



Consulting and Training | Reach New Heights

Course Name

Advanced Fault Diagnosis in Electrical Systems

Sector Name

Electrical Engineering

Document Type

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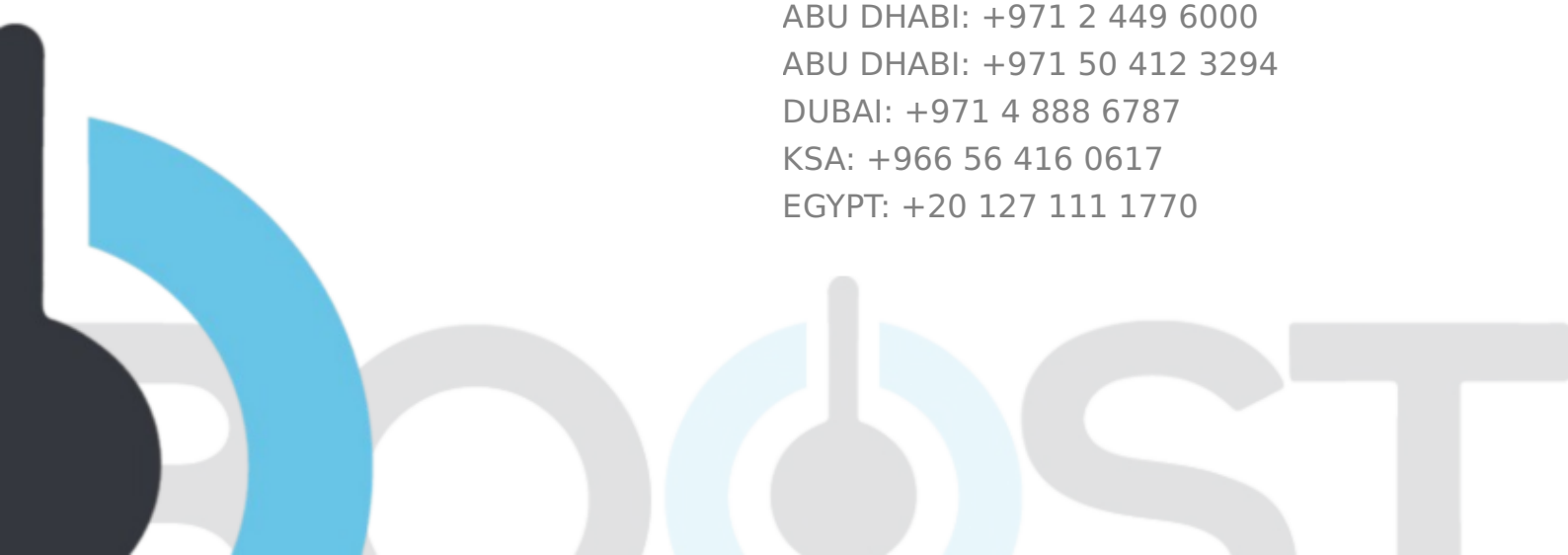
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Advanced Fault Diagnosis in Electrical Systems

Course Introduction

Electrical Faults

This Electrical Faults training course teaches practical electrical faults detection and how the team can depend on the available equipment tools, and the modern updated technology to make a good detection and analysis of the faults, and how they can in the future minimize or/decrease the values of repeatedly cited electrical faults.

Also, the attendees will have a good understanding of fault types with the calculation of fault currents in electrical power systems. Moreover, the attendees will be subject to types of Comprehend Fault Awareness and Analysis.

Effective power system faults detection and troubleshooting is consider one of the goals where the speed / rapidly detection for the faults and solve it is consider one the key features for the power system quality and reliability, this fault detection depending in the right methodology of thinking and catching the points of faults using the right tools as (instrument transformers, thermograph survey, vibration, metering devices, protection system,....)

This training course includes the preparation of the system for analysis, by manual calculation and by the use of the computer analysis software program ETAP. Participants will be introduced to

the various fault analysis software programs. Depending on the Promote Proactive Measures and Compliance is consider of the course targets to reduce the repeated faults and increase electrical power system reliability.

In summary, at the end of the course, the attendees will have a solid background in the Electrical Faults reasons & Causes, how can conduct a good analysis for the root cause, and how can make a detection & Remedies.

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Target Audience

- ✓ Electrical Engineers
- ✓ Electrical Supervisors
- ✓ Maintenance Technicians
- ✓ Managers in charge of Instrument Installations
- ✓ Project Engineers

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Learning Objectives

- ✓ Identification of a power system component
- ✓ Types of electrical faults and understand the causes, risks, and implications of electrical faults.
- ✓ Analyze the root causes of various fault types comprehensively, gaining insights into their effects.
- ✓ Explain the predictive methods for detecting electrical faults.
- ✓ Explain the different methods of diagnosing electrical faults.
- ✓ Explain the new technology of practical strategies to address, minimize/ prevent disruptions caused by faults.
- ✓ Emphasize safety protocols when dealing with electrical issues, ensuring participant well-being.
- ✓ Illustrate real-world case studies, applying theoretical knowledge to practical scenarios.
- ✓ Advocate for proactive approaches to prevent electrical faults and encourage a preventive mindset.
- ✓ Inform about relevant regulations and compliance standards, ensuring adherence to legal requirements.
- ✓ Enrich professionals' and students' electrical knowledge and expertise.
- ✓ Explore emerging trends for future advancements, fostering industry awareness and growth

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Course Outline

✓ DAY 01

Module (01): Comprehend Fault Awareness and Analysis.

- ✓ Pre-assessment
- ✓ Power System Configuration & Component
- ✓ Power system Fundamentals & theory
- ✓ Standard Nominal System Voltages and Voltage Ranges
- ✓ IEC 60038
- ✓ IEEE 141-1993
- ✓ Effects Of Electrical Current In The Human Body (Health & Safety)
- ✓ Electrical faults Protection system
- ✓ Protection System Functions
- ✓ Power System Protection – Qualities
- ✓ Power System Protection Reliability
- ✓ Power System Protection Dependability
- ✓ Power System Protection Security
- ✓ Common fault statistics of electrical equipment
- ✓ Symmetrical faults
- ✓ Unsymmetrical faults
- ✓ Source of fault current in an electrical installation
- ✓ Fault Isolation Timing
- ✓ Short-circuit rating of equipment
- ✓ X/R Ratio for Electrical Equipment
- ✓ Fault types according to their effects (Active & Passive Faults)

- ✓ (Overloading, Overcurrent, Under frequency, Power swings, Transients, Sag / Under-voltage, Swell / Over-voltage, Voltage luctuations, Frequency variations, Harmonic distortion)
- ✓ Causes of short circuits in the power system
- ✓ Selective Coordination is defined by NEC Article 100

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Course Outline

✓ Day 02

Module (02): Effective Detection and Troubleshooting.

- ✓ Instrument transformer
- ✓ Current and Voltage
- ✓ Rating of CT & PT
- ✓ Difference between CT/PT used for protection and Measurement
- ✓ Installation and Inspection
- ✓ Consideration of phase shift in two-winding transformers

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Course Outline

✓ Day 03

Module (03): Prioritize Safety and Practical Application (industrial case studies).

- ✓ Steps to perform a Fault Analysis in a Power System
- ✓ Converting the System to Base Values:
- ✓ Type of Fault
- ✓ Constructing Sequence Networks
- ✓ Make a Faulted Sequence Network Diagram
- ✓ Hand Calculation
- ✓ Convert per-unit value into three-phase current and voltage quantities
- ✓ Fault calculation
- ✓ Introduction to ETAP software
- ✓ Common network faults
- ✓ Industrial standards, namely ANSI, NEC & NFPA 70 compliance
- ✓ Practical training: On a Case study of faults in a power system network
- ✓ LL
- ✓ LLG
- ✓ 3Phase
- ✓ 3Phase To Ground
- ✓ Short circuit study using ETAP
- ✓ Load flow study using ETAP
- ✓ Selectivity and coordination study using ETAP

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Course Outline

✓ Day 04

Module (04): Promote Proactive Measures and Compliance.

- ✓ Key Features of Innovative Diagnostic Tools
- ✓ Real-time monitoring
- ✓ Data logging and analysis
- ✓ Fault locating
- ✓ Predictive testing
- ✓ Thermograph survey
- ✓ Vibration survey
- ✓ PD (partial discharge)
- ✓ IR (insulation Resistance)

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Course Outline

✓ Day 05

Module (05): Thermography survey using a thermal imaging camera can be used on different types of equipment, including:

- ✓ Motors
- ✓ Drives
- ✓ Distribution boards and fuse boards
- ✓ High voltage systems
- ✓ Transformers
- ✓ Control panels
- ✓ UPS systems
- ✓ Switchgears and switchboards
- ✓ Troubleshooting tools
- ✓ General Discussion

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Confirmed Sessions

FROM	TO	DURATION	FEES	LOCATION
Sept. 7, 2026	Sept. 11, 2026	5 days	4950.00 \$	Norway , Oslo
Jan. 24, 2027	Jan. 28, 2027	5 days	4250.00 \$	KSA , Riyadh
June 28, 2027	July 2, 2027	5 days	4250.00 \$	UAE , Dubai
Nov. 1, 2026	Nov. 5, 2026	5 days	4250.00 \$	KSA , Riyadh

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