

**Training Title**

**POWER SYSTEM PROTECTION IN UTILS & IND ELECT NETWORKS & PROTECTIVE RELAY**

**Training Duration**

**5 days**

**Training Venue and Dates**

<b>Power System Protection In Utils &amp; Ind Elect Networks &amp; Protective Relay</b>	<b>5</b>	<b>26 Feb-01 Mar 2024</b>	<b>\$5,500</b>	<b>Dubai, UAE</b>
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**Trainings will be conducted in any of the 5 star hotels.**

**Training Fees**

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

**Training Certificate**

**Prolific Consultants FZE Certificate of Course Completion will be issued to all attendees.**

**TRAINING OVERVIEW**

**COURSE DESCRIPTION**

**Efficient and Safe Power Protection systems are vital to ensure no overload may occur and a smooth current is maintained at the level determined for the demand required. Safety systems also demand the highest standards of operations and maintenance and therefore Relay Protection Systems play a large part in the Electrical Power Process.**

**This 5 days course is designed to inform participants how Power systems operate & and safely maintain protection Systems.**

**The workshop features an introduction covering the need for protection, fault types and their effects, simple calculations of short circuit currents and system earthing.**

**COURSE OBJECTIVE:**

**This course is designed to the participants:**

- **Understand the electrical characteristics of various electrical faults**
- **Identify different types of protection systems, understand the purpose of each type of protection system and identify the zone of protection for a given relay**
- **Recognize modern protective relays and understand their basic operation**
- **Appreciate the characteristics and importance of voltage transformers and current transformers in achieving dependable and accurate electrical protection systems**
- **Understand the concept of protection system discrimination and appreciate its importance in improving security of supply**
- **Be familiar with the requirements for testing of protection systems**
- **An Increased level of knowledge of the theoretical aspects and Operation of Protective Relays**

- *Familiarity with the application, basic connections and internal schematics*
- *Ability to test several Relays (Electromagnetic & Solid State), including type 50 / 51, type 27 / 59, etc ...*
- *The Safety rules applicable*
- *The nature of different types of electrical faults and the effect these faults can have on company assets*
- *Understanding of electrical fault protection systems*
- *Practical solutions for specifying and operating protection systems*
- *Comprehensive understanding of principles and selection of protection relays and protection schemes*
- *Hands on work shop for short circuit & relay coordination using ETAP Power station.*

**SUITABLE FOR:**

*The course is aimed at Managers, Engineers, and Technicians responsible for the operation and maintenance of distribution equipment who will benefit from sharing experiences in the planning, organization, and implementation of maintenance activities.*

**TRAINING METHODOLOGY:**

*A highly interactive combination of lecture and discussion sessions will be managed to maximize the amount and quality of information, knowledge and experience transfer. The sessions will start by raising the most relevant questions, and motivate everybody finding the right answers. The attendants will also be encouraged to raise more of their own questions and to share developing the right answers using their own analysis and experience.*

*All presentations are made in excellent colorful power point. Very useful Course Materials will be given.*

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

**DAY WISE COURSE OUTLINE:**

***AC Breaking & Fundamentals of Short circuit***

- *Causes of Faults*
- *Sources of short-circuit Currents*
- *Fundamentals of Short-Circuit Currents*
- *Three-Phase Short Circuits*
- *Usefulness of Fault Calculation in the Study of Power System*
- *Symmetrical Fault Currents*

- *Asymmetrical Fault Currents*
- *Types of Faults/Magnitudes*
- *Symmetrical Components*
- *Importance and construction of sequence networks*
- *Calculation of asymmetrical faults using symmetrical components and MVA methods*
- *Overview to PU systems*
- *Related international standards*
- *Case studies using computer simulations (using ETAP Power station)*

#### *Introduction to Protective systems*

- *Relay Operation and Fundamentals*
- *CT & VT*
- *Different type of Relays (Functions, theory of operations & objectives).*
- *Classification of Faults and Protection Philosophy*
- *Relay co-ordination study*
- *Neutral earthing configurations.*
- *CT Hazards*
- *VT Hazards*
- *Modern protection relays/Microprocessor used with switchgear*

#### *Protection Schemes*

- *Feeder protection cable feeders and overhead lines.*
- *Transformer protection.*
- *Switchgear (busbar) protection.*
- *Motor protection relays.*
- *Generator protection.*
- *Recommended protection schemes of international standards and some brand name manufactures (Siemens, Schneider, etc...).*
- *Management of protection.*

#### *Co-ordinated Distribution Networks*

- *Methods of selectivity's.*
- *Cable Damage curve.*
- *Motor starting curve.*
- *Transformer Z-curve.*
- *Fuse characteristics.*
- *LV Circuits breakers tripping curves (TM, SST, ..)*
- *Setting rules for coordination study.*
- *Principles of Protection Co-ordination, Discrimination and Relay Settings.*
  - *Generator Protection*
  - *Transformer Protection*

- *Line Protection*
- *Cable Protection*
- *Motor Protection*
- *Overcurrent Co-ordinations. New philosophies/constraints of co-ordination studies.*
- *IEEE Standard 242.*
- *Case studies using computer simulations (using ETAP Power station)*

***Relaying Testing, Maintenance & Failure Analysis***

- *CT & VT testing*
- *Relays testing*
- *Maintenance intervals*
- *Preventive maintenance & Corrective maintenance*
- *Troubleshooting and repair.*
- *Maintenance / Acceptance Testing*
- *Relay Installation and Removal*
- *Test Plug Usage*
- *Primary & Secondary Test Methods.*
- *Maintenance of Protection Relays and Reliability.*

**Case Studies, Role Plays, Videos, Discussions, Last Day Review & Assessments will be carried out.**

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