection and termination diagrams.
- Cable routing, cable tray, and conduit layouts.
- Electrical room layout considerations.

- Coordination of electrical services with other engineering disciplines.
- Practical review of electrical layouts, wiring diagrams, and control drawings.

Day 5: Design Review, Coordination, Quality Control, and Project Application

- Electrical design workflow from concept to detailed engineering.
- Design basis and electrical design criteria.
- Developing coordinated electrical drawing packages.
- Reviewing drawings against calculations and technical specifications.
- Design checking and verification techniques.
- Identifying inconsistencies between electrical documents.
- Interdisciplinary design coordination.
- Constructability considerations in electrical design.
- Equipment accessibility and maintenance requirements.
- Design risk identification and mitigation.
- Electrical drawing quality assurance and quality control.
- Revision management and change control.
- As-built drawings and final project documentation.
- Common electrical design mistakes and lessons learned.
- Technical review checklist for electrical drawings.
- Integrated practical exercise based on a real-world electrical design scenario.

Target Audience

This Electrical Drawing & Design training course is suitable for professionals involved in electrical engineering, design, construction, operation, maintenance, technical review, and project delivery, including:

- Electrical engineers.
- Electrical design engineers.
- Project engineers.
- Maintenance engineers.

- Facilities engineers.
- Construction engineers.
- Site engineers.
- Power system engineers.
- Electrical supervisors.
- Engineering consultants.
- Technical office engineers.
- CAD and electrical drafting professionals.
- EPC project personnel.
- Quality assurance and quality control professionals.
- Technical reviewers and engineering coordinators.
- Professionals working in utilities, manufacturing plants, oil and gas facilities, infrastructure projects, commercial developments, and government organizations.

Course Requirements

Participants should have a basic understanding of electrical engineering principles or relevant practical experience in engineering, maintenance, construction, drafting, facilities, or technical operations. Previous advanced electrical design experience is not required.

Participants will benefit from familiarity with basic electrical terminology, electrical equipment, power distribution concepts, and engineering drawings. The course progressively develops capabilities from drawing interpretation to integrated electrical design review and practical project application.

Training Methodology

The course applies an interactive, application-oriented training methodology focused on transferring electrical design knowledge into practical workplace capability. Technical concepts are reinforced through realistic engineering scenarios and structured design activities.

The methodology includes:

- Expert-led technical presentations and facilitated discussions.
- Practical electrical drawing interpretation.
- Real-world engineering examples and design scenarios.
- Single-line diagram development and review exercises.
- Electrical calculation exercises.
- Cable sizing and voltage drop applications.
- Electrical layout analysis.
- Wiring and control diagram interpretation.
- Design review and error-detection exercises.
- Technical checklists and structured review techniques.
- Case-based problem solving.
- Individual and group engineering exercises.
- Integrated project-based application.

This approach enables participants to understand not only how electrical drawings are produced, but also why specific engineering decisions are made and how those decisions affect safety, reliability, compliance, construction, operation, and lifecycle performance.

Learning Outcomes

Upon successful completion of the Electrical Drawing & Design course, participants will be able to:

- Read and interpret professional electrical engineering drawings confidently.
- Recognize commonly used electrical symbols, conventions, and documentation requirements.
- Interpret and develop electrical single-line diagrams.
- Evaluate electrical load schedules and power distribution arrangements.
- Apply fundamental cable sizing and voltage drop principles.
- Understand electrical protection and fault-level considerations.
- Interpret grounding, bonding, and lightning protection drawings.
- Review lighting, power, cable routing, and equipment layouts.
- Interpret wiring, control, interconnection, and termination diagrams.

- Coordinate electrical design requirements with other engineering disciplines.
- Detect common errors and inconsistencies within electrical design packages.
- Conduct more systematic technical reviews of electrical drawings.
- Improve drawing accuracy, consistency, constructability, and documentation quality.
- Support safer and more reliable electrical system implementation.
- Contribute effectively to electrical design, construction, commissioning, operation, and maintenance activities.

Instructor Profile

The course is delivered by "An internationally certified expert with extensive practical and consulting experience."

The instructor brings strong professional expertise in electrical engineering, electrical drawing, power distribution design, engineering documentation, technical review, project implementation, and industry best practices. The training combines engineering principles with practical insights drawn from real project environments, enabling participants to connect design decisions with construction, operation, maintenance, safety, reliability, and organizational performance.

Contact Us

For registration inquiries, upcoming dates, or group pricing, please contact us:

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