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Course Name

Transformer Operational Principles Troubleshooting Training

Sector Name

Electrical Engineering

Document Type

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Transformer Operational Principles Troubleshooting Training

Course Introduction

The Transformer Operational Principles Troubleshooting Training course provides electrical professionals with the technical knowledge required to understand transformer operation and effectively diagnose common faults in power systems. Transformers play a critical role in electrical transmission and distribution networks, making proper operation and maintenance essential for system reliability.

This course focuses on transformer operating principles, electrical performance, fault detection, troubleshooting techniques, and preventive maintenance strategies. Participants will learn how transformers function within power systems, how to identify operational problems, and how to apply practical troubleshooting methods to maintain system stability.

By completing the Transformer Operational Principles Troubleshooting Training, professionals can improve equipment reliability, reduce downtime, and ensure efficient operation of electrical infrastructure. This course is ideal for electrical engineers, maintenance engineers, power system technicians, and professionals involved in transformer operation and maintenance

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Target Audience

✓ Electrical Engineer

✓ Electrical Project Engineer

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Transformer Operational Principles Troubleshooting Training

Learning Objectives

- ✓ Operational principles
- ✓ Design guidelines and different types
- ✓ Selection methodology
- ✓ Maintenance and commissioning procedures
- ✓ Troubleshooting checklists and failure analysis techniques
- ✓ Testing procedures
- ✓ Diagnostics and monitoring technologies
- ✓ Practical solutions for specifying, operating, and maintaining power transformers in a utility or plant environment
- ✓ Comprehensive understanding of principles, selection, testing, and commissioning, protection, maintenance, and troubleshooting of distribution and power transformers
- ✓ The necessary safe procedures relating to transformer operation and related circuitry
- ✓ Testing and maintenance of transformers
- ✓ How to care for your transformers

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Course Outline

✓ DAY 01

Module (01): Introduction, General Principles, and Classification

- ✓ General Classification of Transformers:
- ✓ Transformer Construction, Core-Type,
- ✓ Shell-Type, Dry-type Transformers,
- ✓ Oil-filled Transformers,
- ✓ Cooling Techniques
- ✓ Transformer Windings
- ✓ Interconnection of Windings
- ✓ Advantages and Disadvantages of Principal Connections.
- ✓ Tertiary Windings
- ✓ Autotransformers
- ✓ Harmonics in Transformers
- ✓ Parallel Operation of Transformers
- ✓ Loadings of Transformers in Parallel
- ✓ Paralleling Requirements
- ✓ Polarity
- ✓ Standards for Transformers, Types and Requirements
- ✓ Transformer Tappings and Connections
- ✓ Ability to withstand Short Circuit, Sound Level
- ✓ Case Studies and Workshop Discussion

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Course Outline

✓ Day 02

Module (02): Transformer Constructional Details

- ✓ Transformer Oil:
- ✓ Characteristics
- ✓ Oil Oxidation
- ✓ Breakdown Voltage
- ✓ Water Content
- ✓ Acidity
- ✓ Oil and Field Oil Testing
- ✓ Dissolved Gas Analysis
- ✓ Treatment and Filtering of Oil
- ✓ Effect of Oil Expansion
- ✓ Breathing Action
- ✓ Buchholz Relay
- ✓ Explosion Vents
- ✓ Instrument Transformers
- ✓ Transformers for Industrial Applications:
- ✓ Electro-chemical,
- ✓ Arc and Induction Furnaces,
- ✓ Rectifier Transformers,
- ✓ High Voltage Testing Transformers,
- ✓ Precipitator Transformers,
- ✓ Dry Type Transformers
- ✓ Transformer Construction & Details

- ✓ Transformer Cooling
- ✓ Natural Cooling
- ✓ Forced Cooling
- ✓ Case Studies and Workshop Discussion

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Course Outline

✓ Day 03

Module (03): Transformer Features And Thermal Performance

- ✓ Thermal Performance and Cyclic Rating of Transformers
- ✓ Transformer Impedance
- ✓ Electromagnetic Forces
- ✓ Transformer Construction
- ✓ Transformer Windings Construction
- ✓ Coil Types
- ✓ Disc Coils
- ✓ Cross-over Coils
- ✓ Concentric Coils
- ✓ Sandwich Coils
- ✓ Transpositions
- ✓ Transformer Tanks and Radiators, Tank Losses, Paint Treatments
- ✓ Transformer Fittings
- ✓ Lifting Lugs
- ✓ Undercarriages
- ✓ Jacking Pads
- ✓ Tie-Down Lugs
- ✓ Bleed Pipes
- ✓ Thermometers
- ✓ Case Studies and Workshop Discussion

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Course Outline

✓ Day 04

Module (04): Transformer Operation And Maintenance

- ✓ Distribution Voltage Adjustment, Off-Load Tap Changing, On-Load Tap Changing
- ✓ Switching of high voltage underground cables supplying the Distribution Transformers
- ✓ Earthling and Over-Current Protection of Distribution Transformers
- ✓ Transformer Maintenance:
- ✓ Oil preservation
- ✓ Deterioration of oil
- ✓ Breathers
- ✓ Condition Monitoring
- ✓ Faults in Transformers
- ✓ Tappings and Windings
- ✓ Advanced Transformer Maintenance
- ✓ Guidelines on how to care for your Distribution Transformer
- ✓ Case Studies and Workshop Discussion

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Course Outline

✓ Day 05

Module (05): Transformer Testing

- ✓ Transformer Routine Tests
- ✓ Measurement of winding resistance
- ✓ Measurement of voltage ratio
- ✓ Measurement of impedance voltage, short-circuit impedance, and load loss
- ✓ Measurement of No-load loss and current
- ✓ Insulation resistance
- ✓ Harmonics testing
- ✓ Separate-source power-frequency voltage withstand test
- ✓ Induced overvoltage withstand test
- ✓ Transformer Type Tests
- ✓ Temperature–rise test
- ✓ Lightning impulse test
- ✓ Sound level
- ✓ Special Tests
- ✓ Transformer Partial Discharge Testing
- ✓ Accuracy and Interpretation of test results and of test reports
- ✓ Workshop and Tutorials
- ✓ Questions and Case Studies

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Sept. 21, 2026	Sept. 25, 2026	5 days	4250.00 $	UAE , Dubai
April 4, 2027	April 8, 2027	5 days	4250.00 $	KSA , Dammam
June 22, 2026	June 26, 2026	5 days	4950.00 $	England , London
Dec. 28, 2026	Jan. 1, 2027	5 days	4250.00 $	UAE , Dubai

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