

Advanced Protective Relaying

This five-day course is designed to provide the participant with an advanced background of differential relaying, distance relaying, directional control relays, relay system testing, instrument transformers used for relay applications, and rotating machinery protection.

I. Differential Relaying

- Operating Principles
- Transformers
- Generators
- Construction of Differential Relays
- Relay Operation
- Relay Characteristics

II. Distance Relaying

- R-X Diagrams
- MHO Unit
- Step Distance Relaying
- Distance Measurement
- Distance Relays and Loss of Potential
- General Electric CEY51 MHO Distance Relay
- Compensator Type Distance Relay
- General Electric CEH-52A

III. Directional Control Relays

- ICW Power Directional Relay
- Westinghouse CRN-1 Relay
- Basic Relay Connections to CT'S and PT'S
- Directional Supervision vs. Directional Control
- Operating Principles of Directional Control
- Ground Directional Relays
- Westinghouse IRQ Relay
- Westinghouse CWC/CWP Relays
- General Electric IBCG Relay
- General Electric IBCG Relay

IV. Relay System Testing

- Safety
- Testing Cycles

- Types of Testing
- Current and Voltage Relay Testing
- Installation Tests
- Time Overcurrent Relays
- Target and Seal In Units
- Directional Overcurrent Relays
- Differential Relay Testing
- Distance Relay Testing
- Instrument Transformer Testing

V. Instrument Transformers for Relay Applications

- Potential Transformers
- Current Transformers
- Interpretation of Instrument Transformer Nameplate Data
- Instrument Transformer Accuracies, Burdens, and Relay Performance
- Auxiliary Transformers
- Polarity of Instrument Transformers
- Installation Considerations for Instrument Transformers
- Wiring Considerations for Installing Instrument Transformers
- Testing of Instrument Transformers

VI. Rotating Machinery Protection

- AC Motor Protection
- Protective Categories
- Motors Rated Below 1500 HP
- Motors Rated 1500 HP and Above
- Synchronous Motors
- Synchronous Generator Protection