ABB Technical Training booklet
General course information

BOR ENERJİ

ABB

ABB School of Maintenance
Courses

ABB University
Courses

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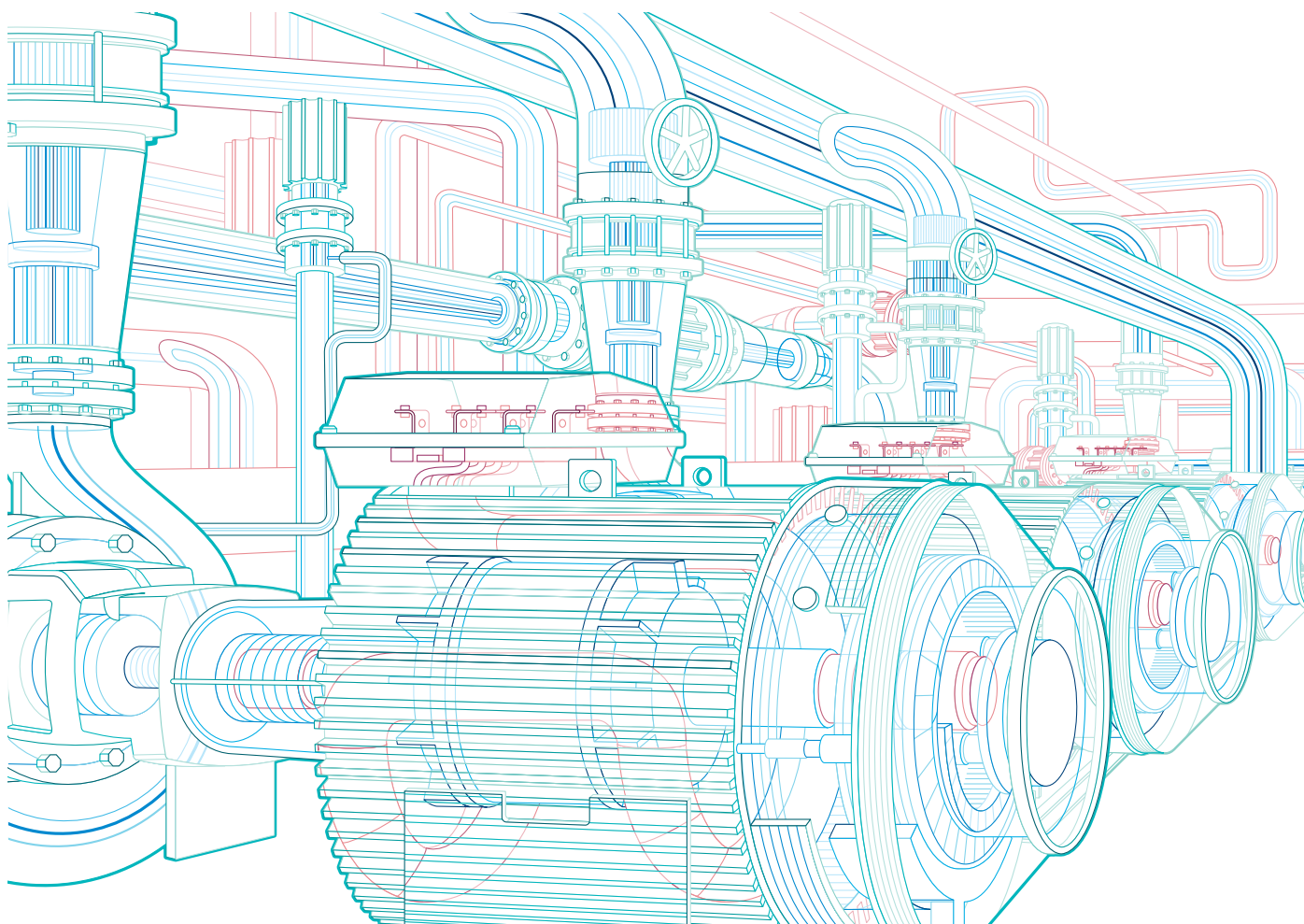
Introduction
ABB University & ABB School of Maintenance

The ABB Technical Training provides life-long learning solutions for engineering and technical careers (both technical and managerial). This philosophy links career paths that relate most to the business strategy. In other words, it customises solutions to the business per skills need and job level.

ABB University

A skilled and efficient workforce is a plant's most valuable asset. The ABB University can help to increase workforce skill levels and knowledge, providing more productive responses to system and process challenges. The ABB University offers accredited and registered training on ABB products and systems that adds value to the entire business (value chain) by offering training on the full range of products and systems to internal ABB staff and to external customers. As a consequence, all the training programmes, engineers, programmers, maintenance and operations personnel provide comprehensive and up-to-date technical expertise for existing and new products, processes and technology advances.

Conferences & Workshops

The Predictive Maintenance Conference South Africa (PdMSA), as well as subject specific workshops are part of the annual calendar.

ABB School of Maintenance

The key focus areas of ABB School of Maintenance are quality training that is innovative, combines theory, research and practice, and produces trainees who have a broad range of generic skills that will not only equip them to contribute to the economic development of an organization, but also to compete successfully in the international market.

The ABB School of Maintenance learning programmes assists to overcome some of the current challenges associated with the maintenance industry namely, scarcity of experienced maintenance resources, as well as the effective gathering and managing of quality information. As such, the ABB School of Maintenance's short learning programmes fit national and international training demandsh

Management Series
Root Cause Failure Analysis (RCFA)

Course goal

This valuable training course will ensure that you are able to optimise your maintenance activities. You will learn how to identify the root cause of a breakdown and prevent it from happening again. Participation in the case study will lead to a set of optimized preventative maintenance schedules.

Learning objectives

Upon completion of this course, students will be able to:

– Understand the importance of a return on investment in existing maintenance
– Discuss the influence of production breakdowns
– Identify incidents that can cause production failures
– Discuss sound maintenance strategies
– Develop a maintenance plan based on sound engineering principles
– Participate in problem solving exercises

Participant profile

The student will be anyone in the maintenance field, but focusing on Maintenance Engineers, Maintenance Planners, Reliability Engineers, Production Engineers, Process Engineers, Section Engineers, System Engineers, Technical Engineers, Head Diagnostics, Mechanical Engineers, Electrical Engineers, Mechanical Engineers, Electrical Engineers, Industrial Engineers, Maintenance Managers, Maintenance Superintendents, Mine Managers, Plant Managers, Asset Managers, Mechanical Superintendents, Planning Managers, Planning Officers, Senior Technical Officers

Topics

– Identify problems, weaknesses and opportunities in your current Maintenance strategy
– Techniques to perform Root Cause Analysis
– Determining cause and effect relationships
    – Tools
    – Specialised methods
– Effective Information Management techniques
– Essential Management Systems
– Case Study:
    – Learners will apply the Root Cause Analysis techniques to a case study by following the OMM process. This serves as test-and-apply process under the guidance of an expert facilitator.

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 3 days.

Condition Monitoring Series
Vibration Analysis Basic   (VIB B)

Course goal
Little or no previous experience is required to do this course. However, no vibration analyst can truly be effective without some basic skills and previous experience in maintenance of machines that will be included in the maintenance programme. General familiarity with using a calculator along with some good math skills in arithmetic and simple algebra is helpful.

Learning objectives
Upon completion of this course, students will be able to:

– Understand Maintenance Systems Predictive Maintenance Programmes (PMP)
– Discuss the basics of Vibratory motion
– Understand the basic theory of machine vibration
– Understand the preparation process for data collection
– Discuss and understand the data collection process
– Understand data analysis

Participant profile
The student will be anyone in the maintenance field that aspires to become a Vibration Analyst.

Topics
– Identify the steps to Condition Monitoring for a successful PMP
– Machine vibration theory
– Amplitude
– Root mean square
– Analysis of frequency peaks
– Preparation for data collection
– Choosing a transducer
– Selection criteria
– Data collection
– Selection of equipment
– Safety
– Data Analysis

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 3 days.

Condition Monitoring Series
Vibration Analysis One (VIB 1)

Course goal
This course provides the essential Vibration Analysis information in a generic manner for the implementing of a successful Predictive Maintenance Programme (PMP) and is intended for analysts having less than one year of experience.

Learning objectives
Upon completion of this course, students will be able to:

– Understand what vibration is and how to use vibration to evaluate machinery condition
– Discuss the strengths and weaknesses of typical vibration instruments
– Understand various transducers and their optimum applications
– Understand the role of High Frequency Enveloping (HFE)
– Discuss the role of spike energy
– Discuss common pitfalls in everyday vibration measurements

Participant profile
Aspiring vibration analysts with less than one year vibration experience will benefit from this course. Candidates should have basic skills and previous experience in maintenance of machines that will be included in their predictive maintenance programme. General familiarity with using a calculator, along with basic math skills is required.

Topics
– Phase measurement
– Transducers
– Role of HFE & HFD
– Introduction to Vibration Signature Analysis
– Specifying Spectral Band Alarm Levels
– Common pitfalls in everyday measurements
– Implementing an effective Predictive Maintenance Programme (PMP)
– Case Studies:
  – Learners will be introduced to actual case histories of vibration diagnostics on various machine types.

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 3 days.

Condition Monitoring Series
Vibration Analysis Two (VIB 2)

Course goal

This course is primarily intended to enhance the vibration expertise of analysts having approximately 2 years experience. The curriculum allows the analysts to significantly improve the effectiveness of their condition monitoring programs.

Learning objectives

Upon completion of this course, students will be able to:

– Use of Vibration Severity Charts
– Understand the Refining of the Overall Alarm and Spectral Band Alarm Levels
– Discuss phase analysis techniques
– Discuss detailed vibration signature analysis
– Present a proven analysis procedure
– Select the Optimum Condition Monitoring Hardware

Participant profile

General familiarity with using a calculator and computer is required. Good math skills and simple algebra, primarily solving for one unknown, is a must. Some fundamental trigonometry background will also prove helpful. If certification is desired at Level Two, a student must have attended the Level One course and passed the Level One Certification exam, or have an equivalent Level One Certification.

Topics

– Vibration Severity Charts
– FFT Processing Techniques
– Specifying Spectral Band Alarm Levels
– Diagnoses of more complex machine problems are taught including:
    – gear, rotor rub, journal bearing, electrical,
    – hydraulic/aerodynamic, beat vibration,
    – resonance and tracking of rolling element bearing "failure scenarios".
– Demodulation Spectral Analysis
– Case Studies:
    – Learners will be introduced to actual case histories of vibration diagnostics on various machine types.

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 4 days.

Condition Monitoring Series
Vibration Analysis Three (VIB 3)

Course goal

This course shows you how to evaluate low, high and variable speed machines, DC motors, and AC motors using special vibration signature, time waveform, amplitude demodulation and motor current analysis techniques.

Learning objectives

Upon completion of this course, students will be able to:

– Understand Frequency and Amplitude Interpolation
– Discuss the Diagnosis of a Bearing, Gear or Electrical Problem
– Create and specify Optimum Narrowband Envelope Spectral Alarms
– Identify Specific Vibration Frequencies
– Understand the value of Acceptance Tests
– Discuss Gear Problem Diagnostics
– Understand Natural Frequency Testing
– Identify effective PdM Reporting Techniques

Participant profile

Students should have approximately two to four years spectrum analysis experience. General familiarity with using a calculator and computer is required. Good math skills, including algebra and fundamental trigonometry, are mandatory.
Students wanting Level Three certification are required to have passed both the Level One and Two Certification exams.

Topics

– Frequency and Amplitude Interpolation
– Machines Having Different Operating Speeds
– Vibration Frequencies per machine type
– Acceptance tests and criteria:
    – New machinery,
    – Overhauled machinery
– Accurate tracking
– Gear problems
– Case Studies:
    – Learners will be introduced to actual case histories of vibration diagnostics on various machine types.

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 4 days.

Application-Specific Series
Delivering Energy Savings (DES)

A practical training course in the managerial and technical aspects of energy management.

Course goal

Delivering Energy Savings is a course developed by and presented by experienced energy improvement practitioners. It will be of real practical assistance both to those
who set energy strategy and those who have responsibility for delivering quantified energy savings.

Learning objectives

Upon completion of this course, students will be able to:

Participant profile

- Improve the overall energy efficiency of your organisation
- Deliver direct cash benefits to your company
- Develop a culture of sustained and continuous improvement
- Set realistic, achievable, improvement targets
- Understand key energy efficiency issues
- Understand the links between energy use and carbon emissions

- Effectively use energy management tools and techniques
- Be equipped to carry out energy audits
- Understand how to evaluate and implement improvements
- Implement measurement and reporting systems
- Benchmark your energy use
- Identify the opportunities in common energy users and utilities

The course is aimed at managers, engineers and supervisors who have responsibility for energy management or who are involved in delivering energy savings, particularly:

- Site managers
- Project managers / engineers
- Recent graduates
- Development engineers

Course type and methods

This course meets the requirements of Continuing Professional Development (CPD).

The course will cover the following:	
Background to energy management Why is energy management important? Energy price trends	South African legislative regulatory requirements Incentives and penalities
Energy principles Essential thermodynamics Definition and measures of efficiency	Primary and delivered energy
Energy management principles The energy management cycle Energy strategy and policy Energy auditing	Energy management matrices Energy maps
Understanding site utilities Steam systems Cooling water systems	Compressed air systems
Managing heat flows Heat exchangers and heat exchanger networks Heat exchanger integration techniques	Energy mapping
Understanding site utilities (II) Refrigeration and cooling systems	Heat pumps

The course will cover the following:	
Electrical systems Electrical motors Power factor	Electrical system energy losses Variable speed drives
Energy measurement and analysis Metering and collecting data Analysing data - essential statistical tools	Monitoring and targeting to deliver energy savings
Delivering benefits Evaluation of energy saving opportunities Developing and implementing an improvement programme	Prioritising energy saving projects Maintaining the energy improvement momentum
CHP systems and renewable energy Types of CHP systems CHP economics	Defining and sizing CHP systems Renewable energy options
Case studies Management of energy within key industrial processes	Conveying and pumping etc.

Application-Specific Series
Mine Winder braking Systems (MWS)

Course goal
The goal of this course is to teach the delegates the principles and operating technique required for braking a mine-winder in a safe manner.

Learning objectives
Upon completion of this course, students will be able to:

– Read and understand hydraulic schematic diagrams.
– Understand the basic operation of major hydraulic components.
– Understand the various methods of retarding a mine winder.
– Trace and correct faults associated with the winder braking system.

Participant profile
This training is targeted at:
– Winder Engineers.
– Winder maintenance fitters.
– Winder maintenance electricians.
– Winder maintenance planners.

Prerequisites
– Students should have a basic knowledge of mechanical components, preferably in a mining environment.
– Knowledge of mine winders used in a production environment is required.
– Knowledge of basic physics up to Matric level would be an advantage.

Topics
– Principles of Hydraulics
– Symbolic Representation
– Pumps and Motors
– Directional Valves
– Pressure Valves
– Single Drum Brake Schematics
– Double Drum Brake Schematics
– Escort Braking System
– Type of braking configurations
– Mechanical equipment

Course type and methods
This is an instructor led class room course on a winder site, with visit to a winder installation as required.

Course duration
The duration of this course is 2 days.

Application-Specific Series
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The goal of this course is to teach the delegates the principles and operating technique required for braking a mine-winder in a safe manner.

Learning objectives

Upon completion of this course, students will be able to:

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– Pumps and Motors
– Directional Valves
– Pressure Valves
– Single Drum Brake Schematics
– Double Drum Brake Schematics
– Escort Braking System
– Type of braking configurations
– Mechanical equipment

Course type and methods

This is an instructor led class room course on a winder site, with visit to a winder installation as required.

Course duration

The duration of this course is 2 days.

Application-Specific Series
Pump Maintenance (PUMP)

Course goal
This 2-day course focuses primarily on centrifugal pumps, although other types of pumps are also discussed.

Learning objectives
Upon completion of this course, students will be able to:

– Understand increased pump availability
– Discuss the reduction in pump maintenance costs
– Understand the benefits of higher return on pump investments
– Discuss the benefits of fewer unexpected production losses

Participant profile
The student will be anyone in the maintenance field, but focusing on Rotating Equipment Specialists, Reliability Improvement Engineers, Maintenance Supervisors, Pump Technicians, Maintenance Engineers, Maintenance Planners, Reliability Engineers, Production Engineers, Process Engineers, Section Engineers, System Engineers, Technical Engineers, Head Diagnostics, Mechanical Engineers, Electrical Engineers, Mechanical

Topics
– Centrifugal slurry pump fundamentals
– Pump specification and selection
– Design and installation flaws affecting pump maintenance
– Best pump maintenance practices
– Operator errors resulting in unnecessary maintenance
– Condition monitoring of pumps
– Case studies

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of this course is 2 days.

Application-Specific Series
Motor Maintenance (MOTOR)

Course goal
This 2-day course focuses primarily on centrifugal pumps, although other types of pumps are also discussed.

Learning objectives
Upon completion of this course, students will be able to:

– Understand increased pump availability
– Discuss the reduction in pump maintenance costs
– Understand the benefits of higher return on pump investments
– Discuss the benefits of fewer unexpected production losses

Participant profile
The student will be anyone in the maintenance field, but focusing on Rotating Equipment Specialists, Reliability Improvement Engineers, Maintenance Supervisors, Pump Technicians, Maintenance Engineers, Maintenance Planners, Reliability Engineers, Production Engineers, Process Engineers, Section Engineers, System Engineers, Technical Engineers, Head Diagnostics, Mechanical Engineers, Electrical Engineers, Mechanical

Topics
– Centrifugal slurry pump fundamentals
– Pump specification and selection
– Design and installation flaws affecting pump maintenance
– Best pump maintenance practices
– Operator errors resulting in unnecessary maintenance
– Condition monitoring of pumps
– Case studies

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of this course is 2 days.

Application-Specific Series
Transformer Operation & Maintenance
(TOM)

Course goal

Provide a basic level of understanding of a transformer, its components, design, manufacture, operation, maintenance, monitoring and life management to a student profile with some knowledge of electrical systems.

Learning objectives

Upon completion of this course, students will be able to:

– Understand different types of transformers, materials and their application
– Understand the design, manufacture and testing of transformers
– Understand the life management of transformers in service, including the use of diagnostic tools.

Participant profile

Electricians, technicians and engineers who install, operate, maintain and service transformers.

Prerequisites

Students should have basic knowledge of electrical systems.

Topics
– Transformers in the system
– Mechanical requirements
– Transformers: basic theory
– Magnetic cores
– Transformer materials
– Efficiency and regulation
– Design
– Maintenance
– Fittings and components
– Reactors
– Rectifier transformers
– Testing
– Faults

Course type and methods

This is an instructor led class room course, but will include a visit to the service bay in the ABB factory.

Course duration

The duration of this course is 3 days.

Application-Specific Series
Oil Sampling Level 1 (OS1)

Course goal
Provide a basic level of understanding of how to take an oil sample from a transformer's bottom main tank and buchholz relay for routine analysis.

Learning objectives
Upon completion of this course, students will be able to:

– Understand different methods of sampling for routine analysis
– Understand the labeling and packing of oil samples
– Discuss sample management
– Understand the handling of PCB contaminated items

Participant profile
Electricians, technicians and engineers, who install, operate, maintain and service transformers.

Prerequisites
Basic knowledge of on site safety & HV regulations
Grade 12 or N3
Practical knowledge of transformers preferable
Basic knowledge of electrical systems

Topics
– Tin & Syringe Sampling
– Labeling & packaging
– Sample Management
– Handling of contaminated items
– Safety and the general environment

Course type and methods
This is an instructor led class room course. Various demonstrations included, as well as working with oil samples. Each delegate will be assessed at the end of the learning programme.

Course duration
The duration of this learning programme is 1.5 days.

Application-Specific Series
Oil Sampling Level 2 (OS2)

Course goal
Provide more than just a basic level of understanding of how to take an oil sample; a host of other techniques will be explored. This course is more advanced than the level 1
course.

Learning objectives
Upon completion of this course, students will be able to:

– Understand different methods of sampling from different sampling points such as: selector, diverters, conservator, drums, tankers, ISO tanks, online monitors and portable analysers
– Understand the sampling for specific analysis
– Understand the packaging and handling of sample containers, packaging and spill risks.
– Understand the labelling and transporting of oil samples
– Understand the process of sample management

Participant profile
Electricians, technicians and engineers, who install, operate, maintain and service transformers.

Prerequisites
A valid level 1 sampling course certificate
Basic knowledge of on site safety & HV regulations
Grade 12 or N3
Practical knowledge of transformers preferable
Basic knowledge of electrical systems

Topics
– Tin & Syringe Sampling
– Labeling & packaging
– Sample Management
– Handling of contaminated items
– Safety and the general environment

Course type and methods
This is an instructor led class room course. Various demonstrations included, as well as working with oil samples. Each delegate will be assessed at the end of the learning
programme.

Course duration
The duration of this learning programme is 1.5 days.

Application-Specific Series
Transformers
Insulating Oil Management IOM

Course goal
Provide complete training for the management of transformers in service and the transformer life blood – the oil.

Learning objectives
Upon completion of this course, students will be able to:

– Understand the importance of oil in transformers
– Basic operation of a transformer
– Types of oil used in transformers
– Oil specifications
– Characteristics of transformer fault gases found in oil
– Understanding techniques used in the interpretation of oil sample analysis results
– Identify individual gases and their importance
– Diagnostic tools and ratios used in oil analysis
– Working with oil sample results (practical)

Participant profile
Electricians, technicians and engineers, who install, operate, maintain and service transformers, condition monitoring personnel and maintenance managers.

Prerequisites
Post matriculation technical electrical qualification
Understanding of the operation and construction of a transformer
Operational knowledge of MS Excel
Own laptop computer – MS Excel installed

Course type and methods
This is an instructor led class room course. Various demonstrations included, as well as working with oil samples. Each delegate will be assessed at the end of the learning
program.

Course duration
The duration of this learning program is 4 days.

Day 1	Day 2	Day 3	Day 4
– Insulating fluids	– Benefits of oil sampling	– Trending of data	– Life extension management
– Specifications	– Routine tests	– Production rates	– Protecting the paper
– Researching the market	– Long term plant health	– Sample automation	– Oxidation and sludge management
– Using the right oil for the task	– Other tests and tools	– Artificial intelligence	– Degree of polymerization
– Oil classes	– Analysis on oil	– Oil quality and storage	– Polychlorinated biphenyls
– Transformer design and materials	– Gas in oil interpretation	– Quality assurance testing	– Safe handling and management
– Dual operational transformer triangles	– Breakdown of oil molecules	– Moisture management	– Removal of PCB's
– Life expectancy	– Gases produced from oil	– Moisture – oil characteristics	– Summary
– Oil sampling process	– Temperature and gases	– Moisture calculations	– Assessment
– Working out sample frequency	– Transformer design considerations	– Moisture assessments	
– Transformer Risk Assessment	– Calculations and ratios	– Moisture in insulating materials	
– Taking a sample		– Moisture removal	
– Sample containers			
– Sample labeling			
– Sample management			
– Laboratory processes			

Engineering Series
Vibration Analysis for Engineers (VIB ENG)

CPD Points
This course was awarded 4 CPD points.

Course goal
This 4-day course has been designed by engineers for engineers. It aims to give these professionals a firm understanding of the concepts and theory of vibration analysis. It teaches how to diagnose virtually every type of machine used in general industry. The course delivers three courses (Vibration Analysis Level I, II & III) at a pace that engineers are accustomed to.

Learning objectives
Upon completion of this course, students will be able to:

– Identify the techniques of vibration analysis
– Discuss the analysis of vibration analysis
– Understand the application of vibration analysis
– Understand the influence of vibration analysis in decision making processes about plant availability and maintenance costs

Participant profile
The student will be anyone in the maintenance field, but focusing on Maintenance Engineers, Reliability Engineers, Production Engineers, Process Engineers, Section Engineers, System Engineers, Technical Engineers, Head Diagnostics, Mechanical Engineers, Electrical Engineers, Mechanical Engineers, Electrical Engineers, Industrial Engineers, and Maintenance Managers

Topics
– Presentation of 6 Bearing Failure Scenarios
– Displacement, Velocity & Acceleration
– When Should Bearings be Replaced
– Selecting Frequency Span & Resolution
– Lines
– Plain Bearing Problems
– Phase Measurement & Analysis
– Rotor Rub, Partial Rub & Full Annular Rub
– Transducers & Vibration Instrumentation
– Flow-Induced Vibration Problems
– Spike Energy, Shock Pulse & HFD
– Gear Problems: Gear Tooth Wear & Loading
– Gear Eccentricity and/or Backlash
– Gear Tooth Misalignment
– RMS vs Peak vs Peak-to-Peak
– Measurements
– Spectral Band Alarm Levels & Frequencies
– Common Pitfalls In Vibration Measurements
– Measurement Locations & Point Identification
– Implementing An Effective Programme
– Fractional Gear Mesh Frequencies
– Natural Frequency, Resonance and Critical
– Speed
– Polar & Bode Plot Acquisition & Interpretation
– Electrical Problems With Induction Motors
– Mass Unbalance
– Narrowband Envelope Alarms
– Eccentric Rotors
– High Frequency Demodulated & Enveloped
– Spectra
– Bent Shafts
– Vibration Isolation Mechanisms
– Misalignment
– Vibration Damping Treatments
– Mechanical Looseness (3 Types)
– Motor Current Spectral Analysis
– Belt-Drive Problems Motor Current vs
– Vibration
– Spectral Analysis
– Beat Vibration Problems, Problems With DC
– Motors and Their Controls

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 4 days.

Engineering Series
Roller Element Bearing Maintenance
(ROLLER)

Course goal

This course has been specifically designed for engineers and plant managers. It aims to give these professionals a game plan to implement throughout their plants. It delivers the skills and necessary information to implement an effective programme to reduce failures and increase bearing life.

Learning objectives

Upon completion of this course, students will be able to:

– Understand the importance and best practices of bearing maintenance
– Identify condition monitoring technologies
– Understand Root Cause Failure analysis and prevention

Participant profile

The student will be anyone in the maintenance field, but focusing on Maintenance Engineers, Maintenance Planners, Reliability Engineers, Production Engineers, Process Engineers, Section Engineers, System Engineers, Technical Engineers, Head Diagnostics, Mechanical Engineers, Electrical Engineers, Mechanical Engineers, Electrical Engineers, Industrial Engineers, Maintenance Managers, Maintenance Superintendents, Mine Managers, Plant Managers, Asset Managers, Mechanical Superintendents

Topics

– Poor lubrication
– Fatigue
– Poor fitting
– Contamination
– Case Study:
– The course is presented in a manner designed to facilitate practical implementation of the key elements delivered in the course

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 2 days.

Engineering Series
Project Management (PROJ)

Course goal

Although relevant, traditional project management needs to be adapted and broadened to address the unique requirements of business projects in trying times.

This intensive 3-day course addresses the concepts and issues of managing projects under trying and challenging circumstances.

This course will assist all course participants in making the shift from a strong but narrow technical project management practice to a broader, more business-oriented approach which can be applied to guide projects through the current challenges and create disciplines for increasing future project success.

Learning objectives

Upon completion of this course, students will be able to:

– Understand the essentials of managing a project from beginning to end
– Discuss the concept: planning
– Discuss the concept: organising
– Discuss the concept: directing
– Discuss the concept: leading
– Discuss the concept: controlling project teams
– Identify and manage stakeholders and stakeholder relations

Participant profile

The student will be anyone in the project management field, but focusing on Engineers in a Project Management

Topics

– Presentations
– Syndicate work
– Computer simulation
– Case studies
– Efficient and effective project delivery

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 3 days.

Engineering Series
Contract Management (CTRACT)

Course goal

The aim of this 2-day course is to obtain the services as agreed in the contract and achieve value for money.

This course will assist all course participants in making the shift to a business-oriented approach.

Learning objectives

Upon completion of this course, students will be able to:

– Understand efficiency optimisation
– Discuss the concept: effectiveness
– Identify risk elements
– Discuss the customer-supplier relationship
– Understand the value of continuous improvement through the lifecycle of a contract
– Identify and manage stakeholders and stakeholder relations

Participant profile

The student will be anyone in the contact management field, but focusing on engineers in a Contract Management

Topics

– Sourcing
– Financial models
– Getting the contract right
– Service delivery management
– Relationship management
– Continuous improvement

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 2 days.

Engineering Series
Time Management (TIME)

Course goal
This valuable training course is designed to provide delegates with the skills required to analyse their use of time and to give practical tools to improve self-management.

Learning objectives
Upon completion of this course, students will be able to:

– Discuss the different brain styles
– Identify issues that steals time
– Discuss the importance of prioritisation
– Identify planning tools
– Understand delegation
– Understand goal setting tools
– Develop a personal action plan

Participant profile
The student will be anyone that wants to gain the skills to analyse their use time and wanting practical tools to improve their own self-management.

Topics
– Discuss left brain/right brain processes
– Planning tools
– Goal setting
    – assertiveness
    – delegation
– Getting organised
– Personal Action Plan
– Case Study:
    – Learners will apply the time management techniques to a case study called: Another day at the office.

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 2 days.

Additional Training Series
Introduction to Power System Protection
(IPSP)

Course goal

This course empowers electrical field staff by exploring the hardware composition, the applied laws as well as the designs and individual component terminology. This will be applied to protection functions in general.

The electrical power system faces several complex challenges to meet the extreme consumer demands in a developing country. Not only is the network under pressure, more output is expected of the electrical field staff. Rapid developments of applied processor technology in the power system network add to this burden.

Learning objectives

Upon completion of this course, students will be able to:

– Understand the hardware composition
– Discuss and apply theorems and laws
– Learn about the profile of an electrical power system
– Explore possible symmetrical and asymmetrical faults
– Learn about earthing systems

Participant profile

Electricians, technicians and engineers who install, operate, maintain and work in substations.

Prerequisites

This course is a pre-requisite for the advanced protection course where individual protection functions and the ABB application will be discussed.

Topics

– Personal safety
– Circuit terminology, theorems and laws
– Basic ac circuit theory
– Profile of an electrical power system
– Primary components of a power system
– Power architecture
– Symmetrical and asymmetrical faults
– Protection
  – Substations
  – Power and instrument transformers
  – Motors
  – Generators
– Earthing systems
– Tripping and closing of circuit breakers

Course type and methods

This is an instructor led class room course.

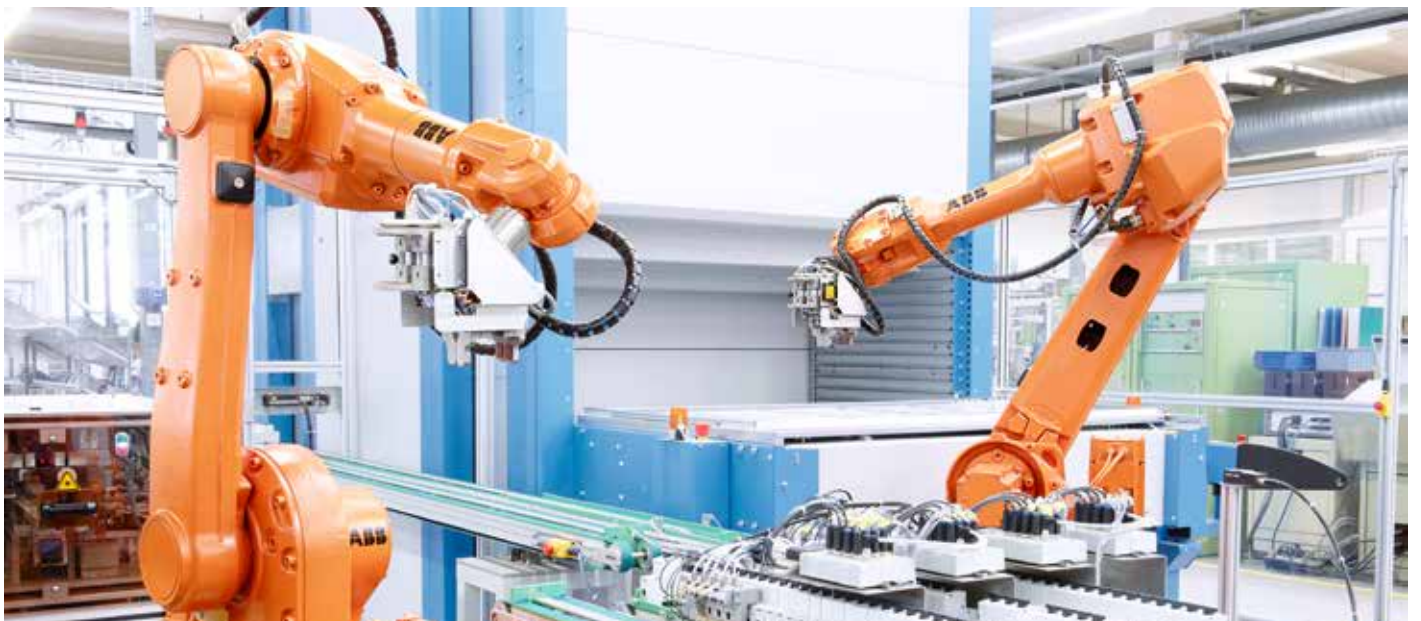### Course duration

The duration of this course is 5 days.

ABB University - Automation
System 800xA Administration & Installation (T305)

Course goal
The goal of this course is to learn how to install and administer an Extended Automation System 800xA. It covers the Core System, but not the additional options such as Batch etc.

Learning objectives
Upon completion of this course, students will be able to:

- Describe the Aspect Integrator Framework
- Plan a complete system architecture and state the system limits
- Describe remote access to an System 800xA
- Design and setup a redundant automation network
- Setup audit trail functionality
- Configure and maintain redundant servers
- Configure access rights on Windows and 800xA level with user accounts, group policies, roles and permissions
- Set up clock synchronization to AC 800M
- Configure SMS and e-mail notification
- Configure IT assets
- System backup / restore
- Set up a distributed engineering environment
- Configure Windows domains / workgroups
- Install and license the System 800xA software

Participant profile
This training is targeted at system engineers, administrators system integrators.

Prerequisites
Students should have attended either the Basic Configuration course T314 or the Engineering course T315 or have knowledge and experience associated with the content of these courses. In addition, they should have attended the courses MS2151 / MS2152 or have equivalent experience.

Topics
- Aspect Intergrator Framework
- System Planning
- Security
- Network setup
- Redundancy
- Audit trail
- Clock synchronization
- Remote access
- IT assets
- Backup / restore
- Distributed engineering
- Domain / workgroups
- Software Installation

Course type and methods
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 5 days.

ABB University - Automation
System 800xA Basic Configuration (T314)

Course goal

The goal of this course is to learn the basic configuration of the Extended Automation System 800xA.

Learning objectives

Upon completion of this course, students will be able to:

– Explain the System 800xA architecture and the function of the different components
– Modify existing application programs by using Function Block Diagrams, Sequential Function Charts, Structured Text and Control Modules
– Navigate in the system and create new objects / aspects
– Describe the structure of application programs i.e. variables, libraries, programs, tasks
– Troubleshoot the OPC connectivity to AC800M
– Configure the AC 800M hardware and corresponding I/O's
– Load the controller and work in online mode
– Modify graphic displays
– Manage and configure alarm and events
– Monitor trends and configure historical data collection
– Describe the use of Function Designer
– Import / Export System 800xA data

Participant profile

This training is targeted to System 800xA users who need to learn the fundamentals in order to form a foundation for maintenance and administration skills. If more comprehensive engineering skills are needed, it is recommended to consider T315 instead.

Prerequisites

Students shall know the fundamentals of working with Control Systems and have basic knowledge of Windows 2000.

Topics

– System 800xA architecture
– Engineering Workplace
– Application structures
– AC 800M Hardware
– POC connectivity
– Applications with FBD and ST
– Control Modules
– Sequential Function Chart (SFC)
– Alarm and Events
– Historian and Trends
– Graphic Displays
– Operator Workplace
– Function Designer
– Import / Export

Course type and methods

This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration

The duration of the course is 5 days.

ABB University - Automation
System 800xA with AC 800M
Engineering, Part 1 – Control Builder (T315C)

Course goal
The goal of this course is to learn the engineering of a complete control project using the Extended Automation System 800xA with AC 800M controllers and Control Builder as the engineering tool. Note that this course is split in two parts and the follow-up course is T315H for the Human System Interface (HIS) configuration.

Learning objectives
Upon completion of this course, students will be able to:
– Explain the System 800xA architecture and the function of the different components
– Navigate in the system and create new objects / aspects
– Create a new control project and plan the structure of application programs based on a P&ID and a Functional Specification
– Configure the AC 800M hardware and corresponding I/O's
– Handle the standard libraries provided by ABB and develop project specific libraries

– Design and configure application programs by using a variety of IEC 61131-3 languages
– Define tasks and describe the assignment rules
– Analyze the controller diagnostics and optimize the CPU load / memory usage
– Configure user defined object types
– Setup communication using various protocols
– Setup the OPC connectivity to AC800M

Participant profile
This training is targeted to system and application engineers, commissioning and maintenance personnel, service engineers and system integrators.

Prerequisites
Students shall know the fundamentals of working with Control Systems and have basic knowledge of Windows XP and networking technologies.

Topics
– System 800xA architecture
– EngineeringWorkplace / Plant Explorer
– Project and application structures

– AC 800M hardware
– Project backup
– Libraries
– Variables and data types
– Function Block Diagram

– Structured Text
– Task assignment and memory
– Control Modules
– User defined object types

– Sequential Function Charts (SFC)
– Communication
– OPC connectivity

Course type and methods
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 5 days.

Course Outline

Day 1	Day 2	Day 3	Day 4	Day 5
– System 800xA architecture	– AC 800M hardware	– Structured Text	– User defined object types	– Communication
– Engineering Workplace / Plant Explorer	– Project backup	– Task assignment and memory	– Sequential Function Charts (SFC)	– OPC connectivtiy
– Project and application structures	– Libraries	– Control Modules		
– AC 800M hardware	– Variables and data types			
	– Function Block Diagram			
	– Structured Text			

ABB University - Automation
System 800xA with AC 800M
Engineering, Part 2 – Human System Interface (T315H)

Course goal
The goal of this course is to learn the engineering of a complete control project using the Extended Automation System 800xA with AC 800M controllers and Control Builder as the engineering tool. Note that this course is split in two parts and the pre-course is
T315F or T315C for the controller configuration.

Learning objectives
Upon completion of this course, students will be able to:
– Build up a plant model in the Functional and Location Structure
– Configure process graphic displays and define navigation links
– Modify faceplates and create graphic elements
– Manage and configure alarm and events
– Configure external alarms and alarm printers
– Set up the historical data collection and configure trend displays

– Create and customize OperatorWorkplaces
– Configure user accounts and describe how access rights work
– Backup and restore System 800xA datan Use the import / export tool
– Create simple reports using MS Excel Data Access
– Use bulk data handling with templates
– Describe the NLS principles

Participant profile
This training is targeted to system and application engineers, commissioning and maintenance personnel, service engineers and system integrators.

Prerequisites
Students should have attended either the course T315C "Engineering with Control Builder" or the course T315F "Engineering with Function Designer" or have knowledge and experience associated with the content of these courses.

Topics
– Plant modelling
– Graphic displays
– Graphic elements
– Faceplates
– Alarm and events

– Historical data collection
– Trend displays
– OperatorWorkplace
– User security
– Backup and restore

– Import and export
– Simple reports
– Document manager
– National Language Support (NLS)

– Bulk data handling

Course type and methods
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 5 days.

Course outline

Day 1	Day 2	Day 3	Day 4	Day 5
– Plant modelling	– Faceplates	– Historical data collection	– Operator Workplace	– Simple reports
– Graphic displays	– Alarm and events	– Trend displays	– User security	– Document manager
– Graphic elements		– Workshop "Engineering"	– Backup and restore	– National Language Support (NLS)
			– Import and export	– Bulk data handling

ABB University - Automation
800xA Operations for Harmon (T308)

Course goal
The goal of this course is to teach students how to configure and operate Process Portal with the Harmony Connect add-on.

Learning objectives
Upon completion of this course, students will be able to:
- Build up a plant model in the Functional and Location Structure
- Configure process graphic displays and define navigation links
- Modify faceplates and create graphic elements
- Manage and configure alarm and events
- Configure external alarms and alarm printers
- Set up the historical data collection and configure trend displays
- Create and customize OperatorWorkplaces
- Configure user accounts and describe how access rights work
- Backup and restore System 800xA datan Use the import / export tool
- Create simple reports using MS Excel Data Access
- Use bulk data handling with templates
- Describe the NLS principles

Student profile
This training is targeted to system, process, and application engineers, and instrumentation, electrical, and service engineers.

Prerequisites
Students should have a basic knowledge of Windows 2000 and a basic understanding of how processes are controlled. They should also have knowledge and skills relating to course M201 DCS Harmony Control Unit Configuration.

Topics
- Explain the main principles of interaction between Harmony Control Units and Process Portal
- Configure system applications using available tools
- Operate Process Portal
- Use Plant Explorer to navigate between structures, create new structures, set privileges, search/create/maintain Aspect Objects, view/create/maintain aspects, configure aspect views and object types, etc.
- Create and customize a workplace for process operators
- Create a new Plant Workspace object
- Integrate different software tools using Web Page aspects, ActiveX wrapper aspects, and Windows Application Aspects
- Create, edit, modify, save and deploy graphic displays, elements, and faceplates
- Manage and configure Alarms and Events
- Use trend display tools
- Create and configure Log Configuration Aspects, Trend Template Aspects, and Trend Display Aspects
- Install, supervise, and back-up and restore the system
- Implement Security Functionality

Main topics
- System Presentation
- Workplace and Plant Explorer
- Graphics
- Alarm and Event
- Trends and Historian
- System Administration
- Security

Course duration
The duration of the course is 5 days.

ABB University - Automation
System 800xA Troubleshooting & Maintenance (T302)

Course goal
The goal of this course is to provide students with
knowledge to troubleshoot, maintain, and extend functionality in applications for the platform AC800M controllers and Process Portal.

Learning objectives
Upon completion of this course, students will be able to:

– Troubleshoot and diagnose:
  – Locally connected I/O
  – Communication Interfaces
  – Processor Modules
– Add application functionality in Control Builder and Process Portal
– Trace signals in a Control Builder project and follow signal from I/O to a Process Graphic display
– Understand OPC communications
– Understand and troubleshoot security problems
– Execute Backup/Restore
– Usage of diagnostic possibilities in Windows

Participant profile
The training is targeted to maintenance personnel and service engineers who maintain and troubleshoot 800xA systems.

Prerequisites
Students should have a basic knowledge of Windows OS, basic AC800M programming, and a general understanding of Process Portal.

Topics
– Hardware Description of AC800M and I/O
– Extend an Application
– Signal Tracing from I/O to Graphics
– Hardware Diagnostics
– Communication between Controllers
– Profibus Diagnostics
– Redundant Controller
– OPC Communication

– System Status
– Security and Users
– Navigation in Process Portal
– Process Graphic Diagnostics
– Import/Export and Backup/Restore
– Window Diagnostic
– Log Files

Course type and methods
This is an instructor led course. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 5 days.

ABB University - Automation
System 800xA for Advant Master
Configuration (T320)

Course goal
The goal of this course is to learn the installation, configuration and maintenance of the Extended Automation System 800xA for Advant Master AC400 and AC100.

Learning objectives
Upon completion of this course, students will be able to:

– Plan an appropriate architecture for a system 800xA with Advant Master
– Install the AC400 Connect software (AC100 Connect optional)
– Navigate in the system and create new objects / aspects
– Configure and maintain the communication between 800xA and Advant controllers
– Configure and modify graphic displays, faceplates and graphic elements
– Manage and configure alarm and events
– Configure historical data collection and trends
– Configure time synchronization
– Create and customize a workplace
– Configure user accounts and describe how access rights work
– Save and restore data

Participant profile
This training is targeted to system and application engineers, commissioning and maintenance personnel, service engineers and system integrators.

Prerequisites
Students should have attended the AC400 configuration course A331 (course A400 for AC100) or have knowledge and experience associated with the content of the courses.

Topics
– System 800xA architecture for Advant Master
– AC400Connect installation
– Plant Explorer introduction
– Controller communication and Database integration
– Graphic Displays
– Faceplates
– Alarm and Events
– Historical data collection
– Trends
– Time synchronization
– Workplace configuration
– Security
– Backup and restore

Course type and methods
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 5 days.

ABB University - Automation
Control Builder Professional Configuration (T530)

Course goal
The course goal is to teach the students how to use the Control Builder Professional engineering tool.

Learning objectives
Upon completion of this course, students will be able to:

– Use the Control Builder Professional to configure a project with one or several applications running in the AC800M and Soft-Controller

Participant profile
Programmers who should write programs for AC 800M/C, Soft Controller and AC 250.

Prerequisites
Students should have basic knowledge of controller configuration or programming, and Windows NT/ Windows 2000 is required to enrol on this course.

Topics
– The IEC 61131-3 concept and ABB extensions
– Variables and data types
– IEC Programming languages:
– Tasks and Function Blocks
– Downloading of the project
– Hardware configuration and I/O connections
– Control Modules
– Communication
– Backup/Restore.

Course type and methods
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 5 days.

ABB University - Automation
Freelance System Engineering (T568)

Course goal
The goal of this course is to engineer a Freelance 800F system and to become familiar with configuration and commissioning tasks.

Learning objectives
Upon completion of this course, students will be able to:

– Describe the network structure in the Freelance 800F architecture
– Describe the functionality of the major system components
– Describe the structure of application programs i.e. variables, programs, tasks
– Configure and maintain objects in Control Builder F
– Configure the AC 800F controller and establish fieldbus connectivity to corresponding Remote I/O's
– Create and maintain standard and user specific function blocks
– Load the controller and work in online mode
– Create and modify standard displays
– Manage and configure alarm and events
– Create and maintain logs and system documentation
– Setup trends and configure historical data collection
– Interchange Freelance 800F data with other Freelance 800F systems

Participant profile
This training is targeted to Freelance 800F users and system integrators who need to get a comprehensive overview about the Freelance 800F system capabilities.

Prerequisites
Students shall know the fundamentals of working with Distributed Control Systems and have basic knowledge of IEC 61131-3 programming and of working with Microsoft Windows XP.

Topics
– Freelance 800F architecture
– Control Builder F
– Application structures
– AC 800F Hardware
– OPC connectivity
– Applications with FBD and ST
– User Function Blocks
– Alarm and Events
– Historian and Trends
– Graphic Displays
– Import / export

Course type and methods
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 5 days.

ABB University - Automation
System 800xA Operation (T310)

Course goal
The goal of this course is to learn how to operate and navigate in the Industrial IT Extended Automation System 800xA.

Learning objectives
Upon completion of this course, students will be able to:

– Explain the System 800xA architecture and the function of the different components
– Navigate in a standard Operator Workplace by using Aspect Objects technology
– Read and interpret information from different process displays
– Create operator notes
– Monitor and control standard process objects such as motors, valves and PID loops through faceplates
– Interpret information on interlocks
– Handle alarm and event lists
– Acknowledge alarms
– Describe the principles of historical data logging
– Operate trend displays and interpret the information
– Monitor and control sequences based on Sequence Function Charts
– View and print reports
– Log in as different users
– Use some basic system monitoring tools

Participant profile
This training is targeted to operators.

Prerequisites
Students shall know the fundamentals of working with Control Systems and have basic knowledge of Windows XP and networking technologies.

Topics
– Course introduction
– Introduction to System 800xA
– Operator Workplace
– Navigation
– Process control
– Basic control objects
– Alarm and events
– Trending
– System monitoring

Course type and methods
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Course duration
The duration of the course is 2 days.

Course overview

Day 1	Day 2
– Course overview	– Basic control objects
– Introduction to System 800xA	– Alarm and events
– Operator Workplace	– Trending
– Navigation	– System monitoring
– Process control	

ABB University - Automation
Industrialᴵᵀ 800xA Applications for Minerals Configuration and Operation (T651)

Course goal

The goal of this course is to learn the operation and config-uration of the IndustrialIT Extended Automation System 800xA with AC 800M controllers and the Control Builder M tool utilizing the Minerals Library.

Learning objectives

Upon completion of this course, students will be able to:

– Explain the System 800xA architecture and the function of the different components
– Navigate in the system and create new objects and aspects using Plant Explorer
– Create a new control project using Plant Explorer and Control Builder M
– Configure the AC 800M hardware and corresponding I/Os
– Use the standard libraries and the Minerals Library as well as create project specific libraries
– Design and configure application programs using a variety of IEC 61131-3 languages
– Perform advanced configuration with control modules and structured data types applying the Minerals Library
– Setup the OPC connectivity to AC800M
– Customize and use the operator's workplace and its functions and operate the Minerals Library objects
– Configure process graphic displays and define naviga-tion links
– Manage and configure events and alarms
– Set up the historical data collection and configure trend displays
– Use the import/export tool
– Backup and restore the System 800xA

Participant profile

This training is targeted to engineering, planning, advanced operating, commissioning, maintenance and service per-sonnel working in the field of minerals applications.

Prerequisites

Participants should know the fundamentals of working with control systems and have basic knowledge of the Windows XP operating system and of technical English.

Topics

– System 800xA architecture
– Plant Explorer, engineering workplace and Control Builder M
– Application and system structures
– Controller AC800M hardware configuration
– Overview of standard libraries
– Variables and data types
– Function block diagram (FBD) and structured text (ST) programming
– Control modules
– Monitoring and testing applications
– Minerals Library and minerals applications
– Task assignment and memory
– OPC communication
– Operator workplace
– Process graphics
– Events and alarms
– Historical data collection and trend displays
– Import/export tool
– Backup and restore of the System 800xA
– Workshop engineering

Course type and methods

This is an instructor led course with lectures, demonstra-tions, interactive discussions and practical exercises. At the end of the course a workshop is done. This workshop co-vers a larger exercise and is used to consolidate the most important items from the training which the students will need for their future work.

Course duration

The duration of the course is 10 days.

Course outline

Day 1	Day 2	Day 3	Day 4	Day 5
– Welcome, personnel introduction	– Daily review session	– Daily review session	– Daily review session	– Daily review session
– Course overview	– AC800M hardware (continues)	– Structured data type handling	– Programming and configu-ration with control modules	– Task assignment and memory handling
– System 800xA architec-ture	– Configuration and test with Control Builder M	– Programming with function block diagram language	– Comparison with function blocks	– Minerals (BMI) Library
– Plant Explorer / engineer-ing workplace	– Standard libraries, overview and handling	– Programming in structured text language	– Creation of application with control modules	– Overview of the different object categories and object types
– Project framework	– Variables and data types			– Variable and application structure
– Plant Explorer				– Design rules
– Control Builder M				
– AC800M hardware				
– Overview				
– Configuration and test with Control Builder M				

Day 6	Day 7	Day 8	Day 9	Day 10
– Review of the first week	– Daily review session	– Daily review session	– Daily review session	– Daily review session
– Minerals (BMI) Library	– Operation (continues)	– Process graphics (continues)	– Workshop	– Overview of System 800xA configuration
– Add I/O-signals	– Object handling	– Use of Expression Builder	– Insert a motor in an existing group	– Configuration steps
– Insert a motor in an existing group utilizing variables, control modules, IO-signals and defining interlocks	– Alarm and event han-dling	– Configuration of display navigation	– Add the corresponding I/O-signals	– Configuration wizard
– OPC connectivity	– Trend handling	– Configuration of alarms and events	– Configure needed interlocks	– Create system
– Operation	– Process graphics	– Historical data collection and trend displays	– Adapt the graphic display	– Delete system
– Minerals workplace lay-out	– Creation of graphic displays	– Log configuration	– Create a trend display	– Connect nodes
– Process graphics	– Configuration of graphic elements	– Creation of trend displays	– Test the implementation	– Use of backup and re-store functions (continues)
– Display navigation			– Use of import/export tool	– Restore of System 800xA
– Overview of the graphic elements and faceplates			– Use of backup and re-store functions	– Questions and answers
			– Backup of System 800xA	– Summary
				– Evaluation
				– Course close

ABB University - Automation
Profibus Installer with Troubleshooting (IP310)

Course goal
The PROFIBUS Installer with Troubleshooting Course covers the basics of PROFIBUS DP and PA installation and operational requirements. It also focuses on DP and the various diagnostic-troubleshooting tools and strategies.

Course outline
The goal of the course is to convert theory into practice and give attendees the confidence to quickly diagnose network problems.

Learning objectives
Upon completion of this course, students will be able to:

– Quickly locate the fault
– Ascertain the fault severity and correct it

Participant profile
This training is targeted at those personnel that are charged with keeping networks running.

Prerequisites
Recommend that all candidates:
– Have a good command of the English language.
– Are familiar with the basics of electricity and electrical circuits.
– Have been exposed to the basics of digital communications and what it entails.
– Be able to quickly understand and interpret technical ideas and systems.
– Instrumentation background

Topics
– Standard Installers course
– Basics of PROFIBUS DP and PA installation.
– Operational requirements
– Potential PROFIBUS problems
– DP and the various diagnostic-troubleshooting tools.
– Strategies to go about troubleshooting.

Course type and methods
This is an instructor led seminar. Attendees will undertake two extended practical sessions. The language of the course is English. Delegates will write the Certified Installer's examination on completion of the course.

Course duration
The duration of the course is 2 days.

Cost for 2013
R6 600.00 (excl VAT)

Dates for 2013
10-11 September 2013
8-9 October 2013
22-23 October 2013
12-13 November 2013
3-4 December 2013

Training delivery
At ABB Campus, but on-site, in-situ training can be arranged to take place at the client's premises, country-wide.

ABB University - Automation
Profibus certified engineers (IP320)

Course goal
The goal is to produce fully competent engineering personnel.

Course outline
The PROFIBUS International Certified Engineers Course uses international training material to provide an internationally recognized certification. The course gives an in-depth view of PROFIBUS network operation and characteristics, covering the theory, practice and common pitfalls of PROFIBUS DP and PA network installation.The learner is taken through the basics of designing and wiring an active network, in-depth analysis of the protocol, using diagnostic tools to detect and fix bus faults and packet analyzers to identify more complex configuration errors. The many ways to tailor a PROFIBUS network and device configuration using GSD & EDD files as well as DTM/FDT under various master configurations are examined.

Learning objectives
Upon completion of this course, students will be able to:

– Gain an in-depth understanding of the technology.
– Implement and maintain well-structured and reliable PROFIBUS networks.
– Troubleshoot technical difficulties that might accompany a PROFIBUS installation.

Prerequisites
Recommend that all candidates:
– Attended the Certified Installer's course in the day preceding the Engineer's course, or Certified Installer certification.
– Have experience with Process Automation and especially Digital Communication systems.
– Hold a tertiary level qualification.

Topics
– Basics of designing and wiring an active network.
– In-depth analysis of the protocol.
– Diagnostic tools to detect and fix bus faults and packet analysers to identify more complex configuration errors.
– Ways to tailor a PROFIBUS network and device configuration using GSD & EDD files as well as DTM/FDT under various master configurations.
– PROFIBUS PA and its associated components are lightly introduced.
– In-depth view of PROFIBUS network operation and characteristics.
– Theory, practice and common pitfalls of PROFIBUS DP and PA network installation.

Course type and methods
This is an instructor led seminar with practical exercises, writing both a practical and open-book, multiple-choice theory test. The language of the course is English.

Course duration
The duration of the course is 3.5 days.

Cost for 2013
R18 150.00 (excl.VAT)

Dates for 2013
27-30 August 2013   26-29 November 2013
17-20 September 2013   10-13 December 2013
29 Oct – 1 November 2013

Training delivery
At ABB Campus, but on-site training can be arranged to take place at the client's premises, country-wide.

ABB University - Automation
Profibus certified engineers with installer (IP321)

Course goal
The goal is to produce fully competent engineering personnel.

Course outline
The PROFIBUS International Certified Engineers Course uses international training material to provide an internationally recognized certification. The course gives an in-depth view of PROFIBUS network operation and characteristics, covering the theory, practice and common pitfalls of PROFIBUS DP and PA network installation. The learner is taken through the basics of designing and wiring an active network, in-depth analysis of the protocol, using diagnostic tools to detect and fix bus faults and packet analyzers to identify more complex configuration errors. The many ways to tailor a PROFIBUS network and device configuration using GSD & EDD files as well as DTM/FDT under various master configurations are examined.

Learning objectives
Upon completion of this course, students will be able to:

– Gain an in-depth understanding of the technology.
– Implement and maintain well-structured and reliable PROFIBUS networks.
– Troubleshoot technical difficulties that might accompany a PROFIBUS installation.

Prerequisites
Recommend that all candidates:
– Attended the Certified Installer's course in the day preceding the Engineer's course, or Certified Installer certification.
– Have experience with Process Automation and especially Digital Communication systems.
– Hold a tertiary level qualification.

Topics
– Basics of designing and wiring an active network.
– In-depth analysis of the protocol.
– Diagnostic tools to detect and fix bus faults and packet analysers to identify more complex configuration errors.
– Ways to tailor a PROFIBUS network and device configuration using GSD & EDD files as well as DTM/FDT under various master configurations.
– PROFIBUS PA and its associated components are lightly introduced.
– In-depth view of PROFIBUS network operation and characteristics.
– Theory, practice and common pitfalls of PROFIBUS DP and PA network installation.

Course type and methods
Instructor led seminar with practical exercises, writing both a practical and open-book, multiple-choice theory test. Course language is English.

Course duration
The duration of the course is 4.5 days (including attending the prerequisite Installer's course)

Cost for 2013
R22 000.00 (excl.VAT)

Dates for 2013
26-30 August 2013   25-29 November 2013
16-20 September 2013   9-13 December 2013
28 Oct – 1 November 2013

Training delivery
At ABB Campus, but on-site training can be arranged to take place at the client's premises, country-wide.

ABB University - Drives
ACS 800-01,-02,&-07 Single Drive, Start-up, Service and Hands-On exercises (SAG152)

Course goal
The course goal is to teach students to install, startup, adjust, operate, maintain, trouble-shoot and repair ACS800-01 & -02 single drives.

Learning objectives
Upon completion of this course, students will be able to:

– Commission and tune ACS800-01, -02 & -07 single drives.
– Trace and correct faults
– Operate and maintain ACS800-01 & -02 & -07 single drives.

Participant profile
Recommend that all candidates:
– Students should have basic knowledge of Drives and related equipment.

Prerequisites
Electricians, technicians, and engineers who install, operate and service ACS800-01 & -02 single drives

Topics
– Hardware and software overview
– Component and board functions
– Reading and interpreting circuit diagrams
– ACS800-01 & -02 standard application program
– Control panel functions
– Locating and identifying terminals, boards and other components
– Converter commissioning
– Fine tuning of the converter
– Fault tracing methods
– Installation principles
– Optional equipment overview
– Fieldbus Communication
– Reading and interpreting circuit diagrams
– Adaptive programming
– Drive AP, adaptive programming tool operations
– Exchange of drive modules in the
– ACS800–07 range
– Drive Window commissioning

Course type and methods
This is an instructor led course with hands-on lab activities.

Course duration
The duration of this course is 5 days. Our local SAG152 covers G152E/B, G152 and G156 on the Finish schedule

ABB University - Drives
ACS 800 – Multidrive Operation & Maintenance (G161)

Course goal
The course goal is to teach students the basics of the installation, start-up, adjusting, operation, maintenance, trouble-shooting and repair of the ACS800 multidrives.

Learning objectives
Upon completion of this course, students will be able to:

– Commission ACS800 multidrives.
– Trace and correct faults
– Operate and maintain ACS800 multidrives.

Participant profile
Electricians, technicians, and engineers who install, operate and service ACS800 multidrives

Prerequisites
Students should have basic knowledge of electronics, and experience in using PC in Windows environment.

Topics
– Component and board functions
– Reading and interpreting circuit diagrams
– ACS800 system application program
– Control panel functions
– Locating and identifying terminals, boards and other components
– Converter and Supply unit commissioning
– Optional equipment overview
– Fine tuning of the converter
– Fault tracing methods
– Drive Window commissioning and maintenance tool operations

Course type and methods
This is an instructor led course.

Course duration
The duration of this course is 5 days.

ABB University - Drives
ACS 800 – Multidrive Control Section with ACS800M Operation & Maintenance (G162)

Course goal

The course goal is to teach students to start-up, operate, maintain, trouble-shoot and repair the Control Section (AC 800M) of ACS800 multidrive systems.

Learning objectives

Upon completion of this course, students will be able to:

– Perform the basic tasks of startup
– Locate and correct faults, trace input and output signals of the AC800M
– Replace a faulty module
– Make backups and restore application programs
– Use AC 800M SW tool programs

Participant profile

Electricians, technicians, and engineers who maintain, ACS800 multidrive Control Section with the AC800M.

Prerequisites

A basic knowledge of electronics, experience in using PCs in the Windows environment. A knowledge corresponding to the ACS800 multidrive Fundamentals , Internet course (G160e) and ACS800 multidrive Startup,Maintenance & Service Hands-on course, (G160) or ACS800 multidrive Operation and Maintenance course, G161.

Topics

– System components and functions
– Using and interpreting system documents
– Application program structure and basic functional blocks
– Backup and restore
– Fault tracing methods and repair

Course type and methods

This is an instructor led class room course.

Course duration

The duration of this course is 5 days.

ABB University - Drives
DCS 800 Course (G560/561)

Course goal
The DCS 800 is a digital converter for speed and torque control of DC-drives with nominal currents from 25A up to 5150A and nominal supply voltages from 220V up to 1200V. The course goal is to teach the DC basics in theory and how to design, start-up, adjust, operate and maintain the DCS 800 digital converter and how to do trouble- shooting. The use of the programming tool Drive Window Light is trained by practical exercises.

Participant profile
Electricians, technicians and engineers who, planning a DC Drive, installing and servicing DCS 800

Prerequisites
Students should have Basic knowledge of DC-drives engineering.

Topics
– DC Drives basics
– Control and operation principles of DC converters
– DCS 800 hardware
– DCS 800 software
– Using of the control panel
– Parameter setting and programming
– Locating and identifying the terminals of different processes
– Making proper terminations
– Commission, tune and operate DCS 800
– Initial converter start-up and commissioning
– Setting up small applications with Drive Window Light – AP Program
– Replacing cards and components
– Fault-tracing and trouble-shooting method

Course type and methods
This is an instructor led course.

Course duration
The duration of this course is 3 days.

ABB University - Drives
Basic DC Drives Course (SAG555)

Course goal

The course goal is to give the student an introduction of DC motors and the control thereof. Namely, DC converters. The course will cover the analogue type as well as the digital type converter and the maintenance of the aforesaid converters.

Learning objectives

Upon completion of this course, students will be able to:

– Maintenance and connection of the DC motors.
– parts of DCS 800
– Connection and commissioning of the DC converters
– Replacing and testing thyristors.

Participant profile

Electricians, Technicians and Drive service personnel.

Prerequisites

Basic Electrical & Electronic knowledge.

Topics

– System components and functions
– Using and interpreting system documents
– Application program structure and basic functional blocks
– Backup and restore
– Fault tracing methods and repair

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 2 days.

ABB University - Drives
Basic DC Drives Course (SAG550)

Course goal

The course covers bare AC motors, maintenance of AC motors, AC inverters and their respective switching devices. The course will enable the delegate to identify different control methods as well as fault find and tune the drive.

Learning objectives

Upon completion of this course, students will be able to:

– Installation and commissioning of the AC inverters.
– Tuning and parameter settings
– Replacing / testing switching components.

Participant profile

Electricians, Technicians and Drives service personnel.

Prerequisites

Basic Electrical & Electronic knowledge.

Topics

– System components and functions
– Using and interpreting system documents
– Application program structure and basic functional blocks
– Backup and restore
– Fault tracing methods and repair

Course type and methods

This is an instructor led course. The language of the course is English.

Course duration

The duration of the course is 2 days.

ABB University - Drives
ACS550 Standard Drive, Fundamentals, Start-up, Maintenance & Service Hands-On Exercises (G165)

Course goal
The goal of this course is to teach students
To install, start-up, adjust, operate, maintain, troubleshoot the ACS550 standard Drive.

Learning objectives
Upon completion of this course, students will be able to:

– Describe the functions of the ACS550 drive
– Describe the hardware structure of the product
– Use the Assistant Control Panel
– Describe the basics of installation, commissioning and service operations of the ACS550
– Describe the basic principles of fault-finding
– Installation and Commission the ACS550 standard Drive
– Trace and correct faults
– Operate and maintain the ACS550 standard drive

Participant profile
This course is intended for Electricians, Technicians and Engineers who install, operate and service ACS550.

Prerequisites
– Basic Knowledge of electronics
– Experience in using PCs in the Windows environment

Topics
– Overview of the ACS550 features
– Hardware construction
– Component and board functions
– Locating and identifying terminals, boards and other components with circuit diagrams
– ACS550 standard application program
– Assistant Control Panel functions
– Optional equipment overview
– Fieldbus communication
– Installation principles
– Basic service operations
– Commissioning
– Fault tracing principles and maintenance
– DriveWindow Light commissioning and maintenance tool operations

Course type and methods
This is an instructor led, classroom course, with hands-on lab activities. The language of the course is English.

Course duration
The duration of the course is 2.5 days.

ABB University - Medium Voltage
Switchgear Unigear Operator Training

Course goal

This course covers information that will enable operators to carry out the various safe operations of the Unigear type switchgear.

Learning objectives

Upon completion of this course, students will be able to:

– Understand the correct operation of the switchgear
– Gain an overview of the switchgear specifications
– Identify the different mechanisms
– Understand the operation of interlocks
– Understand the safe operation of the switchgear

Participant profile

The student will be employees from the electricity supply industry.

Prerequisites

– Minimum Qualification: N3 Electrical Engineering
– At least 3 years experience in Electrical industry and a solid background in MV switching procedures

Topics

– Specifications
– Operating Mechanisms
– Panel Module Types
– Interlocks
– Operating
– The Operator

Course type and methods

This is an instructor led course with audio-visuals and Practical exercises.

Course duration

The duration of the course is 1 day.

ABB University - Medium Voltage
Switchgear LMR/LMT/LMS Operator Training

Course goal

This course covers information that will enable operators to carry out the various operations of the LMR / LMS type Switchgear

Learning objectives

Upon completion of this course, students will be able to:

– Understand the correct operation of the switchgear
– Gain an overview of the switchgear specifications
– Identify the different mechanisms
– Understand the operation of interlocks
– Understand the safe operation of the switchgear

Participant profile

The student will be employees from the electricity supply industry.

Prerequisites

– Minimum Qualification: N3 Electrical Engineering
– At least 3 years experience in Electrical industry and a solid background in MV switching procedures

Topics

– Specifications
– Operating Mechanisms
– Panel Module Types
– Interlocks
– Operating
– The Operator

Course type and methods

This is an instructor led course with audio-visuals and Practical exercises.

Course duration

The duration of the course is 1 day.

ABB University - Medium Voltage
Switchgear Safeplus & Safering Operator Training

Course goal
This course covers information that will enable operators to carry out the various operations of the Safe ring / Safe plus type Switchgear

Learning objectives
Upon completion of this course, students will be able to:

– Understand the correct operation of the switchgear
– Gain an overview of the switchgear specifications
– Identify the different mechanisms
– Understand the operation of interlocks
– Understand the safe operation of the switchgear

Participant profile
The student will be employees from the electricity supply industry.

Prerequisites
– Minimum Qualification: N3 Electrical Engineering
– At least 3 years experience in Electrical industry and a solid background in MV switching procedures

Topics
– Specifications
– Operating Mechanisms
– Panel Module Types
– Interlocks
– Operating
– The Operator

Course type and methods
This is an instructor led course with audio-visuals and Practical exercises.

Course duration
The duration of the course is 1 day.

ABB University - Medium Voltage
Circuit breakers HD4 maintenance

Course goal

This course covers information that will enable operators to carry out day to day maintenance operations on medium voltage circuit breakers

Learning objectives

Upon completion of this course, students will be able to:

– Understand the activities comprising maintenance
– Gain an overview of the operational checks involved
– Discuss the testing of interlock functions
– Discuss the relevance of time based maintenance plans
– Understand the maintenance of the HD4 SF6 gas insulated circuit breakers

Participant profile

The student will be employees from the electricity supply industry.

Prerequisites

– Minimum Qualification: N3 Electrical Engineering
– At least 3 years experience in Electrical industry and a solid background in MV switching procedures

Topics

– Maintenance activities
– Interlock functions
– Time based maintenance plans
– Understanding gas insulated circuit breakers
– Operating gas insulated circuit breakers
– General procedures

Course type and methods

This is an instructor led course with audio-visuals and Practical exercises.

Course duration

The duration of the course is 1 day.

ABB University - Medium Voltage
Circuit breakers VD4 maintenance

Course goal

This course covers information that will enable operators to carry out day to day maintenance operations on medium voltage circuit breakers

Learning objectives

Upon completion of this course, students will be able to:

– Understand the activities comprising maintenance
– Gain an overview of the operational checks involved
– Discuss the testing of interlock functions
– Discuss the relevance of time based maintenance plans
– Understand the maintenance of the VD4 vacuum insulated circuit breakers

Participant profile

The student will be employees from the electricity supply industry.

Prerequisites

– Minimum Qualification: N3 Electrical Engineering
– At least 3 years experience in Electrical industry and a solid background in MV switching procedures

Topics

– Maintenance activities
– Interlock functions
– Time based maintenance plans
– Understanding gas insulated circuit breakers
– Operating gas insulated circuit breakers
– General procedures

Course type and methods

This is an instructor led course with audio-visuals and Practical exercises.

Course duration

The duration of the course is 1 day.

ABB University - Medium Voltage
Relion® 615 Series (P261)

Course goal

The aim of this course is to familiarize the participants with the operation, setting and engineering of 615 series of IEDs by using REF615 feeder protection relay and PCM600.

Learning objectives

Upon completion of this course, students will be able to:

– perform all the basic operations from the local HMI (Human Machine Interface).
– read and clear events and alarms
– manage the relay settings
– upload disturbance recordings
– program the relay inputs, outputs, alarm LEDs and functions
– configurate the GOOSE communication

Participant profile

System engineers, maintenance engineers and persons who want to learn to operate and engineer 615 series of relays.

Prerequisites

– Basic knowledge of protection relays and the electrical network to be controlled.

Topics

– Introduction to REF615, RED615, RET615 and REM615
– Presentation of tool PCM600
– Local HMI, Web HMI
– Setting the relay (LHMI, Web HMI, PCM600)
– Setting and reading the disturbance recorder
– Signal Matrix Tool (SMT)
– GOOSE engineering

Course type and methods

This is an instructor led course with interactive classroom discussions and associated exercises.

Course duration

The duration of the course is 2 days.

ABB University - Medium Voltage
Relion® 630 Series (P264)

Course goal

The aim of this course is to familiarize the participants with programming and communication configuration of 630 series of IEDs by using REF630 feeder protection relay and PCM600.

Learning objectives

Upon completion of this course, students will be able to:

– Know the configuration principles and programming process of 630 series
– Modify pre-configurations
– Create the relay configuration with PCM600 tool
– Modify the graphical display
– Manage the relay configurations
– Create GOOSE communication

Participant profile

Substation operators, system engineers and persons who want to learn to configurate the 630 series of relays.

Prerequisites

– Basic knowledge of protection relays and the electrical network to be controlled.

Topics

– Introduction to REF615, RED615, RET615 and REM615
– Presentation of tool PCM600
– Local HMI, Web HMI
– Setting the relay (LHMI, Web HMI, PCM600)
– Setting and reading the disturbance recorder
– Signal Matrix Tool (SMT)
– GOOSE engineering

Course type and methods

This is an instructor led course with interactive classroom discussions and associated exercises.

Course duration

The duration of the course is 2 days.

ABB University - Medium Voltage
MV Protection Relay Applications (242)

Course goal

The aim of this course is to present general protection principles and relay settings in the medium voltage distribution network.

Learning objectives

Upon completion of this course, students will be able to:

- The type of faults appearing in power systems
- Different protection principles
- Parameter setting calculation

Participant profile

Relay protection and maintenance engineers, system and sales engineers.

Prerequisites

- Basic knowledge of electrical engineering and protection relays.

Topics

- Introduction to various protection applications in the distribution network
- Common faults in power systems
- Current and voltage transformers for protection purposes
- Main operation principles of protection relays
- Overcurrent protection
- Earth-fault protection
- Transformer differential protection
- Motor protection
- Generator protection
- Disturbance recording
- Practical training with the protection models (2 days hands-on training)

Course type and methods

This is an instructor led course with interactive classroom discussions and hands-on exercises.

Course duration

The duration of the course is 5 days.

ABB University - PLC
IMS AC500/PLC Basic Training (BU3111)

Course goal
The duration for PLC Basic Training Course is 4 days.

Course type
This is an instructor led course with interactive classroom discussions and associated lab exercises. Approximately 50% of the course is hands-on lab activities.

Student profile
This training is targeted to technical support engineers, application engineers, programmers and system integrators.

Prerequisites and Recommendations
Students should know the fundamentals of working with Programmable Logic Controllers and have basic knowledge of Windows operating systems.

Topics
– Explain the AC500 architecture and the functions of the different components.
– Create a new project and configure the structure of application programs.
– Navigate and use the system libraries.
– Configure the AC500 hardware with corresponding I/Os.
– Design and configure application programs by using a different type of
– IEC61131-3 languages.
– Configure CPU execution times and
  monitoring loading.
– Network the AC500 using Ethernet
– Configure and use different decentralized I/O networks, CS31, Modbus and Profibus.

Main topics
– AC500 architecture
– PS501 Control Builder
– Project and application structures
– Hardware configuration components
– Decentralized I/O networks, CS31, Modbus and Profibus.
– CoDeSys visualization
– CP400 operator panels presentation
+ Basic functions with CP400SOFT
– SD memory card presentation

Day 1	Day 2	Day 3	Day 4
– **Welcome Course overview**	– **Project engineering**	– **AC500 fieldbus**	– **AC500 and HMI**
– **AC500 hardware overview**	– **PS501 Control Builder**	– **Overview AC500 communications**	– **CoDeSys visualization**
– Introduction architecture	– AC500 system configuration	– Possibilities over different field buses and networks	– PS501 Visu
– presentation, config…	– Project structure and components	– **CS31 bus network**	– PS541-HMI
– Task excution procedure	– Variables declaration	– DC551 Rules and configuration	– **PS501 - DDE interface**
– **PS501 Control Builder**	– Libraries	– **SYCON.net software**	– **PS501 - OPC server**
– Software installation	– **Online access**	– Configuration Ethernet	– **CP400 operator panels**
– Programming according to IEC6113163	– Via serial interface	– Configuration Profibus	– Installation
– Basic overview of the design and main functions	– Via Ethernet interface	– **Profibus network**	– Software presentation
– Introduction to AC500 system configuration and FBD editor	– **Diagnosis & troubles**	– Configuration master/slave with CM572 +DC505	– Basic functions
– Exercises	– **Password protection**	– **Watch & recipe manager**	– On-line simulation
	– **Program backup**	– **Sampling traces**	– Exercises
	– **Help**	– Exercises	
	– Exercises		

* Please note a PC or laptop with serial port and administration rights will be required by each candidate*

ABB University - PLC
IMS AC500/PLC Advanced (F851)

Course Duration
The duration is 5 days.

Course Type
This is an instructor led course. Approximately 50% of the time is used for hands-on labs and practical exercises.

Course Goal and Learning Objectives
The goal of this course is to learn the engineering of the AC500.
Upon completion of this course the participants will expand their programming skills and learn how to efficiently program and test AC500 and how to connect it to different control and monitoring devices.

Student Profile
This training is targeted at application engineers, programmers and system integrators.

Prerequisites and Recommendations
Students should have attended the F850 AC500 Basic course or have knowledge and experience associated with the content of this course.

Main Topics of the Training
Project structure and programming
– Definition of HW configuration for main project
– Mapping of variables (import from templates)
– Program structure and programming
  – Task configuration
  – Dealing with POUs, actions and several global variable lists
  – Step chain programming, SFC editor
  – Editors: ST and FBD
  – Defined data types: arrays and structures
  – Creation of an own FB
  – Creation of an own library
  – Alarm and Event handling
  – Recipes
  – Project security; user groups and levels
– Creation of new project from the existing one (best practice by adaption)
  Integrated Visualization
– Import and creation of visualization objects (dealing with several screens and master screen, switching between screens)
  – Mapping the variables for existing visualization
  – Creation of additional screens
  – Creation of a visualization template
– Program test, test functions, trouble shooting
– Watch lists and further test functions
– Trends and traces
– Customization of programming environment depending on the programmer and application requirements

Programming of parallel control and monitoring devices
– Control out from different devices:
  – Integrated visualization
  – Web server
  – OPC client (e.g. Matrikon)
  – CP600 via CoDeSys TCP/IP protocol (the CP600 project is prepared)
– Data backup and data handling
– Project and source code backup on the SD card
– Data handling by use of CAA library

Day 1	Day 2	Day 3	Day 4
– AC500 Hardware Overview	– Step chain programming	– Creation of own library	– Dealing with defined data types
– Communication Modules	– Adapting of visualization template	– Recipes with visualization	– Data logging
– Profibus and CS31	– Commissioning of the project	– Sampling traces with visualization	– Test of control from different
– Ethernet and Modbus	– Program test, test functions and	– CP600	places:
– Definition of HW configuration for	trouble-shooting		– Integrated visualization
project	– Project backup		– Web server
– Mapping of variables (import from	– Programming of control from		– OPC client (e.g. Matrikon)
templates)	different places		– CP600 via CoDeSys TCP/IP
– Test of the hardware configuration	– Creation of additional vizualization		protocol (the CP600 project is
– Creating of program structure for	objects		prepared)
project	– Alarm handling with visualization		– Project security, user groups and
– Creation of own Function Block			levels
with integrated vizualization			– Data backup and data handling
template			

Please note that a notebook with PS501 Control Builder Plus is provided by the training facility. If you wish to use your notebook, please install the current version of PS501 software by yourself prior to the training.

ABB University - Low Voltage Systems
MNS: LV Switchgear

Course goal
The goal of this course is to teach students to install, start-up, adjust, operate, maintain and troubleshoot ABB MNS low voltage switchgear.

The training covers the following types and constructs:

– MNS 3.0
– MNS iS

Learning objectives
Upon completion of this course, students will be able to:
– Introduction and System Overview
– Understand the components and their function
– Operation and maintenance of LV Switchgear

Participant profile
This course is intended for Electricians, Technicians and Engineers who install, operate and service MNS LV Switchgear.

Prerequisites
– Basic Knowledge of LV Switchgear
– Basic knowledge of general plant safety

Topics
– Introduction to MNS
– MNS Safety Aspects
– Arc Fault Theory
– MNS Operation
– Mechanical Operation: Emax ACBs
– Demonstration:
  – Withdrawable modules
  – Emax ACBs

Course type and methods
This is an instructor led, classroom course, with hands-on activities. The language of the course is English.

Course duration
The duration of the course is 1 day.

ABB University - Low Voltage Systems
INSUM: End User System Training

Course goal
The goal of this course is to provide participants with the required theoretical knowledge on operation and maintenance aspects.

Learning objectives
Upon completion of this course, students will be able to:
– identify the System components
– understand the functionality of the main components of the Insum System
– understand parameterization
– understand LON Setup
– discuss Gateways

Participant profile
Electricians, technicians, and engineers who install, operate and service Insum

Prerequisites
Students should have basic knowledge of low voltage electrical systems, industrial communication and intelligent motor protection systems and experience in using a computer in a Windows environment.

Topics
– Intelligent Systems
– Structure & Components
– MCU Description & Standards
– MCU Parameterisation
– Backplane Descriptions
– LON Setup
– Introduction to Gateways
– INSUM Compatibility
– MMI

Course type and methods
This is an instructor led class room course.

Course duration
The duration of this course is 1 day.

ABB University - Transformer
On-load Tapchanger UB, UZ, UC (OLT)

Learning objectives

Upon completion of this course, students will be able to:
– Understand the basic operating principles on different ranges of ABB tap-changers and motor drives,
– Be able to do a condition assessment, do an inspec-tion, and perform maintenance on tap-changers and motor drives.

Course type and methods

This is an instructor led theoretical and practical course. Various demonstrations included, as well as practicals working with Tapchangers.

Duration

The duration of this learning program is 5 days

Course Outline

Day 1	Day 2	Day 3	Day 4	Day 5
Introduction Theoretical and hands-on training type UB:	Hands-on training UB if necessary Theoretical and hands-on training type UZ:	Hands-on training UZ if necessary Theoretical and hands-on training type UC:	Hands-on training UC if necessary Theoretical and hands-on training motor-drive mecha-nisms type BUE, BUF and BUL	Hands-on training UC if necessary Theoretical and hands-on training motor-drive mechanisms type BUE, BUF and BUL
– Instructional DVD – Discussing connection diagram type UB – Discussing maintenance guide – Correct positioning for maintenance and checking the shaft system – Lifting center shaft from the cylinder – Discussion on cleaning and measurement of moving and fixed con-tacts – Replacing moving and fixed contacts – Checking transition resis-tors – Checking shaft system – Checking pressure relay	– Instructional DVD – Discussing connection diagram: type UZ – Discussing maintenance guide – Discussion on cleaning and measurement of moving and fixed con-tacts – Replacing moving and fixed contacts – Checking transition resis-tors	– Instructional DVD – Discussing connection diagram type UC – Discussing maintenance guide – Lifting the diverter switch from the cylinder – Discussion on cleaning and measurement of moving and fixed con-tacts – Replacing moving and fixed contacts – Checking transition resis-tors – Assembling diverter switch in correct position – Checing shaft system – How to replace conven-tional type UCG with VUCG	– Discussing circuit diagram for all types of motor-drives – Familiarisation with circuit diagram – Replacing belts for all types of motor-drives – Checking the brake func-tion – How to replace maintenance switch	– How to adjust time relay – How to adjust measuring transducer – Checking position switch-es – Checking counter function – Checking the gland for main shaft (UZ) – Final question & answer session

ABB University - Robotics
Basic Programming & Operation

Duration: 3 days
Pre-requisite: PC Knowledge and file handling
Will benefit: Supervisors, Team Leaders, Setters, Programmers, and Operators.

Subject Areas

Safety Instructions
Program Sequence and collision awareness
Teach velocity & pinch points
Emergency stops & enabling device
Cell interlocking

System Description
Robot and external mechanical units
Control system description and Operators panel
FlexPendant

Starting and stopping the program
The program test and Production windows
Manual and Automatic modes of operation
Override speed
Stepping through program Instruction by instruction
Continuous & cycle running modes
The Program Pointer and Cursor
Start up procedures
Shut down procedures

Jogging the robot using the joystick
Axis and Linear jogging
Tool Re-Orientation
Co-ordinate systems
Fine positioning

Error codes
Error identification
Error recovery
Error logs

Basic Programming Theory
Creating a new program
Main routine
Instructions pick lists
Move instructions (MoveJ & MoveL)
Editing a move instruction
Saving and retrieving a program (HD0A & memory stick)
File Management & Backup.

Basic tool point definition
Tool centre point (TCP) theory
Create a TCP using the approach point method
Basic instructions
Inputs (WaitDI, WaitUntil)
Outputs (Set, Reset, SetDO)
Wait time

Program editing
Deleting, inserting, changing & marking
Cut, copy, paste

Routines & modules
Creating, calling & returning from routines
System modules
Program modules

Data
Data definition local / global
Robtarget, speed, zone, tool, numbers

Decision making
If Then
Changing an instructions structure
Compact If
Comment
Label
While

Working with numbers
Increment / decrement
Clear
Using Then with If and Test

FlexPendant communications
TPErase / TPWrite
TPRead NUM / TPRead FK

Objectives: On completion of this course the participants will be able to perform:
– Safe robot operation
– FlexPendant operation
– System start up, shut down and error recovery
– RAPID programming and editing
– Programming and operating inputs and outputs
– Tool and Workobject definition
– Backup and Restore system information

ABB University - Robotics
Electrical Maintenance

Duration: 4 days

Pre-requisite: Students attending should be employed by their companies as maintenance technicians with electrical bias or hold relevant electrical qualifications. PC Knowledge and file handling would be useful. Previous attendance of the IRC5 Programming & Operation course or IRC5 Operator course is strongly recommended. The course objectives are unlikely to be met if students do not fulfill these requirements.

Will benefit: Service engineers and person responsible for electrical service

Subject Areas

Safety Instructions
Program Sequence and collision awareness
Teach velocity & pinch points
Emergency stops & enabling device
Cell interlocking
Electrical safety

System Description
Robot and external mechanical units
Control system description / Operators panel
FlexPendant

Event Logs:
Error identification
Error recovery

RobotStudio online
Use of RobotStudio Online software
Building systems

Servo System
Fault finding on drives
Drive system component recognition

Computer System
Fault finding on computer
Computer component recognition

Safety Chains
Fault finding on safety chains
Safety chain component recognition

Calibration
Robot calibration and measurement system
Fault finding exercises
I/O System
Configuring I/O units and signals

Objectives

On completion of this course the participants will be able to perform:

– Trouble shooting
– Preventative Maintenance
– RobotStudioOnline Operation
– Installation and update of RobotWare operating systems
– Restart procedures
– Make I/O connections to peripheral equipment and safety devices
– Controller construction, components
– Communications with controller module
– Calibration

ABB University - Robotics
Advanced Programming – Stage 1

Duration: 4 days
Pre-requisite: Students must have attended the IRC5 Programming and Operation Course or have an extensive working knowledge of the topics covered.
Will benefit: Supervisors, Team Leaders, Setters, Programmers, Advanced Operators

Subject Areas

Introduction and Safety

Complex Tool Centre Points
Default Orientation
Tool Centre Point & Z
Tool Centre Point with X & Z
Stationary Tools

Work Objects
Reasons and Uses
Definition of Work Objects
Mirroring

Review
Pendant
Instructions
Techniques
Procedures
Data types
Optional Arguments

Modules
Program and System Modules
File Names & Module Attributes
Local & Global Data
Loading and Unloading during execution.
Task Structure

World Co-ordinate System
Reasons for use and comparison to other systems
Definition of World co-ordinates

World Zones
Definition of temporary & stationary World Zones

Working with Numbers
Assigning a value to data
Instruction / Operator definition
Incrementing values
Decrementing values
Clearing Values
Read a clock used for timing

Checking data values using "IF" and "TEST"
Common Numeric Functions

Cycle Timing Instructions
Reset a clock used for timing
Start a clock used for timing
Stop a clock used for timing
Clock Data

Configuration Instructions
Robot configuration control during Joint motion
Robot configuration control during Linear motion
Interpolation method through Singular Points

New Functions
Displacing a robot position
Reading the robot current position e.t.c.

Searching
Linear search for position
Circular search for position

Routine Handling
Explanation and Uses
Instructions and data
Backwards Handling
Error Handling
Undo Handling

Position Displacement
Activating program displacement
Deactivating program displacement
Activating program displacement

Interrupts
Connecting a variable to a trap routine
Interrupt from a Digital Input Signal
Interrupt from an Analog Input Signal
Timed interrupts
Activating individual interrupts
Deactivating individual interrupts
Enabling all interrupts

Trap Routines
Uses and Commonly Used Instructions

Event Handling
Power on
Start
Restart
Stop
Qstop
Reset

Logical Instructions
For
While
Goto
Label

Advanced I/O Instructions
Changing Analogue Output values
Waiting and testing for Inputs
Group/Binary signals
Cross Connections
Changing the value of a group of Digital Output signals

Trigg Instructions
Defining a fixed position I/O event
Defining a fixed position Interrupt event

Performance Instructions
Reducing acceleration
Changing program velocity
Defining the payload of the robot
Soft Servo
External Axes activation & deactivation

Creating Your Own Instructions
Functions & Instructions

Communication Instructions
TPWrite, TPErase, TPReadFK & TPReadNum
New User Interaction Instructions & Functions

Objectives

On completion of this course the participants will be able to perform:

– Practise all areas of robot safety
– Perform basic programming techniques
– Create and properly use complex tool centre points
– Define and use World and work object co-ordinate systems
– Use numerical data instructions
– Perform String Manipulation
– Use instructions for avoiding singularity areas
– Use search and error handling instructions
– Use program displacement instructions
– Use interrupt instructions and trap routines
– Use event routines and backward handling
– Use Error Handlers and Undo Handlers
– Use communication instructions
– Use advanced I/O instructions
– Use instructions to enhance robot performance
– Create basic 'user' instructions and functions

ABB University - Robotics
Advanced Programming – Stage 2

Duration: 4 days
Pre-requisite: Participants must have completed the IRC5 Programming and Operation & IRC5 Advanced Programming Stage 1 Courses and have ongoing IRC5 Experience.
Will benefit: Personnel with a sound knowledge of IRC5 Robot System.

Subject Areas

Dot Notation
Accessing Data type parts.
Checking robot at home

Creating Routines with arguments
Creating instructions with parameters
INOUT
Optional Arguments
Present() Function
Switches
Mutually Exclusive Arguments
Global and Local Routines
Global and Local Data
PERS/VAR
"Present()" Versus "?"
Functions with Parameters
Variables inside Routines

Arrays
Creation
Manipulation
Printing
Resetting
In combination with routines and parameters
1,2 and 3 dimensional arrays

Strings
String Concatenation and String Manipulation
String Functions
8 Bit Hexadecimal ASCII Codes

Serial Communication
Reading, Writing & Appending Files
COM Port Communication

File Handling
Copying, Renaming and Removing Files
Making, Removing and Opening Directories
Directory Listings
File Handling Functions

MultiTasking
General Description
Creating a parallel program
System parameter setting
Task Data
Synchronising using a common variable
Synchronising using interrupt
Synchronising using a dispatcher
Common data in several tasks
Teach pendant messages from parallel tasks

Socket Messaging
Client Configuration
Server Configuration

FTP Client
FTP Server Configuration
FTP Robot Client Configuration
Mounting an FTP Network Drive

NFS Client
NFS Server Configuration
NFS Robot Client Configuration
Mounting an NFS Network Drive

Objectives

On completion of this course the participants will be able to perform:

– Demonstrate the techniques of advanced programming
– Use Dot notation
– Create instructions and functions to suit any purpose
– Create and manipulate Arrays
– Manipulate Strings
– Communicate using Serial Channels
– Handle Files and Directories
– Utilise MultiTasking to create and program Background tasks
– Socket Messaging for Client and Server configurations
– Configure the robot to communicate with an FTP and NFS Server

On request - ABB University - Automation & Drives
CDC Operation & Maintenance (G210)

Course goal

The course goal is to teach students to start-up, adjust, operate, maintain, and troubleshoot the CDC (Common Drive Control) and APC for ACV700 and DCV700 digital drives, using available troubleshooting tools.

Learning objectives

Upon completion of this course, students will be able to:

– Trace signals in/out of APC
– Localize faults and replace boards or components
– Back-up and re-start system

Participant profile

Electricians, Technicians, Engineers who commission and service ACV 700 or DCV 700 drive systems.

Prerequisites

Students should have basic knowledge of of electronics and computersh

Topics
– Control principles
– CDC system configuration
– Using system documentation
– CDC hardware
  – APC (Application Program Controller)
  – I/O
– CDC software principles
– Operating in a Windows environment
– Programming using CMT (Commissioning and Maintenance Tool)
– Programming using FCE (Function Chart Editor)
– Fault-tracing and trouble-shooting

Course type and methods

This is an instructor led course.

Course duration

The duration of the course is 5 days.

On request - ABB University - Automation & Drives
ACV 700 Operation & Maintenance (G220)

Course goal
The course goal is to teach students to start-up, adjust, operate, maintain, troubleshoot and repair the ACV 700 digital AC frequency convertor, using available troubleshooting tools.

Learning objectives
Upon completion of this course, students will be able to:

– Commission and tune the frequency converters
– Trace and correct faults

Participant profile
Electricians, technicians, and engineers who commission and service the ACV 700

Prerequisites
Students should have basic knowledge of of electronics and computersh

Topics
– PC hardware and software requirements
– Operation principles of AC frequency convertors
– Vector / Scalar control
– Component and card functions
– Reading and interpreting circuit diagrams
– ACV 700 application software
– Programming using CMT (Commissioning & Maintenance Tool.)
– DDC tool.
– Initial converter start-up and commissioning
– Fine-tuning the converter
– Replacing and adjusting cards and components
– Fault Tracing methods

Course type and methods
This is an instructor led course.

Course duration
The duration of the course is 5 days.

On request - ABB University - Automation & Drives
DCV 700 Operation & Maintenance (G230)

Course goal

The course goal is to teach students to start-up, adjust, operate, maintain, troubleshoot, and repair the DCV 700 digital DC converter using available troubleshooting tools.

Learning objectives

Upon completion of this course, students will be able to:

– Commission and tune the DC converter
– Trace and correct faults

Participant profile

Electricians, technicians, and engineers who commission and service the DCV 700

Prerequisites

Students should have basic knowledge of of electronics and computersh

Topics

– Speed and current control of DC motors with thyristeor drives
– Component and card functions
– Reading and interpreting circuit diagrams
– DDC tool
– Initial Converter start-up and commissioning
– Fine - tuning the Converter
– Replacing and adjusting cards and components
– Programming using CMT (Commissioning & Maintenance Tool.).
– Fault Tracing methods

Course type and methods

This is an instructor led course.

Course duration

The duration of the course is 5 days.

On request - ABB University - Automation & Drives
ACS 600 – DTC Operation & Maintenance (G300)

Course goal
The course goal is to teach students to start-up, adjust, operate, maintain, troubleshoot, and repair the ACS 600 digital AC frequency converter using available programming and troubleshooting tools

Learning objectives
Upon completion of this course, students will be able to:

– Commission and tune the ACS 600 frequency converter.
– Trace and correct faults.

Participant profile
Electricians, technicians, and engineers who commission and service the ACS 600

Prerequisites
Students should have basic knowledge of of electronics and computersh

Topics
– Control and operation principles of AC frequency converters.
– Hardware & Software overview.
– Direct Torque Control (DTC) principles.
– Component and card functions
– Reading & interpreting circuit diagrams.
– ACS 600 software.
– Locating and identifying the terminals, cards, and other components.
– Parameter-setting using application macros.
– Installation principals.
– Initial converter start-up and commissioning.
– Fine - tuning the Converter
– Fault-tracing and troubleshooting methods.
– Communication options
– Using the operator control panel.

Course type and methods
This is an instructor led course.

Course duration
The duration of the course is 5 days.

On request - ABB University - Automation & Drives
Advant Controller 400, Advant station 500
OS-Maintenance 1 (A221)

Course goal
This course defines the concept, design and item designation of Advant Controller 410 and 450. Students will learn to read Advant Controller 410 and 450 standard diagrams. The structure of the database and the programming language will be studied to trace signals from the inputs, through the application program, to the outputs. Participants will be taught to use configuration and maintenance tools for basic location procedures

Learning objectives
Upon completion of this course, students will be able to:

– Operate Advant Station 500 Series OS
– Locate faults in installations and trace signals into and out of Advant Controller
– Describe the meaning of the status LEDs
– Replace input and output circuit boards

Participant profile
Maintenance Technicians.

Prerequisites
Students should have Basic knowledge of electrical functions.

Topics
–

Course type and methods
This is an instructor led classroom course

Course duration
The duration of the course is 5 days.

On request - ABB University - Automation & Drives
Advant Station 500 Series Operator Stations-
Configuration & Operation (A350)

Course goal
This course covers the user interface in the Advant Station 500 Series OS.

Learning objectives
Upon completion of this course, students will be able to:

– Operate Advant Station 500 Series OS.
– Define Event and Alarm handling
– Configure and activate TTD log and trend functions.
– Design Process Displays
– Configure and display hierarchy in the system
– Use the Status List function in order to search the process database
– Use different back-up functions
– Use available tools and aid functions

Participant profile
Process, instrumentation, electrical, and service engineers.

Prerequisites
Knowledge corresponding to course A330 is required.

Topics
– Aid functions
– Basics in Display design
– User Interface / Manual Control
– Event and Alarm handling Process Sectioning and Authority check
– Status List Function
– Logging, Trend and Multitrend Presentation
– Various back-up functions
– Activation of External Applications

Course type and methods
This is an instructor led, classroom course. The language of the course is English.

Course duration
The duration of the course is 5 days.

On request - ABB University - Automation & Drives
AC Drives Service Basic (G106)

Course goal
The goal of this course is to teach students the basic technical principles of the ABB LV AC drives preventive maintenance.

Learning objectives
Upon completion of this course, students will be able to:

– Describe the ABB Drives Lifecycle management model.
– Describe how the site survey/audit is carried out
– Explain the significance of the correct working methods (safety, ESD)
– Recognise the effects and analyze the state of critical ambient conditions
– Recognize the effects of aging of components
– Recognize the aging of the whole drive sytem and as a result the possible need for corrective actions
– Recognize different mechanical and electrical connection types, check the condition of the connections and as a result recognize the possible need for corrective actions
– List the needed SW and HW tools and use them in preventative maintenance

Participant profile
This course is intended for maintenance personnel of ABB LV AC drives.

Prerequisites
Fundamentals of ABB LV AC drives mechanics and operation. Some experience of both single and system drives

Topics
– LV Drives preventive maintenance
– Safety and ESD
– Ambient conditions
– Aging of the drive system and components
– Connections
– Preventive maintenance tools

Course type and methods
This is an instructor led, classroom course. The language of the course is English.

Course duration
The duration of the course is 2 days.

On request - ABB University - Automation & Drives
ACS 800 Single Drive, Start-up, Maintenance & Service Hands-On (G152)

Course goal
The goal of this course is to teach students. To install, start-up, adjust, operate, maintain, troubleshoot and repair ACS800 single Drives.
The training covers the following types and constructs:
– ACS800-01
– ACS800-02 R7 or ACS800-04 R8
– ACS800-11 on request

Learning objectives
Upon completion of this course, students will be able to:

– Commission & tune ACS800 single Drives
– Trace and correct faults
– Operate and maintain ACS800 single drives

Participant profile
This course is intended for Electricians, Technicians and Engineers who install, operate and service ACS800 single Drives.

Prerequisites
– Basic Knowledge of electronics
– Experience in using a Windows PC
– Course G152e or G152A or G152B

Topics
– Hardware & Software overview
– Component and board functions
– Reading and interpreting circuit diagrams
– ACS800 standard application program
– Control panel functions
– Locating and identifying terminals, boards and other components
– Converter commissioning
– Fine tuning of the converter
– Fault tracing methods
– Installation principles
– Adaptive programming
– Optional equipment overview
– Adaptive programming
– DiveAP adaptive programming tool operations
– DriveWindow commissioning and maintenance tool operations
–

Course type and methods
This is an instructor led, classroom course, with hands-on lab activities. The language of the course is English.

Course duration
The duration of the course is 2 days.

On request - ABB University - Automation & Drives
ACS800-07 Single Drive, Start-up, Maintenance & Service Hands-On (G156)

Course goal
The goal of this course is to teach students to install, start-up, adjust, operate, maintain, troubleshoot and repair ACS800-07/-17/-37 single Drives.

Learning objectives
Upon completion of this course, students will be able to:

– Commission & tune ACS800-07/-17/-37 single Drives
– Trace and correct faults
– Operate and maintain ACS800-07/-17/37 single drives

Participant profile
This course is intended for Electricians, Technicians and Engineers who install, operate and service ACS800-07/-17/-37 single Drives.

Prerequisites
– Basic Knowledge of electronics
– Experience in using a Windows PC
– Course G152e or G152A or G152B

Topics
– Hardware of ACS800-07
– Component and board functions
– Reading and interpreting circuit diagrams
– ACS800 standard application program with PROFIBUS
– IGBT replacement
– Locating and identifying terminals, boards and other components
– Converter commissioning
– Redundancy
– Fault tracing methods
– Regenerative drive
– DriveWindow commissioning and maintenance tool operations

Course type and methods
This is an instructor led, classroom course, with hands-on lab activities. The language of the course is English.

Course duration
The duration of the course is 1.5 days.

On request - ABB University - Automation & Drives
ACSM1 Machinery Drive, Start-up, Service Hands-On Training (G190)

Course goal
The goal of this course is to teach students to install, start-up, adjust, operate, maintain, troubleshoot and repair the ACH550 Drive.

Learning objectives
Upon completion of this course, students will be able to:

– Commission and tune the ACSM1 single Drives
– Operate and maintain the ACSM1 single drives

Participant profile
This course is intended for Electricians, Technicians and Engineers who install, operate and service ACSM1 single drives.

Prerequisites
– Basic Knowledge of electronics
– Experience in using a Windows PC
– Course G190e

Topics
– Hardware and software overview
– ACSM1 standard application program
– Control panel functions
– Converter commissioning
– Fine tuning the converter
– Installation principals
– Encoder connections
– Optional equipment connections
– Profibus (Optional)
– DriveStudio commissioning and maintenance tool operations

Course type and methods
This is an instructor led, classroom course, with hands-on ACSM1 exercises. Any of the exercises can be replaced with optional Profibus exercises. Please inform the Training Center if you would like to do the Profibus exercise. The language of the course is English.

Course duration
The duration of the course is 1 days.

On request - ABB University - Automation & Drives
ACSM1 Machinery Drive, Motion Control Hands-On Training (G191)

Course goal
The goal of this course is to teach students
To adjust, operate, ACSM1single Drives with motion control applications.

Learning objectives
Upon completion of this course, students will be able to:

– Commission and tune the ACSM1 single Drives with motion control applications

Participant profile
This course is intended for Electricians, Technicians and Engineers who operate and tune ACSM1 single drives with motion control applications.

Prerequisites
– Basic Knowledge of electronics
– Experience in using a Windows PC
– Courses G190e, G195e and G191e

Topics
– ACSM1 standard motion control feature
– Positioning
– Homing
– Cyclic correction
– Profibus (Optional)
– DriveStudio commissioning and maintenance tool operations

Course type and methods
This is an instructor led, classroom course, with hands-on ACSM1 exercises. Any of the exercises can be replaced with optional Profibus exercises. Please inform the Training Center if you would like to do the Profibus exercise. The language of the course is English.

Course duration
The duration of the course is 1 days.

On request - ABB University - Automation & Drives
SAMI GS Frequency convertors (ACS 500 series) (G310)

Course goal
The goal of this course:- SAMI GS frequency converters are used for stepless speed control of 2.2 to 315 kW squirrel cage motors which are in accordance with IEC and NEMA B standards. The SAMI GS uses the latest IGBT transistor technology. This provides, among other benefits, a high switching frequency which enables up to 100 % motor loading, thereby minimizing the need to derate the motor. The same converter design can be used for many varied applications like pumps, Fans, Conveyors, Compressors, extruders and centrifuges

Learning objectives
Upon completion of this course, students will be able to:

– Basis principles of the asynchronous motor
– Principle of the PWM inverter
– Hardware and software
– Drive start-up procedure
– User programming

Participant profile
This course is intended for Electricians, Technicians and Engineers who commission and service SAMI GS frequency converters.

Prerequisites
A basic knowledge of electronics and computers

Topics
–

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 2 days.

On request - ABB University - Automation & Drives
ACS 600 Preventitive Maintenance (G304)

Course goal
The goal of this course is to teach students to perform ACS600 drive preventative maintenance.

Learning objectives
Upon completion of this course, students will be able to:

– Explain the significance of the correct working methods (safety, ESD) with ACS600
– Recognise the effects of aging ACS600 components
– Interpret the ACS600 maintenance schedule and maintenance notes
– Select correct ACS600 maintenance kits
– Perform ACS600 preventative maintenance

Participant profile
This course is intended for ACS600 drive service engineers

Prerequisites
– Fundamentals of ABB LV AC drives mechanics & operation
– 6 months experience in ACS600 single/multidrive field service
– Course G300 or G330 and G106

Topics
– Fundamentals of ACS600 preventative maintenance
– Safety and ESD with ACS600
– Operation on ACS600 preventative maintenance
– Aging of ACS600 components
– ACS600 preventative maintenance kits and tools

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 1.5 days.

On request - ABB University - Automation & Drives
ACS350 General Machinery Drive, Operation & Programming Hands-On Training (G350)

Course goal
The goal of this course is to teach students to install, start-up, adjust, operate, maintain and trouble-shoot the ACS350 standard drive.

Learning objectives
Upon completion of this course, students will be able to:

– Install and commission the ACS350
– Trace and correct faults
– Operate and maintain the ACS350
– Create sequence programs

Participant profile
This course is intended for electricians, technicians, and engineers who install, operate and service ACS350.

Prerequisites
– Basic knowledge of electronics
– Experience in using PCs in the Windows environment
– Course G350e

Topics
– Assistant Control panel functions
– Installation
– Start-up
– ACS350 Program features
– Sequence Programming
– DriveWindow light commissioning and maintenance tool operations
– Fault tracing and maintenance

Course type and methods
This is an instructor led course. This course contains hands-on exercises with ACS350 units. The language of the course is English.

Course duration
The duration of the course is 1 days.

On request - ABB University - Automation & Drives
FlashDrop and DrivePM Operation and Programming (G352)

Course goal
The goal of this course is to teach students to use the DrivePM software and FlashDrop tool to create parameters sets, upload / download them from / to a drive.

Learning objectives
Upon completion of this course, students will be able to:

– Recognise the FlashDrop user benefits
– Present the product and its highlights
– Install the DrivePM software
– Use the DrivePM software and FlashDrop tool with a drive
– Update the DrivePM and the FlashDrop with the latest templates.

Participant profile
This course is intended for electricians, technicians, and engineers who commission, install, operate and service ACS150, ACS350, ACS550 and ACH550 drive systems.

Prerequisites
Either course G165, G166, G350, G351 (or equivalent knowledge).

Topics
– Technical overview
– DrivePM and FlashDrop Quick Guide
– Hands-on exercises

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 0.5 days.

On request - ABB University - Automation & Drives
SAMI F Frequency Convertors (G502)

Course goal
SAMI STAR frequency converters are devices for operating variable-speed drives up to 1800 kVA. They are digital-control PWM inverts used in a wide variety of drives for industrial and municipal applications. Comprehensive options for user programming and fault analysis additionally enable external control system to be dispensed with and provide important insights into process behavior. The training course consists of theoretical and practical instruction classes. The theoretical classes are designed to impart the basic principles of pulse width modulation inverters technology. The practical classes provide exercises in start-up and trouble-shooting procedures.

Learning objectives
Upon completion of this course, students will be able to:

– Recognise Basis principles of the asynchronous motor
– Principle of the PWM inverter
– Hardware and software of the SAMI STAR
– Drive start-up procedure
– User programming
– Trouble-shooting

Participant profile
This course is intended for Electricians, technicians and engineers who commission and service SAMI F frequency converters

Prerequisites
A basic knowledge of electronics and computers. They require a thorough understanding of AC Drives due to this being Engineering Drive. A good understanding of Logic Binary and Analogue Control is also required.

Topics
–

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 5 days.

On request - ABB University - Automation & Drives
SAMI F Advanced level (SAG502)

Course goal
SAMI STAR frequency converters are devices for operating variable-speed drives up to 1800 kVA. They are digital-control PWM inverts used in a wide variety of drives for industrial and municipal applications. Comprehensive options for user programming and fault analysis additionally enable external control system to be dispensed with and provide important insights into process behavior. The training course consist of theoretical and practical instruction classes. The theoretical classes are designed to impart the basic principles of pulse width modulation inverters technology. The practical classes provide exercises in start-up and trouble-shooting procedures to component level. Troubleshooting and testing of drives is covered in detail.

Learning objectives
Upon completion of this course, students will be able to:

– Basis principles of the asynchronous motor
– Principle of the PWM inverter
– Hardware and software of the SAMI STAR
– Drive start-up procedure
– User programming
– Trouble-shooting

Participant profile
This course is intended for Electricians, technicians and engineers who commission, repair and service SAMI F frequency converters.

Prerequisites
A basic knowledge of electronics and computers. They require a thorough understanding of AC Drives. A good understanding of Logic Binary and Analogue Control is also required.

Topics
–

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 5 days.

On request - ABB University - Automation & Drives
DCS500 Operation & Maintenance (G320)

Course goal
The course goal is to teach students how to start-up, adjust, operate, maintain, troubleshoot, and repair the DCS 500 digital DC converter using available programming and troubleshooting tools.

Learning objectives
Upon completion of this course, students will be able to:

– Commission and tune the converter
– Trace and correct faults.

Participant profile
This course is intended for Electricians, technicians, and engineers who install and service DCS 500.

Prerequisites
Basic knowledge of electronics and computers

Topics
– Control and operation principles of DC converters
– Component and card functions
– Reading and interpreting circuit diagrams
– DCS 500 software
– Using operator control panel
– Parameter setting and programming
– Programming with Control Panel
– Locating and identifying the terminals of different processes
– Making proper terminations
– Initial converter start-up and commissioning
– Fine tuning the converter
– Replace cards and components
– Fault tracing and troubleshooting methods

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 5 days.

On request - ABB University - Automation & Drives
ACC600 – DTC Crane Drive Operation & Maintenance (SA301)

Course goal
The course goal is to teach students to start-up, adjust, operate, maintain, trouble-shoot and repair ACC 600 digital AC frequency converters using available programming and troubleshooting tools.

Learning objectives
Upon completion of this course, students will be able to:

– Commission and tune ACC 600 frequency converters.
– Trace and correct faults

Participant profile
This course is intended for Electricians, technicians and engineers, who operate, install and service ACC 600.

### Prerequisites
Basic knowledge of electronics.

Topics
– Control and operation principles of AC frequency converters
– Hardware and software overview
– Direct Torque Control (DTC) principle
– Component and card functions
– Reading and interpreting circuit diagrams
– ACC software
– Locating and identifying the terminals, cards, and other components
– Parameter setting using application macros
– Installation principles
– Initial converter start-up and commissioning
– Fine tuning the Converter
– Fault tracing and troubleshooting methods
– Communication options.
– Using the operator control panel

Course type and methods
This is an instructor led course. The language of the course is English.

Course duration
The duration of the course is 5 days.
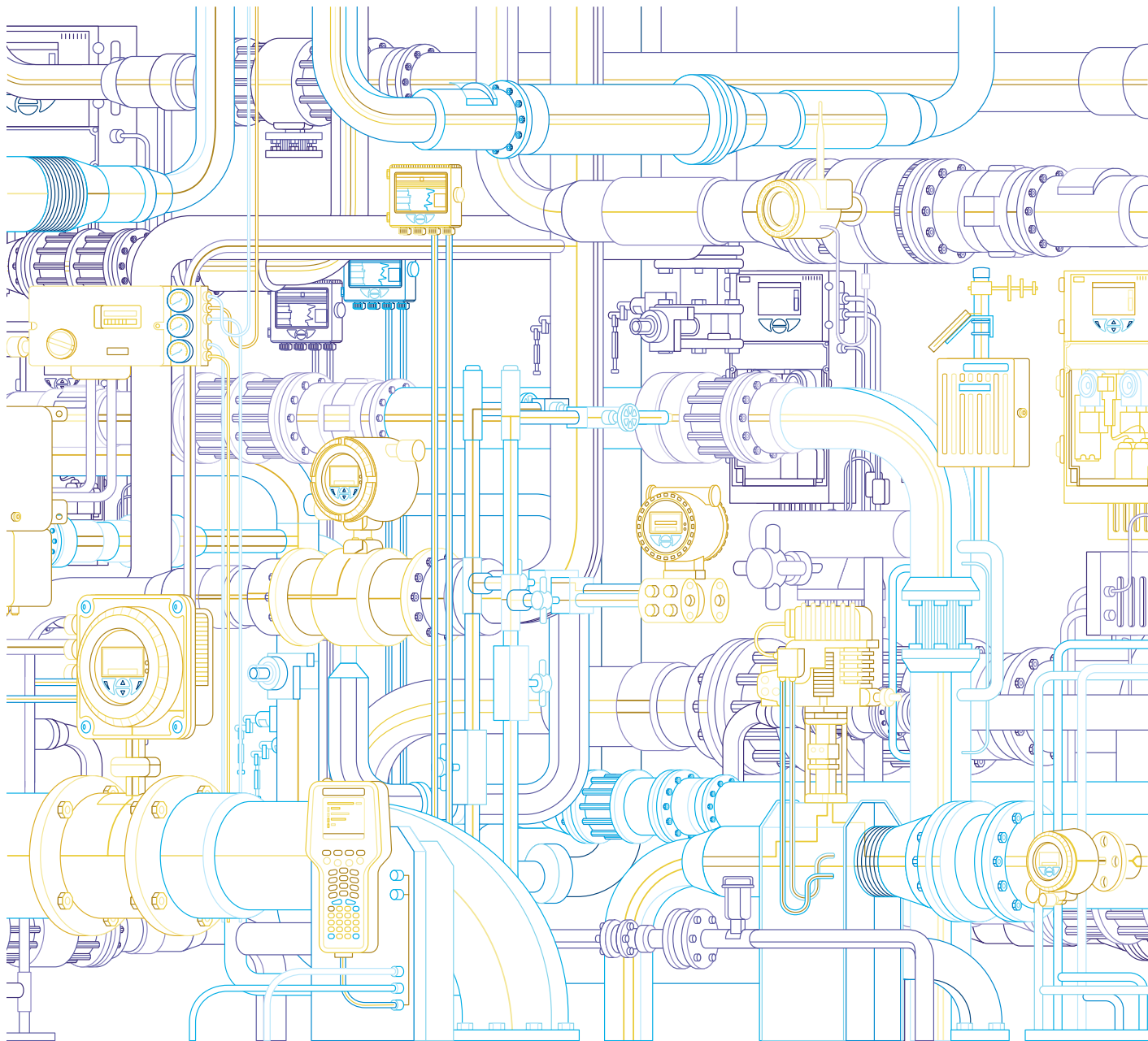
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for a better world™

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