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## Power System Protection Training

Contact us Today for a FREE quotation to deliver this course at your company's location.

<https://www.electricityforum.com/onsite-training-rfq>

Refresh your knowledge of the basic industrial system protection techniques including fault analysis and overvoltage assessment. Develop your own relay settings and thoroughly understand the philosophy of protective systems. Study actual cases illustrating various techniques in present use and highlighting particular approaches used by experienced system designers. Enhance your experience with power system protection problems generally faced, and solutions successfully adopted, by industry. Understand how to apply microprocessor-based multifunction relays for the protection of various power system equipment and apparatus.

Power System Protection Training teaches students how to make sure that downstream devices (breakers/fuses) should activate before upstream devices and therefore protect their electrical systems. By doing this, it minimizes the portion of the system affected by a fault or other disturbance. At the substation level, feeder breakers should trip before the main. Likewise, downstream panel breakers should trip before the substation feeder supplying the panel.

Power System Protection And Coordination of various electrical equipment and apparatus

requires a good understanding of phase and ground short circuit currents, detection, and safe clearing of the faulted equipment. This Power System Protection And Coordination Training Course provides a practical and comprehensive description of the principles and concepts of analysis, application and operation of protection schemes for various power system elements such as feeders, transformers, motors, buses, generators, etc. The Power System Protection And Coordination Training course starts with an overview of power system fundamentals, design and short circuit calculations which lead to the understanding of protection scheme requirements and their applications. Protection requirements for industrial plants, cogeneration, and interconnection with the utility power system are explained in detail. This course covers the subject of power system protection from a practical perspective, and includes important functional aspects such as testing and coordination of protection systems. This course is designed for individuals who are involved with industries and utilities which depend on proper system protection for operational efficiency and minimizing damage to equipment.

#### **The Power System Protection And Coordination Engineering Training Course:**

- Will reduce unnecessary downtime!
- Provide recommended settings for adjustable trip circuit breakers and relays.
- Will increase coordination (selectivity) between devices.
- Identify deficiencies in system protection.
- Will provide recommended solutions to help correct your problem areas.
- Reviews and discussions on the use of system devices with respect to National Electric Code requirements, and appropriate ANSI/IEEE standards

#### **WHO SHOULD ATTEND**

Electrical Engineers, technicians and technologists in the industrial, consulting, and utility fields involved in design, operation and maintenance who require knowledge of electrical system protection techniques.

## STUDENTS RECEIVE

- This Course Includes Our Latest Protection and Control Electrical Handbook!! (Value \$20)
- **\$100 Coupon** Toward any Future Electricity Forum Event (Restrictions Apply)
- 1.4 Continuing Education Unit (CEU) Credits
- **FREE** Magazine Subscription (Value \$50.00)
- Course Materials in Paper Format

## COURSE OUTLINE

### DAY ONE

#### Session 1: Power System Fundamentals

- Balanced Three-Phase Loads
- Unbalanced Three-Phase Loads
- Power distribution systems

#### Session 2: Power System Configurations

- Typical System configurations
- Design considerations
- Radial systems, loop systems, selective systems

#### Session 3: Short Circuit Calculations

- Short Circuit Theory, Terminology and Studies
- Fault Current Sources and Characteristics
- Equipment Ratings and Asymmetrical Factors

- MVA, point to point, Infinite Bus methods
- Analysis of a Computerized Fault Study

#### **Session 4: Principles of Power System Protection**

- Protection Systems
- Current Transformers
- Potential Transformers
- Microprocessor/digital relays
- General procedures

#### **Session 5: Overcurrent Protection**

- Protective devices (relays, fuses, MC breakers)
- Low-voltage fuse
- Power fuse
- Molded case circuit breakers
- Low-voltage power circuit breakers (static trip)
- Time overcurrent protection
- Instantaneous protection
- Coordination examples

#### **Session 6: Time-Current Coordination Curves**

- Plotting Protective Devices
- Fuses
- Molded Case Circuit Breakers and MCPs
- Low Voltage Power Circuit Breakers
- Protective Relays

### **Session 7: Ground Fault Protection**

- System grounding methods
- Typical industrial practices
- Zero-Sequence currents
- Ground fault concerns
- Common problems

### **Session 8: Conductor and Bus Protection**

- Types of Conductor Circuits
- Types of Protection
- Cable Damage Criteria
- Low and Medium Voltage
- Tie Line Protection
- Protection and Coordination Criteria

### **Session 9: Transformer Protection**

- Protection characteristics
- Data requirements
- Basic protection systems
- Factors affecting protection
- Overload Protection
- Phase and Ground Fault Protection
- Primary Fuse Protection
- Primary Breaker Protection

### **Session 10: Motor Protection**

- NEC and ANSI/IEEE Standards
- Motor nameplates
- ANSI/IEEE device numbers and functions
- Motor TCC curves
- MCP Low-voltage Protection
- Medium-voltage Motor Protection
- NEMA Class E2 Controllers
- Thermal Overload Protection
- Thermal Locked Rotor Protection
- Phase and Ground Fault Protection
- Miscellaneous Protection (Undervoltage, Single-Phasing, etc.)

### **Session 11: Generator Protection**

- Voltage restraint/dependent phase overcurrent
- Ground fault protection
- Differential protection
- Loss of Field protection
- Volts/Hertz protection
- Frequency protection
- Voltage protection
- Thermal protection

### **COURSE TIMETABLE**

#### **Both days:**

Start: 8:00 a.m.

Coffee Break: 10:00 a.m.

Lunch: 12:00 noon

Restart: 1:15 p.m.

Finish: 4:30 p.m.

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