

Circuit Breakers, Switchgears, and Substation Equipment: Operation & Maintenance

COURSE OVERVIEW

This course provides a comprehensive understanding of the design, function, operation, and maintenance of modern electrical power systems. The curriculum emphasizes preventive and predictive maintenance techniques, testing procedures, insulation coordination, and condition monitoring aligned with IEC, IEEE, and ISO international standards. Participants will learn how to diagnose, maintain, and troubleshoot substation and switching equipment through their exposure to the latest technologies in digital substations, smart monitoring systems, and AI-based predictive maintenance tools. This will enable them to mitigate risks, ensure operational safety, and enhance equipment performance under diverse load and environmental conditions.

WHO SHOULD ATTEND?

This course is designed for electrical engineers, technicians, substation engineers, operators, power system maintenance engineers, protection and control engineers, utility engineers, supervisors, plant maintenance managers, electrical inspectors seeking to strengthen their technical expertise and operational competence. It is equally valuable for safety officers, energy auditors, consultants, field service engineers, contractors, technical trainers and engineering educators.

COURSE OUTCOMES

Delegates will gain the skills and knowledge to:

- Identify different types of circuit breakers and switchgears and their specific applications.
- Conduct proper operation, inspection, testing, and maintenance of substation components.
- Analyze and troubleshoot common faults and failures in switchgear and substation systems.
- Interpret single-line diagrams and substation layouts for system planning and safety.
- Evaluate the performance and reliability of high-voltage and medium-voltage systems.
- Implement modern digital substation technologies for smarter and safer grid operations.

KEY COURSE HIGHLIGHTS

At the end of the course, you will understand;

- The operating principles, design, and functions of circuit breakers, switchgears, and related substation equipment.
- The classification and application of air, vacuum, SF₆, and hybrid circuit breakers.
- The role of insulation systems, busbars, current transformers (CTs), and potential transformers (PTs) in substations.
- Diagnostic techniques such as thermography, vibration analysis, and contact wear assessment.
- How to perform risk assessments and safety protocols for working on live and de-energized systems.
- The integration of IoT and smart sensors for real-time monitoring of substation performance.
- Root cause analysis and preventive strategies for minimizing electrical failures.

All our courses are dual-certificate courses. At the end of the training, the delegates will receive two certificates.

1. A GTC end-of-course certificate.
2. Continuing Professional Development (CPD) Certificate of completion with earned credits awarded.