



EE033: D & T Electrical Systems: From Generation to the Last Consumer

Training Description:

The D & T Electrical Systems – From Generation to the Last Consumer training course is designed to provide participants with a comprehensive understanding of electrical power systems, from generation at the source to distribution and final consumption. The training course focuses on the principles, components and operation of electrical systems, ensuring participants gain both theoretical knowledge and practical skills. Emphasis is placed on safe and efficient management of electricity throughout the supply chain, highlighting modern technologies, protection systems and regulatory requirements.

This intensive training course will let participants explore the complete electrical network, including power generation, transmission, substation operations, distribution networks, and end-user connections. The training combines lectures, hands-on exercises and case studies to illustrate key concepts such as load management, system protection, fault analysis and energy efficiency. Participants will also learn about instrumentation, metering, switchgear, transformers and the integration of renewable energy sources within conventional systems.

By the end of the training course, participants will be able to analyze and troubleshoot electrical systems, design safe and efficient distribution solutions and ensure reliable power delivery to end users. The training course enhances technical competence, improves problem-solving and decision-making skills and builds confidence in managing electrical systems across generation, transmission, distribution and consumption stages. Practical exercises and interactive workshops are integrated throughout to ensure immediate application in the workplace.

Training Objectives:

By the end of the training, participants will be able to:

- ✓ Understand the fundamentals of electrical generation, transmission, and distribution
- ✓ Identify key components and functions in electrical systems from source to consumer
- ✓ Analyze electrical loads, power quality, and system efficiency
- ✓ Apply safety standards and protection mechanisms in electrical networks
- ✓ Conduct fault detection, troubleshooting, and system diagnostics
- ✓ Understand substation design, switchgear operation, and transformer applications
- ✓ Implement energy management and efficiency improvement techniques
- ✓ Prepare documentation and schematics for electrical systems
- ✓ Apply regulatory and industry standards to system design and operation
- ✓ Strengthen technical competence and decision-making for electrical system management

Training Designed for:

This training course is intended for electrical engineers, technicians, and maintenance personnel responsible for generation, transmission and distribution systems. It is also suitable for plant managers, system operators and safety officers who oversee power systems in industrial, commercial, or utility settings. Professionals involved in substation operations, electrical troubleshooting and energy management will benefit from practical skills and system knowledge.

Training Requirement:

"Hands on practical sessions, equipment and software will be applied during the course if required and as per the client's request."

Contents can be adapted to your specific wishes. It is therefore possible to focus on specific modules of the training course as per client's learning needs and objectives. Further, it should be forwarded to us a month prior to the course dates.

Training Program:

DAY ONE:

ELECTRICAL POWER GENERATION SYSTEMS

❖ Understanding Power Generation and Its Principles

- Introduction to electrical power systems
- Conventional generation methods: thermal, hydro, and nuclear
- Renewable generation: solar, wind and hybrid systems
- Power station components and control systems
- Generators, alternators and prime movers
- **Practical exercise:** Overview and identification of generation equipment

DAY TWO:

TRANSMISSION AND SUBSTATION OPERATIONS

❖ Transmitting Electricity Safely and Efficiently

- High-voltage transmission principles and grid operations
- Transmission lines, insulators, and transformers
- Substation types, layout, and equipment
- Protection systems: relays, circuit breakers, and fault detection
- Load balancing and reactive power management
- **Workshop:** Substation inspection and fault simulation

DAY THREE:

DISTRIBUTION NETWORKS

❖ Delivering Power from Substations to Consumers

- Medium and low voltage distribution principles
- Overhead and underground distribution systems
- Transformers, switchgear, and distribution panels
- Voltage regulation and power quality considerations
- Safety protocols for distribution operations
- **Case study:** Designing an efficient distribution network

DAY FOUR:

END-USER CONNECTIONS AND LOAD MANAGEMENT

❖ Ensuring Reliable and Safe Electricity Consumption

- Service connections, metering, and customer equipment
- Load analysis, demand forecasting, and energy management
- Wiring systems, protective devices, and safety devices

- Power factor improvement and energy efficiency techniques
- **Practical exercise:** Load calculations and system sizing
- Troubleshooting common end-user electrical problems

DAY FIVE:

SYSTEM TROUBLESHOOTING, SAFETY, AND BEST PRACTICES

- ❖ **Maintaining, Protecting, and Optimizing Electrical Systems**
 - Fault detection, isolation, and system restoration
 - Safety procedures for electrical operation and maintenance
 - Documentation, schematics, and regulatory compliance
 - System reliability and continuous improvement techniques
 - **Exercise:** Comprehensive system troubleshooting scenario
 - **Final presentation:** Integrated electrical system analysis and recommendations
- ❖ Course Conclusion
- ❖ POST-ASSESSMENT and EVALUATION

Training Methodology:

This interactive training course includes the following training methodologies as a percentage of the total tuition hours:

- 30% Lectures, Concepts, Role Play
- 70% Workshops & Work Presentations, Techniques, Based on Case Studies & Practical Exercises, Gamification, Software & General Discussions
- Pre and Post Test

Training Certificate(s):

CMCT Internationally recognized certificate(s) will be issued to each participant who completed the course.

Training Fees:

TBA as per the course location - This rate includes participant's manual, hand-outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

Note: The 5% VAT (Value Added Tax), will be effective starting 01st of January 2018 as per the new regulation from the UAE Government. The VAT applies for all quotation both for local and abroad.

Training Timings:

Daily Timings:

07:45 - 08:00	Morning Coffee / Tea
08:00 - 10:00	First Session
10:00 - 10:20	Recess (Coffee/Tea/Snacks)
10:20 - 12:20	Second Session
12:20 - 13:00	Recess (Prayer Break & Lunch)
13:00 - 14:00	Last Session

For training registrations or in-house enquiries, please contact:

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