

TRAINING TITLE

ELECTRICAL PLANT FAULT DIAGNOSIS -ADVANCE

Training Duration

5 day

Training Venue and Dates

Ref. No. EE178	Electrical Plant Fault Diagnosis - Advance	5	28 July- 01 Aug. 2025	\$5,500	DUBAI, UAE
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In any of the 4 or 5-star hotels. The exact venue will be informed later.

Training Fees

- \$5,500 per participant for Public Training includes Materials/Handouts, tea/coffee breaks, refreshments & Lunch

Training Certificate

Define Management Consultants Certificate of course completion will be issued to all attendees.

TRAINING DESCRIPTION

The Electrical Plant Fault Diagnosis - Advanced course is designed for experienced electrical engineers, technicians, and plant personnel who wish to deepen their expertise in diagnosing complex electrical faults in industrial and power plant systems. This advanced-level course delves into intricate fault detection techniques, predictive diagnostics, and troubleshooting of sophisticated electrical equipment, including transformers, motors, generators, switchgear, and advanced protection systems. Participants will be trained in advanced tools and diagnostic methods to handle challenging fault scenarios, ensure optimal performance, and prevent catastrophic failures in electrical plants.

TRAINING OBJECTIVES

By the end of the course, participants will be able to understand

- Diagnose complex faults in electrical equipment using advanced diagnostic tools and techniques.
- Understand and apply advanced fault detection methods in electrical plants.
- Use predictive maintenance tools and condition monitoring systems to prevent failures.
- Analyze and troubleshoot faults in electrical protection systems and switchgear.
- Develop fault management strategies to optimize plant reliability and reduce downtime.

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- Implement advanced safety protocols during fault diagnosis and repair in high-voltage systems.

WHO SHOULD ATTEND?

- Electrical engineers, plant technicians, and maintenance personnel with experience in electrical systems and plant operations.
- Senior plant operators and supervisors involved in high-voltage systems and critical electrical plant equipment.
- Engineers responsible for the commissioning, testing, and troubleshooting of electrical plant systems.
- Electrical professionals seeking to advance their fault diagnosis skills and knowledge.
- Technical personnel responsible for predictive maintenance, root cause analysis, and system optimization.

TRAINING METHODOLOGY

A highly interactive combination of lectures and discussion sessions will be managed to maximize the amount and quality of information and knowledge transfer. The sessions will start by raising the most relevant questions and motivating everybody to find the right answers. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

Very useful Course Materials will be given.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Group Work& Practical Exercises
- 20% Videos& General Discussions

COURSE PROGRAM: www.definettraining.com

Day 1: Advanced Fault Diagnosis Fundamentals

- Review of common and complex faults in electrical systems: short circuits, insulation failures, grounding issues, arc flash, and phase imbalances.
- Overview of advanced fault diagnosis principles: root cause analysis, fault detection methods, and fault location techniques.
- Techniques for diagnosing intermittent faults and hidden defects.

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- Understanding power quality issues: voltage sags, harmonics, transients, and their effect on equipment.

Day 2: Advanced Diagnostic Tools and Techniques

- Introduction to advanced diagnostic tools:
 - High-resolution thermal cameras and infrared thermography.
 - Ultrasound technology for detecting electrical discharges.
 - Advanced power quality analyzers and harmonic analysis tools.
 - Partial discharge testing for high-voltage insulation systems.
 - Digital oscilloscopes and high-frequency sensors for motor diagnostics.
- Implementing advanced fault analysis software to collect and analyze data from plant systems.
- Using data acquisition systems (DAQ) and SCADA to track system behavior and predict faults.
- Integrating machine learning algorithms for predictive maintenance and fault detection.

Day 3: Diagnosing Complex Faults in Electrical Equipment

- **Motors and Generators:**
 - Diagnosing winding faults, rotor faults, and insulation breakdowns using advanced techniques.
 - Motor condition monitoring: Vibration analysis, thermography, and acoustic emission.
 - Generator fault analysis: Excitation issues, voltage instability, and winding problems.
 - Predictive maintenance strategies for motors and generators.
- **Transformers:**
 - Advanced diagnostic techniques for transformer faults: Bushing failures, core grounding, insulation aging, and oil analysis.
 - Monitoring transformer health using dissolved gas analysis (DGA) and dielectric strength testing.
 - Fault detection and analysis in tap-changer mechanisms and high-voltage bushings.
- **Switchgear and Protection Systems:**
 - Diagnosing faults in circuit breakers, protection relays, and contactors.

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- Protection system failures: Overcurrent, under/over-voltage, and differential protection malfunctions.
- Fault analysis of SF6 and vacuum circuit breakers.
- Application of fault analysis tools in relay settings and coordination.

Day 4: Advanced Fault Isolation and Troubleshooting Techniques

- **Fault Isolation:**
 - Fault isolation techniques for multi-zone electrical networks: Tracing faults using phase sequence analysis, current/voltage impedance, and relay coordination.
 - Using data from protective relays, fault recorders, and monitoring systems to pinpoint fault locations.
 - Integration of GIS (Geographic Information System) for complex fault isolation in large plants.
- **Troubleshooting:**
 - Step-by-step methodology for troubleshooting complex electrical faults in high-voltage equipment.
 - How to utilize detailed electrical drawings, schematics, and system layouts for fault diagnosis.
 - Troubleshooting switchgear, motor starters, protection circuits, and power distribution systems.
 - Utilizing advanced techniques such as impedance testing, insulation resistance testing, and overcurrent protection tests.

Day 5: Preventive and Predictive Maintenance, Safety, and Compliance

- **Predictive Maintenance:**
 - Advanced predictive maintenance tools: Vibration analysis, thermography, oil testing, and partial discharge measurement.
 - Setting up condition monitoring programs: Selecting monitoring points, frequency of tests, and analysis methods.
 - Building a comprehensive predictive maintenance strategy for critical electrical assets.
- **Safety and Compliance:**
 - Advanced safety protocols during fault diagnosis and repair: Lockout/tagout (LOTO), arc flash protection, and personal protective equipment (PPE).

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- Electrical safety standards: Compliance with international standards (e.g., IEC, ANSI, NEC) and local regulations.
- Working with high-voltage equipment: Techniques for safely diagnosing faults in energized systems.
- Best practices for documentation and reporting on fault diagnosis, corrective actions, and safety compliance.

NOTE:

Pre-& Post Tests will be conducted.

Case Studies, Group Exercises, Group Discussions, Last Day reviews, and assessments will be carried out.



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