

Modern Power System Protective Relaying

Course general description:

Protection systems are installed to prevent faults from damaging distribution equipment. Protective relays initiate isolation of faulted sections in order to maintain continuity of supply elsewhere on the system while lightning arresters bypass the excess energy of voltage surges to earth. The modern microprocessor-controlled relays also provide facilities to monitor system performance and permit adjustment of relay settings by remote control. Digital technologies based on microprocessors have greatly modified solutions used in the design of protection and control systems.

The role of a protection device or MV relay is: to continually monitor various parameters for part of the network (line, cable or transformer) and to act in the case of a fault, and increasingly frequently to transmit information for the operation of the network. It analyses the electrical values that are supplied to it by measurement device sensors and gives operating commands to the switching circuits. Having been limited to electromagnetic technology, MV protection devices are today undergoing fundamental development with the use of microprocessors. Thus, the equipment available today is based on three technologies: electromagnetic, analog, and digital.

Audience:

This course is designed for:

- 1- Electrical supervisors
- 2- Electrical Engineers
- 3- Anyone involved in the maintenance of modern power system protection relaying

Course objectives:

Delegates will gain a detailed appreciation of the following:

- The nature of different types of electrical faults and the affect these faults can have on distribution company assets
- Understanding of electrical fault protection systems utilized within the electricity distribution industry
- Practical solutions for specifying, operating protection systems
- Comprehensive understanding of principles, selection, testing maintenance, and troubleshooting of protection relays
- The requirement for testing of relays and protection systems
- Each course participant will receive a copy of the comprehensive course notes. The presenter will outline and discuss the topics using computer displays, CD displays, and Videotapes.
- The course is designed to have an interactive format to maximize delegate participation. Questions and answers are encouraged throughout and at the daily sessions. Needs-Based case-studies and examples will be discussed in problem-solving workshop sessions.
- This gives participants the opportunity to discuss with other delegates and the presenter their specific problems and appropriate solutions. Only minimum note taking is encouraged to ensure maximum delegate attention during the course

Course duration:

5 days

Course location:

Dubai

Course contents:

Day-1:

- Introduction and aims
- Course Overview and Objectives
- Discussion with all participants (experience and current responsibilities)
- Fundamentals of Protection Practice
- Basic Concepts: Electrical Faults and Protection, Short Circuit Fault Calculations

Day-2:

- Classification and function of relays: Classification, Electromagnetic Relays, Computerized Protection
- HV fuses
- Current Transformers and Voltage Transformers

Day-3:

- Protection systems (operator's notes)
- Purpose of protective relays
- Protection Schemes and Principles
- Overload and Earth Leakage Protection
- Transformer Protection
- Bus Protection
- Directional Protection
- Primary and Backup Protection
- Generator Protection

Day-4:

- Line Protection Schemes
- Protection system zoning and class exercises
- Protection system failure incident (class discussion)
- Group discussion on faults and appropriate action
- Over-current and Earth Fault protection (System grading and coordination)

Day-5:

- Characteristic Curve Plotting (Class Exercise).
- Protection System Maintenance (Standard Procedures).
- Protection Relay Field Testing (Sample Procedures).
- Case Studies: Protection of Distribution Systems Using Modern Electronic Devices(ALSTOM, SCHNEIDER, etc)
- Conclusion: General Discussion, Feedback Survey, Closing

Methodology:

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions
- 10% Software (if applicable or examples)

Course code: (TEEI006)