

Course No. 1151

Transformers Engineering Training Course

ELECTRICAL ENGINEERING
INDUSTRIAL ENGINEERING, MAINTENANCE & OPERATIONS

DURATION

5 Days

DELIVERY

Classroom



Course Overview

The Transformers Engineering Training Course is a comprehensive professional development program designed to equip electrical engineers, maintenance professionals, operations personnel, technical specialists, and engineering managers with the knowledge and practical skills required to design, install, operate, maintain, test, troubleshoot, and optimize power transformers throughout their operational lifecycle. Power transformers are among the most critical assets in electrical power systems, serving as the backbone of power generation, transmission, and distribution networks by ensuring efficient voltage transformation, reliable power delivery, and system stability.

Modern industrial facilities, utilities, oil and gas operations, manufacturing plants, and critical infrastructure depend on high-performance transformer systems to maintain operational continuity and electrical reliability. Failures in transformer equipment can result in costly outages, production interruptions, equipment damage, and safety hazards. This course provides participants with internationally recognized engineering principles and practical methodologies for transformer selection, installation, operation, preventive maintenance, condition assessment, fault diagnosis, asset management, and lifecycle optimization.

Throughout the program, participants will develop a comprehensive understanding of transformer engineering, including transformer design principles, transformer construction, insulation systems, magnetic circuits, cooling methods, transformer ratings, tap changers, transformer protection, oil-filled and dry-type transformers, transformer testing, dissolved gas analysis (DGA), insulation diagnostics, condition monitoring, maintenance planning, fault analysis, transformer failures, reliability improvement, and asset lifecycle management. Practical engineering exercises and real industrial case studies allow participants to apply engineering concepts to actual transformer operation and maintenance scenarios.

The Transformers Engineering Training Course also demonstrates how transformer engineering supports maintenance management, reliability engineering, electrical protection, asset integrity, operational excellence, energy efficiency, engineering safety, regulatory compliance, and digital asset management initiatives. By completing this course, participants will be prepared to improve transformer reliability, reduce maintenance costs, optimize electrical system performance, strengthen engineering decision-making, enhance operational safety, and support sustainable engineering operations across government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, oil and gas companies, electric utility providers, power generation facilities, manufacturing industries, mining operations, transportation

infrastructure, and multinational corporations.

Objectives

- Analyze the engineering principles governing transformer design, operation, and performance.
- Develop practical knowledge for installing, operating, maintaining, and managing power transformers.
- Evaluate transformer performance using engineering calculations, testing procedures, and operational performance indicators.
- Apply transformer engineering principles to improve equipment reliability, efficiency, and operational safety.
- Design maintenance and asset management strategies that optimize transformer performance throughout its lifecycle.
- Improve transformer operation through effective inspection, testing, monitoring, and maintenance practices.
- Strengthen troubleshooting capabilities by identifying transformer faults and conducting systematic root cause analysis.
- Implement preventive, predictive, and reliability-centered maintenance strategies for transformer assets.
- Assess transformer condition using advanced diagnostic techniques and performance analysis.
- Align transformer engineering practices with organizational objectives for safety, reliability, asset management, regulatory compliance, and operational excellence.

Who Should Attend

This course is designed for electrical engineers, power systems engineers, transformer engineers, maintenance engineers, operations engineers, protection engineers, substation engineers, commissioning engineers, reliability engineers, utility engineers, project engineers, electrical technicians, maintenance supervisors, operations supervisors, engineering technicians, maintenance planners, equipment inspectors, engineering consultants, and technical professionals responsible for transformer systems.

The program is equally valuable for engineering managers, maintenance managers, operations managers, plant managers, facility managers, project managers, asset management professionals,

procurement engineers, HSE specialists, quality professionals, executive managers, technical advisors, and decision makers responsible for electrical infrastructure, transformer reliability, maintenance planning, engineering asset management, and operational continuity.

Professionals working within government entities, ministries, public sector organizations, financial institutions managing engineering infrastructure, electric utility companies, oil and gas organizations, petrochemical industries, power generation facilities, manufacturing plants, mining operations, transportation authorities, airports, water treatment facilities, infrastructure developers, and multinational engineering organizations will benefit significantly from the practical engineering methodologies and internationally recognized transformer engineering practices presented throughout the course.

Learning Outcomes

- By the end of this course, participants will be able to:
- Explain transformer construction, operating principles, and industrial applications.
- Analyze transformer performance and evaluate operational reliability.
- Apply transformer engineering principles to improve efficiency and asset performance.
- Interpret transformer drawings, electrical schematics, and technical specifications.
- Diagnose transformer faults using systematic engineering troubleshooting and root cause analysis.
- Develop preventive and predictive maintenance programs for power transformers.
- Perform transformer testing, insulation assessment, dissolved gas analysis (DGA), and condition monitoring.
- Evaluate the performance of transformers, tap changers, cooling systems, protection devices, and associated equipment.
- Apply engineering safety procedures during transformer installation, testing, maintenance, and commissioning.
- Support operational excellence through effective transformer asset management, reliability improvement, and continuous performance optimization.

Course Outline

DAY 01

Fundamentals of Transformer Engineering

- Principles of transformer operation and electromagnetic induction
- Transformer construction, components, and classifications
- Transformer ratings, cooling methods, and insulation systems
- Electrical drawings, transformer schematics, and technical documentation

PRACTICAL

Practical workshop on transformer identification and engineering documentation interpretation

DAY 02

Transformer Design, Protection, and System Integration

- Power transformer design fundamentals
- Transformer protection systems and relay coordination
- Tap changers and voltage regulation
- Transformer connections and power system integration

PRACTICAL EXERCISE

Practical exercise on transformer selection, protection, and performance evaluation

DAY 03

Transformer Operation, Maintenance, and Diagnostic Testing

- Safe transformer operation and operating procedures
- Preventive, predictive, and reliability-centered maintenance strategies
- Transformer testing, insulation diagnostics, and dissolved gas analysis (DGA)
- Condition monitoring and asset integrity assessment

DAY 03 — CONTINUED

PRACTICAL

Practical workshop on maintenance planning and transformer diagnostic testing

DAY 04

Transformer Fault Analysis and Reliability Improvement

- Transformer fault diagnosis and failure mechanisms
- Root cause analysis of transformer failures
- Transformer life assessment and reliability improvement
- Electrical safety standards, switching procedures, and Lockout/Tagout (LOTO)

PRACTICAL APPLICATION

Practical application involving transformer fault investigation and corrective action planning

DAY 05

Advanced Transformer Asset Management and Operational Excellence

- Transformer asset lifecycle management
- Regulatory compliance and engineering best practices
- Performance measurement and transformer reliability indicators
- Continuous improvement strategies for transformer systems

FINAL WORKSHOP

Final workshop involving the development of a comprehensive Transformers Engineering management plan integrating transformer testing, condition monitoring, maintenance planning, fault diagnosis, protection coordination, asset lifecycle management, electrical safety, reliability improvement, and continuous improvement to maximize transformer performance, operational reliability, and engineering excellence.



Register or Request More Information

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