



Content
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Utility Distribution Protection Fundamentals

Course details: <https://electricityforum.com/electrical-training/utility-relay-protection-fundamentals>

COURSE DATES AND TIMES

Utility Distribution Protection Fundamentals - This 12-hour live online instructor-led training course is a must-have for all electric utility transmission and distribution engineers who enter into the Protection & Control field and electrical technicians.

This comprehensive two-day course offers an in-depth exploration of electric utility distribution protection fundamentals. Designed for electrical engineers, system operators, and utility professionals, the course provides a solid foundation in the principles, devices, and schemes used to protect electric power distribution systems.

Day one starts with a primer on the basics of electricity and the structure of power systems before moving into the intricacies of distribution systems. Participants will gain a solid understanding of power system faults, abnormal operating conditions, and the principles of distribution system protection. The day concludes with an examination of different protection devices and the protection schemes for transformers, feeders, busbars, and lines.

Day two dives into more advanced topics, including distribution automation, the impact of smart grids, and the challenges posed by distributed generation. Attendees will gain insights into the testing and maintenance of protective equipment, and the course concludes with real-world case studies and practical demonstrations.

Throughout the course, participants will engage in interactive discussions and practical exercises that highlight real-world applications of the concepts taught. Whether you're looking to expand your knowledge or upskill in your role, this course provides the expertise you need to excel in the field of electric utility distribution protection.

Topics and Issues:

- Management of Utility Relay Protection Assets and Investment Strategies
- Relay Distribution Protection Systems Design Standards and Utility Practices
- Substation Relay Automation – Experiences and Best Practices
- Optimizing Relay Protection System Maintenance and Compliance Reporting

- Introduction of New and Emerging Relay Protection Technologies

Course Objectives

- **Deep Understanding:** Gain a comprehensive understanding of electric utility distribution and its protection mechanisms.
- **Practical Skills:** Learn practical skills for protecting and maintaining electric power distribution systems.
- **Advanced Topics:** Get insights into advanced topics such as distribution automation, smart grids, and the impact of distributed generation.
- **Case Studies:** Study real-world cases that provide context and practical examples of the concepts discussed.
- **Professional Development:** Enhance your professional skills and knowledge, increasing your value to employers in the electrical industry.
- **Interactive Learning:** Engage in interactive discussions and exercises that facilitate active learning and retention.
- **Expert Instructors:** Learn from expert instructors with extensive experience in the field.
- **Networking:** Connect with other professionals in the field, expanding your professional network.
- **Resource Materials:** Receive course materials and resources that can serve as a valuable reference in your future work.
- **Career Advancement:** Improve your career prospects in the electrical industry by gaining specialized knowledge in distribution system protection.

WHO SHOULD ATTEND

- Electric Utility Transmission and Distribution Engineers;
- Electrical Power System Planners
- Electrical Power System Engineers
- Consulting Engineers;
- Electrical Engineers And Technical Staff Entering The Protection Field
- Engineers And Technicians Involved With Design, Operation, Maintenance, Testing, And Troubleshooting Of High And Medium Voltage Electrical Systems And Equipment
- Technicians And Technologists In the Electric Utility Field Involved In Design, Operation And Maintenance Who Require Knowledge Of Electrical System Protection Techniques

STUDENTS RECEIVE

- FREE 100-Page Digital Electrical Protection Handbook (Value \$20)
- \$100 Coupon Toward Any Future Electricity Forum Event (Restrictions Apply)
- 1.8 Continuing Education Unit (CEU) Credits
- FREE Magazine Subscription (Value \$25.00)
- Course Materials In PDF Format

COURSE OUTLINE

Electric Utility Distribution Protection Fundamentals

Eric Stark, Electricity Forum Electrical Protection Specialist

DAY 1

Distribution and industrial power electricity

Power systems grid fundamentals

System design considerations

- Safety
- Reliability & Flexibility

System Planning

- Utility service & requirements
- Protection consideration
- Special Loads

Distribution Power system configurations

Equipment selection

- Circuit Breakers
- Voltage Transformers
- Current Transformers
- Relays & Protection Schemes
- Microprocessor and Electro-mechanical relays

Distribution Short circuit calculations

- Effects of Short Circuit
- Sources of Fault Currents
- Sensitivity & speed
- Voltage Considerations
- Limiting short circuit currents

Case study calculation using the MVA method

Distribution System grounding design considerations

Principles of power system protection Ground fault protection

- System grounding methods

- Zero-Sequence currents
- Ground Fault concerns

Case study: Sequence component calculation

Distribution Feeder Protection

- Main protection elements to consider
- Fuse characteristics
- Time-current coordination curves
- Relay-fuse-relay TOC, IOC selectivity & coordination
- Main-Tie-Main transfer schemes
- Radial systems, Loop systems, Selective systems

Distribution Bus Protection

- Main protection elements to consider
- Principles of Bus applications
- Bus topologies
- Protection Schemes
- Hi-ampacity current detection
- Hi-impedance relaying

Day 2

DER - Distributed Energy Resources and IBR

- Protection Challenges posed by renewable energy sources and IBR
- Microgrid technology developments and IBR
- Power Stability issues & IBR associated impacts on Protection

Transformer Distribution Protection

- Main protection elements to consider
- Substations components
- Protection philosophies
- Ground fault protection
- Neutral grounding systems

MV Distribution Transmission Line Protection

- Main protection elements to consider
- Line protection
- Line Distance protection relaying
- Line differential communication
- Non-pilot schemes
- Pilot wire & schemes

Motor Protection

- Main protection elements to consider
- Motor nameplates
- Thermal overload protection
- Thermal capacity relaying
- Acceleration limits
- Phase and Ground Fault Protection
- Protection elements
- Setting considerations

Case study: A complete relay setting calculation

Q&A and Course Review

Note: Each session should include a short break for attendees. The course should be interactive, with opportunities for attendees to ask questions and participate in discussions. Practical exercises and real-world examples should be used to illustrate the concepts being taught.

COURSE SCHEDULE:

Both days:

Start: 10 a.m. Eastern Time

Finish: 4:30 p.m. Eastern Time

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

<https://electricityforum.com/onsite-requestforquote>