Distribution Automation training
2018
Relay schools, application, product, and automation communications 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. ABB's goal is to help our customers achieve long product life, improve safety, and reduce downtime. ABB’s experts 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.

The value of 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 10-13, 2018, from 8:30 a.m. to 5:00 p.m.
Fundamentals of protection relaying of substation

Objective: The major contents of this fundamentals course are the protection schemes in distribution substations and applications.

Introduction to fundamentals
- Power systems fundamentals
- Elements of feeder protection
- Busbar protection
- Transformer protection
- Line protection
- Generator protection
- Substation automation
- Hands-on/calculation/examples

Participants learn
- The basis upon which the selection of protection system is made for the different components of the Power System (lines, transformers, motors, generators, and busbar)
- 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 29-June 1, 2018, from 8:30 a.m. to 5:00 p.m. each day, with the last day ending at noon.
Power systems protection and coordination for engineers

Objective: 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.

### 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
- Line protection
- Generator protection
- Feeder protection
- Relay coordination

### 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 course will be held on June 5-8, 2018, from 8:30 a.m. to 5:00 p.m.

### 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
Power systems protection and coordination for technicians

Objective: The major contents of this course cover the fundamental aspects of power system protection and coordination. The basic philosophy and introduction to application problems are also addressed.

Power systems
- Power system fundamentals
- Protection systems introduction
- Selection of protection relays
- Introduction to transformer, busbar, generator, motor, and 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 busbar) as well as the basic criteria for relay settings and coordination.
- Review of fault calculations and protective device calculations
- Coordination of overcurrent protective devices

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

Additional course details
This course will be held on October 9-12, 2018, Tuesday – Thursday from 8:30 a.m. to 5:00 p.m., with Friday from 8:30 p.m. to 3:00 p.m.

Participant profile
Electrical engineers, relay engineers, and senior technicians. Involved in protection and coordination for distribution lines, transmission lines, and substations.
Electromechanical relays & Flexitest™ switches

Objective: This course is designed for participants to become proficient in application, installation, operation, maintenance, and testing of ABB EM relays and FT switches. Our mission is to train a power utility workforce to become experienced in these products.

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 May 9-11, 2018, from 8:00 a.m. to 5:00 p.m.

A second training will be held on Sept. 18-19, 2018, from 8:00 a.m. to 5:00 p.m.
Smart grid communication applications (1/2)

Objective: This four-day course is designed for engineers and technicians to become proficient in the installation, operation, and configuration of the COM600F gateway/HMI and Wireless Gateway ARG600 in a complete communication system.

Distribution Automation Controller COM600F

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
Smart grid communication applications (2/2)

Objective: This four-day course is designed for engineers and technicians to become proficient in installation, operation, and configuration of the COM600F gateway/HMI and Wireless Gateway ARG600 in a complete communication system.

Wireless communication solutions

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 to 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

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

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

Additional course details
This course is upon request only. For more information, please contact your local ABB representative or send an e-mail to US-MVRelaySupport@abb.com.
Implementation of transfer schemes using protection relays

Objective: 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**
- Introduction of IEC 61850 communication standard
- Semantic Hierarchical Object Data Model
- Client / Server and Publish / Subscribe communication services
- Hands-on configuration practice with ABB Relion relays
- Monitoring and decoding of IEC 61850 communication
- Automatic Transfer Scheme with IEC 61850 GOOSE

**Prerequisites**
Basic knowledge of protection relays and the electrical network.

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

**Additional course details**
This course will be held on Aug. 7-9, 2018, from 8:30 am - 5:00pm.
# Course schedule

## 2018

<table>
<thead>
<tr>
<th>Course number</th>
<th>Course name</th>
<th>Price (USD)</th>
<th>Location</th>
<th>Date</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCH001</td>
<td>Symmetrical components and fault analysis</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>April 10-13, 2018</td>
<td><a href="#">Register here</a></td>
</tr>
<tr>
<td>SCH002</td>
<td>Fundamentals of protection relaying of substation</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>May 29-June 1, 2018</td>
<td><a href="#">Register here</a></td>
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<tr>
<td>SCH003</td>
<td>Power systems protection and coordination for engineers</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>June 5-8, 2018</td>
<td><a href="#">Register here</a></td>
</tr>
<tr>
<td>RPT006</td>
<td>Electromechanical relays and Flexitest switches</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>May 10-11, 2018</td>
<td><a href="#">Register here</a></td>
</tr>
<tr>
<td>SCH005</td>
<td>Implementation of transfer schemes using protection relays</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>Aug. 7-9, 2018</td>
<td><a href="#">Register here</a></td>
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### Substation communication training

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<th>Location</th>
<th>Date</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>RPT009</td>
<td>Smart grid communication applications</td>
<td>$1,500</td>
<td>Upon request only</td>
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<td></td>
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<tr>
<td>SCH005</td>
<td>Implementation of transfer schemes using protection relays</td>
<td>$1,500</td>
<td>Coral Springs, FL</td>
<td>Aug. 7-9, 2018</td>
<td><a href="#">Register here</a></td>
</tr>
</tbody>
</table>

1 Training course is also available upon request. Location will be determined by the customer or ABB based on the number of participants and the availability of the presenter.

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Please contact the hosting ABB facility for more information:

**Coral Springs, FL**  
Toll Free: +1 800 222 1946  
Email: [US-MVRelaySupport@abb.com](mailto:US-MVRelaySupport@abb.com)

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**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 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. ABB is not responsible for travel expenses of any of the participants if class is cancelled.
- **ABB will confirm all classes at least 2 weeks prior of the date of the course.**
Registration information

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. ABB accepts 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 US-MVRRelaySupport@abb.com.

**Confirmation, facilities and accommodations**
A confirmation will be returned upon receipt of your application with specific details about the hours, and location. ABB has negotiated the best rates available in each area during the 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. ABB reserves the right to postpone or cancel courses. If you need to cancel, please send an email to US-MVRRelaySupport@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. ABB’s representatives 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 2018 ABB Protective Relay School webinar calendar or to access recorded webinar archives from previous webinar events.