



Power Transformer Operation, Selection and Diagnostics Course

21 – 25 February 2027
Johannesburg

Power Transformer Operation, Selection and Diagnostics Course

Ref: 944_172189 **Date:** 21 – 25 February 2027 **Location:** Johannesburg **Fees:** 6000 Euro

Overview

Power Transformer Operation, Selection and Diagnostics Course is a 1-week course for electrical engineers, maintenance specialists, power-system operators, commissioning teams, and reliability professionals who leave with a Transformer Selection and Diagnostic Decision Portfolio. Participants connect transformer principles, specification, loading, cooling, protection, acceptance testing, condition evidence, and fault diagnosis. The course turns separate measurements into traceable engineering decisions for selection, operation, maintenance, and troubleshooting. Agile Leaders Training Center provides this course on power transformer operation, selection, and diagnostics.

Who Should Attend

- Teams responsible for transformer specification and technical evaluation.
- Functions responsible for commissioning and acceptance evidence.
- Engineers responsible for transformer operation and loading decisions.
- Maintenance groups responsible for condition assessment and fault diagnosis.
- Reliability teams responsible for risk-based intervention planning.

The course assumes participants can read transformer nameplates, single-line diagrams, and electrical test records, and leaves out introductory circuit theory and equipment repair procedures.

Departments and Industries

The course supports transformer decisions across power infrastructure and electricity-dependent operations.



- Power generation, transmission, and distribution
- Industrial plants and process facilities
- Renewable energy and grid-connection projects
- Electrical maintenance and asset management
- Engineering consultancies and testing services

Learning Objectives

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

- Analyze transformer operating principles, ratings, and duty constraints.
- Evaluate transformer specifications and selection alternatives.
- Apply loading, cooling, and protection evidence to operating decisions.
- Build acceptance and baseline diagnostic test plans.
- Diagnose electrical, dielectric, mechanical, and thermal fault indicators.
- Prioritize maintenance and troubleshooting actions by risk.



Course Agenda

Day 1: Operating Principles and Ratings

- Transformer Equivalent Circuit Interpretation
- Magnetic Flux and Excitation Behavior Model
- Nameplate Rating and Vector Group Review
- Loss, Efficiency, and Regulation Calculation Sheet
- Operating Duty Constraint Register

Day 2: Specification and Selection

- Load Profile and Capacity Requirement Model
- Cooling Class and Temperature-Rise Selection Matrix
- Impedance and Short-Circuit Duty Assessment
- Tap-Changer and Voltage-Control Decision Map
- IEC 60076 Technical Specification Checklist

Day 3: Testing and Condition Evidence

- Factory and Site Acceptance Test Plan
- Turns-Ratio and Vector Group Evidence Review
- Winding Resistance and Excitation Current Analysis
- Power Factor and Insulation Resistance Assessment
- SFRA and Short-Circuit Impedance Comparison

Day 4: Diagnostics and Troubleshooting

- IEEE C57.104 DGA Interpretation Framework
- Thermal, Electrical, and Dielectric Fault Matrix
- Bushing and On-Load Tap-Changer Diagnostic Map
- Protection Operation and Alarm Correlation Method
- Transformer Fault Hypothesis Tree

Day 5: Decision Practice and Integration

- Suggested Exercise: Transformer Selection Case Review
- Suggested Exercise: Acceptance Test Exception Analysis
- Suggested Exercise: DGA and Electrical Test Diagnosis
- Suggested Exercise: Risk-Based Maintenance Decision
- Capstone Exercise: Transformer Selection and Diagnostic Decision Portfolio

Practical Exercises

The course uses suggested activities to integrate transformer engineering decisions.

- Suggested activity: compare transformer alternatives against load, cooling, impedance, control, and duty requirements.
- Suggested activity: assess acceptance and baseline test evidence for exceptions and follow-up actions.
- Suggested activity: correlate DGA, electrical, dielectric, thermal, and protection evidence into fault hypotheses.
- Suggested activity: present a risk-based operating, maintenance, or troubleshooting decision.

FAQs

Who suits power transformer operation and diagnostics and what does it assume?

Electrical engineers, operators, commissioning teams, maintenance specialists, and reliability professionals suit the course. It assumes participants can read nameplates, single-line diagrams, and test records and excludes introductory circuit theory and repair procedures.

How does power transformer diagnostics differ from general electrical maintenance training?

Power transformer diagnostics integrates transformer-specific loading, cooling, insulation, winding, oil, tap-changer, protection, and test evidence rather than treating transformers as one item within a broad maintenance syllabus.

How is a power transformer selected for its operating duty?

A power transformer is selected by connecting load profile, capacity, voltage ratio, vector group, impedance, cooling, insulation, tap-changing, short-circuit duty, protection, installation constraints, and lifecycle evidence.

Which evidence supports transformer fault diagnosis?

Transformer diagnosis combines DGA trends, ratio, winding resistance, excitation current, insulation measurements, power factor, SFRA, impedance, thermal evidence, alarms, protection operations, and inspection history.



How should transformer diagnostic results guide maintenance?

Diagnostic results should guide maintenance through evidence quality, trend severity, fault mechanism, operating consequence, uncertainty, repeat-test needs, and the risk of continued service or intervention.

Conclusion

Participants take back a Transformer Selection and Diagnostic Decision Portfolio linking specification, operation, tests, condition evidence, fault hypotheses, and maintenance priorities. The portfolio creates a traceable basis for technical review and intervention planning. It improves coordination among engineering, commissioning, operations, maintenance, and reliability functions when transformer evidence is incomplete or conflicting.