Modern Electrical Power Systems

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5 days training course

For detailed information on training course dates, please click the link:
Modern Electrical Power Systems.

Course Overview

The electrical power industry is evolving rapidly with advancements in smart grids, renewable energy integration, and digital automation. This course provides a comprehensive understanding of modern power systems, covering generation, transmission, distribution, and the latest technologies. Participants will explore power flow management, fault analysis, operational challenges, and emerging innovations such as FACTS, HVDC, and digital substations.

Course Objectives

By the end of this course, participants will:

- Understand modern power systems and grid operations.
- Analyze power flow, stability, and fault management.
- Explore renewable energy integration and smart grids.
- Apply advanced protection, relay, and SCADA technologies.
- Optimize voltage, frequency, and demand-side management.

Who Should Attend?

This course is designed for professionals involved in the planning, design, operation, and maintenance of electrical power systems, including:

- **Electrical Engineers & Designers**
- **Technicians & Maintenance Professionals**
- **Power System Operators & Planners**
- **Professionals from Power Utilities & Distribution Companies**
- **Energy Sector & Petrochemical Industry Engineers**

Course Outline:

Day 1: Fundamentals of Modern Power Systems

- Overview of power generation, transmission, and distribution
- Smart grids and their role in modern power networks
- Real (P) and reactive power (Q) flow management
- Transformer fault levels and system disturbances
- Voltage and frequency control strategies
- The impact of reactive power compensation

Day 2: Operational Challenges & System Reliability

- Rising power demand and sustainability challenges
- Power system faults: symmetrical & asymmetrical faults
- Substation automation and plant condition monitoring
- Stability issues in heavily loaded systems
- Transmission line and cable design considerations
- Major causes of power system failures

Day 3: Renewable Energy & Grid Integration

- Solar, wind, and geothermal power integration
- Stability challenges in large-scale renewable generation
- Demand-side management and remote load control
- Harmonics, power quality issues, and mitigation techniques
- Surge protection and network switching advancements
- The role of optical current sensors in power protection

Day 4: Digital Substations & Grid Technologies

- Digital substation architecture and automation
- Flexible AC Transmission Systems (FACTS) and HVDC links
- Remote plant surveillance and unmanned substations
- SCADA and AI-driven fault diagnostics
- Optical cable monitoring for temperature and reliability
- Data logging and predictive maintenance strategies

Day 5: Advanced Protection & Fault Management

- Numerical protection relays and their functionalities
- State-of-the-art fault current limiters
- Condition monitoring and insulation diagnostics
- Gas Insulated Switchgear (GIS) and partial discharge techniques
- Fault detection, isolation, and recovery strategies
- Course review, Q&A session, and practical insights

DOCUMENTATION

The **MTC team** has meticulously prepared **high-quality training materials** for distribution to all delegates.

CERTIFICATES

An **accredited Certificate of Completion** will be awarded to participants who successfully attend and complete the program.

SCHEDULE

Course sessions are scheduled as follows:

- **Morning Session:** 09:00 AM – 1:00 PM
- **Afternoon Session:** 01:00 PM – 05:00 PM

REGISTRATION & PAYMENT

To register, please complete the **registration form** available on the course page and submit it with your **preferred payment method**. Alternatively, you can contact us via **email or WhatsApp** for assistance.

TRAVEL & TRANSPORT

We ensure a **seamless travel experience** by providing **airport-hotel-airport** transfers for all participants.