Content Community Connection

United States
The Electricity Forum Inc.
742 Pre Emption Road
Geneva, NY 14456
Tel 289-387-1025

Canada
The Electricity Forum
1885 Clements Rd, Unit 218
Pickering, ON L1W3V4
Tel 905-686-1040
Fax 905-686-1078
Toll Free 855-824-6131

Protective Relay Training - Basic

View Course Details

COURSE DATES AND TIMES

September 10-11 , 2026

10:00 am - 4:30 pm ET

Why Protective Relay Training Matters

Protective relays sit at the heart of power system protection, yet many engineers and technicians are asked to apply, test, or troubleshoot them without having a clear, structured foundation in how protection schemes are designed and coordinated.

Our protective relay training course introduces participants to the essential principles of protective relaying as they apply to industrial, commercial, institutional, and utility-connected power systems. It bridges the gap between relay theory and real-world application, focusing on how protective relays detect faults, interact with breakers and fuses, and work together to limit damage and maintain system reliability.

Rather than teaching isolated device features, the course emphasizes how protection decisions are made, how relays are applied in common system configurations, and how miscoordination and misoperation can be avoided.

Course Highlights at a Glance

This instructor-led training focuses on how protective relays are applied, coordinated, and tested in real electrical systems, using practical examples rather than theory-only explanations.

- Fault detection principles as they apply to industrial and utility-connected systems

- Relay coordination fundamentals and downstream versus upstream device behavior
- Protective device application in feeders, motors, transformers, and generators
- Relay testing fundamentals and common causes of misoperation

What You Will Gain From This Course

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

- Understand how protective relays detect and classify electrical faults
- Interpret the role of current and voltage transformers in protection schemes
- Apply basic relay settings with an understanding of coordination philosophy
- Recognize common causes of relay misoperation and nuisance tripping
- Understand how modern microprocessor-based relays are applied in practice
- Analyze protection requirements for feeders, motors, transformers, generators, and buses
- Read and interpret relay logic and event information with confidence

The emphasis throughout the course is on practical understanding, not memorization of device numbers or manufacturer-specific features.

Course Approach

This protective relay training is delivered from a practical protection perspective, using real system examples to illustrate how protection schemes behave under normal and fault conditions.

Participants are introduced to modern digital protective relays used in North America and learn how relay software, communications, and testing fit into everyday engineering and maintenance workflows. Coordination principles are explained in context, showing how downstream and upstream devices must work together to limit the impact of faults.

While the course introduces modern relay platforms, it remains vendor-neutral in its core concepts and focuses on principles that apply across manufacturers and industries.

Related Courses

- Utility Relay Protection Fundamentals
- Substation Relay Protection Training
- Power System Protection and Coordination

WHO SHOULD ATTEND

This protective relay training course is designed for professionals who work with electrical protection systems and need a clear, practical understanding of protective relaying fundamentals, including:

- Electrical and power system engineers
- Protective relay and field technicians
- Maintenance and operations personnel
- Consulting and design engineers
- Project and plant engineers
- Electrical supervisors and technical managers
- Plant operators and industrial facility staff

No prior relay programming experience is required, but participants should be familiar with basic electrical system concepts.

STUDENTS RECEIVE

- Basic Protective Relay Training Certificate of Course Completion
- 1.2 Continuing Education Unit (CEU) Credits (12 Professional Development Hours)
- Latest Electrical Protection and Control Handbook!! (Value $20)
- $100 Coupon Toward any Future Electricity Forum Event (Restrictions Apply)
- FREE Magazine Subscription (Value $25.00)
- Course Materials in PDF Format

COURSE OUTLINE

Basic Protective Relay Training Course Outline

DAY ONE

SESSION 1: Power System Faults and Components of Power System Protection Schemes

- Different types of faults
- Detection of faults and fault-detecting relays
- Clearance of faults
- Requirements of protective relaying systems
- Modern microprocessor-based relays
- Current transformers
- Voltage transformers
- Various types of CTs, VTs and CVTs
- Application requirements of CTs for protective relaying
- Accuracy classifications of CTs and VTs
- Testing of CTs and VTs

SESSION 2: Microprocessor-based relays

- North American relay manufacturers and their software needed for settings and communications
- Modern microprocessor-based multi-function relays
- Available functions, applications, and testing
- Downloading the relay manufacturer's software packages
- Basic steps to establish communication with microprocessor-based relays
- Initial steps to create the relay-mandatory setting files.
- Initial steps to set the setting values in the relay.
- Basic concept of differential protection

SESSION 3: Feeder Overcurrent Protection

- Protective relaying requirements for radial and looped systems
- Elements of feeder protection schemes
- High-set, low-set, and inverse-timed elements
- Various types of overcurrent relays
- Relay setting criteria
- Load-shedding schemes
- Testing of overcurrent protection schemes
- Microprocessor-based feeder overcurrent relays - features, application, and testing.

SESSION 4: Coordination of Electrical Protection Systems

- Computer software packages for protection coordination studies
- Auto-reclosing of circuit breakers
- Breaker Failure Protection
- Back-up protection

DAY TWO

SESSION 5: Bus Protection

- Types of bus and bus-bar protection schemes
- High impedance relays for bus differential protection
- Low impedance relays for bus differential
- Application of differential protection to buses
- Bus blocking schemes
- Application to various bus configurations
- Testing of bus protection schemes

SESSION 6: Transformer Protection

- Overcurrent and ground fault protection
- Application of differential protection to transformers
- Restricted ground fault REF protection
- Gas relays, sudden pressure, and gas accumulation
- Winding temperature and oil temperature devices
- Testing of transformer protection schemes
- Modern microprocessor-based multi-function Transformer relays
- Available functions, applications, and testing of Transformer relays

SESSION 7: Generator Protection

- Differential protection
- Reverse power, 100% stator ground fault, out-of-step
- Loss of field, field ground, overexcitation, inter-turn, etc.
- Over-frequency, under-frequency, overvoltage, Undervoltage
- Negative phase sequence or phase unbalance
- Voltage-controlled and voltage-restricted overcurrent protection
- Synchronizing systems, synchro-check relays
- Testing of generator protection schemes
- Microprocessor-based multi-function generator protection relays - available relays, applications, and testing

SESSION 8: Motor Protection and Starting

- Applicable motor standards
- Methods of starting
- Thermal protection
- Differential protection, phase unbalance, and overcurrent
- Ground fault protection
- Transfer Schemes
- Microprocessor-based motor control and protection devices
- Example: Complete protection relay setting

COURSE SCHEDULE:

Both days:

Start: 10 a.m. Eastern Time
Finish: 4:30 p.m. Eastern Time