

PROTECTIVE RELAY TRAINING FOR INDUSTRIAL POWER SYSTEMS



April 20-21, 2020 | Mississauga, ON

April 23-24, 2020 | Winnipeg, MB

April 27-28, 2020 | Richmond, BC

April 29-30, 2020 | Edmonton, AB

Gain valuable experience in utility and industrial electrical system analysis, protection, control, communication, and automation

BONUS FEATURES

- This Course Includes our Latest Electrical Protection and Control Handbook!
- **\$100 Coupon** Towards any Future Electricity Forum Course
- 1.4 Continuing Education Unit (CEU) Credits
- **FREE** Magazine Subscription
- Forum Presentation Materials in Paper Format

2-DAY COURSE

\$799

RECOGNIZED BY



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Complete course details:

www.electricityforum.com/electrical-training/basic-protective-relay-training

ELECTRICAL RELAY PROTECTION FOR INDUSTRIAL ELECTRICAL POWER SYSTEMS

This 2-day protective relay training course provides a comprehensive understanding of industrial, commercial and institutional power system protection. Relay technicians, system protection engineers, consultants, and engineers and technicians working in system protection should take this course.

Our Protective Relay Training course will benefit personnel of all levels of experience because it covers a range of complexity of relay schemes, methods of testing relays and of analyzing relay

operations. We discuss system protection principles, measurement devices used for relaying, basic relay schemes used, and the most common schemes used in the field. This course provides professionals with real examples from actual system protection situations.

This Protective Relay Training course will cover relay theory and operation of modern digital types from two major North American relay manufacturers (GE Multilin and SEL), covering many types of functions such as phase, ground, negative sequence overcurrent, over and under voltage, over and under frequency, reverse power, distance and bus/transformer/line differential. Topics such as complete motor protection, fault current basics and application of fuses and circuit breakers / contactors in industrial and distribution substations, will also be covered.

COURSE BENEFITS

- Gain valuable experience in utility and industrial electrical system analysis, protection, control, communication, and automation
- Learn the latest trends in evolving electrical protection standards, design methods, and new technologies
- Gain Valuable knowledge of electrical power system analysis and short circuit calculations, time current coordination curves, fusing fundamentals, and more!
- Learn how to keep your electrical system engineers, operators and project managers on track by using the latest relay protection techniques

WHO SHOULD ATTEND

- Industrial, commercial, institutional electrical engineers, and technologists
- Consulting electrical engineers
- Project engineers
- Design engineers
- Field technicians
- Electrical technicians
- Plant operators

AGENDA - DAY 1

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 communication
- Downloading relay manufacturers software packages

- Basic steps to establish communication with microprocessor-based relays

SESSION 3: Arc-flash protection and mitigation

- Maintenance mode
- Instantaneous overcurrent protection
- Fast bus bar protection
- Fiber optic protection
- Arc-flash mitigation

SESSION 4: 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

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- Microprocessor-based feeder overcurrent relays - features, application and testing

SESSION 5: Coordination of Electrical Protection Systems

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

AGENDA - DAY 2

SESSION 6: Bus Protection

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

SESSION 7: Motor Protection and Starting

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

SESSION 8: Transformer Protection

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

SESSION 9: Generator Protection

- Differential protection
- Reverse power, 100% stator ground fault, out-of-step
- Loss of field, field ground, overexcitation, inter-turn, etc.
- Over-frequency, underfrequency, 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, application and testing

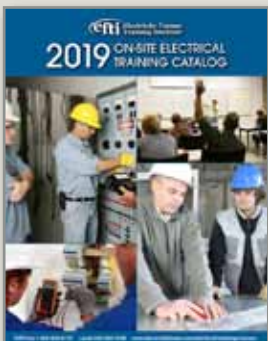
SESSION 10: Cogeneration and Non-Utility Generation (NUG) Protection

- Protection requirements for non-utility generating stations
- Requirements for the interconnection of NUGs to utility power systems
- Typical protection schemes for non-utility generators
- Low-cost microprocessor-based multi-function relays for small generators
- Testing utility tie protection schemes

SESSION 11: Transmission Line Protection

- Distance or impedance protection schemes
- Line current differential protection schemes
- Communication channel requirements between terminals
- Coordination and transfer-tripping between terminals

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AND GET THE 4th REGISTRATION FREE!****WHEN & WHERE****Mississauga, ON - April 20-21 , 2020**Hampton Inn and Suites
3279 Caroga Drive,
Mississauga, ON
Tel: 905-671-4730**Winnipeg, MB - April 23-24 , 2020**Sandman Hotel & Suites Winnipeg Airport
1750 Sargent Ave.
Winnipeg, MB
Tel: 204-775-7263**Richmond, BC - April 27-28 , 2020**Sandman Signature Vancouver Hotel & Resort
10251 ST. Edwards Drive
Richmond, BC
Tel: 604-278-9611**Edmonton, AB - April 29-30 , 2020**Sawridge Hotel Edmonton South
4235 Gateway Blvd N
Tel: 780-438-1222**ATTENDEE INFORMATION**To receive registration fee discounts, you must
REGISTER AND PREPAY prior to the course date.**NAME** _____**TITLE** _____**COMPANY** _____**ADDRESS** _____**CITY** _____**PROVINCE** _____**POSTAL CODE** _____**E-MAIL** _____**TEL ()** _____**FAX ()** _____**METHOD OF PAYMENT** **Bill My Credit Card** **AMEX** **VISA** **MasterCard****Card #** _____**Exp. Date** _____**Signature** _____**Card Holders Name** _____

The registration fee to attend the Electrical Relay Protection Seminar is \$799.00 + Tax. The fee includes forum participation, refreshments. NOTE: LUNCH IS PROVIDED WITH THIS COURSE.

Register and prepay 14 days before forum date and receive an early bird discount of \$50.00**COURSE INSTRUCTOR****JAKOV VICO, P.ENG****PROTECTIVE RELAY SPECIALIST,
THE ELECTRICITY FORUM****INTERESTED IN ON-SITE ELECTRICAL RELAY TRAINING?****Cost Effective On-Site Electrical Training**

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