Technical Training
Safety Training
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Safety Training

Eaton conducts technical training and electrical safety training at its Power Systems Experience Center in Warrendale, PA, and can also deliver training on site for you and those people of your organization who maintain and manage your electrical power distribution systems. Because our training is conducted by the same engineers who perform power systems, power quality and arc-flash analysis, you gain the most up-to-date information and learn the latest techniques.

This training has benefited more than 19,000 people and our reach is international. For additional information or for a quotation of price, call 724-779-5921, or contact your local Eaton distributor or sales office. For a schedule of open-enrollment training, visit the customer courses link at www.eaton.com/learning.

- Safety
- Power quality
- Power system engineering
- Maintenance and operation of Eaton and other brands

Eaton’s Electrical Services & Systems has been approved as an Authorized Provider by the International Association for Continuing Education and Training (IACET), 1760 Old Meadow Road, Suite 500, McLean, VA 22102.

We are Authorized Provider number 1000921.
Power Quality Monitoring

Program overview
The Power Quality Monitoring program is designed for engineers and technicians who need to know how to identify power quality problems or perform measurements of sags, swells, voltage transients, harmonic distortion and voltage flicker. More than 50 percent of the time in this training program is dedicated to hands-on practice using a variety of popular models of portable and panel-mount power monitors. Students are also encouraged to bring their own analyzers to learn new uses for them in our Power Systems Experience Center. Each training program participant receives a comprehensive classroom reference manual.

Program content
Power quality fundamentals: disturbances, harmonics, example waveforms, equipment tolerances, IEEE® 519 and IEC standards.

Practice sessions
- Build your own equipment tolerance diagram
- Monitoring transients, subcycle disturbances and flicker
- Monitoring harmonics
- Evaluating power quality problems using power monitoring data
- Special considerations for making measurements in high-resistance grounded distribution systems and delta-wye power transformer circuits

IACET CEUs: 1.6
Duration: 2.5 days
This training is conducted at our Power Quality Experience Center in Warrendale, PA. For tuition amounts and for our schedule, visit the customer courses link at www.eaton.com/learning. For additional information, call 724-779-5921.
To locate your nearest Eaton distributor or sales office, visit www.eaton.com/electrical.
Program overview

Upon completion of the Industrial Power Systems Analysis I training program, you will be able to recognize the several forms of power system single-line diagrams, calculate short-circuit current, and evaluate the application of power circuit breakers and power fuses. Using classroom exercises and demonstrations, this training program reviews the fundamental techniques of power systems analysis. Although this training program is not intended to teach the use of power systems analysis software, the instructors will use laptop computers in the classroom and review examples created with SKM Power*Tools® for Windows® to help explain the construction of system single-line diagrams and the calculation of short-circuit current. This training program is recommended for electrical engineers.

Program content

- Introduction to Power Systems Analysis: basic unit relationships (voltage/current/power); ANSI device/function numbers
- Three-phase power fundamentals: power triangle, power factor, phasor diagrams; the per-unit system
- Distribution equipment: transformers, induction machines, synchronous machines
- Short-circuit analysis: sources of fault current, symmetrical short circuits, modeling a power system, making impedance diagrams
- Unbalanced fault currents: derivation of non-symmetrical phasors from their symmetrical components, positive/ negative/zero sequence networks, three-phase vs. single-line-to-ground and line-to-line faults
- Data collection, short-circuit calculations, protective device ratings, device evaluations, main-tie-main closed-transition applications, capacitive switching
- Course examination
Program overview

Upon completion of the Industrial Power Systems Analysis II program, the participant will be able to use SKM Power*Tools® for Windows® to calculate short-circuit current and evaluate the application of power circuit breakers and power fuses. This program is a follow-up to the Industrial Power Systems Analysis I training. You will learn to use computer software to perform the tasks that are described and explained in the Industrial Power Systems Analysis I training.

IACET CEUs: 3.2
Duration: 4.5 days

This training is conducted at our Power Quality Experience Center in Warrendale, PA and at other locations. For tuition amounts and for our schedule, visit the customer courses link at www.eaton.com/learning.

For additional information and pricing of on-site training, call 724-779-5921.

To locate your nearest Eaton distributor or sales office, visit www.eaton.com/electrical.
Electrical and Arc-Flash Safety

Program overview
Each new edition of the NFPA® Standard 70E contains revised recommendations for protecting workers from the hazards of arc flash. IEEE® 1584 sets the industry standard for evaluating the hazards in a power distribution system and its equipment. 29CFR1910 subparts R and S tie these standards and governmental regulations for electrical safety together. The Electrical and Arc-Flash Safety training program from Eaton provides electricians, technicians, maintenance managers, safety managers and engineers with the information they need to follow the standard industry practices of government and industry. Programs presented in Canada include a review of provincial regulations. Each training program participant receives a comprehensive classroom reference manual.

A half-day training program, Arc-Flash Safety, is also available. Especially suitable for electricians and maintenance technicians, you can earn 0.4 CEU.

Program content
- Electrical hazards
- Preparing to work safely
- Using live line tools and voltage detectors
- Lockout/tagout
- Temporary grounding
- Flash protection boundary and limits of approach (NFPA 70E)
- Methods for selecting protective clothing and personal protective equipment
- Practical methods for reducing arc-flash hazard

IACET CEUs: 0.8
Duration: 1 day
This training can be conducted at your location.
For additional information and pricing, call 724-779-5921.
To locate your nearest Eaton distributor or sales office, visit www.eaton.com/electrical.

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Program overview
The Power Xpert®, PowerNet™ and Foreseeer® Basics training program focuses on connectivity. Attendee will receive hands-on practice and tools for configuring Power Xpert Software using components of PowerNet and Foreseeer Software. It is designed for engineers and technicians who design, install and operate power management systems using Power Xpert communications capabilities. It provides a basic understanding of the architecture and configuration of Power Xpert Software and its associated hardware components.

Program content
- Configuration of devices that are able to communicate using the Eaton Power Xpert Server Core through PowerNet Software. These include early models of meters and protective relays
- Configuration of devices that are able to communicate using the Eaton Power Xpert Server Core via Foreseeer Software. This includes UPSs and PDUs
- Alarming and trending
- Configuration of Power Xpert devices directly to the Power Xpert Server Core: Power Xpert Meters, Power Xpert Gateways and UPSs
- Setup and configuration of INCOM™, Modbus® and Ethernet communications interface devices such as NetLink, E-MINT, PXG600 Gateway or Power Xpert Meters
- Configuration of Power Xpert devices using Power Xpert Server Core Software

IACET CEUs: 3.2
Duration: 4 days
This training is conducted at our Power Quality Experience Center in Warrendale, PA. For tuition amounts and for our schedule, visit the customer courses link at www.eaton.com/learning.
For additional information and pricing of on-site training, call 724-779-5921.
To locate your nearest Eaton distributor or sales office, visit www.eaton.com/electrical.
Protective Relay Testing, Basic

Program overview
The Protective Relay Testing, Basic training program is for maintenance technicians, electricians, engineers or anyone responsible for maintaining a safe and reliable electrical power distribution system in an industrial or commercial facility.

Program content
Classroom sessions
• Power triangle calculations
• Phasor diagrams
• CT and VT construction and connections as they apply to relaying and metering circuits
• ABB and GE style relay cases and test plugs
• How to simulate VT and CT circuits with a relay test set

Hands-on exercises
• Setup and configuration of a Doble 6150 advanced relay test set
• Testing overcurrent relays (IEEE® 50/51) using ABB type CO and GE type IAC electromechanical relays as an example
• Setup and testing of microprocessor overcurrent relays (IEEE 50/51) using the Eaton DT3000 as an example
• Testing overvoltage (IEEE 59) and undervoltage (IEEE 27) relays using ABB type CV and GE type IAV electromechanical relays as an example
• Testing directional overcurrent relays (IEEE 67) using an ABB type CR electromechanical relay as an example
• Testing transformer differential relays (IEEE 87T) using an ABB circuit shield type 87T solid-state relay as an example
• Testing the overfrequency (IEEE 81O) and under-frequency (IEEE 81U) functions of a microprocessor feeder protection relay using the Eaton FP-5000 as an example
• Testing the sync-check (IEEE 25) function of an FP-5000 microprocessor feeder protection relay

IACET CEUs: 3.2
Duration: 4 days
This training is conducted at our Power Quality Experience Center in Warrendale, PA. For tuition amounts and for our schedule, visit the customer courses link at www.eaton.com/learning.

For additional information and pricing of on-site training, call 724-779-5921.

To locate your nearest Eaton distributor or sales office, visit www.eaton.com/electrical.
Program overview
Upon completion of the Smart Grid training program, you will recognize the components of a Smart Grid, understand the capabilities of a Smart Grid, and recognize the various definitions of a Smart Grid as they are given by the Department of Energy, power generation and power distribution companies and by industrial users of electrical power. This training program is recommended for technicians, engineers or anyone who is interested in learning renewable generation, integration of renewable energy, types of energy storage, and traditional or advanced automation and control.

Product content
- Smart Grid technology overview: driving factors, today’s grid, grid of the future
- Renewable energy: wind, geothermal, photovoltaic, integration of renewable energy sources
- Transmission and distribution systems: energy storage and system security
- Smart Grid technology: automation and control, hardware implementation, choice of protocol, system configuration and testing, cyber security
- Customer empowerment: demand response, smart meters, smart appliances, plug-in vehicles

Duration: 3.5 days
This training is conducted at our Power Quality Experience Center in Warrendale, PA and at other locations. For tuition amounts and for our schedule, visit the customer courses link at www.eaton.com/learning.

For additional information and pricing of on-site training, call 724-779-5921.

To locate your nearest Eaton distributor or sales office, visit www.eaton.com/electrical.
The Industrial Training Laboratory in Warrendale, PA

Overview

Using the equipment of our industrial training laboratory, Eaton provides real-life, hands-on operational and maintenance training for technicians, electricians, equipment operators, engineers and safety managers. We can train on these fully functional assemblies and components:

- A Magnum™ DS low voltage power circuit breaker assembly having ELC-directed main-tie-main transfer; zone interlocking; Digitrip™ RMS 520, 520M, 1150+; breaker lifter; hinged compartments; Arcflash Reduction Maintenance System™; Power Xpert® metering devices; under-voltage and loss-of-phase protective relays
- A VCP-W medium voltage switchgear assembly having a 15 kV vacuum interrupter circuit breaker, CPT drawout compartment, VTs drawout compartment and capacitive trip module
- AMPGARD® medium voltage motor control, type SL contactor, reduced voltage autotransformer type under control of an MP-3000 motor-protection system
- AMPGARD medium voltage motor control, type SJ
- VCP-T medium voltage power circuit breaker, MVS load-interrupter switch and EDR-3000 feeder protection system in an MSB assembly
- Liquid-immersed, unit substation transformer class KNAN/KNAF having active fan controls and a fault pressure relay
- SVX9000 adjustable frequency, adjustable speed motor controllers
- Accusine active harmonic filter
- Type DS II low voltage power circuit breakers
- Freedom 2100 motor control center
- Advantage communicating motor control center
- IT, communicating motor control center
- FlashGard® motor control center

Duration: 0.5 to 4.5 days depending upon your specific requirement.

Technical and safety training in our industrial training laboratory and our Power Quality Experience Center is provided on a quoted-price basis.

For additional information or for a quotation of price, call 724-779-5921.