Power System Protection

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Power System Protect

5 days training course

For detailed information on training course dates, please click the link:

Power System Protection

Target Audience:

This course is essential for professionals involved in **electrical installation, maintenance, and protection systems**. It is particularly beneficial for:

- **Electrical Engineers and Technicians**
- **Technical Management Professionals**
- **Operations & Maintenance Engineers**
- **Power Utility Engineers and Professionals**
- **Infrastructure Project Service Professionals**
- **Maintenance and Operations Technicians**

Introduction:

As the demand for electrical energy continues to rise, ensuring a **reliable, safe, and secure power system** is more critical than ever. Electrical protection devices must be designed with **precision and zero tolerance for error** to safeguard infrastructure and prevent failures.

Modern **numerical relays** have become a key component of digital electrical installations, working alongside traditional **fuses and circuit breakers**. These advanced relays are responsible for **detecting system faults** and triggering protective mechanisms that isolate faulty components before they cause widespread disruptions.

The latest advancements in **power system protection** now integrate **IoT (Internet of Things) and AI (Artificial Intelligence)** within **smart grids**, introducing intelligent **touch-screen human-machine interfaces (HMI)** for enhanced control. With cutting-edge measurement and protection technologies, including **differential protections and distance relays**, modern electrical systems ensure optimal performance, integrity, and reliability.

This course will provide participants with a deep understanding of **power system protection**, covering:

- **Overview of electrical power systems and key equipment**
- **Advanced functionalities of numerical relays**
- **Protection strategies for generators and transformers**
- **Lines and motor protection systems**
- **Next-generation protection systems using IoT and AI**

Training Objectives:

By the end of this course, participants will be able to:

- **Understand** the critical role of electrical power protection in modern infrastructure.
- **Analyze** the functionality and operation of numerical relays.
- **Design** protection systems for generators and power transformers.
- **Examine** the construction and function of instrument transformers.
- **Evaluate** the latest advancements in IoT-based and AI-driven protection systems.

Training Methodologies:

This course will be delivered through a combination of:

- **Expert-Led Presentations** – Covering fundamental and advanced protection concepts.
- **Interactive Discussions** – Encouraging real-world problem-solving and application.
- **Case Studies & Best Practices** – Learning from real-world examples of power system failures and solutions.
- **Hands-On Exercises & Simulations** – Practicing relay coordination, fault detection, and system protection design.
- **Collaborative Workshops** – Engaging in team-based problem-solving on electrical protection scenarios.

Course Outline:

Day 1:Overcurrent Protective Devices – Fundamentals & Characteristics

- Types and characteristics of overcurrent protection
- Fuse types, operation, and characteristics
- Time-current curves (TCC) interpretation
- Electronic trip units: L, S, I, G settings
- Coordination studies for circuit breakers

Day 2: Instrument Transformers & Digital Numerical Relays

- Role of **current transformers (CTs)** and **voltage transformers (VTs)**
- Characteristics and applications of **Non-Conventional Instrument Transformers (NCITs)**
- Protection relay functionalities and coordination
- Numerical relay applications in modern grids

Day 3: Protection of Major Electrical Equipment

- Generator faults and dedicated numerical relays
- Power transformer protection strategies
- Low-voltage and high-voltage **motor protection**
- Busbar protection and its significance
- Distance protection for overhead transmission lines

Day 4: The Smart Grid & IoT-Based Protection Systems

- Intelligent Electronic Devices (IEDs) and smart grids
- IoT applications in electrical power protection
- Digital grid protection strategies
- IEC 61850 and digital substations
- AI-driven **intelligent relay systems**
- Eco-friendly high-voltage circuit breakers

Day 5: Ground Fault, Arc Flash Hazards & Protection Strategies

- Common types of **ground faults** and their impact
- Severe overcurrent fault scenarios
- **Arc flash hazard analysis** and mitigation techniques
- Compliance with IEEE 1584 and NFPA 70E standards
- Final session & certific

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.