Training catalog

ABB Distribution Automation training
2017
Relay schools, application, product, and automation communications training
The value of training

Distribution Automation Training Center (DATC)
Located in sunny Coral Springs, Florida, ABB’s DATC offers factory and on-site training for our Relion products and applications. Our goal is to help our customers achieve long product life, improve safety, and reduce downtime. We work in partnership with you to address your specific needs and ensure that your personnel are more satisfied with their jobs thanks to deeper knowledge of equipment and service procedures.

Our training features:
- Highly qualified professionals with a wealth of experience in relay and technical support
- Training material created to include theory and hands-on exercises
- Expertise in IEEE, IEC 61850, DNP 3.0 and Modbus communication standards

Training offered
The following types of training are offered:
- Classroom training is offered at the DATC in Coral Springs, FL.
- Onsite product training is available to customers at the customer’s location. These classes are upon request only.
- Customized workshops are designed to provide a deeper understanding of the principles of protection and control, each class is targeted to address a specific topic, including feeder, transformer, and motor protection. The classes are structured for 1-2 hour segments and can be held on-site or at one of ABB’s facilities in your area. Contact your FES representative to schedule.
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**Relay & automation schools**

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**Product training**

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Symmetrical components and fault analysis

Objective
The course discusses the symmetrical component representation of various power system components, and comprehensively analyzes faults.

Relay segments covered:
- Per unit system
- Introduction to symmetrical components
- System faults
- Fault calculations
- Sequence network modeling: Generator
- Sequence network modeling: Transformer
- Sequence network modeling: Overhead lines

Participants learn
- Mathematical fault analysis techniques
- Fault calculations and system stability for single-phase and multiple-phase fault scenarios
- Understand real case examples
- Rapid calculation of how your system will behave under abnormal conditions

Participant profile
Engineers and senior level technicians who wish to reacquaint themselves with vector mathematics and fault analysis computations.

Prerequisites
A general knowledge of basic electrical engineering is recommended, as well as Elementary Phaser Mathematics, Mathematical Matrix Manipulation, and Power System Basics.

What to bring
Only scientific calculator.

Additional course details
This class will be held **April 24-28**, starting on Monday at 1:00pm, 8:30 am - 5:00 pm from Tuesday-Thursday, with the last day ending at noon.
Fundamentals of protection relaying of substation

Objectives
The major contents of this fundamentals course are the protection schemes in distribution substations and applications. (3.5 days)

Introduction to Fundamentals
- Power systems fundamentals
- Elements of feeder protection
- Busbar protection
- Transformer protection
- Examples/calculations, and hands-on
- Review of fundamentals
- Line protection
- Capacitor bank protection
- Generator protection
- Substation automation
- Hands-on/calculation/examples

Participants learn
- The basic concepts of protective relaying to the advanced topics of generation protection
- Understand key design consideration and operations
- Criteria used to select protective relay settings

Participant profile
Designers, engineers and technicians involved with design and development of distribution lines, substation, as well as anyone involved in protective relay selection and application.

Prerequisites
Knowledge of basic electrical engineering is required. Basic relay school is highly recommended.

Additional course details
This class will be held May 9-12, 8:00 am - 5:00 pm each day with the last day ending at noon.
Power systems protection & coordination

Objectives
The major contents of this course covers the fundamental aspects of power system protection and coordination. The basic philosophy and introduction to application problems are also addressed. (3.5 days)

Power systems
- Power system fundamentals
- Fault calculation
- Protection systems introduction
- Selection of protection relays
- Transformer, busbar, and arc protection
- Review of power systems
- Motor protection
- Overheard line protection
- Generator protection
- Feeder protection
- Relay coordination

Participants learn
- Students will learn the basis upon which the selection of protection systems is made for the different components of the power system (lines, transformers, motors, generators, and busbars) as well as the basic criteria for relay settings and coordination.
- Review of fault calculations and protective device calculations
- Coordination of overcurrent protective devices

Participant profile
Electrical engineers, relay engineers, and senior technicians. Involved in protection and coordination for distribution lines, transmission lines and substations.

Prerequisites
Knowledge of basic electrical engineering is required. Basic relay school is highly recommended.

Additional course details
This class will be held Sept. 12-15, 8:00 am- 5:00 pm each day with the last day ending at noon.
Electromechanical relays & Flexitest™ switches

Objectives
This two-day course is designed for participants to become proficient in application, installation, operation, maintenance, and testing of ABB electromechanical relays and FT switches. Our mission is to train a new and changing power utility workforce to become experienced in these products using personalized, hands-on training.

Training segments include
- Current non-directional and current directional
- Distance
- Current differential
- Auxiliary and annunciator
- Under/over voltage
- Power directional
- Under/over frequency
- FT Switches

Participants Learn and Perform Hands-On
- Applications: learn to apply relays for various combinations of fault protection
- Settings: set up relay functions for your specific application
- Maintenance: maintain relays to perform for a lifetime
- Calibration: calibrate relays to precision accuracy
- Acceptance Testing: test relays to verify acceptance criteria and characteristics
- Relay construction: learn cylinder unit, induction disc element, transformer, compensator, polar unit and auxiliary relay components
- Troubleshooting techniques: use relay tools to reduce operating costs and minimize downtime

Participant profile
Relay engineers, technicians, and operators.

Prerequisites
Knowledge of/experience with protective relaying and use of electrical equipment.

What to bring
Laptop is recommended.

Additional course details
This class will be held March 23-24 and Sept. 18-19, 8:00 am - 5:00 pm each day.
Relion® series relays - protection and control

Objectives
This free, 4.5 day Relion course is designed for engineers and technicians to become proficient in installation, operation and configuration of Relion distribution series relays, tools, and software.

Course breakdown:
- Operation and engineering for Relion 605, 615, 620, 615R, RER620 relays

Topics covered
- Introduction to Local Human Machine Interface (LHMI) and WebHMI
- Protection settings configuration using WebHMI and LHMI
- Relay configuration and management with PCM600 Tool
- Relion relay applications
- Relay logic design with Application Configuration Tool (ACT)
- GOOSE Engineering hands-on training

Participant profile
Power system engineers, service engineers, technicians, and personal involved in operations and maintenance of protection relays.

Prerequisites
Basic knowledge of protection relays and power distribution operations.

What to bring
Your own laptop computer with PCM600 software previously installed. Please contact our support team for assistance.

Additional course details
This class will be held March 6-10 and July 17-21, 8:00 am- 5:00 pm each day.
Distribution Automation Controller
COM600F

Objectives
This two-day course was designed for engineers and technicians to become proficient in installation, operation, and configuration of the COM600F gateway/HMI. Our mission is to train a new and changing power utility work force to become experienced in ABB’s substation automation COM600F series product using personalized, hands-on training.

Training segments include:
- Hardware identification and configuration
- Operating the COM600F, both locally and remotely
- License upgrades
- Configuration of master and slave communications
- Configuration of the HMI
- Implementation of the advanced features of the COM600F

Participants learn and perform hands-on:
- Where and how to apply COM600F in various applications
- How to set up the COM600F
- How to set up communication networks for your specific application
- How to configure and apply HMI functions
- How to configure and apply functions utilizing ABB connectivity packages and templates
- Upload and download configurations to/from the COM600F
- How to use event and alarm lists
- How to use the Web HMI
- How to use advanced features of the COM600F such as historical data storage and IEC61131-3 active logic programming (emphasis will be placed on the implementation of the Fault Detection Isolation and Restoration (FDIR) algorithm unique to the COM600F)
- Troubleshooting techniques

Product highlights
- COM600F: Gateway and/or HMI
- Communication protocols including IEC61850, DNP and Modbus
- Simple configuration and commissioning
- Bottom up engineering approach

Additional course details
This class will be held March 28-29 and June 13-14, 8:00 am- 5:00 pm each day.
Objectives
This one day training course is designed for participants to become proficient in configuration and implementation of the Wireless Gateway ARG600 in a complete communication system.

Topics covered:
- Hardware identification and configuration
- Configuration and settings
- Point-to-point and point-to-multi-point connections
- How to connect two Ethernet devices under bridged ARG600 to ARG600 open VPN connection
- How to extend a bridged network from local Ethernet to remote sites
- How Utilize the COM600 and the ARG600 applications

Participants learn and perform hands-on:
- ARG600 configuration and settings by using Arctic configuration tool
- How to set up the ARG600 with cellular providers such as AT&T or Verizon
- How to achieve point-to-point and point-to-multi-point connections
- How to use the ARG600 in different communication applications over a distribution network

Product highlights
- Wireless Gateway ARG600 can be utilized for various industrial and utility applications to maximize the benefits
- Industrial grade TCP/IP router
- Ideal for retrofitting by allowing the user to extend the life cycle of existing serial based substation devices
- Remote access to field devices
- Optimizing the cost of communication by using public cellular networks
- Possibility to upgrade from the existing legacy's private radio system to a higher bandwidth cellular networks based

What to bring
You will need to bring your own laptop computer.

Participant profile
Field engineers, sales partners and customers and technicians.

Additional course details
This class will be held March 30 and June 15, 8:00 am - 5:00 pm.
Objectives
This two-and-a-half day course is designed to give attendees the tools necessary to understand, engineer, and deploy protection and control schemes based on IEC 61850.

Topics covered
- Overview of IEC 61850 protocol suite
- Information on IEC 61850 7-3
- Hands-on configuration practice on ABB Relion relay
- Monitoring and decoding of IEC 61850

Prerequisites
Basic knowledge of protection relays and the electrical network.

Participant profile
Relay, protection, control, communication, and automation engineers.

Additional course details
This class will be held April 11-13 and Oct. 4-6, 8:00 am - 5:00 pm each day with the last day ending at noon.
## 2017 course schedule

<table>
<thead>
<tr>
<th>Course #</th>
<th>Course name</th>
<th>Price (USD) *</th>
<th>Location</th>
<th>Date</th>
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<tbody>
<tr>
<td>Relay school training</td>
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<tr>
<td>SCH001</td>
<td>Symmetrical Components and Fault Analysis</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>April 24-28</td>
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<tr>
<td>SCH002</td>
<td>Fundamentals of Protection Relaying of Substation</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>May 09-12</td>
</tr>
<tr>
<td>SCH003</td>
<td>Power Systems Protection &amp; Coordination</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>Sept.12-15</td>
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<tr>
<td>RPT006</td>
<td>Electromechanical relays and FT switches</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>March 23-24 Sept. 18-19</td>
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<tr>
<td>Substation communication</td>
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<tr>
<td>RPT009</td>
<td>Smart Grid Communications Applications</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>March 28-30 June 13-15</td>
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<td>SCH005</td>
<td>IEC 61850 for Protection &amp; Control</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>April 11-13 Oct. 4-6</td>
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<tr>
<td>Relays</td>
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<tr>
<td>615 - Gen</td>
<td>Relion series - Protection &amp; Control</td>
<td>Free</td>
<td>Coral Springs, FL</td>
<td>March 6-10 July 17-21</td>
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* A multi-session 10% discount is granted on the total tuition fee of the same student registering to more than one class during the same calendar year.
Please contact the hosting ABB facility for more information:

Coral Springs, FL
Toll Free:  +1 800 222 1946
Email:  myces@us.abb.com

Disclaimers

− Relay school classes – Need a minimum of 6 participants to confirm this class – Confirmation of this course will be completed once requirement is met.
− Relion product training classes – Minimum of 6 participants to confirm class – Confirmation of this course will be completed once requirement is met. Special offer $0.00 per course is limited and does not include any other additional discounts.
− General: ABB has the right to cancel the class if above requirements are not met. We are not responsible for travel expenses of any of the participants if class is cancelled.
− We will confirm all classes at least 2 weeks prior of the date of the course.
Please register for courses by visiting us online. Please make reservations at least four weeks before the start of the course, as we are only able to accept a limited number of participants on each course. We accept bookings in the order they arrive. To find course dates, please refer to the course descriptions or course schedule. If you have any questions please email at myces@us.abb.com.

Confirmation, facilities and accommodations
A confirmation will be returned upon receipt of your application with specific details about the hours, and location. We’ve negotiated the best rates available in each area during the ABB training program, please contact us for hotel information.

Cancellation and notice
If the course is cancelled or postponed, you will be informed at least one week prior to the course start. We reserve the right to postpone or cancel courses. If you need to cancel, please send an email to myces@us.abb.com as soon as possible, but no later than two weeks prior to course start. The course fee will not be reimbursed to anyone canceling with less than two weeks notice from the scheduled course date.

Course certificate
Each participant will receive a course certificate upon the completion of the course.

Instructors and staff
Training is conducted by our professional instructors who are specialized in delivering the latest information and knowledge about the subject at hand.

On-site and customized customer training
On-site and customized customer training sessions are offered upon request. We will gladly arrange courses at any agreed location. Our training staff will be happy to assist in the planning and organization of your on-site or customized training requirements. Arrangements may also be made by contacting the Customer Support Department.

Course descriptions
Course descriptions concern standard courses only. For tailor-made courses please call +1 954 656 3035. ABB reserves the right to make changes to standard courses without notice.
Webinars

Visit us [online](#) to view the 2017 ABB Protective Relay School webinar calendar or to access recorded webinar archives from previous webinar events.
Notes