

**Course Name: Electrical Power Network Analysis**

**Reference Code: ELEC 106**

**About the course:**

**This training course will feature:**

- Identification of causes of electrical faults
- Understanding three phase short circuit currents
- Recognition of unsymmetrical faults in transformers
- Partial discharge phenomena and how to apply the required analysis
- Representation of unsymmetrical faults in a power system
- Manual and software assisted of fault currents
- Simulation for protection relays configuration

**Course Objective:**

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

- Understand the various types of fault currents
- Determine the causes of overcurrent and short circuit current
- Explain differences between power system faults
- Analyse the common faults in a power system
- Configure multifunction relays to protect the power system
- Know protection simulation
- Know the partial discharge analysis and detection as case study

**Who Should attend?.**

**This training course is suitable for technical professionals:**

- Electricians
- Design electrical engineers
- Electrical supervisors
- Plant electricians
- Operations & maintenance engineers, supervisors & technicians
- Maintenance technicians

**Kingdom of Saudi Arabia**

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King Fahad Street , Khobar 31952  
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### Course Methodology:

This training course is designed to be a hands-on, stimulating experience. The training course is highly interactive with many discussion and practice sessions.

- ☐ Relevant computer simulations and videos .
- ☐ Copies of all presentation material.
- ☐ Variety of Learning Methods.
- ☐ Pre-test and final test.
- ☐ Case Study
- ☐ Training Groups.
- ☐ Presentation.
- ☐ Lectures

### Course Outline:

#### Day One: Introduction to Fault Analysis

- Source of fault current in an electrical installation
- Common fault statistics of electrical equipment
- Short-circuit rating of equipment
- Selecting the correct switchgear rating for fault duties
- Overview of per-unit system and one-line diagrams
- Sources of impedance data for all items of plant

#### Day Two: Power System Faults

- Power system faults
- Faults calculation and using software for verification
- Partial discharge analysis

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- Cables subjected to short-circuit currents
- Surge and lighting faults
- Grounding system to increase power system reliabilities

#### Day Three: Power Systems Faults due to Nonlinear Loads

- Overview of symmetrical components and faults
- Consideration of various fault types
- Linear loads and nonlinear loads
- Harmonic analysis
- K factor in transformers
- Power factor correction

#### Day Four: Protection System

- Short circuit current calculation
- Protection relays according the IEC standards
- High set, low set, and inverse -timed elements
- Co-ordination with other devices and fuses
- Auto-reclosing of feeder circuit breakers
- Various types of overcurrent relays

#### Day Five: Simulation, Computer Calculations and Analysis Techniques

- Simulation for GE advanced relay (Practical Session)
- Power system relays
- ANSI code
- Different method to reduce the faults in power system
- Using software for fault calculation and analysis
- Failure mode effective analysis FMEA explanation

**Time: 08:00 AM -03:00 PM Numbers of hours: 35 Hours**

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