Process Automation Learning Services
Training Catalog 2015

Eurotherm. by Schneider Electric
Foxboro. by Schneider Electric
Triconex. by Schneider Electric

Schneider Electric

[Image of two people working at a laptop]
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Asia Pacific

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Egypt
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North America

Canada
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Argentina
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+55 11 2844 0213

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Introduction
Process Automation Learning Solutions
Process Automation Learning Services has designed a curriculum of more than 200 courses and services to maximize the expertise of your workforce. Our training solutions cover Schneider Electric™ brands Eurotherm™, Foxboro™, and Triconex™, as well as generic instrumentation and control, and functional safety. They are designed to help maximize plant availability and utilization by:

- Establishing consistency of methods and applications
- Managing risks through reducing incorrect methods, applications, and design
- Maximizing revenue and margins through improved performance

Instructor-led Classroom Learning
Classes are regularly scheduled at the Schneider Electric world-class Learning Centers in Foxboro, MA; Lake Forest, CA; Calgary, AB; Montreal, QC; and Houston and Webster, TX, as well as many facilities around the globe. Most classes are five or 10 days in duration, and balance lectures with practical hands-on lab exercises.

Instructor-led On-site Learning
If you prefer, we’ll bring our classroom to you. This can be a cost-effective means of training a large group of students.

Distance Learning
Process Automation Learning’s customized live, virtual classes can bring best practices, specific learning, and technologies from experts around the globe right into your plant.

Custom Learning
Process Automation Learning has conducted hundreds of custom training sessions for operators, engineers, and maintenance technicians. The course materials and software are customized to your unique requirements and environment for guaranteed success.

Operator Training Simulators
The Immersive Training System (ITS), SimSci EYESIM, connects all operators and plant personnel with a high-fidelity 3-D process simulation and virtual walkthrough plant environment. Operator Training Simulators (OTS) allow operators to train on a computer in an identical environment to the control room. This provides a realistic virtual learning environment that prepares personnel to act appropriately in any given situation. EYESIM supports the capture and knowledge-transfer of best practices, increasing efficiency and reducing costly errors or maintenance.

Online Learning Series
Process Automation Learning’s self-study programs bring unparalleled flexibility to your learning program. As the first recipient of the Massachusetts Interactive Media Council Award, our computer-based training sets the highest standards. Process Automation Learning’s Internet-based products can be accessed from anywhere, anytime, and give users the benefit of instructor interface.

Training Growth Fund
Maximize returns from your training investments. Process Automation Learning’s Training Growth Fund doubles the investment Schneider Electric Process Automation support agreement customers make with a dedicated training fund.

For More Information
Details about these and other programs can be found online at http://iomtraining.invensys.com/iom or call us at 866-746-6477.

Experience Counts
All Process Automation Learning instructors have met our strict Process Automation Learning Services expertise and experience standards.
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Eurotherm Learning Tracks
Operational Server and Viewer

6212* Process Measurement Tech

6211* Process Control Tech

111-HT-10005 InTouch Part 1

3006 LINtools Operations Server & Viewer Fundamentals

System Platform (ASP) Foxboro PAC

6212* Process Measurement Tech

6211* Process Control Tech

111-GT-10012 Application Server 2012

111-GT-10013 InTouch for System Platform

3003 T2750 & LINtools

TEST

3004 PAC System & Object Binding

TEST

★ Or equivalent knowledge and experience
Eurotherm
Instructor-led Courses
3000 Fundamentals of LINtools

The Fundamentals of LINtools course is a three-day instructor-led class designed to equip the attendee with the skills to design and configure control strategies for the T-Series Instrumentation. On completion of the training, attendees will be able to confidently maintain and develop continuous and sequential control programs using the LINtools programming environment. You will learn about the range of T-Series controllers available and cover the hardware aspects of these such as power, address switches, what happens on startup, how to remove the memory modules, compact flash cards or SDHS cards, and the meaning of the diagnostic LEDs. You will use LINtools to develop a small typical control strategy, and discuss and practice realistic scenarios such as how to alter tuning parameters on a running process and save those alterations. (Course code 3000)

Duration: 3 days

Who should attend?
- Process engineers responsible for configuration and administration of T-Series Instrumentation, such as Foxboro PAC T2750, Foxboro PAC T2550, and T640

Prerequisites
- Microsoft® Windows® operating systems familiarity
- Knowledge of process control concepts

Objectives
- Describe a typical system and relevant T-Series hardware (T640, T2550, T2750 hardware)
- Recognize and configure the key aspects of the T-Series Hardware — Foxboro PAC (T2550 PAC, T2750 PAC), T640, Eycon
- Set up IP addresses and LIN node addresses
- Use LINtools to configure control strategies
- Download to T-Series instruments (T640, T2550, T2750)
- Alter parameters and ensure changes are permanent
- Configure Sequence programs — SFCs
- Practice good programming — hints and tips
- Configure alarm settings

3003 Foxboro PAC System — T2750 and LINtools

This hands-on, instructor-led class provides lectures and hands-on labs designed to provide a good working knowledge of the Foxboro PAC Hardware and LINtools configuration software. Attendees will work through a real-life project for controlling the temperature, level, and batch filling of a series of control reactors. Completion of this training will provide engineers with the ability and confidence to create their own control programs, modify existing ones, and recognize and fix faults such as an open circuit input or incorrect module type. Good techniques for backup and version control will be suggested and procedures for process parameter modifications will be discussed in detail. (Course code 3003)

Duration: 3 days

Who should attend?
- Engineers responsible for the development and maintenance of the Foxboro PAC T2750 or T2550 hardware and control programs

Prerequisites
- Wonderware System Platform knowledge (recommended but not essential)
- Good PC skills
- Process control experience

Objectives
- Configure the Foxboro PAC hardware, including the Foxboro PAC in the IDE Configure ELIN communications between the PC and Foxboro PAC T2750 (and Foxboro PAC T2550)
- Launch LINtools software
- Create a Continuous Control Strategy using LINtools
- Design and configure sequential control programs using LINtools
- Download and run control programs within the Foxboro PAC T2750 (and Foxboro PAC T2550)
- Make offline and online control strategy modifications
- Explain and evaluate different startup modes

3004 Foxboro PAC System — Wonderware® PAC Object Binding

This hands-on, instructor-led class provides lectures and hands-on labs designed to provide a good working knowledge of how to integrate the Foxboro PAC into the ArchestrA System platform environment. Attendees will further enhance the project configured during the prerequisite training course, Foxboro PAC System Essentials — T2750 and LINtools, by creating suitable objects to integrate the LIN blocks into the system platform IDE and by developing an HMI using Wonderware InTouch. (Course code 3004)

Duration: 2 days

Who should attend?
- Process engineers responsible for configuration and administration of T-Series Instrumentation, such as Foxboro PAC T2750, Foxboro PAC T2550, and T640

Prerequisites
- Microsoft® Windows® operating systems familiarity
- Knowledge of process control concepts

Objectives
- Describe a typical system and relevant T-Series hardware (T640, T2550, T2750 hardware)
- Recognize and configure the key aspects of the T-Series Hardware — Foxboro PAC (T2550 PAC, T2750 PAC), T640, Eycon
- Set up IP addresses and LIN node addresses
- Use LINtools to configure control strategies
- Download to T-Series instruments (T640, T2550, T2750)
- Alter parameters and ensure changes are permanent
- Configure Sequence programs — SFCs
- Practice good programming — hints and tips
- Configure alarm settings

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• Good PC skills
• Process control experience

Objectives
• Add the PAC Network object
• Add PAC DeviceDiag objects
• BIND LIN blocks to objects
• Configure the InTouch HMI to display LIN block data
• Map and configure alarms

3005 Eycon Configuration
This hands-on, instructor-led class is designed to provide you with a good understanding of how to configure cached blocks and control strategies within the Eycon and create an operator-friendly HMI. On completion of the training you will be able to confidently maintain and develop the control programs and HMI within any Eycon. The LINtools programming application will be covered in detail and you will create a small realistic project ensuring sufficient hands-on practice. You will learn how to cache blocks into the Eycon from a Foxboro PAC T2750, and how to read/write between an Eycon and a PLC using a modbus gateway file. The User Screen Editor application will be used to develop a user-friendly HMI, and the alarm and security aspects will be demonstrated and practiced in detail. (Course code 3005)

Duration: 2 days

Who should attend?
• Process engineers responsible for configuration and administration of Eurotherm Eycon controllers and HMI

Prerequisites
• Microsoft Windows operating systems familiarity
• Knowledge of process control concepts
• Good LINtools knowledge

Objectives
• Cache blocks from other LIN nodes
• Create FBD Control Programs
• Create SFC Sequences to automate the filling of a tank
• Download files to Eycon
• Use the standard HMI
• Create customized displays using the User Screen Editor
• View and configure the audit trail to capture alterations
• Configure and view alarm displays
• Set up the security to protect certain functions
• Customize the standard HMI with user dictionaries

• Create recipes to allow repeatable downloading of known parameter sets
• Configure and run setpoint profiles
• Set up modbus gateway files to communicate to other PLCs

3006 LINtools — Operations Server and Viewer Fundamentals
This hands-on, instructor-led class is designed to equip the attendee with all the necessary skills for configuring a Eurotherm Suite system. On completion of the training, attendees will be able to confidently develop and maintain a small Eurotherm Suite project. Emphasis will be on using all the fundamental software tools and hardware with suggestions and guidance for good practice. A typical small project will be developed during the week. This project will include PID control for tank temperature, mathematical calculations, and automatic filling and emptying of a tank. The LINtools application will be covered in detail and practical aspects such as changing settings on a running system will be discussed and practiced. A user-friendly HMI on the PC will be developed using the Eurotherm Suite applications, and the User Screen Editor tools will be used to develop a suitable HMI for the Eycon. Alarm and security aspects will be discussed, and you will have sufficient hands-on practice to configure these and consolidate the knowledge gained.

Please note that this course will equip users with all the fundamental knowledge to develop a small project; further training will be required for especially large or complex projects, or those with specific requirements such as GAMP or third-party integration. A more detailed course for the Eycon is available if required. The InTouch interface will concentrate on the interface to the LIN blocks and will cover only the basic aspects of InTouch. A detailed Wonderware InTouch course should be attended for those engineers wishing to learn more. (Course code 3006)

Duration: 5 days

Who should attend?
• Process engineers responsible for configuration and administration of the control system

Prerequisites
• Microsoft Windows operating systems familiarity
• Knowledge of process control concepts

Objectives
• Overview of a typical system, training course project user requirement specification, and what equipment to use
• Create a Eurotherm Suite project
• Set up IP addresses, and LIN node addresses for T2550 and Eycon hardware
• Use LINtools to configure control strategies
3008 E+PLC400 and E+PLC100
Learn how to configure the E+PLC400 and E+PLC100. Attendees will create small realistic projects using the Codesys programming language and Eurotherm additions. Course 3008 covers the details of the Eurotherm additions but does not cover Codesys programming in detail.

For details of Codesys programming courses, please contact Eurotherm http://www.eurotherm.com or 3S-Smart Software Solutions http://www.codesys.com.

Please note that the help included within the E+PLC installation includes the topics covered in this training course. Comprehensive instructions and recordings are available so that users have the option to self-train, thus avoiding time restrictions and travel, and reducing expenses. (Course code 3008)

Duration: 2 days

Who should attend?
- Engineers responsible for the development and maintenance of Eurotherm E+PLC400 and/or E+PLC100

Prerequisites
- Good PC skills
- Process control experience
- Codesys programming knowledge is useful but not essential prior to the training. However, attendees may wish to obtain further Codesys knowledge after the training. Please contact Eurotherm or 3S for details of Codesys training courses.

Objectives
- Configure the hardware
- Set up the IP address
- Add I/O
- Configure Data Recording
- Add Control Loops
- Archive data and use UHH files in the review software
- Use the Setpoint Programmer
- Back up the project
- Download to the E+PLC400 or E+PLC100

3110 Series 2000 Introduction and Operation
Models 2100 Series, 2200 Series, 2400 Series controllers, and iTools — E0200 (Course code 3110)

Duration: 2 days

Who should attend?
- Engineers who maintain and configure Eurotherm 2000 Series controllers

Prerequisites
- General PC and Microsoft Windows operating systems usage
- Understanding of control theory

Objectives
- Use the front panel of various 2000 series controllers
- Configure control settings using the front panel
- Use iTools to configure the control strategy
- Use video tutorials for Series 2000 controllers available on the Web

### Prerequisites
- General PC and Microsoft Windows operating systems usage
- Understanding of control theory

### Objectives
- Learn about 6000 Series operation:
  - Log in
  - Navigate screens
  - Use history mode
  - Acknowledge alarms
  - Add notes
  - Control archives
  - Set clock and locale
  - Adjust input
  - Run diagnostics
- Configure 6000 Series systems
- Save and restore configurations
  - Configure the following:
    - instrument settings
    - group settings
    - channel settings
    - views settings
    - archive settings
    - events settings
    - event buttons settings
    - messages settings
    - user linearization settings
    - batch settings
    - math settings
    - total settings
    - counter settings
    - connection settings
    - output settings
    - demand write settings
    - email settings
    - report settings
- Learn about 6000 Series in a networked system:
  - Learn about recorder tools
  - Understand data flows
  - Configure network settings
  - Use the BRIDGE remote viewing tool
  - Use the EYRIS remote viewing tool
- Use the SECURITY MANAGER package to set up users, passwords, and access
- Deploy security settings to other recorders

#### 3120 Series 3000 Introduction and Operation
Models 3200, 3500, and iTools — E0200
(Course code 3120)

Duration: 2 days

Who should attend?
- Engineers who maintain and configure Eurotherm 3000 Series controllers

### Prerequisites
- General PC and Microsoft Windows operating systems usage
- Understanding of control theory

### Objectives
- Use the front panel of various Series 3000 controllers
- Configure control settings using the front panel
- Use iTools to configure the control strategy

#### 3130 Multiloop Controllers
Model 2500, 2604/2704 Mini8, and iTools — E0300
(Course code 3130)

Duration: 2 days

Who should attend?
- Engineers who maintain and configure Eurotherm Series multiloop controllers

### Prerequisites
- General PC and Microsoft Windows operating systems usage
- Understanding of control theory

### Objectives
- Use the front panel of various controllers
- Configure control settings using the front panel
- Use tools to configure the control strategy

#### 3210 Series 6000 Introduction and Operation
Hardware, configuration, networking, tools, and application — R0100 (Course code 3210)

Duration: 3 days

Who should attend?
- Engineers who maintain and configure Eurotherm Series multiloop controllers
3220 Series 6000 User Screens and Data Logging
User Screen creation, batch configuration, and data export with review — R0200 (Course code 3220)

Duration: 1 day

Who should attend?
• Engineers who maintain and configure Eurotherm Series multiloop controllers

Prerequisites
• General PC and Microsoft Windows operating systems usage
• Understanding of control theory

Objectives
• Learn how to use 6000 Series User Screens:
  - Navigate with User Screen Editor
  - Describe main screen properties
  - Add components
  - Edit components
  - Describe canvas view
  - Save and deploy
  - Import and export
• Describe the Historical Data Package
• Transfer history files using removable media
• Transfer history files using the network
• Transfer history files using auto backup and transfer
• Set up charts and spreadsheets
• Print and export data
• Describe database management

3220 Series 6000 User Screens and Data Logging

Duration: 1 day

Who should attend?
• Engineers who maintain and configure Eurotherm Series multiloop controllers

Prerequisites
• Knowledge of basic electronics
• Familiarity of process signals

Objectives
• Gain understanding of industries and various applications where Action products are used

3510 Signal Conditioning Action IQ, Ultra Slimpak
This instructor-led course provides hands-on experience with the Action IQ and the Ultra Slimpak product lines. The course explores real-world applications and the use of isolators and signal conditioners in the industrial world. (Course code 3510)

Duration: 1 day

Who should attend?
• Inside and outside instrumentation sales engineers, instrumentation technicians, Eurotherm distributors, and related personnel

Prerequisites
• Knowledge of basic electronics
• Familiarity of process signals

Objectives
• Gain understanding of industries and applications where Action products are used

3520 Signal Conditioning Ultra Slimpak II
This instructor-led course provides hands-on experience with the Ultra Slimpak II product line. The course explores real-world applications, and use of isolators and signal conditioners in the industrial world. Participants perform lab exercises using communications interface software. Additionally, the course demonstrates DDE software. (Course code 3520)

Duration: 3 days

Who should attend?
• Inside and outside instrumentation sales engineers, instrumentation technicians, Eurotherm distributors, and related personnel

Prerequisites
• Knowledge of basic electronics
• Familiarity of process signals
• Knowledge of Microsoft Windows operating systems

Objectives
• Gain understanding of industries and various applications where Action products are used
• Select the appropriate product based on customer requirements
• Calculate and understand principles of product specifications
• Become proficient in configuration and calibration of potentiometer and pushbutton modules
• Become familiar with software to configure Q488i and Q498 math modules

3520 Signal Conditioning Ultra Slimpak II

Duration: 3 days

Who should attend?
• Inside and outside instrumentation sales engineers, instrumentation technicians, Eurotherm distributors, and related personnel

Prerequisites
• Knowledge of basic electronics
• Familiarity of process signals
• Knowledge of Microsoft Windows operating systems

Objectives
• Gain understanding of industries and various applications where Action products are used
• Select the appropriate product based on customer requirements
• Calculate and understand principles of product specifications
• Become proficient in configuration and calibration of potentiometer and pushbutton modules and the communications interface
Foxboro and Triconex® Learning Tracks
Set your sites on the future

The more things change, the more you need process automation that keeps you in control. The Foxboro Evo™ process automation system is uniquely designed to protect your investments today while easing your transition to tomorrow. To learn more about how to future-proof your plant, visit www.foxboro.com/foxboroevo.

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Foxboro and Triconex Learning Tracks

Maintenance Engineer

- 8901: TRICON System Basic Maintenance
- 8902: TRICON System Configuration & Implementation
- 8903: Standard Programming
- 8907: Triconex Wonderware InTouch

- 8601: Triconex General-Purpose Basic Maintenance
- 8602: Triconex General-Purpose Configuration & Implementation

- 8901A: TRICON System Advanced Maintenance
- 8902A: TRIDENT System Configuration & Implementation

- 8904: Field Device Manager w/HART
- 8905: TRIDENT System Basic Maintenance
- 8905A: TRIDENT System Advanced Maintenance

- 8906: TRIDENT System Configuration & Implementation
- 8907: Triconex Wonderware InTouch

Field Devices

- 2220: FDS (fieldbus) w/Modbus
- 5612: FOUNDATION Fieldbus w/IACC
- 5613: FOUNDATION Fieldbus w/Control Editor
- 2221: Field Device Integration w/OPC
- 2222: Field Device Integration w/DeviceNet
- 5223: Field Device Manager w/HART
- 8963: OPC and Networking Essentials

Control Configuration

- 6212: Process Measurement Technology
- 6211: Process Control Technology

- 2211: Configuration Essentials
- 5200: Equipment Maintenance
- 5201: Configuration Essentials

Networks

- 2101: Continuous Control
- 5101: Continuous Control
- 2102: Sequence Control & Ladder Logic
- 5102: Sequence Control & Ladder Logic
- 2103: Integrated Control
- 5103: Integrated Control

SCADA

- 2212: Control Editor
- 2213: VA Configuration Component
- 5110: Control Editor
- 5111: MESH Config
- 5112: SCADA Config Essentials
- 2811: PIDA Block Configuration
- 2812: FBTUNE Block Configuration

Generic

- Foxboro Evo Process Automation System
- Foxboro Evo Core Services & I/A Series
- Triconex
- I/A Series
Foxboro Evo™ System
Instructor-led Courses
Foxboro Evo delivers actionable information when and where you need it.

The best decisions come from the best operational insights. So the Foxboro Evo™ process automation system provides every member of your team with the context-rich knowledge they need, on-site or off-site. Data dedicated to each role, predictive maintenance tools, and embedded user guidance help minimize distractions and focus attention on just what your people need to know. So managers and workers can make fast, accurate, proactive decisions in every area of the business — for maximized safety and success.

This changes everyone.

foxboro.com/FoxboroEvo
foxboroevo.apmarketing@invensys.com
5000 Introduction to Foxboro Evo Configuration
This instructor-led course will help increase plant availability and utilization by enabling plant engineering personnel to generate Foxboro Evo Control HMI displays, build simple control loops, and understand general system diagnostic messages from a process and maintenance engineer’s perspective. Participants will learn to identify major hardware and software components of the Foxboro Evo System. Participants will also learn the mechanisms and priorities used in process alarm reporting and will be taught to enable and disable alarm reporting. This course also introduces the programming steps needed to access and engineer the Historian. You will learn to manipulate data using mathematical functions. You will also practice configuring the Historian server to retrieve data and reports into a Microsoft Excel® spreadsheet or Web-based application, among other tasks. This hands-on course is designed to give you up-to-date information on creating, managing, and interrogating this sophisticated database. The classroom instruction and practical laboratory exercises will lay the groundwork for more advanced Foxboro Evo System courses. This course is made up of Process Automation Learning courses 5001 week 1 and 5004 week 2. (Course code 5000)

Duration: 10 days

Who should attend?
• Personnel who are responsible for Foxboro Evo System configuration and software maintenance
• This course is also intended for personnel responsible for retrieving and distributing data on process or plant performance and operations

Prerequisites
• Working knowledge of personal computers and Microsoft Excel
• Minimum of six months’ experience using process control computers

Objectives
• Identify basic hardware components of the MESH network, its functions, and interrelationships
• Describe the function of an operating system and execute elementary commands on Foxboro Evo System to support maintenance tasks
• Demonstrate use of the Control Editor to construct and generate simple process control schemes
• Demonstrate testing of control loops using default Control HMI process displays
• Use the Control HMI to construct process displays that interact with live process data
• Make online modifications to real-time and historical trend displays
• Interpret results and demonstrate modification of predefined alarm schemes
• Assign control block alarm events to Annunciator Keyboard LEDs and displays
• Assign programs to Annunciator Keyboard pushbuttons
• Describe the process of modifying the Foxboro Evo System configuration
• Describe standard system diagnostic and support tools available with the System Manager
• Operate the Historian to insert, update, retrieve, and display archived and live plant data
• Operate the Historian to import and store offline data (old data)
• Operate the Historian to configure advanced Event Detectors and Event Actions
• Perform Historian archiving operations
• Set up production-related reporting within Microsoft Excel and Word, and publish InSQL reports
• Set up the Historian and access data with the SQL query statement
• Use Historian utilities to access and modify instances
• Configure an instance to include both events activated by user-defined conditions and by data import values
• Describe data storage planning

5001 Foxboro Evo Configuration Essentials
This instructor-led course will help plant availability and utilization by enabling plant engineering personnel to generate Control HMI displays, build simple control loops, and understand general diagnostic messages from a process and maintenance engineer’s perspective. Participants will learn to identify major hardware and software components of the Foxboro Evo System. They will also learn the mechanisms and priorities used in process alarm reporting and will learn to enable and disable alarm reporting. Classroom instruction and practical laboratory exercises will lay the groundwork for more advanced Foxboro Evo System courses. (Course code 5001)

Duration: 5 days

Who should attend?
• Process and system engineers responsible for configuration of process control loops, displays, and security of their Foxboro Evo System

Prerequisites
• Working knowledge of personal computers and plant processes
• Minimum of six months’ experience using process control computers
Objectives

- Identify basic hardware components of the MESH network, its functions, and interrelationships
- Describe the function of an operating system and execute elementary commands on a Foxboro Evo System to support maintenance tasks
- Demonstrate use of the Control Editor to construct and generate simple process control schemes
- Demonstrate testing of control loops using default Control HMI process displays
- Use the Control HMI to construct process displays that interact with live process data
- Make online modifications to real-time and historical trend displays
- Interpret results and demonstrate modification of predefined alarm schemes
- Assign control block alarm events to Annunciator Keyboard LEDs and displays
- Assign programs to Annunciator Keyboard pushbuttons
- Describe the process of modifying a Foxboro Evo System configuration
- Describe the standard system diagnostic and support tools available with the System Manager

5001FV Foxboro Evo Configuration Essentials with FoxView

This instructor-led course will help plant availability and utilization by enabling plant engineering personnel to generate FoxView displays, build simple control loops, and understand general diagnostic messages from a process and maintenance engineer’s perspective. Participants will learn to identify major hardware and software components of the Foxboro Evo System. They will also learn the mechanisms and priorities used in process alarm reporting, and will learn to enable and disable alarm reporting. Classroom instruction and practical laboratory exercises will lay the groundwork for more advanced Foxboro Evo System courses. (Course code 5001FV)

Duration: 5 days

Who should attend?

- Process and system engineers responsible for configuration of process control loops, displays and security of their Foxboro Evo System

Prerequisites

- Working knowledge of personal computers and plant processes
- Minimum of six months’ experience using process control computers

5004 Historian

This instructor-led course helps increase plant utilization by introducing the programming steps needed to access and engineer the Historian. This course will provide the participant with a fundamental understanding of the role of the Historian as a plant-wide historian and data provider. The course is also designed to provide the participant with a fundamental understanding of how the Historian client can be used to report and analyze historian data. You will also practice configuring a Historian server to retrieve data and reports into a Microsoft Excel spreadsheet or Web-based application, among other tasks. This hands-on course is designed to give you up-to-date information on creating, managing, and interrogating this sophisticated database. (Course code 5004)

Duration: 5 days

Who should attend?

- Managers and engineers responsible for retrieving data on process or plant performance or on plant operations

Prerequisites

- Process Automation Learning course 5001 Foxboro Evo Configuration Essentials
- Familiarity with Microsoft Office®
Objectives

- Operate the Historian application to insert, update, retrieve, and display archived and live plant data
- Operate the Historian application to import and store offline data (old data)
- Operate the Historian application to configure advanced event detectors and event actions
- Perform Historian archiving operations
- Set up production-related reporting within Microsoft Excel and Word, and publishing InSQL reports
- Set up the Historian and access data with the SQL query statement
- Use Historian utilities to access and modify instances
- Configure an instance to include both events activated by user-defined conditions and data import values
- Describe data storage planning

5005 Foxboro Evo Control HMI

This instructor-led course helps increase plant utilization and lower engineering costs through effective design and use of Foxboro Evo development tools. This hands-on course is intended for customers using the Control HMI as the display application for the Foxboro Evo System. Students will learn to use built-in Control HMI functionality, as well as creating custom functionality for their specific application using WindowMaker® and the Control Editor. (Course code 5005)

Duration: 5 days

Who should attend?
- Process control engineers and technicians who are responsible for building or maintaining the Control HMI application and/or application objects

Prerequisites
- A basic knowledge of programming or scripting concepts is helpful
- Process Automation Learning course 5001 Foxboro Evo Configuration Essentials

Objectives
- Create and edit graphical objects in the Control HMI
- Reduce engineering efforts by using templates for graphical objects
- Create scripts using the WindowMaker Script Editor and the Control Editor
- Identify built-in scripts/script functions and use them to reduce development time on an application

5006 Foxboro Evo Managed Control HMI

This instructor-led course will help increase plant utilization and lower engineering cost through the application of advanced techniques when building graphical displays for the Foxboro Evo system using the Control HMI with managed apps. Foxboro Evo Control HMI version 6.0 and later facilitates the use of a managed or stand-alone Control HMI. Students can manage and edit managed Control HMI through the ArchestrA IDE. Students will learn to use standard Control HMI features and create custom functions in user displays using managed apps.

(Course code 5006)

Duration: 5 days

Who should attend?
- Process control engineers and technicians who are responsible for building or maintaining managed Control HMI and/or application objects

Prerequisites:
- A basic knowledge of programming or scripting concepts is helpful
- Process Automation Learning course 5001 Foxboro Evo Configuration Essentials

Objectives
- Configure alarm displays for the Control HMI
- Configure trend displays for the Control HMI
- Configure security for the Control HMI
5012 Foxboro Evo Control System Security

This instructor-led workshop will help make engineers familiar with key security features available in the Foxboro Evo Process Automation system. The workshop will enable the participant to understand the settings and set-up of the Control Security Services management settings. This workshop will also introduce participants to workstation hardening, types of installation, modifications of Active Directory, and troubleshooting and recovery techniques required in meeting cybersecurity standards. (Course code 5012)

Duration: 5 days

Who should attend?
- Plant engineers with Foxboro system security responsibilities and background

Prerequisites
- Process Automation Learning course 2000 Introduction to Configuration, 2001 Configuration Essentials, 5000 Introduction to Foxboro Evo Configuration, or 5001 Foxboro Evo Configuration Essentials
- Experience in critical infrastructure (CI) control systems and their relationship to modern IT networks
- At least one year’s experience in process control system administration

Objectives
- Describe key enhancements contained in Foxboro Evo System Control Security Services
- Describe use of the system definition software
- Describe procedures needed to perform Microsoft Windows hardening on both Microsoft Windows 7 and server class stations
- Review Active Directory enhancements and settings
- Review troubleshooting techniques for Active Directory
- Save Active directory settings from a Primary Domain Controller (PDC)
- Review the install procedures for eight types of installs of PDC
- Review Day 1 procedures and workarounds
- Work with the McAfee ePolicy Console to work with settings of firewalls and whitelisting
- Use available documentation, configurators, tools, and utilities to analyze and troubleshoot Control Security Services issues

5090 Foxboro Evo Virtualization Server

This instructor-led workshop is intended for system and network engineers responsible for supporting virtualization servers and operator workstations using thin clients. This course will cover the use of Microsoft Hyper-V server and the administration of virtual images. Attendees will back up and restore virtual images to the server to demonstrate the reliability and versatility of this platform. (Course code 5090)

Duration: 3 days

Who should attend?
- Application and control engineers responsible for the administration of Foxboro systems and maintaining virtualization servers

Prerequisites
- Process Automation Learning course 2007 System Administration for Microsoft Windows or equivalent knowledge
- Process Automation Learning course 5012 Foxboro Evo Control System Security or equivalent knowledge
- At least one year’s experience in process control administration

Objectives
- Describe requirements and advantages of a virtualization server
- Describe procedures to maintain a virtualization server and virtual images for Primary Domain Controller, Galaxy repository, Display Server, and Historian Server
- Describe network requirements and setups for connecting a virtualization server to a MESH network and engineering networks
- Describe how to manage thin client connections
- Save and recover virtual stations using Microsoft Hyper-V tools
- Utilizing all available documentation, use assigned configurators, tools, and utilities to analyze and troubleshoot the virtualization server

5091 SCP Computer for Foxboro Evo System Control Check-out

This instructor-led class is designed to provide a fundamental understanding of the basics of the SCP software for Foxboro Evo controls check-out. SCP is a virtual stimulation of the Foxboro Control Processor, FCP270, ZCP270 and FCP280 hardware. The class provides lectures and hands-on labs to supply and reinforce the knowledge necessary to effectively interact with the SCP software. The course is designed for both new users and infrequent users who would benefit from a refresher course. (Course code 5091)

Duration: 1 day
Who should attend?
• Control engineers
• Operator training simulator maintainers
• Process engineers
• Other individuals who would like a basic understanding of configuring and deploying Foxboro Evo process automation system using emulation software
• Operator training simulator engineers

Prerequisites
• Process Automation Learning course 5091 SCP Computer for Foxboro Evo System Controls Check-out
• Knowledge of the Foxboro Evo process automation system is highly recommended

Objectives
• Configure simulations
• Create flowsheets
• Create the cross reference database
• Create and restore backtracks and initial conditions
• Record scenarios
• Create tieback simulation models

5100 Foxboro Evo Integrated Control
This instructor-led course will help you increase plant utilization and availability by making familiar the control blocks and algorithms available for designing control databases using the Control Editor. This course focuses on parameters and algorithms required for continuous control applications, such as cascade, ratio, feedforward, and adaptive control loops. Included in the course are procedures for executing real-time complex mathematical calculations at the loop level. Fail-safe strategies and procedures are also discussed in this course. This course also makes familiar the procedures for designing ladder logic programs using the Ladder Logic Diagram Editor, and designing sequence programs using the Control Editor HLBL and the Sequential Function Chart Editor. These programs are typically used to automate the start-up or shutdown of a process, as well as in batch processes. You will build and test ladder logic control and sequential control schemes. The course includes extensive laboratory sessions to allow participants to both practice and test procedures learned. This course is made up of Process Automation course 5101 week 1 and 5102 week 2. (Course code 5100)

Duration: 10 days

Who should attend?
• Control and process control engineers and technicians responsible for the design, installation, testing, or maintenance of control schemes using the Control Editor

Prerequisites
• Process Automation Learning course 5091 SCP Computer for Foxboro Evo System Controls Check-out
• Knowledge of the Foxboro Evo process automation system is highly recommended

Objectives
• Describe the SCP software
• Connect to a Galaxy
• Import Automation Objects
• Import SaveAll Controls
• Create an SCP Instance
• Start an SCP
• Deploy controls using the Control Editor
• Use SCP utilities (e.g., SCP Console, System Manager)

5092 SCP Computer for Foxboro Evo System Tieback and OTS
This instructor-led class is designed to provide an understanding of the basics of the SCP (Simulated Control Processor — FCP270, ZCP270, FCP280) software. This course will introduce the major concepts and applications used for tieback and OTS including: DYNSIM, initial setup and startup, defining units of measure and components, process models, cross reference database, snapshots, scenarios, modifying controls, tieback simulation, rules and validating models, bulk generating model objects, and the model data view. The class provides lectures and hands-on labs to supply and reinforce the knowledge necessary to effectively interact with the SCP software. The course is designed for both new users and infrequent users who would benefit from a refresher course. (Course code 5092)

Duration: 3 days

Who should attend?
• Control engineers
• Operator training simulator maintainers
• Process engineers
• Other individuals who would like a basic understanding of using simulation tools and controls emulation software to enhance the ability to define and tune controls
• Operator training simulator engineers

Prerequisites
• Process Automation Learning course 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
• Process Automation Learning course 6211 Process Control Technology or equivalent knowledge
Objectives:

- Utilize control block parameters to construct and verify the operation of cascade, feedforward, ratio, multiple output, and discrete control schemes
- Employ the use of control parameters to enable output tracking, alarm filtering, and loop initialization
- Configure fieldbus modules for desired fail-safe operation and measurement resolution
- Implement complex real-time calculations in control loops using advanced calculation blocks
- Employ I/A Series system PIDA, FBTUNE, and other control blocks to configure and test adaptive control schemes
- Understand the use of the different types of control algorithms available
- Employ the PLC block and other control blocks to configure and test ladder logic control strategy
- Describe the functions of sequence control blocks and how they interact with each other
- Operate, configure, and program the monitor, timer, independent, dependent, and exception sequence blocks
- Use preprocessor commands in conjunction with macros and include files
- Program and test subroutines and standard block exception handlers
- Use the Control Editor Sequence Function Chart Editor to program and test sequence control blocks

5101 Foxboro Evo Continuous Control

This instructor-led course will help you increase plant utilization and availability by making familiar the control blocks and algorithms used in designing continuous control databases using the Control Editor. This course focuses on parameters and algorithms required for continuous control applications, such as cascade, ratio, feedforward, and adaptive control loops. Included in the course are procedures for executing real-time complex mathematical calculations at the loop level. Fail-safe strategies and procedures are also discussed in this course, which includes extensive laboratory sessions to allow participants to both practice and test procedures learned. (Course code 5101, 5101FV – same objectives with FoxView as the HMI)

Duration: 5 days

Who should attend?

- Control and process control engineers and technicians responsible for the design, installation, testing, or maintenance of control schemes using the Control Editor

Prerequisites:

- Process Automation Learning course 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
- Process Automation Learning course 6211 Process Control Technology or equivalent knowledge

Objectives:

- Utilize control block parameters to construct and verify the operation of cascade, feedforward, ratio, multiple output, and discrete control schemes
- Employ the use of control parameters to enable output tracking, alarm filtering, and loop initialization
- Configure Fieldbus modules for desired fail-safe operation and measurement resolution
- Implement complex real-time calculations in control loops using advanced calculation blocks
- Employ PIDA, FBTUNE, and other control blocks to configure and test adaptive control schemes
- Understand the use of the different types of control algorithms available
- Employ the PLB block and other control blocks to configure and test ladder logic control strategy
- Describe the functions of sequence control blocks and how they interact with each other
- Operate, configure, and program the monitor, timer, independent, dependent, and exception sequence blocks
- Use preprocessor commands in conjunction with macros and include files
- Program and test subroutines and standard block exception handlers
- Use the Control Editor Sequence Function Chart Editor to program and test sequence control blocks

5101FV Foxboro Evo Continuous Control with FoxView

This instructor-led course will help you increase plant utilization and availability by making familiar the control blocks and algorithms used in designing continuous control databases using the Control Editor. This course focuses on parameters and algorithms required for continuous control applications, such as cascade, ratio, feedforward, and adaptive control loops. Included in the course are procedures for executing real-time complex mathematical calculations at the loop level. Fail-safe strategies and procedures are also discussed in this course, which includes extensive laboratory sessions to allow participants to both practice and test procedures learned. (Course code 5101FV. This class uses FoxView as the HMI)

Duration: 5 days

Who should attend?

- Control and process control engineers and technicians responsible for the design, installation, testing, or maintenance of control schemes using the Control Editor

Prerequisites:

- Process Automation Learning course 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
- Process Automation Learning course 6211 Process Control Technology or equivalent knowledge
Objectives:
- Utilize control block parameters to construct and verify the operation of cascade, feedforward, ratio, multiple output, and discrete control schemes
- Employ the use of control parameters to enable output tracking, alarm filtering, and loop initialization
- Configure fieldbus modules for desired fail-safe operation and measurement resolution
- Implement complex real-time calculations in control loops using advanced calculation blocks
- Employ PIDA, FBTUNE, and other control blocks to configure and test adaptive control schemes
- Understand the use of the different types of control algorithms available in a Foxboro Evo System

5102 Foxboro Evo Sequence Control and Ladder Logic
This instructor-led course will help you increase plant utilization and availability by making familiar the procedures and processes for designing sequence and ladder logic programs using the Control Editor. These programs are typically used to automate the start-up or shutdown of a process, as well as in batch processes. This course uses the Control Editor Ladder Logic Diagram Editor to implement ladder logic schemes, and HLBL and Sequential Function Chart Editor to design sequence programs. These programs are typically used to automate the start-up or shutdown of a process, as well as in batch processes. The course includes extensive laboratory sessions to allow participants to both practice and test procedures. (Course code 5102, 5102FV — same objectives with FoxView as HMI)

Duration: 5 days

Who should attend?
- Control and process control engineers and technicians responsible for the design, installation, testing, or maintenance of control schemes involving ladder logic and/or sequential control schemes using the Control Editor

Prerequisites
- Process Automation Learning course 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
- Process Automation Learning course 5101 Foxboro Evo Continuous Control
- Process Automation Learning course 6211 Process Control Technology or equivalent knowledge

Objectives
- Describe the functions of sequence control blocks and how they interact with each other
- Operate, configure, and program the monitor, timer, independent, dependent, and exception sequence blocks
- Use Preprocessor Commands in conjunction with Macros and include files
- Use HLBL to create sequence control programs
- Program and test subroutines and Standard Block Exception Handlers
- Use the Sequence Function Chart Editor to program sequence control blocks
- Employ the PLB block, and other control blocks, to configure and test a ladder logic control strategy

5102FV Foxboro Evo Sequence Control and Ladder Logic with FoxView
This instructor-led course will help you increase plant utilization and availability by making familiar the procedures and processes for designing sequence and ladder logic programs using the Control Editor. These programs are typically used to automate the start-up or shutdown of a process, as well as in batch processes. This course uses the Control Editor Ladder Logic Diagram Editor to implement ladder logic schemes and HLBL and Sequential Function Chart Editor to design sequence programs. These programs are typically used to automate the start-up or shutdown of a process, as well as in batch processes. The course includes extensive laboratory sessions to allow participants to both practice and test procedures. (Course code 5102FV uses FoxView as HMI)

Duration: 5 days

Who should attend?
- Control and process control engineers and technicians responsible for the design, installation, testing or maintenance of control schemes involving ladder logic and/or sequential control schemes using the Control Editor

Prerequisites
- Process Automation Learning course 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
- Process Automation Learning course 5101 Foxboro Evo Continuous Control
- Process Automation Learning course 6211 Process Control Technology or equivalent knowledge

Objectives
- Describe the functions of sequence control blocks and how they interact with each other
- Operate, configure, and program the monitor, timer, independent, dependent, and exception sequence blocks
Operate System Manager displays to update the firmware of control stations and peripherals

Utilize documentation and the proper troubleshooting techniques to resolve hardware problems

5210 Foxboro Evo System and Software Maintenance
This instructor-led course will help increase plant availability, and reduce corrective and preventive maintenance cost by making familiar procedures to test and identify I/O problems encountered during hardware and software installation, system modification, and ongoing maintenance. It will also help protect plant intellectual assets and minimize the impact of unforeseen plant outages through the usage of proper archiving and restoration of Foxboro Evo System files and databases. Laboratory exercises will reinforce the procedures taught in the use of system diagnostic tools and procedures, and in identifying field problems in control loops.
(Course code 5210)

Duration: 5 days

Who should attend?
• Technicians responsible for system backup and restore procedures, and testing communications between Foxboro Evo System equipment and I/O devices

Prerequisites
• Working knowledge of personal computers
• Prior experience with digital process control equipment

Objectives
• Use basic operating system commands to support maintenance tasks
• Perform system backup and restoration procedures on workstations
• Construct a continuous control loop using the Control Editor to monitor and control a process
• Incorporate alarming parameters into a control loop
• Utilize Control HMI displays to monitor and control a process
• Utilize Control Editor ladder logic application to control and test discrete devices
• Employ discrete control blocks to test devices
**5210FV Foxboro Evo System and Software Maintenance with FoxView**

This instructor-led course will help increase plant availability, and reduce corrective and preventive maintenance cost by making familiar procedures to test and identify I/O problems encountered during hardware and software installation, system modification, and ongoing maintenance. It will also help protect plant intellectual assets and minimize the impact of unforeseen plant outages through the usage of proper archiving and restoration of Foxboro Evo System files and databases. Laboratory exercises will reinforce the procedures taught in the use of system diagnostic tools and procedures and in identifying field problems in control loops. (Course code 5210FV uses FoxView as HMI)

**Duration: 5 days**

**Who should attend?**
- Technicians responsible for system backup and restore procedures, and testing communications between Foxboro Evo System equipment and I/O devices

**Prerequisites**
- Working knowledge of personal computers
- Prior experience with digital process control equipment
- Process Automation Learning course 5200 Foxboro Evo Equipment Maintenance

**Objectives**
- Use basic operating system commands to support maintenance tasks
- Perform system backup and restoration procedures on workstations
- Construct a continuous control loop using the Control Editor to monitor and control a process
- Incorporate alarming parameters into a control loop
- Utilize FoxView displays to monitor and control a process
- Utilize Control Editor ladder logic application to control and test discrete devices
- Employ discrete control blocks to test devices

**5223 Foxboro Evo Field Device Manager with HART**

This instructor-led workshop is intended for both engineers and instrument specialists who work with HART instruments. This course is an introduction to the major components and major concepts when using HART instrumentation along with the Foxboro Evo Field Device Manager for HART. Attendees will configure and connect to HART instruments using the Foxboro Evo Field Device Manager for HART. (Course code 5223)

**Duration: 3 days**

**Who should attend?**
- Process control engineers, technicians, and instrument specialists who are responsible for installing and maintaining HART instruments using the Foxboro Evo Field Device Manager for HART system

**Prerequisites**
- At least one year of process control and instrumentation experience
- Process Automation Learning course 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
- Process Automation Learning course 6211 Process Control Technology or equivalent knowledge
- Process Automation Learning course 6212 Process Measurement Technology or equivalent knowledge

**Objectives**
- Describe requirements of HART principles and network configurations
- Describe procedures to populate Field Device Manager with HART instrument templates by instrument model type
- Describe how to set-up, install, and commission HART equipment on the Foxboro Evo Control System
- Describe how to perform maintenance functions on HART instruments using the Field Device Manager with HART

**5300 Foxboro Evo System Process Operations**

This instructor-led course will help improve plant utilization and availability by providing plant staff with the background necessary to perform procedures normally encountered by a process operator in the control room. Through a series of simulated control schemes, participants will learn the mechanics of operating the Control HMI by interacting with typical process displays. (Course code 5300)

**Duration: 3 days**

**Who should attend?**
- Control room operators, supervisors, and process engineers responsible for day-to-day operations in the plant

**Prerequisites**
- Previous control room experience using pneumatic, electronic, or digital systems

**Objectives**
- Use the devices provided by the operator's workstation to access displays, overlays, and environments, and to determine which variables are operator changeable
• Given a typical process situation, recognize the occurrence of a process alarm, determine its cause, and provide appropriate response
• Operate the standard Control HMI faceplate displays and custom graphic displays
• Use the features of real-time trends to observe variations in process conditions and review historical data
• Demonstrate the methods to access information presented in the Control HMI operational and on-demand custom process reports
• In the event of a failure, acknowledge the system alarm and identify the failed system component

5612 Foxboro Evo Control Editor
This instructor-led course will help you increase plant availability and utilization while reducing engineering cost. Upon completion of this course, participants will be able to understand the Control Editor features and capabilities for creating control solutions and applications for a variety of automation application areas with reusability and ease of debugging and commissioning. Participants will be able to control, design, create, test, and run real-time application programs for their plant. Participants will learn to use Control Editor strategies to create control schemes. The Control Editor supports bulk generation function that you can use to generate a database using Control Station Save-Alls. Participants will also learn to use the Control Editor Appearance Editor, which allows the building of custom functional symbols. Participants will also learn how to define system hardware and accompanying software parameters. (Course code 5612)

Duration: 5 days

Who should attend?
• Process control engineers who will use the Control Editor to create, edit, document, and secure control databases, displays, and Foxboro Evo System Core Services

Prerequisites
• Process Automation Learning course 5000 Introduction to Configuration or 5001 Configuration Essentials
• Process Automation Learning course 5100 Integrated Control or 5101 Continuous Control

Objectives
• Build a simple loop using Control Editor strategies, assign it to a compound, and download it to a control station
• Given a tag list and templates, bulk generate multiple compounds and Control Editor tool strategies
• Build user-defined objects, e.g., SAMA diagrams
• Describe and use Control Editor templates, instances, and inheritance

5625 Foxboro Evo InBatch™
This instructor-led course will help you increase plant availability and utilization while reducing engineering cost in developing Foxboro Evo System programs. The participant will gain practical experience with batch processing. Participants will construct a batch model based on a plant physical model and functional specification, then run and report on the batch recipes that have been created. Participants will also optimize the performance of the batch control strategy using recipe phases. (Course code 5625)

Duration: 5 days

Who should attend?
• Process and control system engineers responsible for coordinating, implementing or maintaining InBatch

Prerequisites
• Process Automation Learning course 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
• Process Automation Learning course 5100 Foxboro Evo Integrated Control, or 5101 Foxboro Evo Continuous Control and 5102 Foxboro Evo Sequence Control and Ladder Logic

Objectives
• Given a process model, define the units, connections, and phases required to implement the batch control strategy
• Link a process model to a control strategy
• Map the process states defined in a Functional Design Specification into the sequence block states
• Program sequence blocks so that the batch interface can be used effectively and the control strategy can be easily maintained
5652 FOUNDATION Fieldbus System Engineering with Control Editor

This hands-on, instructor-led course will help improve plant availability and reliability by making familiar the concepts, tools, and tasks required to engineer and integrate FOUNDATION fieldbus devices with the Foxboro Evo System. Participants will become acquainted with segment design, importing Device Description (DD) files and installing a Device Type Manager (DTM). Participants will create new device-type templates, set security privileges, and default parameter values. Participants will also create derived device type templates, create and configure device instances, associate device instances with an FBM/channel, and set FBM parameters.

(Course code 5652)

Duration: 5 days

Who should attend?

• Engineers who need to design FOUNDATION fieldbus segments, and configure and integrate FOUNDATION fieldbus devices with the Foxboro Evo System

Prerequisites

• Process Automation Learning course 5100 Foxboro Evo Integrated Control (recommended)
• Process Automation Learning course 5612 Foxboro Evo Control Editor (recommended)

Objectives

• Describe the publish, subscribe, and client server communication methods
• Describe FOUNDATION fieldbus loading and sizing rules and best practices
• Describe the function and link master block schedules
• Describe the macrocycle implementation
• Describe Link Active Scheduler (LAS) responsibilities
• Use Foundation fieldbus device templates in the Control Editor
• Customize download/upload behavior and FDM tabs & viewing screens in the Control Editor
• Link manuals and other documentation in the Control Editor
• Set up security by privileges and user roles in the Control Editor
• Use inheritance functions in the Control Editor
• Configure the function block in the Control Editor
• Use the Field Device Manager to commission, replace, and troubleshoot devices

5700 Foxboro Evo Management Overview

This course will help managers understand how they can increase plant availability and utilization using the Foxboro Evo System. The course profiles the capabilities and major components of the Foxboro Evo System. Participants will review hardware, control strategies, and Foxboro Evo System software packages and their features. This increased system comprehension will help participants make better informed day-to-day plant decisions. (Course code 5700)

Duration: 3 days

Who should attend?

• Process managers or newly promoted supervisors who need a basic understanding of the Foxboro Evo System functions and operations

Prerequisites:

• None

Objectives:

• List the major hardware components of the Foxboro Evo System, their functions, and interrelationships
• Demonstrate the method of accessing environments, displays, and the Control Editor, and describe the purpose of this configurator
• Describe and manipulate predefined process control schemes consisting of block types
• Describe and recognize the occurrence of a process alarm
• Identify a failed component
• Describe the information presented in standard and custom process reports
• Use Control HMI trend displays and trending software packages to view real-time and historical data
• Describe how the Control Editor is used to modify and document a predefined system configuration
Triconex
Instructor-led Courses
8100 Triconex Cybersecurity
This instructor-led course will help improve plant availability and utilization by providing instruction on networking fundamentals and cybersecurity. The primary objective of this course is to use the software tools and hardware modules; including the TriStation 1131 Developer’s Workbench, communications devices, and Tofino to implement cybersecurity on your Triconex system. Students will learn to effectively secure TRICON/TRIDENT controllers within a network to protect the system and communications from unauthorized exposure and external interference. Student labs and practical exercises will validate learning by configuring and resolving system connectivity issues. Successful completion of this course will reduce integration and installation time by effectively applying the Triconex tools and systems. Students will learn the principles of Triple Modular Redundancy (TMR) architecture. Learning objectives include: verification of network and system health, cybersecurity features, networking fundamentals, Triconex hardware configuration, TriStation 1131 project security, the Tofino firewall, and describe best practices. (Course code 8100)

Duration: 3 days

Who should attend?
• Supervisory personnel responsible for the TRICON system
• Engineers and technicians responsible for supporting a TRICON system
• Plant engineers who configure and support the TRICON system

Prerequisites
• Working knowledge of Microsoft Windows operating systems
• Working knowledge of Programmable Logic Controllers (PLCs) and/or Distributed Control Systems (DCS)
• Familiar with basic electronics and maintenance procedures
• Process Automation Learning course 8902 TRICON System/TriStation 1131 Configuration and Implementation

Objectives
• Describe the basic theory and operation of the TRICON TMR system
• Describe the fundamentals of networking
• Configure and troubleshoot Triconex communications devices
  - Triconex Keyswitch settings
  - TRICON System Communications Module (TCM)
• Set up and implement the Tofino firewall
• Implement TriStation 1131 Developer’s Workbench project security
• Describe and implement cybersecurity features

8300 Triconex — Wonderware Operator
This instructor-led course will help improve plant availability and utilization by providing instruction for operators to monitor and maintain plant operations. The training environment simulates the plant environment, allowing students to work with processes and instrumentation. Using the TRICON safety system and Wonderware InTouch screens, the training will provide displays that are configured for plant operations. This comprehensive training program tests students on real-time decision making on alarm recognition and response. Learning modules cover: 1) System configuration, 2) Describe the control/safety application, 3) Overview of process simulation screens, 4) Recognize and respond to alarms, 5) Modify setpoints, and 6) Troubleshooting and preventive maintenance. (Course code 8300)

Duration: 3 days

Who should attend?
• Supervisory personnel responsible for the Triconex system
• Technicians responsible for installing and maintaining the Triconex system
• Plant engineers who configure and support the Triconex system

Prerequisites
• Working knowledge of Microsoft Windows operating systems
• Working knowledge of PLCs or DCSs
• Familiarity with basic electronics and maintenance procedures
• Process Automation Learning course 8902 TRICON System/TriStation 1131 Configuration and Implementation or 8906 TRIDENT System/TriStation 1131 Configuration and Implementation

Objectives
• Describe the hardware and implementation of the TRICON controller
• Describe the basic features of the Wonderware InTouch system
• Establish communications between the TRICON System and Wonderware display
• Describe a Control Program in TriStation 1131
• Read Wonderware displays using WindowMaker and WindowViewer®
• Change setpoints and force points from the Wonderware display
• Recognize and respond to alarms
8601A Triconex General-Purpose/TriStation 1131 Advanced Maintenance

This 2-day hands-on, instructor-led, advanced course will improve plant safety and availability by instructing students in advanced Triconex General-Purpose system maintenance techniques. Primary course objectives include identifying and responding to internal, external, and field faults. Basic Triconex General-Purpose system implementation, maintenance, and troubleshooting of the system will be reviewed at the start of the course. Students will learn and be evaluated on their understanding of maintenance scenarios and troubleshooting skills using advanced level techniques.

Students will also use the features of the Enhanced Diagnostic Monitor (EDM) of the Microsoft Windows-based TriStation 1131 Developer’s Workbench to troubleshoot, respond to alarms, replace modules, and clear faults. (Course code 8601A)

Duration: 2 days

Who should attend?

• Supervisory personnel responsible for the Triconex General-Purpose system
• Technicians responsible for installing and maintaining the Triconex General-Purpose system
• Plant engineers who configure and support the Triconex General-Purpose system

Prerequisites

• Working knowledge of Microsoft Windows operating systems
• Working knowledge of PLCs or DCSs
• Familiar with basic electronics and maintenance procedures

Objectives

• Triconex General-Purpose System Overview
  - Describe the basic theory of operation of the Triconex General-Purpose architecture
  - Identify components
  - Replace modules
  - Respond to alarms
• Use Enhanced Diagnostic Panel
  - Monitor status
  - Troubleshoot
  - Collect events
• TriStation 1131 Developer’s Workbench
  - Developing a project
  - Function block diagram (FBD) programming
• Downloading and Online Maintenance
  - Download procedures to the Triconex General-Purpose system
  - Online maintenance and forcing points
  - Download changes
• Maintenance and Troubleshooting
  - Use Enhanced Diagnostic Monitor
  - Preventive maintenance techniques
  - System Administration

8601 Triconex General-Purpose/TriStation 1131 Basic Maintenance

This hands-on, instructor-led course will help improve plant reliability and robustness by covering all aspects of Triconex General-Purpose implementation and maintenance. Participants are taught the principles of Triconex General-Purpose redundant architecture, system configuration, programming, maintenance, and troubleshooting of the system. Using the TriStation 1131 Developer’s Workbench, participants configure and program a system with digital and analog I/O. Participants get practical experience in system operation such as downloading new programs, and disabling and forcing I/O points. (Course code 8601)

Duration: 2 days

Who should attend?

• Supervisory personnel responsible for the Triconex General-Purpose system
• Technicians responsible for installing and maintaining the Triconex General-Purpose system
• Plant engineers who configure and support the Triconex General-Purpose system

Prerequisites

• Working knowledge of Microsoft Windows operating systems
• Working knowledge of PLCs or DCSs
• Familiar with basic electronics and maintenance procedures

Objectives

• Triconex General-Purpose System Overview
  - Describe the basic theory of operation of the Triconex General-Purpose architecture
  - Identify components
  - Replace modules
  - Respond to alarms
• Use Enhanced Diagnostic Panel
  - Monitor status
  - Troubleshoot
  - Collect events
• TriStation 1131 Developer’s Workbench
  - Developing a project
  - Function block diagram (FBD) programming
• Downloading and Online Maintenance
  - Download procedures to the Triconex General-Purpose system
  - Online maintenance and forcing points
  - Download changes
• Maintenance and Troubleshooting
  - Use Enhanced Diagnostic Monitor
  - Preventive maintenance techniques
  - System Administration
8602 Triconex General-Purpose Configuration & Implementation
This hands-on, instructor-led course will help improve plant reliability and robustness by covering all aspects of Triconex General-Purpose implementation and maintenance. Participants are taught the principles of Triconex General-Purpose redundant architecture, system configuration, programming, maintenance, and troubleshooting of the system. Using the TriStation 1131 Developer’s Workbench, participants configure and program a system with digital and analog I/O. Participants get practical experience in system operation such as downloading new programs, and disabling and forcing I/O points. (Course code 8602)

Duration: 5 days

Who should attend?
• Supervisory personnel responsible for the Triconex General-Purpose system
• Technicians responsible for installing and maintaining the Triconex General-Purpose system
• Plant engineers who configure and support the Triconex General-Purpose system

Prerequisites
• Working knowledge of Microsoft Windows operating systems
• Working knowledge of PLCs or DCSs
• Familiar with basic electronics and maintenance procedures
• Process Automation Learning course 8601 Triconex General-Purpose/TriStation 1131 Basic Maintenance and 8601A Triconex General-Purpose/TriStation 1131 Advanced Maintenance

Objectives
• Triconex General-Purpose System Overview:
  - Describe the basic theory of operation of the Triconex General-Purpose architecture
  - Identify components
  - Replace modules
  - Respond to alarms
• TriStation 1131 Developer’s Workbench:
  - Developing a project
  - FBD programming
• Downloading and Online Maintenance:
  - Download procedures to the Triconex General-Purpose system
  - Online maintenance and forcing points
  - Download changes
• Maintenance and Troubleshooting:
  - Use Enhanced Diagnostic Monitor
  - Preventive maintenance techniques
• System Administration

8801 TUV Functional Safety Engineer Training
The TUV Training and Certification program supports knowledge, know-how, and expertise to engineers working in the field of functional safety. This course provides a clear understanding of the global and uniform standard of competence towards compliance of IEC61511-1, paragraph 5.2.2.
The first three days are classroom setting instruction that provide detailed information and examples/discussions for understanding and mastering the requirements of IEC61508/IEC61511 functional safety. Evening study time and problem-solving is recommended. The last day consists of a two-part examination:
• 130 multiple choice questions
• 5 working problems
(Course code 8801)

Duration: 4 days

Who should attend?
• Engineers involved in any part of the SIS Safety life cycle

Prerequisites
• A minimum of 3 to 5 years in the field of functional safety
• University degree or equivalent engineering responsibilities, status should be certified by employer

Objectives
• Engineering knowledge, training, and experience appropriate to the process application
• Engineering knowledge, training, and experience appropriate to the applicable technology used (for example, electrical, electronic, or programmable electronic)
• Engineering knowledge, training, and experience appropriate to the sensors and final elements
• Safety engineering knowledge (for example, process safety analysis)
• Knowledge of the legal and safety regulatory requirements
• Adequate management and leadership skills appropriate to their role in safety life cycle activities
• Understanding of the potential consequence of an event
• The safety integrity level of the safety instrumented functions
• The novelty and complexity of the application and the technology
8901 TRICON™ System/TriStation 1131
Basic Maintenance

This hands-on, instructor-led course will help improve plant availability and utilization by providing an overview of the TRICON system with a primary focus on maintenance, and troubleshooting. Participants are taught basic principles of TMR architecture and system configuration including field wiring, power distribution, and module capabilities. Participants get practical experience with continuity checks, loop testing, and general field maintenance. Using the EDM of the Microsoft Windows-based TriStation 1131 Developer's Workbench, participants troubleshoot, respond to alarms, replace modules, and clear faults. (Course code 8901)

Duration: 2 days

Who should attend?
• Supervisory personnel responsible for the TRICON system
• Engineers and technicians responsible for supporting a TRICON system
• Plant engineers who support and maintain the TRICON system

Prerequisites
• Working knowledge of Microsoft Windows operating systems
• Working knowledge of PLCs and/or DCSs
• Familiar with basic electronics and maintenance procedures

Objectives
• Describe the basic theory of operation of the TRICON system TMR architecture
• Install and wire a TRICON system
• Learn basic navigation of the TriStation 1131 Developer's Workbench
• Perform continuity and loop testing
• Diagnose and troubleshoot a TRICON system

8901A TRICON System Advanced Maintenance

This hands-on, instructor-led course will help improve plant availability and utilization by providing effective and advanced maintenance and troubleshooting techniques for the TRICON system. Primary course objectives include identifying and responding to internal, external, and system faults. This is an intensive, hands-on course that will emphasize real-world applications as well as theory. (Course code 8901A)

Duration: 2 days

Who should attend?
• Supervisory personnel responsible for the TRICON system
• Engineers and technicians responsible for supporting a TRICON system
• Plant engineers who support and maintain the TRICON system

8902 TRICON System/TriStation 1131
Configuration and Implementation

This hands-on, instructor-led course will help improve plant availability and utilization by covering all aspects of TRICON system configuration and implementation. Students are taught the principles of TMR architecture and system configuration. The primary objectives of this course are to: 1) Configure the system, 2) Set up communications, 3) Build a TriStation 1131 project, 4) Assign tagname database, 5) Download a safety application to the controller, 6) Force points, 7) Make online changes, and 8) Use the EDM to troubleshoot and recognize alarms.

Using the Microsoft Windows-based TriStation 1131 Developer’s Workbench, participants learn basic navigation techniques. They will configure, program, and test a system with digital and analog I/O. Participants will also make full use of automatically generated documentation features of TriStation 1131. Performance labs and written evaluations will validate classroom learning. (Course code 8902)

Duration: 5 days

Who should attend?
• Supervisory personnel responsible for the Triconex system
• Technicians responsible for installing and maintaining the Triconex system
• Plant engineers who configure and support the Triconex system
Who should attend?

- Engineers responsible for programming or maintaining a TRICON or TRIDENT system

Prerequisites

- Working knowledge of Microsoft Windows operating systems
- Working knowledge of PLCs or DCSs
- Familiar with basic electronics and maintenance procedures
- Process Automation Learning course 8901 TRICON System/TriStation 1131 Basic Maintenance
- Process Automation Learning course 8901A TRICON System Advanced Maintenance

Objectives

- Describe the operational concepts and basic features of TriStation 1131
- Write Program logic using TriStation 1131 FBD Editor
- Perform diagnostics using the TriStation 1131 Diagnostic Panel
- Use the TriStation 1131 system administration features
- Use the TriStation 1131 documentation and variable annotation features
- Write comment macros and cross-reference program variables
- Perform download procedures to the TRICON controller
- Test and debug program logic

8903 TriStation 1131 Standard Programming

This is an intermediate-level programming course. Using the IEC 61131-3 compliant TriStation 1131 Developer’s Workbench, students will be taught advanced programming techniques to write program logic from a flow chart, primarily using FBD. Students will receive instruction to write customer function blocks using both FBD and ST. The primary objective of this course is to learn the concepts of effective project development and logic segmentation commonly used in safety and process control applications. Students develop a project, partition logic, write customer function blocks and functions, and allocate memory structure for an effective application. Real-world lab exercises require a written design statement, logic segmentation, program testing, and downloading the control program. (Course code 8903)

Duration: 5 days
8905 TRIDENT™ System/TriStation 1131 Basic Maintenance

This hands-on, instructor-led basic maintenance course will help improve plant availability and utilization by covering all aspects of TRIDENT system implementation and maintenance. Students are taught the basic principles of TMR architecture, system configuration, maintenance, and troubleshooting of the TRIDENT system. Primary objectives include alarm response, replacing modules, and general maintenance of the TRIDENT system.

Participants get practical experience with the TriStation 1131 Enhanced Diagnostic Monitor to troubleshoot the system. Lab exercises include communications setup, maintenance exercises to identify and respond to alarms, analyze real-time diagnostic error messages, and collecting system events. Student learning objectives are validated during the course by successfully completing written exams and performance evaluations. (Course code 8905)

Duration: 2 days

Who should attend?

- Technicians and engineers responsible for supporting a TRIDENT system

Prerequisites

- Working knowledge of Microsoft Windows operating systems
- Working knowledge of PLCs or DCSs
- Familiar with basic electronics and maintenance procedures

Objectives

- Describe Safety Concepts
  - Protection layers
  - SIS factors
  - SIL factors
- Describe Application Guidelines
  - TUV certification
  - General guidelines
  - Guidelines for TRICON controllers
- Perform Fault Management
  - System architecture
  - System diagnostics
  - Types of faults
    - External faults
    - Internal faults
- Develop Safety Application
- Appendices
  - Peer-to-peer
  - Safety shutdown function blocks

8905A TRIDENT System Advanced Maintenance

This intensive hands-on, instructor-led, advanced course will improve plant safety and availability by instructing students in advanced TRIDENT system maintenance techniques. Primary course objectives include understanding and responding to internal, external, and field faults. Basic TRIDENT system implementation, maintenance, and troubleshooting of the system will be reviewed at the start of the course. Students will learn and be evaluated on their understanding of maintenance scenarios and troubleshooting skills using advanced level techniques.

Students will also use the features of the Diagnostic Monitor, including responding to error messages, security, and reporting features. The students get practical experience with the Diagnostic monitor.
of the Microsoft Windows-based TriStation 1131 Developer’s Workbench to troubleshoot, respond to alarms, replace modules, and clear faults. (Course code 8905A)

**Duration:** 2 days

**Who should attend?**
- Supervisory personnel responsible for the Triconex system
- Technicians responsible for installing and maintaining the Triconex system
- Plant engineers who configure and support the Triconex system

**Prerequisites**
- Working knowledge of Microsoft Windows operating systems
- Working knowledge of PLCs or DCSs
- Familiar with basic electronics and maintenance procedures
- Process Automation Learning course 8905 TRIDENT System/TriStation 1131 Basic Maintenance

**Objectives**
- Describe the basic theory of operation of the TRIDENT system TMR architecture
- Identify components
- Replace modules
- Respond to alarms
- TriStation 1131 Developer’s Workbench
  - Developing a project
  - FBD Programming
- Downloading and Online Maintenance
  - Download procedures to the TRIDENT system
  - Online maintenance and forcing points
  - Download changes
- Maintenance and Troubleshooting
  - Use Enhanced Diagnostic Monitor
  - Preventive maintenance techniques
- System Administration

**8906 TRIDENT System/TriStation 1131 Configuration and Implementation**

This hands-on, instructor-led course will help improve plant reliability and robustness by covering all aspects of TRIDENT system configuration and implementation. Participants are taught the principles of TMR architecture, system configuration, programming, maintenance, and troubleshooting of the TRIDENT system. Using the TriStation 1131 Developer’s Workbench, participants configure and program a system with digital and analog I/O. Participants get practical experience in system operation such as downloading new programs and disabling and forcing I/O points. (Course code 8906)

**Duration:** 5 days

**Who should attend?**
- Supervisory personnel responsible for the TRIDENT system
- Technicians responsible for installing and maintaining the TRIDENT system
- Plant engineers who configure and support the TRIDENT system

**Prerequisites**
- Working knowledge of Microsoft Windows operating systems
- Working knowledge of PLCs or DCSs
- Familiar with basic electronics and maintenance procedures
- Process Automation Learning course 8905 TRIDENT System/TriStation 1131 Basic Maintenance

**Objectives**
- Describe the basic theory of operation of the TRIDENT system TMR architecture
- Describe the operational concepts and basic features of TriStation 1131
- Recognize and respond to internal faults
- Recognize and respond to external faults
- Recognize and respond to system faults
- Disable and force points in maintenance application
- Connect to and navigate the Diagnostic Panel
- Display firmware status
- Collect system events
- General maintenance and troubleshooting

**8907 Triconex — Wonderware InTouch® Comprehensive**

This hands-on, instructor-led course will help improve plant availability and utilization by providing instruction for TRICON system — Wonderware InTouch interface. This course includes expert instruction in both the TRICON safety system and the Wonderware HMI to view and maintain a safety application program. Students are taught the principles of TMR architecture, and the TRICON system configuration, and the Wonderware InTouch graphical tools including WindowMaker and WindowViewer.

Learning modules cover: 1) Program a safety application in TriStation 1131, 2) Build Wonderware
8916 Triconex TS3000 Comprehensive

This hands-on, instructor-led course will help improve plant availability and utilization by making familiar configuration, programming, operations, and the maintenance of the Triconex TS3000 for turbine control. The Triconex TS3000 is used for Turbo-machinery (TMC) applications. Participants are taught the principles of TMR architecture and using the Microsoft Windows-based TriStation 1131 Developer’s Workbench to configure and program a system with digital and analog I/O. Participants get practical experience in system operations, downloading new programs, changing programs online, and forcing I/O points. (Course code 8916)

Duration: 5 days

Who should attend?
- Supervisory personnel responsible for the Triconex system
- Plant technicians responsible for installing / maintaining the Triconex system
- Plant engineers who configure and support the Triconex system

Prerequisites
- Basic understanding of turbine control systems
- Working knowledge of Microsoft Windows operating systems
- Working knowledge of PLCs or DCSs
- Familiar with basic electronics and maintenance procedures
- Process Automation Learning course 8902 TRICON System/TriStation 1131 Configuration and Implementation

Objectives
- Describe the basic theory of operation of the Triconex TS3000 (TMR) system
- Identify Triconex TS3000 system hardware and TMC specific modules
  - Analog output module
  - Pulse input module
- Install and wire a Triconex TS3000 system
- Write a TMC control program using TriStation 1131
- Review and apply the TMC Specific libraries
- Download an application program to the Triconex TS3000 system
  - Download Changes
  - Force Points
- Use Enhanced Diagnostic Monitor
  - Respond to Alarms
- Clear Faults
8942 Triconex Safety View® Comprehensive
This hands-on, instructor-led course will help improve plant availability and utilization by covering all aspects of Triconex Safety View, which provides superior alarm and bypass management. Safety View is the world’s first alarm and bypass management software to be TÜV-certified for use in up to SIL3 process safety applications. Safety View draws attention to changes in process conditions that require immediate attention, giving operators, maintenance engineers, and shift personnel better visibility into the process so they can take actions that reduce risk, optimize total cost of ownership, and increase overall asset performance. Safety View process alarm function blocks allow configuration of the alarm sequence as defined in the ISA 18.1 Standard. It is a PC-based HMI dedicated to safety critical alarms and is independent of the control system. It also provides an alternative to traditional hard-wired alarm annunciator panels. It supports Schneider Electric industry-leading family of Triconex safety instrumented systems: TRICON system (SIL3), TRIDENT system (SIL3), and Triconex General-Purpose (SIL2) systems. Written exams and performance tests will validate student learning. (Course code 8942)

Duration: 3 days

Who should attend?
• Personnel responsible for performing ABM Safety View operations
• Technicians responsible for acknowledging safety critical alarms
• Plant engineers responsible for managing Safety View system

Prerequisites
• Working knowledge of Microsoft Windows operating systems
• Knowledge of PLCs or DCSs
• Completion of Process Automation Learning courses 8902 TRICON System/TriStation 1131 Configuration and Implementation/8903 TriStation 1131 Standard Programming
• Wonderware InTouch courses Part I and II are strongly recommended prior to enrollment

Objectives
• Describe key features of Triconex Safety View
• Identify TriStation 1131 application development steps
• Define alarm bypass and bypass function blocks
• Configure alarm and bypass interfaces
• Declare and assign tagname properties
• Import tagname alarm information
• Configure Safety View components
• Perform Alarm Bypass Management (ABM) maintenance functions such as:
  - Reactivate alarms acknowledged by an operator
  - Reset alarms in the ring back state

8950 TriStation 1131 Advanced Programming
This advanced-level programming course will help improve plant availability and utilization by providing students with effective techniques to design and implement an effective control strategy based on the IEC 61131-3 programming standard. Using the TriStation 1131 Developer’s Workbench, students will be taught advanced programming techniques to write program logic from a flow chart, primarily using FBD. Students will also write customer function blocks, using both FBD and ST. Primary objectives include developing a project(s) commonly used in Emergency Shutdown and process control applications. Students design, implement logic segmentation strategies, write customer function blocks, and allocate memory structure for an effective application. Real-world lab exercises require a written design statement, logic segmentation, program testing, and downloading the control program. (Course code 8950)

Duration: 5 days

Who should attend?
• Supervisory personnel responsible for the Triconex system
• Technicians responsible for installing and maintaining the Triconex system
• Plant engineers who configure and support the Triconex system

Prerequisites
• Working knowledge of Microsoft Windows operating systems
• Working knowledge of PLCs or DCSs
• Familiar with basic electronics and maintenance procedures
• Process Automation Learning course 8903 TriStation 1131 Standard Programming

Objectives
• Software Overview
  - Describe IEC 61131-3 programming concepts
  - Navigate TriStation 1131 Developer’s Workbench
• Project Development
  - Read process and instrumentation drawings
  - Write a design statement for Furnace application
• Program Safety Application
  - Write, test, and debug FBD
  - Write ST to use custom function blocks
- Segment logic
- Implement Control Strategy
- Download application to controller
- Use advanced techniques to effectively use scan time and memory
- Use advanced programming techniques to write control program
- System administration: Implement project security, documentation, and reports

Objectives
- Describe IEC 61131-3 programming concepts
- Navigate TriStation 1131 Developer's Workbench
- Read process and instrumentation drawings
- Develop a TriStation 1131 project
- Write a safety application with user-defined functions and function blocks
- Create custom libraries for import/export
- Perform download procedures to the controller
- Use System Administration features

8963 OPC and Networking Essentials
This intensive, hands-on, instructor-led course provides detailed instruction and practical exercises for the TCM with embedded OPC Server interface. Classroom theory and practical exercises will include Basic TriStation 1131 programming as it relates to OPC servers/client relations. An overview of OPC Data, and Alarm and Events as it relates to the TRICON system will be discussed. The primary objective of this course is to learn how the TCM/with embedded OPC Server interfaces with the control application as well as Alarm and Events. Using the Microsoft Windows-based TriStation 1131 Developer's Workbench, students primarily concentrate on basic navigation techniques in order to configure and program a system with digital and analog I/O. Students also gain practical experience in system operations such as downloading new programs, and disabling and forcing I/O points. This course will offer lectures, demonstrations, and practical exercises on selected communications protocols, as well as installation and configuration of tagname databases to pass data via each link. Student learning will be validated by a written evaluation and performance tests. (Course code 8963)

Duration: 3 Days
Who should attend?
- Supervisory personnel responsible for the Triconex system
- Technicians responsible for installing and maintaining the Triconex system
- Plant engineers who configure and support the Triconex system

Prerequisites
- Working knowledge of Microsoft Windows operating systems
- Working knowledge of PLCs or DCSs
- Familiar with basic electronics and maintenance procedures
- Process Automation Learning course 8902 TRICON System/TriStation 1131 Configuration and Implementation
- Process Automation Learning course 8903 TriStation 1131 Standard Programming

8951 Creating Custom Function Blocks and Libraries
This advanced-level programming course will help improve plant availability and utilization by providing students with effective techniques to design custom functions and function blocks, and create custom libraries for import/export. Custom libraries are a very effective method to manage project development by allowing programs to be developed remotely. Using the TriStation 1131 Developer’s Workbench, students will be taught advanced programming techniques to create, test, and debug efficient and reusable code that minimizes impact on project scan time and memory. IEC 61131-3 compliant languages FBD and ST will be used to write the code. Lab exercises will include instruction to write, test, debug, and download programs written in FBD and ST. Students will also write user-defined function blocks and invoke or ‘call’ them in an online control program. Students develop a project, partition logic, write customer function blocks and functions, and allocate memory structure for an effective application. Real-world lab exercises require a written design statement, logic segmentation, program testing, and downloading the control program. (Course code 8951)

Duration: 3 days
Who should attend?
- Supervisory personnel responsible for the Triconex system
- Technicians responsible for installing and maintaining the Triconex system
- Plant engineers who configure and support the Triconex system

Prerequisites
- Working knowledge of Microsoft Windows operating systems
- Working knowledge of PLCs or DCSs
- Familiarity with basic electronics and maintenance procedures
- Process Automation Learning course 8902 TRICON System/TriStation 1131 Configuration and Implementation
- Process Automation Learning course 8903 TriStation 1131 Standard Programming
Objectives

• Describe the operation and configuration of the TRICON system architecture
• Describe the basic theory of TMR and Fault Tolerance
• Describe networking concepts and fundamentals
  - Describe the process to set up and connect to the OPC servers
• OPC:
  - Describe how OPC is used in Triconex systems
  - Describe how security is implemented with OPC
  - Configure OPC date
• Connect to the TRICON system using the embedded OPC server
• Identify alarms and monitor values from field devices using the OPC server
• Identify and Configure TRICON System Communications Modules and Interfaces
• Use TriStation 1131 program:
  - Monitor TRICON system hardware and communications status
  - Configure TRICON System Function Blocks

Prerequisites

• Working knowledge of Microsoft Windows operating systems
• Working knowledge of PLCs or DCSs
• Familiar with basic electronics and maintenance procedures
• Process Automation Learning course 8902 TRICON System/TriStation 1131 Configuration and Implementation

Objectives

• Describe TRICON system theory and configuration
• Navigate TriStation 1131 Developer’s Workbench
• Develop safety application program
• Use Trilogger Features
• Trilogger event mode
• Trilogger playback mode
• Trilogger remote mode

8965 Triconex Trilogger Comprehensive

This hands-on, instructor-led course will help improve plant availability. The 3-day Trilogger hands-on course provides detailed instruction and practical exercises for Trilogger interfaces and utilities. This intensive hands-on course will include classroom theory and practical exercises. An overview of TRICON system configuration and the TriStation 1131 Developer’s Workbench will be included in the course before students begin to use the Trilogger features. The primary objectives of this course are to effectively use Trilogger modes to collect, analyze, and identify trending real-time control application data. After downloading the application to the TRICON controller, students will then use the Trilogger to identify, monitor, and analyze tag names from the program logic. Students will receive instructions, perform practical exercises, and must successfully complete practical and written exams in order to complete the course. (Course code 8965)

Duration: 3 days

Who should attend?

• Supervisory personnel responsible for the Triconex system
• Technicians responsible for installing and maintaining the Triconex system
• Plant engineers who configure and support the Triconex system
2000 Introduction to Configuration version 6 and 7
This instructor-led course will help increase plant availability by establishing plant consistency of methods and applications. The course will enable plant engineering personnel to generate displays, build simple control loops, and understand general system diagnostic messages from a process and maintenance engineer's perspective. Participants will learn to identify major hardware and software components of the I/A Series system. Participants will also learn the mechanisms and priorities used in process alarm reporting, and are able to enable and disable alarm reporting. This course also introduces the programming steps needed to access and engineer the AIM*AT suite of software applications. You will learn to manipulate data using mathematical functions. You will also practice configuring an AIM*AT server to retrieve data and reports into a Microsoft Excel spreadsheet or Web-based application, among other tasks. This hands-on course is designed to give you up-to-date information on creating, managing, and interrogating this sophisticated database. The classroom instruction and practical laboratory exercises will lay the groundwork for more advanced I/A Series courses. This course is made up of Process Automation Learning courses 2001 week 1 and 2004 week 2. (Course code 2000)

Duration: 10 days

Prerequisites
• Working knowledge of personal computers and Microsoft Excel spreadsheet
• Minimum of six months’ experience using process control computers

Who should attend?
• Personnel responsible for configuration, maintenance for their I/A Series system and generating reports
• Managers and engineers responsible for retrieving data on process or plant performance, or plant operations

Special Note
Inform the registrar if you are using the Display Manager or FoxView, ICC, or IACC when you register

Objectives
• Identify basic hardware components of a typical I/A Series system, its functions, and interrelationships
• Describe the function of an operating system and execute elementary commands on an I/A Series system to support maintenance tasks
• Use an I/A Series control configurator to construct and generate simple process control schemes
• Use default displays to test the operation of control loops
• Operate FoxDraw to construct process displays that interact with live process data
• Make online modifications to real-time and historical trend displays
• Configure and understand predefined alarm schemes
• Assign control block alarm events to Annunciator Keyboard LEDs and displays
• Assign programs to Annunciator Keyboard pushbuttons
• Install the AIM*AT suite of software and perform the setup tasks in order to access data
• Operate the AIM*Historian application to monitor various process variables
• Configure and utilize reduction groups
• Perform AIM*Historian archiving operations
• Access real-time and historical data
• Access real-time and historical data in graphical format
• Set up the AIM*ODBC driver and access data with the SQL select statement
• Use AIM*Historian utilities to access and modify instances
• Configure an instance to include both events activated by user-defined conditions and MDE values
• Configure and execute reports using the I/A Series Report Package

2000v8 Introduction to Configuration version 8 and higher
This instructor-led course will help increase plant availability and utilization by establishing plant consistency of methods and applications. This course will enable plant engineering personnel to generate displays, build simple control loops, and understand general system diagnostic messages from a process and maintenance engineer’s perspective. Participants will learn to identify major hardware and software components of the I/A Series system version 8 and higher. Participants will also learn the mechanisms and priorities used in process alarm reporting, and be able to enable and disable alarm reporting. This course also introduces the programming steps needed to access and engineer the AIM*AT suite of software applications. You will learn to manipulate data using mathematical functions. You will also practice configuring an AIM*AT server to retrieve data and reports into a Microsoft Excel spreadsheet or Web-based application, among other tasks. This hands-on course is designed to give you up-to-date information on creating, managing, and interrogating this sophisticated database. The classroom instruction and practical laboratory exercises will lay the groundwork for more advanced I/A Series courses. This course is made up of Process Automation Learning course 2001v8 week 1 and 2004 week 2. (Course code 2000v8)

Duration: 10 days

Prerequisites
• Working knowledge of personal computers and Microsoft Excel spreadsheet
• Minimum of six months’ experience using process control computers

Who should attend?
• Personnel responsible for configuration, maintenance for their I/A Series system and generating reports
• Managers and engineers responsible for retrieving data on process or plant performance, or plant operations

Special Note
Inform the registrar if you are using the Display Manager or FoxView, ICC, or IACC when you register

Objectives
• Identify basic hardware components of a typical I/A Series system, its functions, and interrelationships
• Describe the function of an operating system and execute elementary commands on an I/A Series system to support maintenance tasks
• Use an I/A Series control configurator to construct and generate simple process control schemes
• Use default displays to test the operation of control loops
• Operate FoxDraw to construct process displays that interact with live process data
Who should attend?
- Personnel responsible for configuration, maintenance and generating reports from their I/A Series system version 8 and higher
- Managers and engineers responsible for retrieving data on process or plant performance, or plant operations

Prerequisites
- Working knowledge of personal computers and Microsoft Excel spreadsheet
- Minimum of six months’ experience using process control computers

Objectives
- Identify basic hardware components of the I/A Series system MESH network, its functions, and interrelationships
- Describe the function of an operating system and execute elementary commands on an I/A Series system to support maintenance tasks
- Use an I/A Series control configurator to construct and generate simple process control schemes
- Use default displays to test the operation of control loops
- Operate FoxDraw to construct process display that interface with live process data
- Make online modifications to real-time and historical trend displays
- Configure and understand predefined alarm schemes
- Assign control block alarm events to Annunciator Keyboard LEDs and displays
- Assign programs to Annunciator Keyboard pushbuttons
- Install the AIM*AT suite of software and perform the setup tasks in order to access data
- Operate the AIM*Historian application to monitor various process variables
- Configure and utilize reduction groups
- Perform AIM*Historian archiving operations
- Access real-time and historical data
- Access real-time and historical data in graphical format
- Set up the AIM*ODBC driver and access data with the SQL select statement
- Access data using AIM*OPC using the tools embedded in the AIM suite
- Use AIM*Inform to build and view HTML reports
- Use AIM*Historian utilities to access and modify instances
- Configure an instance to include both events activated by user-defined conditions and MDE values
- Configure and execute reports using the I/A Series Report Package
- Configure an instance to include both events activated by user-defined conditions and MDE values
- Configure and execute reports using the I/A Series Report Package

2001 Configuration Essentials
version 6 and 7
This instructor-led course will help establish plant consistency of methods and applications by enabling plant engineering personnel to generate displays, build simple control loops, and understand general system diagnostic messages from a process and maintenance engineer’s perspective. Participants will learn to identify major hardware and software components of the I/A Series system. Participants will also learn the mechanisms and priorities used in process alarm reporting, and are able to enable and disable alarm reporting. The classroom instruction and practical laboratory exercises will lay the groundwork for more advanced I/A Series courses. (Course code 2001)

Duration: 5 days

Who should attend?
- Personnel responsible for configuration and maintenance of their I/A Series system

Prerequisites
- Working knowledge of personal computers
- Minimum of six months’ experience using process control computers

Special Note
Inform the registrar if you are using the Display Manager or FoxView, ICC, or IACC when you register

Objectives
- Identify basic hardware components of a typical I/A Series system, its functions, and interrelationships
- Describe the function of an operating system and execute elementary commands on an I/A Series system to support maintenance tasks
- Use an I/A Series control configurator to construct and generate simple process control schemes
- Use default displays to test the operation of control loops
- Operate FoxDraw to construct process display that interface with live process data
- Make online modifications to real-time and historical trend displays
- Configure and understand predefined alarm schemes
- Assign control block alarm events to Annunciator Keyboard LEDs and displays
- Assign programs to Annunciator Keyboard pushbuttons
- Install the AIM*AT suite of software and perform the setup tasks in order to access data
- Operate the AIM*Historian application to monitor various process variables
- Configure and utilize reduction groups
- Perform AIM*Historian archiving operations
- Access real-time and historical data
- Access real-time and historical data in graphical format
- Set up the AIM*ODBC driver and access data with the SQL select statement
- Access data using AIM*OPC using the tools embedded in the AIM suite
- Use AIM*Inform to build and view HTML reports
- Use AIM*Historian utilities to access and modify instances
- Configure an instance to include both events activated by user-defined conditions and MDE values
- Configure and execute reports using the I/A Series Report Package

2001v8 Configuration Essentials
version 8 and higher
This instructor-led course will enable plant engineering personnel to identify major hardware and software components of the I/A Series system. Participants will learn to generate displays, build
simple control loops, and understand general system diagnostic messages from a process and maintenance engineer’s perspective. Participants will also learn the mechanisms and priorities used in process alarm reporting, and be able to enable and disable alarm reporting. The classroom instruction and practical laboratory exercises will lay the groundwork for more advanced I/A Series courses. (Course code 2001v8)

Duration: 5 days

Who should attend?
- Process engineers responsible for configuration or software maintenance of their version 8 I/A Series system

Prerequisites
- Working knowledge of personal computers and plant processes
- Minimum of six months’ experience using process control computers

Objectives
- Identify basic hardware components of the I/A Series system MESH network, its functions, and interrelationships
- Describe the function of an operating system and execute elementary commands on an I/A Series system to support maintenance tasks
- Demonstrate use of an I/A Series control configurator to construct and generate simple process control schemes
- Demonstrate testing of control loops using default process displays
- Apply FoxDraw to construct process displays that interact with live process data
- Make online modifications to real-time and historical trend displays
- Interpret results and demonstrate modification of predefined alarm schemes
- Assign control block alarm events to Annunciator Keyboard LEDs and displays
- Assign programs to Annunciator Keyboard pushbuttons
- Describe process of modifying the I/A Series system configuration
- Describe standard system diagnostic and support tools

2003 Advanced I/A Series Tools for UNIX servers
This instructor-led course will help you increase plant availability and effectiveness by optimizing the usage of key I/A Series system tools and configurators. It will also help you protect plant intellectual assets and minimize the impact of unforeseen catastrophes through the usage of proper archiving and restoration of I/A Series system databases. You will be able to control access to key plant variables in graphic displays. You will also learn how to use powerful system utilities to access, change, and diagnose system and process variables. (Course code 2003)

Duration: 5 days

Who should attend?
- Process engineers responsible for configuration of their I/A Series system that want to optimize and control the use and availability of system and process information

Prerequisites
- Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
- Process Automation Learning course 2400 Unix Software Technologies, UNIX Self-study Workshop, or equivalent UNIX experience

Objectives
- Configure the execution of Display Manager Calls using various soft keys
- Utilize display utilities and Display Manager Variables to modify displays and limit access to graphics in FoxView software or the Display Manager
- Inhibit process alarms at the compound and block level on command or a process event
- Use the Alarm/Display Manager Configurator to configure multiple display managers
- Associate Alarm Managers with display managers and customize Alarm Manager configuration schemes
- Describe Object Manager concepts
- Use Object Manager utilities to access and manipulate the control database
- Use system tools and utilities to assist in the analysis and troubleshooting of I/A Series system

2004 AIM*AT®
This instructor-led course helps increase plant utilization by introducing the programming steps needed to access and engineer the AIM*AT suite of software applications. You will learn to manipulate data using mathematical functions. You will also practice configuring an AIM*AT server to retrieve data and reports into a Microsoft Excel spreadsheet or Web-based application, among other tasks. This hands-on course is designed to give you up-to-date information on creating, managing, and interrogating this sophisticated database. (Course code 2004)

Duration: 5 days

Who should attend?
- Managers and engineers responsible for retrieving data on process or plant performance, or plant operations
**Objectives**

- Convert existing Display Manager displays to FoxDraw displays
- Verify control block function by using FoxView and FoxSelect software to call up block detail displays
- Build or enhance a process display using FoxDraw software
- Configure basic control dynamics in a process display using FoxDraw and verify its function using FoxView
- Restrict display and Configuration access using FoxView Environment Configuration Editor
- Trend and plot process values
- Reduce engineering efforts using advanced FoxDraw features such as custom symbols and aliases

**2007 System Administration for Microsoft® Windows®**

This instructor-led course will help you increase plant availability and effectiveness by making familiar Microsoft Windows Administration requirements, and key system tools and configurators. It will also help you protect plant intellectual assets from security threats and minimize the impact of unforeseen system outages through the usage of proper setup, backup, and restoration of workstations. This course will also outline the basic steps needed to set up and install the MESH network. You will be able to complete the full install process for both new and updated configuration changes. You will learn to view and modify files that affect the operation of your I/A Series workstation. You will be able to control access to key plant variables in graphic displays. You will also learn how to use Microsoft Windows and system utilities to access, change, and diagnose system and process variables using available documentation to complete tasks. (Course code 2007)

**Duration:** 5 days

**Who should attend?**

- Process engineers responsible for configuration and administration of I/A Series and Foxboro Evo Systems

**Prerequisites**

- Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials (Note: you need not attend this course if the course 2000 or 2001 course you attended included FoxView/FoxDraw)
- Working knowledge of computers

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**Prerequisites**

- Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
- Process Automation Learning course 2101 Continuous Control

**Objectives**

- Use Foxboro Electronic Documentation
- Configure the McAfee setup, installing of new virus definitions, and exclusion lists
- Review Microsoft Security Patch requirements for
Microsoft Windows workstations and procedure required to update the Security Patches on your system

- Configure the MESH using the MESH Configurator utility
- Create install commit diskette and install software in a new system
- Modify the installed software and install software on an existing system using the System Definition software
- Review files that get modified during a software install
- Review and edit files that will change the start-up of a Microsoft Windows station
- Configure the execution of Display Manager Calls using various soft keys
- Utilize display utilities and Display Manager variables to modify displays and limit access to graphics in FoxView software or the Display Manager
- Use the Alarm/Display Manager Configurator to configure multiple display managers, associate Alarm Managers with Display managers, and customize Alarm Manager Configuration schemes
- Review Microsoft tools to license terminal server sessions and create users for terminal server sessions
- Use the Backup Exec System Recovery console to backup and restore a Microsoft Windows I/A Station

• At least one year experience in process control system administration

Objectives

- Describe key enhancements contained in I/A Series system Software version 8.5 and above
- Describe the system architectures required to create a secure system
- Manage a PDC
- Add users to Organizational Units (OU)
- Modify Group Policy Objects and add users to OU
- Describe the concept of an Active Directory and how it is used for I/A Security
- Describe the difference between OU and Security Groups
- Use troubleshooting tools for group policy issues
- Describe the installation of an I/A Series as a secured system
- Describe the relationship between the System Manager Service and the System Manager Client
- Use all functions in the Station Assessment Tool
- Enable and modify all portions of the McAfee ePolicy Orchestrator (ePO)
- Use the McAfee ePO Console to view station information
- Knowledge of the Host Intrusion feature to test for system intrusions
- Use the Device Control feature to disable devices per user
- Create client tasks to configure more functions in McAfee ePO
- Use McAfee ePO to update McAfee DAT file to all clients
- Describe the new features of FCS as well as what needs to be addressed in a secure installation of FCS

2008 I/A System Security Administration

This instructor-led workshop is directed at plant engineers with system security responsibilities or background. This workshop will introduce attendees to basic definitions, components, and protocols of the major applications and architectures within CI and key resources of the I/A Series system architecture at I/A series version 8.5. The workshop will focus on solutions aimed at preventing unauthorized use of the systems that use I/A Series Secure system. The workshop will also identify mitigations available in the system to prevent vulnerabilities and ways to prevent and detect intrusions. (Course code 2008)

Duration: 3 days

Who should attend?

- Plant engineers with I/A Series system security responsibilities and background

Prerequisites

- Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials, 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
- Experience in CI control systems and their relationship to modern IT networks

2009 Advanced System Administration

This instructor-led course will help increase plant availability and effectiveness by introducing the participant to the tools and techniques used by a system administrator responsible for a Microsoft Windows-based system. This course uses system tools to view system functionality. This course will look at the Object Manager connections, IPC connections, and Tools that allow the viewing of I/A interactions between Operator Stations, CPs, Historians, and third-party data collection packages. View Control Processor usage and be able to determine better control sizing. Tools to view displays and how to change displays connections. Lessons will concentrate on writing scripts in the Mortis Korn Shell scripting capabilities on the Microsoft Windows System. This course will look at FoxApi, AIMAPI functions available in these products. (Course code 2009)
Prerequisites
- Process Automation Learning course 2000v8 Introduction to Configuration, 2001v8 Configuration Essentials, or 5000 Introduction to Foxboro Evo Configuration and 5001 Foxboro Evo Configuration Essentials
- Process Automation Learning course 2101 Continuous Control
- Process Automation Learning course 2007 System Administration for Windows

Objectives
- List Mortis Korn Shell (MKS) commands
- Use scripts in MKS
- Schedule MKS scripts and other MKS utilities
- Use tools to view and report Object Manager Connections
- Use tools to view and report IPC Connections
- Set up and understand the use of Object Manager Multicast Optimization (OMMO)
- Use tools to view Control Processor usage and files
- Describe the usage of Compound Summary Access
- Describe features use in Device Monitor
- Describe and use features and tools of FoxDraw
- Troubleshoot problems with third-party utilities
- List and review FoxAPI and AIMAPI utilities

2100 Integrated Control
This instructor-led course will help you increase plant availability and utilization by making familiar the procedures and processes for designing control databases using I/A Series system process control configurators. This course focuses on parameters and algorithms required for continuous control applications, such as cascade, ratio, feedforward, and adaptive control loops. Included in the course are procedures for executing real-time complex mathematical calculations at the loop level. Fail-safe strategies and procedures are also discussed in this course. This course also makes familiar the procedures and processes for designing sequence and ladder logic programs using I/A Series system process control configurators. These programs are typically used to automate the start-up or shutdown of a process as well as in batch processes. You will build and test ladder logic control schemes and learn to build sequential control schemes, using the High Level Batch Language. The course includes extensive laboratory sessions to allow participants to both practice and test procedures learned. This course is made up of Process Automation Learning course 2101 week 1 and 2101 week 2. (Course code 2100)

Duration: 10 days

Who should attend?
- Control and process control engineers and technicians responsible for the design, installation, testing, or maintenance of control schemes using an I/A Series system

2015 Advanced FoxView/FoxDraw
This instructor-led course will help increase plant utilization and lower engineering cost through the application of advanced techniques when building graphical displays for the I/A Series system. Students are introduced to advanced features of FoxDraw enabling effective design of HMI. The student learns to use display configuration tools, the use of substitutions, Display Manager commands (DMCMD), and utilities. In addition students use FoxView to interact with real-time and historical field and process data. (Course code 2015)

Duration 5 days

Who should attend?
- Process control engineers and who are responsible for building or maintaining FoxDraw displays and maintaining the process operator’s human interface environment
Prerequisites
• Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
• Process Automation Learning course 6211 Process Control Technology or equivalent knowledge

Objectives
• Utilize control block parameters to construct and verify the operation of cascade, feedforward, ratio, multiple output, and discrete control schemes
• Employ the use of control parameters to enable output tracking, alarm filtering, and loop initialization
• Configure fieldbus modules for desired fail-safe operation and measurement resolution
• Implement complex real-time calculations in control loops using advanced calculation blocks
• Employ I/A Series PIDA, FBTUNE, and other control blocks to configure and test adaptive control schemes
• Understand the use of the different types of control algorithms available in the I/A Series system
• Describe the functions of sequence control blocks and how they interact with each other
• Operate, configure, and program the monitor, timer, independent, dependent, and exception sequence blocks
• Use Preprocessor Commands in conjunction with macros and include files
• Program and test subroutines and Standard Block Exception Handlers
• Use the Sequence Function Chart software to program sequence control blocks
• Employ the PLB block and other control blocks to configure and test ladder logic control strategy

2101 Continuous Control
This instructor-led course will help you increase plant availability and utilization by making familiar the procedures and processes for designing control databases using I/A Series system process control configurators. This course focuses on parameters and algorithms required for continuous control applications, such as cascade, ratio, feedforward, and adaptive control loops. Included in the course are procedures for executing real-time complex mathematical calculations at the loop level. Fail-safe strategies and procedures are also discussed in this course. The course includes extensive laboratory sessions to allow participants to both practice and test procedures learned. (Course code 2101)

Duration: 5 days

Who should attend?
• Control and process control engineers and technicians responsible for the design, installation, testing, or maintenance of control schemes using an I/A Series system

Prerequisites
• Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
• Process Automation Learning course 6211 Process Control Technology or equivalent knowledge

Objectives
• Utilize control block parameters to construct and verify the operation of cascade, feedforward, ratio, multiple output, and discrete control schemes
• Employ the use of control parameters to enable output tracking, alarm filtering, and loop initialization
• Configure fieldbus modules for desired fail-safe operation and measurement resolution
• Implement complex real-time calculations in control loops using advanced calculation blocks
• Employ I/A Series PIDA, FBTUNE, and other control blocks to configure and test adaptive control schemes
• Understand the use of the different types of control algorithms available in the I/A Series system
• Describe the functions of sequence control blocks and how they interact with each other
• Operate, configure, and program the monitor, timer, independent, dependent, and exception sequence blocks
• Use Preprocessor Commands in conjunction with macros and include files
• Program and test subroutines and Standard Block Exception Handlers
• Use the Sequence Function Chart software to program sequence control blocks
• Employ the PLB block and other control blocks to configure and test ladder logic control strategy

2102 Sequence Control & Ladder Logic
This instructor-led course will help you increase plant availability and utilization by making familiar the procedures and processes for designing sequence and ladder logic programs using I/A Series system process control configurators. These programs are typically used to automate the start-up or shutdown of a process, as well as in batch processes. You will build and test ladder logic control schemes and learn to build sequential control schemes using the High Level Batch Language. The course includes extensive laboratory sessions to allow participants to both practice and test procedures. (Course code 2102)

Duration: 5 days

Who should attend?
• Control and process control engineers and technicians responsible for the design, installation, testing, or maintenance of control schemes using an I/A Series system

Prerequisites
• Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
- Process Automation Learning course 2101 Continuous Control
- Process Automation Learning course 6211 Process Control Technology or equivalent knowledge
- Understand the workings of ICC and/or IACC

Objectives
- Describe the functions of sequence control blocks and how they interact with each other
- Operate, configure, and program the monitor, timer, independent, dependent, and exception sequence blocks
- Use Preprocessor Commands in conjunction with macros and include files
- Program and test subroutines and Standard Block Exception Handlers
- Use the Sequence Function Chart software to program sequence control blocks
- Employ the s PLB block and other control blocks to configure and test ladder logic control strategy

2103 Advanced System Block Configuration
This instructor-led workshop will help you become proficient in implementing plant control schemes using Series control continuous control blocks by making familiar the usage of control blocks and their parameters in simple and complex applications. This course focuses on parameters and algorithms required for continuous control applications, such as cascade, ratio, feedforward, ratio, and adaptive control loops. The content of the workshop can be applied to any I/A series or Foxboro Evo System. It includes extensive laboratory sessions to allow participants to both create and discuss best practices in using control blocks. (Course code 2103)

Duration: 5 days

Who should attend?
- Plant application engineers responsible for the design, installation, testing, or maintenance of control schemes using a Foxboro Evo System or I/A Series system

Prerequisites
- Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials, 5000 Introduction to Foxboro Evo Configuration or 5001 Foxboro Evo Configuration Essentials
- Process Automation Learning course 6211 Process Control Technology or equivalent knowledge
- At least one year experience in using and configuring Foxboro control blocks

Objectives
- Describe the dynamic elements in a control loop, characteristics of real process, and the use of linear and non-linear controllers
- Describe what makes control loops behave as they do
- Describe what determines how well a given variable can be controlled
- Describe the characteristics of a real process
- Describe the use of linear and non-linear controllers in a control loop
- Demonstrate proper configuration of key parameters of the following input blocks:
  - AIN block
  - CIN block
  - AINR block
- Demonstrate proper configuration of key parameters of the following output blocks:
  - AOUT block
  - OUTSEL block
  - COUT block
  - VLV block
  - MOV block
  - MOVLV block
  - MTR block
  - GDEV block
- Demonstrate proper configuration of key parameters when configuring a single loop
- Show proper configuration of control block parameters in a standard loop structure
- Show proper configuration of control block parameters for basic control functions
- Show proper configuration of control block parameters for mode control and initialization
- Show proper configuration of control blocks parameters for the advanced functions in a PIDA control block
- Demonstrate proper configuration of key blocks and block parameters for a loop with adaptive tuning capability with the following behaviors:
  - Provide control stability as conditions change
  - Limit the range of the allowable tuning constants
  - Alarm the operator if the loop breaks into an oscillation
  - Transfer the controller into manual if the oscillation exceeds a specified amplitude
- Demonstrate proper configuration of key I/A series blocks and block parameters for a standard cascade control scheme with the following constraints using a heat exchanger as an example:
  - Integrate a control loop that will regulate flow directly and prevent upsets in the steam header from changing heat transfer
  - Maintain a minimum steam flow to the heat exchanger
- Maintain effective temperature control by limiting the feed rate to the downstream unit as necessary
- Discuss and demonstrate proper configuration of key blocks and block parameters in a typical ratio control scheme to:
  - Reduce the amount of off-specification product by automatically adjusting the additive flow when the production rate increases
  - Allow the operator to adjust the amount of the additive ingredient per unit of product within bounded limits
  - Maintain feedback correction of the product composition
  - Limit the production flow rate when insufficient additive is available
  - Alarm the operator if the product is not within specification limits
- Discuss and demonstrate proper configuration of key blocks and block parameters of a basic feedforward control scheme for the following behaviors using a heat exchanger as an example:
  - Immediately adjust the flow rate of the steam flow setpoint whenever either the flow or temperature of the water inlet changes
  - Provide feedback correction of any steady-state errors in the discharge temperature
  - Provide a back-calculated output for the feedback trim controller
  - Include a dynamic function for temporary correction of transient errors
  - Minimize the number of blocks used in the scheme
  - Compensate the effect of variable steam pressure in the steam supply header
  - Allow the operator to switch back to conventional cascade control
- Discuss and demonstrate proper configuration of key blocks and block parameters of an override control scheme without using selector blocks using a distillation column as an example:
  - Maintain a minimum flow through the pump or shut it down
  - Limit the amount of heat input to the re-boiler to keep the level from falling below an acceptable minimum
  - Limit the feed rate to the column so as to avoid flooding the column with liquid

**2200 Equipment Maintenance version 6 and 7**

This instructor-led course will help increase plant availability, and reduce corrective and preventive maintenance cost by making familiar diagnostic and problem-solving procedures through lab exercises using I/A Series system hardware and software. The course will also help you identify all the essential hardware and software components of the I/A Series system and verify its proper installation. (Course code 2200)

**Duration:** 5 days

**Who should attend?**
- Technicians responsible for maintenance of I/A Series systems

**Prerequisites**
- Working knowledge of personal computers
- Prior experience with digital process control equipment

**Objectives**
- List the basic hardware components of a typical I/A Series system, their functions and interrelationships
- Differentiate between the types and number of industrial power modules necessary to satisfy different power configurations
- Follow documented procedures to verify proper system installation
- For a given I/A Series system, which includes fault-tolerant stations, identify each module and peripheral device, trace all bus and cable connections, and demonstrate proper removal and replacement procedures
- Using FoxView software, demonstrate the methods of accessing environments, displays, and I/A Series configurators, and describe their purpose
- Operate the system management displays to access status, configuration, and fault analysis information related to an I/A Series system network, individual modules, and peripheral devices
- Utilize documentation and proper troubleshooting techniques to resolve hardware problems

**2200v8 Equipment Maintenance version 8 and higher**

This instructor-led course will help increase plant availability, and reduce corrective and preventive maintenance cost by making familiar diagnostic and problem-solving procedures through lab exercises using I/A Series system hardware and software version 8.0 and higher. The course will also help you identify all the essential hardware and software components of the I/A Series system and verify its proper installation. (Course code 2200v8)

**Duration:** 5 days

**Who should attend?**
- Technicians responsible for maintenance of I/A Series systems version 8

- Maintain effective temperature control by limiting the feed rate to the downstream unit as necessary
- Discuss and demonstrate proper configuration of key blocks and block parameters in a typical ratio control scheme to:
  - Reduce the amount of off-specification product by automatically adjusting the additive flow when the production rate increases
  - Allow the operator to adjust the amount of the additive ingredient per unit of product within bounded limits
  - Maintain feedback correction of the product composition
  - Limit the production flow rate when insufficient additive is available
  - Alarm the operator if the product is not within specification limits
- Discuss and demonstrate proper configuration of key blocks and block parameters of a basic feedforward control scheme for the following behaviors using a heat exchanger as an example:
  - Immediately adjust the flow rate of the steam flow setpoint whenever either the flow or temperature of the water inlet changes
  - Provide feedback correction of any steady-state errors in the discharge temperature
  - Provide a back-calculated output for the feedback trim controller
  - Include a dynamic function for temporary correction of transient errors
  - Minimize the number of blocks used in the scheme
  - Compensate the effect of variable steam pressure in the steam supply header
  - Allow the operator to switch back to conventional cascade control
- Discuss and demonstrate proper configuration of key blocks and block parameters of an override control scheme without using selector blocks using a distillation column as an example:
  - Maintain a minimum flow through the pump or shut it down
  - Limit the amount of heat input to the re-boiler to keep the level from falling below an acceptable minimum
  - Limit the feed rate to the column so as to avoid flooding the column with liquid

**2200 Equipment Maintenance**

**version 6 and 7**

This instructor-led course will help increase plant availability, and reduce corrective and preventive maintenance cost by making familiar diagnostic and problem-solving procedures through lab exercises using I/A Series system hardware and software. The course will also help you identify all the essential hardware and software components of the I/A Series system and verify its proper installation. (Course code 2200)

**Duration:** 5 days

**Who should attend?**
- Technicians responsible for maintenance of I/A Series systems
Prerequisites
- Working knowledge of personal computers
- Prior experience with digital process control equipment

Objectives
- List the basic hardware components of an I/A Series system: the MESH network, station on the network, their functions, and interrelationships
- Follow documented procedures to verify proper system installation
- For a given I/A Series system, which includes fault-tolerant stations, identify each module and peripheral device, trace all bus and cable connections, and demonstrate proper removal and replacement procedures
- Demonstrate the procedures required to replace a MESH switch
- Using FoxView software, demonstrate the methods of accessing environments, displays, and I/A Series configurators, and describe their purpose
- Describe how power is distributed to fieldbus modules and control processors
- Operate system management displays to access status, configuration, and fault analysis information related to an I/A Series system network, individual modules, and peripheral devices
- Operate system management displays to update firmware of I/A Series system stations and peripherals
- Utilize documentation and proper troubleshooting techniques to resolve hardware problems

2210 System & Software Maintenance version 6 and 7
This instructor-led course will help increase plant reliability, and reduce corrective and preventive maintenance cost by making familiar procedures to test and identify I/O problems encountered during hardware and software installation, system modification, and ongoing maintenance. It will also help protect plant intellectual assets and minimize the impact of unforeseen catastrophes through the usage of proper archiving and restoration of I/A Series system files and databases. Laboratory exercises will reinforce the procedures taught in the use of system diagnostic tools and procedures, and in identifying field problems in control loops. (Course code 2210)

Duration: 5 days

Who should attend?
- Technicians who are responsible for system backup and restore procedures, and testing communications between I/A Series equipment and I/O devices

Prerequisites
- Working knowledge of personal computers
- Prior experience with digital process control equipment
- Process Automation Learning course 2200

Objectives
- Use basic operating system commands to support maintenance tasks
- Perform system backup and restoration procedures on system servers
- Construct a continuous control loop to monitor and control a process
- Incorporate alarming parameters into a control loop
- Utilize default displays to monitor and control a process
- Utilize a ladder logic application to control and test discrete devices
- Employ discrete control blocks to test devices

2210v8 System & Software Maintenance version 8 and higher
This instructor-led course will help increase plant availability, and reduce corrective and preventive maintenance cost by making familiar procedures to test and identify I/O problems encountered during hardware and software installation, system modification, and ongoing maintenance. It will also help protect plant intellectual assets and minimize the impact of unforeseen catastrophes through the usage of proper archiving and restoration of version 8 I/A Series system files and databases. Laboratory exercises will reinforce the procedures taught in the use of system diagnostic tools and procedures, and in identifying field problems in control loops. (Course code 2210v8)

Duration: 5 days

Who should attend?
- Technicians who are responsible for system backup and restore procedures, and testing communications between version 8 I/A Series equipment and I/O devices

Prerequisites:
- Working knowledge of personal computers
- Prior experience with digital process control equipment
- Process Automation Learning course 2200v8

Objectives:
- Use basic operating system commands to support maintenance tasks
- Perform system backup and restoration procedures on system servers
• Construct a continuous control loop to monitor and control a process
• Incorporate alarming parameters into a control loop
• Utilize default displays to monitor and control a process
• Utilize a ladder logic application to control and test discrete devices
• Employ discrete control blocks to test devices

2211 MESH Configuration & Maintenance Workshop
This instructor-led workshop will help you increase plant availability and reliability by providing an understanding of the tools and key concepts used in the selection, configuration, and support of the MESH network. MESH Definitions and topologies will be discussed along with the usage of the Internet Protocol Suite (commonly known as TCP/IP) in the MESH. Additional topics discussed are the uses of virtual LANs, commonly known as a VLAN, the I/A Series COMEX (communication executive). Participants will also be introduced to the Switch configuration tool used for switch diagnostics and repair and the Enterasys NetSight console used for verifying network health and network diagnostics. 
(Course code 2211)
Duration: 3 days
Who should attend?
• Personnel responsible for control system administration
• Personnel responsible for plant control networks
Prerequisites
• Familiarity with I/A Series or Foxboro Evo System hardware and software
• Process Automation Learning course 2001 Configuration Essentials or 5001 Foxboro Evo Configuration Essentials recommended
• Process Automation Learning course 2200 Equipment Maintenance or 5200 Foxboro Evo Equipment Maintenance recommended
Objectives
• Describe Networking Fundamentals: TCP/IP protocol, IP addressing, routing fundamentals, ethernet fundamentals, ethernet switching, spanning tree protocol, rapid spanning tree protocol, virtual LANs, LDP SNMP, NTP, firewalls
• Describe MESH requirements, Legacy IA requirements, Topology, Enterasys Switches, configuration
• Describe tools and techniques used in MESH diagnostics
• Describe good practices when installing and using and maintaining the Foxboro I/A Series MESH network

2220 I/A Series System Field Device System Integrator (FDSI) with Modbus
This instructor-led course will help maintenance and project engineers successfully install and commission the majority of communication linkages between modbus devices and the I/A Series or Foxboro Evo System using FDSI modules. The course will cover:
• The installation of cables and connections required to enable modbus devices to communicate with the I/A Series system through FDSIs
• Verification of correct installation of cables and connections
• Verification of communication between modbus device(s) and the I/A Series system with a test database
• Troubleshooting and correction of common problems that impede communication between the modbus device(s) and the I/A Series system
(Course code 2220)
Duration: 3 days
Who should attend?
• Project and maintenance engineers responsible for supporting or installing I/A Series or Foxboro Evo Process Automation Systems
Prerequisites
• Process Automation Learning course 2001v8 Configuration Essentials version 8 and higher or 5001 Foxboro Evo Configuration Essentials recommended
• One year project engineering or maintenance experience
Objectives
• Identify FDSI modules
• Create an FDSI network topology
• Connect FDSI cabling
• Wire FDSI Terminal Assemblies
• Connect RS232 serial cabling
• Connect RS485 serial cabling
• Set up Redundant Serial FDSIs
• Set up Redundant Ethernet FDSIs
• Install FDSI hardware
• Make FDSI cable connections
• Utilize third-party modbus emulators
• Use Sniff Cables to monitor communications
• Use Tap Devices to monitor communications

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Follow steps of integration process
- Install FDSI Driver
- Generate Configuration Files
- Create and configure Equipment Control Blocks (ECBs)
- Create and configure Distributed Control Interface (DCI) Blocks
- Detail the modbus protocol
- Use Block Detail Displays
- Use Faceplates
- Maintain FDSI using System Manager
- Interpret LED indicators for each FDSI module
- Employ FDSI diagnostics
- Recognize loss of communications
- Employ error handling
- Examine possible problems
- Configure an I/A system to communicate with third-party modbus device through FDSI

2221 Field Device Integration with OPC
This instructor-led course will enable plant engineering personnel to apply the FDSI using the OPC client driver. The classroom instruction and practical laboratory exercises will lay the groundwork for connecting to plant floor devices via an OPC server. (Course code 2221)

Duration: 3 days

Who should attend?
- Process engineers responsible for integration of version 8 I/A Series system control database and factory floor devices using OPC protocol

Prerequisites
- Working knowledge networks using Ethernet
- General knowledge of the control database structure such as letterbugs, ECBs, etc.
- Concept of client/server applications

Objectives
- Describe common hardware and software components of a MESH system
- Describe current OPC standards
- Install FDSI Hardware with OPC client driver
  - Install FBM 233 used to facilitate the OPC FDSI
  - Connect the FBM 233 to an OPC server
  - Describe other FBM hardware that can be used as an OPC interface
- Configure FDSI with OPC client driver
  - Build the ECBs to provide software support to the FBM233
  - Create the XML support files needed by the OPC drive
  - Create the control blocks to integrate OPC device data into an I/A system
- Troubleshoot FDSI using the OPC client driver
  - Use the System Manager to determine the health of the FDSI
  - Put the interface online
  - Assess the health of the FBM233 and OPC using System Manager and device LEDs
  - Use the FDSI diagnostic tool to test communication

2222 Field Device Integration with DeviceNet
Implementing DeviceNet on Foxboro IA Series is supported by the Field Device Editor for DeviceNet software application that adds functionality to the FCS (Foxboro Control Software). This software add-on provides system configuration for DeviceNet slave devices and integration of DeviceNet networks into the Foxboro Process Automation System via the FBM229. The slave devices are connected to the control system via the FBM229. The FBM229 operates as a DeviceNet master exchanging I/O messages with the slave devices for process value updates.

The Field Device Editor’s graphical user interface opens inside the FCS Control Editors, and provides easy-to-use tools for selecting the I/O mode and specifying device verification criteria based on the device’s Electronic Data Sheet file. The device configuration is maintained in a database, where it is integrated with other control system elements such as control strategies and DCI blocks.

This instructor-led course will introduce the engineers to the DeviceNet protocol, the DeviceNet fieldbus network structure, and the RSNetWorx Software. The engineers are presented with the necessary hardware to build a DeviceNet Controller Area Network (CAN) and attach devices to the network.

Step-by-step lab instructions guide the engineers on configuring the FBM229 ECBs and application blocks to read and write data to/from the devices.

The engineers are guided into operating the RSNetWorx software by configuring the assembled DeviceNet network to access device data and status. (Course code 2222)

Duration: 3 days

Who should attend?
- Engineers responsible for configuring and maintaining the Foxboro controller interface to DeviceNet CAN equipment

Prerequisites
- Process Automation Learning Services Course 2001v8 Configuration Essentials version 8 and higher or 5001 Foxboro Evo Configuration Essentials
Objectives

- Use the features of real-time trends to observe variations in process conditions and review historical data
- Demonstrate the method of access and the information presented in I/A Series operational reports and in scheduled and on-demand custom process reports
- In the event of a failure, acknowledge the system alarm and identify the failed I/A Series component

2400 UNIX Software Technologies

This instructor-led course will help increase plant reliability and reduce corrective and preventive maintenance cost by providing a fundamental understanding of the UNIX operating system. (Course code 2400)

Duration: 5 days

Who Should Attend

- System administrators who are responsible for file and server maintenance and who need a better understanding of the UNIX operating system

Prerequisites

- Working knowledge of personal computers
- Prior experience with digital process control equipment
- Prior experience with computer programming will be an advantage

Objectives

- On a personal computer, access the UNIX operating system environment and execute simple commands
- Traverse and manipulate the file system structure using UNIX commands
- Execute commands using features of the Bourne Shell, including command I/O, metacharacters, variables, quotes, and process creation and control
- Create and edit predefined text files using the vi text editor
- Execute commands to transform or search for files, and to establish user-to-user communications
- Perform basic UNIX system administration duties, including maintaining file systems, scheduling command execution, and managing printer requests
- Use the DOS file utilities commands to access DOS files
- Create and execute Bourne Shell scripts that use UNIX commands, shell variables, conditionals, loops, I/O, and command-line arguments
- Execute UNIX commands on 50 Series equipment to format floppy diskettes, create file systems on diskettes, and archive and restore files
2610 FoxCAE
This instructor-led course will help you increase productivity and reduce engineering for I/A Series control stations and I/A Series historians using FoxCAE v5.0 software. Forward engineering, loop documentation, and back documentation are some of the benefits to be realized with this course. You will be able to implement control schemes offline and online in the I/A Series system. You will also learn how to use the powerful importing and propagation tools to populate field device databases. Forward engineering instrument databases will help you increase engineering productivity and help eliminate configuration errors. (Course code 2610)

Duration: 3 days
Who should attend?
• Process control engineers who will use FoxCAE software to configure, document, and secure I/A Series control databases

Prerequisites
• Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
• Process Automation Learning course 2100, 2101 Integrated Process Control, or Continuous Control
• Working knowledge of personal computers in a Microsoft Windows environment

Objectives
• Access the various FoxCAE components and describe their functions
• Utilize the basic working area windows and graphical editor to create a simple loop
• Utilize FoxCAE functions to manage a Project Database, manipulate a Tag List to import data, and set up various block propagation
• Manipulate data-forms to map data for Block propagation schemes, and create and modify block structure defaults
• Create and modify typical loop structures for bulk generation of a control scheme
• Manipulate a FoxCAE control database for downloading into a Control Processor
• Load an existing CP database onto FoxCAE software and organize the compounds and blocks into control loops for documentation and control database maintenance

2612 I/A Series Configuration Component (IACC)
This instructor-led course will help you increase plant utilization, reduce engineering, and establish consistency of methods for I/A Series control stations, hardware, software, and displays using IACC. In this course you will learn to use Control Strategy Diagrams (CSDs) to create a control strategy. You will also learn to use Animated Loop Drawings that is a new mode of the CSD Editor in which live data values from a running I/A Series system are displayed. IACC has improved import with merge capability, which has been expanded to allow an import/merge of all control object types. You will learn to use IACC Bulk functionality, which permits users to upload selected parameters from a CP to IACC across many compounds and blocks in a single action. You will integrate control loops with FoxDraw displays. You will also learn how to define system hardware and accompanying software parameters. You will learn to make the bulk generation and edits of control loops. (Course code 2612)

Duration: 5 days
Who should attend?
• Process control engineers who will use IACC to create, edit, document, and secure I/A Series control databases, displays, and the I/A Series platform

Prerequisites
• Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
• Process Automation Learning course 2100 Integrated Control or 2101 Continuous Control

Objectives
• Build a simple loop using the Control Strategy Diagram Editor, assign it to a compound, and download it to a control station
• Create and edit FoxDraw displays from within IACC
• Given a Tag List, build a CSD Template, and Bulk Generate multiple compounds and CSDs from a tag-list and CSD template
• Apply ladder logic control using the IACC interface
• Apply sequential control using the IACC interface
• Build a system configuration, define the hardware naming and software parameters, validate it, and create a commit disk
• Describe and use the various security, multiuser, and version control features of IACC
• Use the Find in Database and Where Used search commands, as well as generate a report
• Back up, restore and verify IACC databases

2625 I/A Series Batch
This instructor-led course will help you increase productivity, reduce engineering, and establish consistency of methods with batch processing using the I/A Series system. You will construct a batch model based on a plant physical model and Functional Specification, then run and report on the batch recipes you have created. You will optimize the performance of the batch control strategy using recipe phases. (Course code 2625)
Duration: 5 days

Who should attend?

- Process and control system engineers responsible for coordinating, implementing, or maintaining the I/A Series Batch

Prerequisites:

- Process Automation Learning course 2000 Introduction to Configuration or 2001 Configuration Essentials
- Process Automation Learning course 2100 Integrated Control or 2101 Continuous Control
- 2102 Sequence Control and Ladder Logic

Objectives

- Given a process model, define the units, connections, and phases required to implement the batch control strategy
- Declare a process block connection to the Batch System
- Create simple macros and tie block to the Batch System
- Define Flexible Batch and develop a good understanding of Flexible Batch characteristics
- Define and build a process model with the following components: units, process classes, tags and formula parameters, equipment status
- Link a process model to a control strategy
- Map the process states defined in a Functional Design Specification into the sequence block states
- Program sequence blocks so that the batch interface can be used effectively and the control strategy can be easily maintained
- Create batch recipes, and modify and build transition logic
- Schedule, run, and test recipes

2652 FOUNDATION Fieldbus System Engineering with IACC

This hands-on, instructor-led course will help improve plant availability and reliability by making familiar the concepts, tools, and tasks required to engineer and integrate FOUNDATION Fieldbus devices with an I/A Series system. Participants will become acquainted with segment design, importing DD files, and installing a DTM. Participants will create new device type templates and set security privileges and default parameter values. Participants will also create derived device type templates, create and configure device instances, associate device instances with an FBM/ channel, and set FBM parameters.

(Course code 2652)

Duration: 5 days

Who should attend?

- Engineers who need to design FOUNDATION Fieldbus segments, configure and integrate FOUNDATION fieldbus devices with an I/A Series system

Prerequisites

- Process Automation Learning course 2001v8 Configuration Essentials version 8 and higher (recommended)
- Process Automation Learning course 2612 I/A Series Configuration Component (recommended)

Objectives

- Describe “publish and subscribe” and client server communication methods
- Describe FOUNDATION Fieldbus loading and sizing rules and best practices
- Describe the function and link master block schedules
- Describe the I/A Series macrocycle implementation
- Describe LAS responsibilities
- Use Foundation Fieldbus Device Templates in IACC
- Customize download/upload behavior and FDM tabs & viewing screens in IACC
- Link manuals and other documentation in IACC
- Set up security by privileges and user roles in IACC
- Use inheritance functions in IACC
- Configure the function block in IACC
- Use the Field Device Manager to commission, replace, and troubleshoot devices

2700 Management Overview

This instructor-led course will help you increase plant utilization by providing you with an overview of capabilities and major components of the I/A Series system. You will review hardware, control strategies, and I/A Series software packages and their features. This increased system comprehension will help you make better-informed day-to-day plant decisions.

(Course code 2700)

Duration: 3 days

Who should attend?

- Plant supervisors, managers, and supply chain staff who have indirect responsibilities or connection with the I/A Series system

Prerequisites

- Familiarity with computer systems and process control
Objectives

• List the major hardware components of an I/A Series system, their functions, and interrelationships
• List the available software that Schneider Electric offers as the Enterprise Control System
• Demonstrate the method of accessing environments, displays, and I/A Series configurators, and describe the purpose of these configurators
• Describe and manipulate predefined process control schemes consisting of I/A Series continuous block types
• Describe and recognize the occurrence of a process alarm
• Identify a failed component
• Describe the information presented in standard and custom process reports
• Use I/A Series trend displays and trending software packages to view real-time and historical data
• Describe how the I/A Series Control configurators are used to modify and document a predefined system configuration

2801 SCD2200 Configuration Essentials

This instructor-led course will help increase utilization and performance by generating a sound foundation of the hardware, software, and diagnostic features of the I/A Series SCD2200 Remote Telemetry Unit (RTU). This course covers the firmware and drivers needed for the SCD2200, and the key points for designing and operating the SCD2200. The participant will become familiar with the features and functions of FoxRTU Station, including diagnostics, utilities, the Dictionary, and event logging. This includes advanced configuration procedures for FoxRTU Station and the procedures for performing FoxRTU functions in ISaGRAF. (Course code 2801)

Duration: 5 days

Who should attend?

• Personnel responsible for configuration and maintenance of the Foxboro SCD2200

Prerequisites

• Familiarity with computer applications and networking

Objectives

• Describe key supervisory control and data acquisition (SCADA) concepts
• List hardware, software, and diagnostic features of the Foxboro SCD2200 Remote Telemetry Unit (RTU)
• List the firmware and drivers needed for the SCD2200

• Describe key points for designing and operating the SCD2200
• Describe the features and functions of FoxRTU Station, including diagnostics, utilities, the Dictionary, and event logging
• Describe the advanced configuration procedures for FoxRTU Station and the procedures for performing FoxRTU functions in ISaGRAF
• Describe the process of implementing redundancy
• Describe basic troubleshooting of the SCD2200 RTU procedures by performing software diagnostic functions
• Describe the procedures for interfacing the SCD2200 to an I/A Series system FBM233 through a DNP3 driver
Process Instrumentation and Control Instructor-led Courses
6211 Process Control Technology
This instructor-led course will help increase plant availability, utilization, and performance by generating a sound foundation of process control principles and theories. The course gives emphasis to fundamentals as well as practical application. It will provide a fuller appreciation of what can be expected when control strategies are applied and integrated to processes and their limits. The essential properties of a control loop are explained to provide you with a process control foundation. The course material is not tied to any specific vendor equipment. You may use this course as an independent overview of process control or as part of a continuing program in process control education. (Course code 6211, formerly 8211)

Duration: 5 days
Who should attend?
• Persons with loop servicing responsibilities should attend this course
• The course has been prepared with the “non-specialist” engineer or technician in mind
• This course is also recommended for supervisors, managers, and other individuals whose responsibilities are indirectly related to process control

Prerequisites
• Six months of experience working with plant instrumentation and controls, successful completion of Process Automation Learning course 6212 Process Measurement Technology, or the equivalent

Objectives
• Explain basic feedback control loops utilizing transmitters, controllers, and valves
• Sketch a controller’s output for step and ramp changes in measurement and setpoint
• Tune a P, PI, or PID controller on simple flow, level, and temperature loops
• Explain and tune basic cascade control loops
• Explain the basic concepts behind feedforward control
• Explain the basic concepts behind ratio and signal selector applications
• Identify and list symbols and terminology used in control loop drawings

6212 Process Measurement Technology
This instructor-led course will help increase plant availability and utilization while reducing plant corrective and preventive maintenance costs by generating a sound foundation in the engineering principles and theories behind the selection and use of common plant sensing devices: flow, pressure, temperature, level, and electrochemical. This course will require you to put to use what you learned in sizing flow devices and orifices. The course material is not tied to any specific vendor equipment. (Course code 6212, formerly 8212)

Duration: 5 days
Special Feature
• A reference book on instrumentation is used as course text and will be provided as part of student course material

Who should attend?
• Experienced plant personnel with general instrumentation responsibilities, which include instrument selection, design, installation, purchasing, or maintenance

Prerequisite
• Ability to work with simple algebraic equations

Objectives
• Define uniform terminology in the field of process instrumentation
• Understand the basic theory, principles, and use of common plant process measurement instruments: flow, pressure, level, density, temperature, and electrochemical
• Identify the key mechanism required to build a field transmitter and realistic instrument operating conditions
• Identify qualitative and quantitative data that will help determine how to best select and effectively apply instruments for monitoring and controlling measurement variables: pressure, liquid level, density, flow temperature, pH, ORP, conductivity, and humidity
• Calculate flow rates and orifice sizing

6235 Control Systems Engineering
This instructor-led advanced engineering course will help increase plant utilization and performance by generating a sound foundation of process control theories explaining why processes behave the way they do, and therefore enabling you to apply more efficient methods of control. Most process control courses try to explain process control concepts in either a qualitative manner or a pure quantitative manner. Neither is satisfactory. The first simplifies the subject too much to make it useful for understanding how processes behave and why particular control strategies are successful. The latter involves too much math, making the subject too abstract for any real-world application. The Control Systems Engineering course combines a qualitative and quantitative approach. It explains the
6242 Industrial Boiler Control Systems
This instructor-led comprehensive course will help increase plant availability by generating a sound understanding of the industrial boiler and its functions. This course is designed to cover the fundamental concepts related to industrial boiler control schemes. You will learn how control theories and practices relate to this highly specific area of industrial applications. This course includes coverage of boiler basics and the steaming process, basic control loops and their system interconnection related to combustion of fuel, excess air, and products of combustion, the steam supply system, main steam and reheat steam of temperature control, feedwater control systems, boiler draft systems, measurement, MOCS and control of furnace draft, measurement and control of combustion air flow plus related functions, fuel gas analysis trimming of combustion control systems, combustion control for liquid and gaseous fuel boilers. (Course code 6242)

Duration: 5 days

Who should attend?
• Operators, engineers, and supervisors who have some responsibility for industrial boiler operation should attend this course
• This course provides a beneficial review of basic control principles for experienced personnel and novices

Prerequisites
• At least six months of process control and instrumentation experience
• First year BSC degree or equivalent mathematical ability
• Process Automation Learning course 6212 Process Measurement Technology or equivalent knowledge
• Process Automation Learning course 6211 Process Control Technology or equivalent knowledge

Objectives
• Describe dynamic elements in a control loop, both steady state and dynamic gains, loop gain and decay
• Describe the interactions that traditional control modes of P, P&I, P&D, I, and PID have with predominantly dead time or lag processes
• Describe the characteristics of multicapacity processes with interacting and non-interacting lags
• Describe the transmitter and valve characteristics and their impact on process control
• Describe the dynamics and characteristics of 5 common control loops:
  - Flow
  - Pressure
  - Liquid-level
  - Quality
  - Temperature
• Select and tune controllers for a wide variety of process loops
Prerequisite
• Successfully completed high school education

Objectives
• Detect improper operation of various sensing elements used in process control loop environments
• Visual inspection and selecting the proper test equipment to verify proper operation
• Use knowledge of basic principles to determine conditions that cause faults or measurement errors in a variety of liquid level measuring applications
• Determine measurement errors in flow measuring applications
• Use principles of different temperature sensing methods to identify the likely causes of temperature measurement errors and eliminate them
• Combine the knowledge of electrochemical measurement principles and related sensors; perform test procedures to identify potential problems in obtaining valid measurements and matching corrective actions
• Using pneumatic, electronic, and digital transmission principles, identify the major factors likely to cause transmission errors or failures

6321 Measurement Principles for Technicians
This instructor-led course will help increase plant availability and utilization while reducing plant corrective and preventive maintenance costs by making familiar the general principles behind the operation of plant sensing elements: flow, pressure, temperature, level, and electrochemical. This hands-on course will require you to put to use what you learned in detecting improperly operating equipment, and determining which primary or secondary sensing element is the cause of field problems. This course will prepare you for more advanced courses in troubleshooting, calibration, and selection. The course material is not tied to any specific vendor equipment. Throughout all exercises, you will apply field-proven, problem-solving models and learn basic plant safety procedures related to the handling, installation, and replacement of measurement equipment. (Course code 6321)

Duration: 5 days

Who should attend?
• Instrumentation technicians or others who require knowledge of primary measurement fundamentals in their work should attend this course
• Novices will gain an understanding of the fundamentals of sensing devices
• More experienced technicians will fill in gaps in fundamental knowledge and skills
• Use the PC50 or equivalent to perform operation, and configuration procedures on Foxboro Automation Intelligent transmitters
• Describe the proper installation and maintenance procedures of Foxboro Automation Intelligent transmitters
• Set up a typical laboratory calibration test for Foxboro Automation Intelligent transmitters

6350 Fundamentals of Pneumatic Instrument Maintenance
This hands-on, instructor-led maintenance course will help you improve plant availability by using proper equipment installation and maintenance practices. You will master industry-standard operating procedures used with pneumatic instruments. You will explore the principles of operation behind pneumatic devices, and then reinforce your comprehension through extensive hands-on lab exercises. (Course code 6350)

Duration: 5 days

Who should attend?
• Instrument technicians and others whose duties include pneumatic instrument maintenance, repair, or the supervision of those functions

Prerequisites
• Process Automation learning course 6321 Measurement Principles for Technicians, or equivalent knowledge
• High school physics and mathematics

Objectives
• Repair pneumatic instruments by calibration or parts replacement
• Align motion and force-balance controllers
• Calibrate selected pneumatic instruments
• Verify proper repair or alignment of an instrument

6393 Model 743/760/761/762 User Maintenance
This application-oriented, instructor-led course will help you increase plant availability by making familiar the operation of the Model 743/760/761/762 Single Station Micro Controllers and some examples of how to apply them. You will also have hands-on experience in the operation and configuration of the controllers. (Course code 6393, formerly 4393)

Duration: 5 days

Who should attend?
• Personnel responsible for maintaining or configuring the Model 743, 760, 761, or 762 controller
Online Learning Series
E5111 Configuring the PIDA Control Block

This online lesson will help increase plant utilization and performance by generating a sound foundation of the features and use of the PIDA control block. The PIDA block implements continuous PID or dead time feedback, and additive and multiplicative feedforward control of an analog loop, providing advanced features compared with the PID and PIDX blocks. Its principal inputs, setpoint, and measurement are used to compute its output, the manipulated variable based on user-set or adaptively tuned values of the tuning parameters, proportional band, integral time, derivative time, delay time, and setpoint relative gain SPLLAG. In addition, the measurement filter time constant factor KD is adjusted by pretune and the deviation alarm delay DEVTIM is adapted. In a dead time controller mode (PIDTAU or PITAU), the filter time FILTER can be adjusted if needed to prevent high frequency instability. The feedforward capability can be used to decouple interacting loops in addition to compensating for measured load upsets. In addition, extension connections can be made to the FBTUNE block that performs adaptive tuning. The features and use of the FBTUNE block is covered in E5112 Configuring the FBTUNE Feedback Tuner Block. (Course code E5111)

Duration: 4+ hours

Who should attend?
• Process control engineers and system administrators responsible for design, testing, and maintenance of plant Foxboro control schemes

Prerequisites
• High school calculus
• Process Automation Learning course 6235 Control Systems Engineering (recommended)
• Process Automation Learning course 2001 or 5001 Foxboro Evo Configuration Essentials

Objectives
• Describe the parameters and parameter options required to establish and process a control block
• Describe the parameters and parameter options for linking and conditioning PIDA input and output signals
• Describe the parameters and parameter options for configuring PIDA control modes and tuning parameters
• Describe the parameters and parameter options for configuring PIDA Auto/Manual modes, initialization, and back-calculations
• Describe the parameters and parameter options for configuring PIDA alarm condition types, actions, definitions, message groups, and priorities
• Describe the parameters and parameter options for configuring PIDA level, deviation, controller output, and quality alarms
• Describe the parameters and parameter options for PIDA alarm indicators and status
• Describe the parameters and parameter options for suspending, inhibiting, and enabling PIDA alarms
• Describe the parameters and parameter options for setting output limits, securing write access, and PIDA operation HMI screens for viewing the PIDA block
• Describe the parameters and parameter options for using the PIDA block PID functions such as:
  - Characterizing/Converting the Control Inputs
  - Setting setpoint clamping
  - Moderating the Impact of Setpoint Changes
• Describe the parameters and parameter options for using the PIDA block in more advanced control functions such as:
  - Non-linear control in PIDA
  - Dead Time Compensation using PIDTau
  - Setpoint Response with Dead Time Compensation on a Pure Delay Process
• Describe the parameters and parameter options for using the PIDA block in Cascade control applications
• Describe the parameters and parameter options for using the PIDA block in more advanced control functions such as:
  - Feedforward Control
    • BIAS Input in PIDA
    • Applying BIAS Input for feedforward Level Control
    • MULTIN Input in PIDA
    • Multin Input for feedforward Composition Control
  - Supervisory Control
• Describe the parameters and parameter options for suspending control action triggered by errors in input signals and constrained automatic control
• Describe the parameters and parameter options for using the PIDA block in more advanced control functions such as:
  - Batch Operations
  - Controlling Discontinuous Measurements
• Describe status information provided by the PIDA block

Configuring the PIDA Control Block Lesson Plan
PIDA 0 Introduction to the PIDA block (6:06 min)

Module 1
PIDA — 1A: A Block Identity and Configuration for Basic Control Applications (15:17 min)
• Establishing and Processing blocks
  - IA Control Hardware — Stations and Networks
  - IA Control Software — Compounds, Blocks, and Parameters
  - Basic Block Processing
  - PIDA Block Identity Parameters

PIDA — 1B: Block Identity and Configuration for Basic Control Applications (8:07 min)
• Linking PIDA Input and Output Signals
  - Basic Feedback Control Loop Structure
PIDA - 1C: Block Identity and Configuration for Basic Control Applications (14:43 min)
- Defining Linkages for IA Blocks — Source and Sink
- Change Deltas in IA Control Blocks

PIDA - 1D: Block Identity and Configuration for Basic Control Applications (19:30 min)
- PIDA Control modes and Tuning Parameters
  - Control Modes in PIDA Blocks
  - Proportional-only Control in PIDA
  - Implementing Integral Action in PIDA — External Integral Feedback
  - Implementing Derivative Action
  - Combining Control Modes — the PIDA Algorithm(s)
- PID Control — Interacting vs. Non-Interacting

PIDA - 1E: Block Identity and Configuration for Basic Control Applications (17:50 min)
- Manual and Automatic
  - Automatic and Manual Operation
  - Initialization & Back-Calculation
  - Auto/Manual Transfer in P-only Control
- Summary
  - Complete Basic Control Loop Connections

Module 2
PIDA - 2A: PIDA Block Alarms and Operator Interface (17:04 min)
- Overview of PIDA block alarms
  - Alarms in process control
  - PIDA Alarm Condition Types
  - PIDA Alarm Condition Actions
  - PIDA Alarm Function Definition
  - Message Groups and Priorities

PIDA - 2B: PIDA Block Alarms and Operator Interface (14:41 min)
- Configuring PIDA alarms
  - Measurement Alarms — Level 1 Absolute Alarms
  - Measurement Alarms — Level 2 Absolute Alarms
  - Deviation Alarms
  - Controller Output Alarms
  - Data Quality Alarms
  - Re-alarming and Nuisance Alarms

PIDA - 2C: PIDA Block Alarms and Operator Interface (3:17 min)
- Alarm Output Indicators
  - Block Alarms — Status Indicators

PIDA - 2D: PIDA Block Alarms and Operator Interface (3:46 min)
- Suspending PIDA Block Alarms
  - Operational Control — Inhibiting and Enabling Alarms

PIDA - 2E: PIDA Block Alarms and Operator Interface (11:06 min)
- Operational Control of a PIDA block
  - Operational Control — Output Limits
  - Operational Control — Securing Write Access
  - Basic Operator Interface for PIDA Operational Control — Select Display
- Summary
  - PIDA Block Alarms and Operator Interface

Module 3
PIDA - 3A: Additional PIDA Functions and Advanced Applications (18:17 min)
- Characterizing PIDA Block Functions
  - Characterizing/Converting the Control Inputs
- PIDA Block Setpoint Clamping
  - Setpoint Clamping
- Moderating the Impact of Setpoint Changes
  - Setpoint Changes and Proportional Action
  - Setpoint Ramping in PIDA

PIDA - 3B: Additional PIDA Functions and Advanced Applications (30:13 min)
- Non-linear in PIDA
  - Non-linear Control in PIDA
- Controlling Processes with Significant Dead Time
  - Dead time Compensation using PID Tau
  - Setpoint Response with Dead Time Compensation on a Pure Delay Process
- PIDA in Cascade Control
  - Cascade Control Applications
  - Configuring PIDA for Cascade Control
  - Parameters for Cascade Coordination

PIDA - 3C: Additional PIDA Functions and Advanced Applications (20:03 min)
- PIDA in feedforward Control
  - BIAS Input in PIDA
  - Applying BIAS Input for feedforward Level Control
  - MULTIN Input in PIDA
  - MULTIN Input for feedforward Composition Control
- PIDA in Supervisory Control
  - Supervisory Control and PIDA

Module 4
PIDA - 4A: Intermittent Operation & Operating Status Information (18:08 min)
- Overriding Auto/Manual Status
  - Auto/Manual Operation — Revisited
• Suspending Control Action
  - Suspending Control Action
• Holding Errors in Input Signals
  - PIDA — Error Bit Propagation
  - PIDA Response to Bad Inputs
• Constrained Operation in PIDA
  - Constrained Automatic Control

PIA — 4B: Intermittent Operation & Operating Status Information (18:20 min)
• Batch Operations in PIDA
  - Batch Operations
• Intermittent Measurements in PIDA
  - Controlling Discontinuous Measurements

PIA — 4C: Intermittent Operation & Operating Status Information (19:22 min)
• Status Information in PIDA
  - Examining the Current Status — Control
  - Examining the Current Status — Inhibited Alarms
  - Examining the Current Status — Active Alarms
  - Combined Control and Alarm Information
  - Additional Alarm Information
  - Examining the Current Status — Cascade
  - Examining the Current Configuration Error Status

E5112 Configuring the FBTUNE Feedback Tuner Block
This online lesson will help increase plant utilization and performance by generating a sound foundation of the features and use of the FBTUNE block. The FBTUNE block is used to adaptively tune gain schedules for the proportional band PBAND, the integral time INT, derivative time DERIV, dead time DTIME, and the relative gain on setpoint (SPLLAG) of the PIDA and DPIDA blocks. FBTUNE also sets the deviation alarm delay DEVTIM and the filter time constant FILTER used to prevent high frequency instability in the PITAU and PIDTAU dead time controller modes. (Course code E5112)

Duration: 60 minutes

Who should attend?
• Process control engineers and system administrators responsible for design, testing, and maintenance of plant Foxboro control schemes

Prerequisites
• High school calculus
• Process Automation Learning course 6235 Control Systems Engineering (recommended)
• Process Automation Learning course 2001 or 5001 Foxboro Evo Configuration Essentials
• Process Automation Learning Online lesson E5111 Configuring the PIDA Control Block

Objectives
• Describe the underlying concepts of controller tuning
  • Describe what an FBTUNE block does
  • Describe the differences between Auto-tuning and Self-tuning
  • Describe how to configure the connection between an FBTUNE and PIDA block
  • Describe the parameters and parameter options for configuring the FBTUNE block
  • Explain how boundaries on the FBTUNE block are set
  • Describe the usage of the Pre-tune function in the FBTUNE block
  • Operate the FBTUNE block using the block’s detail display
  • Explain how and when the FBTUNE block should and should not be used
  • Describe how to get the best out of the FBTUNE block through proper setting of key FBTUNE block parameters
  • Configuring the PIDA Control Block Lesson Plan

Configuring the FBTUNE Feedback Tuner Block Lesson Plan

FBTUNE — 1: Auto-Tuning - What are the underlying concepts? (13:25 min)
• What is controller tuning?
• Proper Tuning is based on a Process Model
• Loop Gain and Stability
• What does an FBTUNE block do?

FBTUNE — 2: Connect to PIDA Target and Configuring for Successful Tuning (16:16 min)
• Auto-Tuning vs. Self-Tuning
• Configuring the connection
• Configuring FBTUNE Blocks for successful tuning
  - Configuring FBTUNE — Creating the block
  - Two Key Parameters
  - Setting Boundaries on the FBTUNE

FBTUNE — 3: Operation of the FBTUNE block (6:39 min)
• Pre-tune function in FBTUNE
• Operation of the FBTUNE Block

FBTUNE — 4: Managing FBTUNE — Standard Detail Display and Functions (9:08 min)
• PIDA Block Detail Display
• FBTUNE Block Detail Display
• Tuning Display in PIDA block

FBTUNE — 5: Application Tips and Conclusion (14:44 min)
• THRESH Setting
• ITMAX Setting
• Maximum PB