



 **Emerson Education Services**  
Maximize Your Investment with Well-Trained Personnel

**TRAINING CENTERS  
& CONTACTS**

**LEARNING PATHS**

**BRANDS AND PRODUCTS**





#### ON-SITE TRADITIONAL

Through our on-site training services, we provide customers a Certified Instructor, courseware literature, and all hardware associated with supporting hands-on workshops. In North America, we deliver on-site training courses sponsored through our Partners' Education Program. This allows our customers the opportunity to access our Training Courses through their local business partner.



#### ELEARNING

Emerson eLearning offerings are professionally developed, engaging, flexible and up to date. Emerson online learning programs provide a convenient opportunity to study about our technologies and solutions at any time. Our goal is to provide our customers a competitive advantage by empowering them with the latest knowledge in a growing range of topics.



#### VIRTUAL LEARNING

Emerson's Virtual Classroom delivers real-time value-based Instructor-Led Training to customers' desktops with full access to software systems. Students connect directly to classroom-based machines for the entire class! There is no travel required, which means fewer expenses for our customers. Class takes place in a live online training room using a teleconference bridge.



#### BLENDED LEARNING

Blended Learning is a contemporary approach to training that blends different teaching methods and deploys them via digital and online media to maximize the effectiveness and convenience of learning. The Emerson Blended Learning approach combines various learning methods using a wide array of digital media. Blended Learning is Emerson's unique approach to delivering quality education while reducing out-of-production learner time.



#### MICROTRAINING

Short "how-to" videos to accomplish specific tasks. The videos are ancillary and complementary to the traditional classroom training. Emerson subject matter experts share their knowledge by providing step-by-step instructions on how to accomplish simple to complex tasks. Exclusive for PSS courses.

*Experiential  
[learning] is a  
philosophy and  
methodology in  
which educators  
purposefully engage  
with students in  
direct experience  
and focused  
reflection in order to  
increase knowledge,  
develop skills, and  
clarify values.*



## IACET ACCREDITED PROVIDER

Education Services is accredited by International Accreditors of Continuing Education and Training (IACET), which means Emerson:

- Demonstrates proof of high-quality instruction by following the ANSI/IACET Standard through a rigorous accreditation process;
- Provides students with Continuing Education Units (CEUs) for successful course completion; and
- Is recognized as a reputable organization committed to high-quality and excellence in education and training.

Emerson Education Services is proud to have been an IACET Accredited provider since 2008! We look forward to the opportunity to provide our education and training with you!



## CANCELLATIONS & TRANSFERS

If your plans or budgets change you may cancel/transfer your reservations up to 14 calendar-days prior to start of the course without incurring a cancellation charge. Limited enrollment makes it necessary to charge 50% of the full tuition for cancellations/transfers received during the 14-days prior to the start of the course, and full tuition for failure to attend without canceling. Substitutions are accepted until the first-day of class.



## E-LEARNING

Training courses are available to you on-line. You can learn at your pace and on your time. For more information please visit our web page: [www.emerson.com/education](http://www.emerson.com/education)



## QUALIFICATIONS FOR ENROLLMENT

Education Services agrees to accept for training, individuals who are not competitors of Emerson Automation Solutions in the field to which the training pertains. Education Services will provide reasonable accommodations to students who have a physical or mental impairment that substantially limits one or more major life activities, as long as the accommodation does not put undue hardship on the company.



## COURSE MATERIALS

All materials presented are copyrighted. Audio and video recording is prohibited and no material or portion of any course may be reproduced in any manner without prior written approval. All necessary documentation, catalogs, and literature are included in the course tuition. The training materials were developed by and for Emerson Education Services exclusive use.



## COURSE SCHEDULING, LOCATIONS & PRICING

Course schedule and locations including length, dates of each session and price are listed on the Education Services MyTraining website. All prices are in U.S. Dollars. For the most up to date information call **800-338-8158** or visit our website at: [www.emerson.com/mytraining](http://www.emerson.com/mytraining)



## ON-SITE & LOCAL TRAINING

Education Services instructors are available to provide expert training anywhere in the world. We can conduct training tailored to meet your needs at your facility or regional and local sites. To learn more about on-site and local training contact your local Emerson service provider or call 1-800-338-8158.



## TUITION

Methods of payment include: purchase order, acceptable credit cards include: Visa, MasterCard and American Express. All tuition is subject to change without notice. Transportation, personal expenses and most meals are the responsibility of the student.



## ARRIVAL & DEPARTURE TIME

Students should plan to arrive the-days prior to the course starting-days, as class typically begins at 8 a.m. If traveling by air, please allow sufficient time to travel to the airport and check-in when scheduling return transportation.



# AMS



## COURSE 7020

CEUs: 2.1

**AMS Device Manager****Overview**

Completing 3-days of AMS Device Manager hands-on instructor assisted training modules and exercises, provides the quickest route to your productive use of this predictive maintenance application.

**Topics**

- AMS Device Manager Features and Overview
- Viewing and Configuring HART Devices
- Creating a Plant Database Hierarchy and Assigning Devices
- Adding New Device Descriptors
- Device Replacement Procedures
- Using AMS Trex Device Communicator
- AMS Device Manager Audit Trail
- Calibration Assistant SNAP-ON
- Configuring and Monitoring System Alerts
- Network Communication Interface Setup
- AMS Database Operations
- Multiplexers and QuickCheck SNAP-ON
- User Configurations and Bulk Transfer
- DVC and ValveLink SNAP-ON
- Wireless Interface & AMS Wireless SNAP-ON
- AMS Device View

**Prerequisite:**

None

**Audience**

This course is intended for technicians and engineers who need to configure and use AMS Device Manager.

## COURSE 7021

CEUs: 2.1

**AMS Device Manager with Rosemount HART Instruments****Overview**

Learn the installation, calibration, maintenance, and troubleshooting of measurement instrumentation using AMS Device Manager. This 3-day course teaches maintenance and calibration of measurement devices using AMS Device Manager software to communicate and track information. The student will learn how pressure and temperature transmitters function, are installed, and calibrated using AMS Device Manager. The course uses hands-on training, labs, and lecture to teach the student how to:

- Configure and use AMS Device Manager correctly perform transmitter installation and setup procedures
- Properly configure HART® transmitters
- Properly calibrate transmitters
- Perform basic troubleshooting-transmitters

**Topics**

- Configuring and Using AMS Device Manager
- Viewing and Modifying Devices
- Creating a Plant Database Hierarchy and Adding Devices
- AMS Device Manager Browser Functions
- Audit Trail
- HART Communication
- HART Transmitters (3051C, 3144P)
- Test Equipment Selection
- Transmitter Installation and Configuration
- Transmitter Calibration
- AMS Calibration Assistant
- Intelligent Calibrators
- Transmitter Troubleshooting

**Audience**

The hands-on focus is on skills required by engineers, technicians, or others that are new to the plant or instrument environment.

## COURSE 7039

CEUs: 2.8

**AMS Device Manager with DeltaV****Overview**

This 4-day course is for instrumentation technicians responsible for all areas of managing and ensuring the reliability of instrumentation in the plant process including startup and commissioning, normal operations, maintenance, and troubleshooting.

**Topics**

- DeltaV and PlantWeb Overview
- AMS Device Manager Overview
- FOUNDATION™ fieldbus Overview
- ValveLink™ SNAP-ON Introduction
- ValveLink™ DVC Setup
- ValveLink™ SNAP-ON Tests and Diagnostics
- HART® Overview
- PROCONEX QuickCheck SNAP-ON
- PROFIBUS Overview
- PlantWeb Alerts
- AMS Device Manager User Interface
- Setup and use of Alert Monitor in AMS Device Manager
- Device Replacement for HART, Fieldbus, and PROFIBUS Devices
- AMS Device Manager Audit Trail
- AMS Device Manager Calibration Assistant
- Smart Commissioning

**Prerequisites**

Microsoft windows experience. Minimal DeltaV and AMS experience is recommended but not required. Recommended to take 7018, but not required.

**Audience**

The target audience usually does following:

- Responds to work orders created to calibrate, troubleshoot, repair, service, and replace instruments and valves
- Monitors alerts to preemptively address problems prior to operators seeing a problem in the control room
- Provides loop testing & assistance with instrumentation in plant turnarounds, startups, and for project work
- Improves process availability & reduces operations and maintenance costs



## COURSE E2300

CEUs: 0.1

**AMS Trex Device Communicator****Overview**

AMS Trex Device Communicator is an introductory course with lessons on:

- Theory of operation
- Model number
- Spare part selection
- Communicator configuration
- Connecting
- Communicating
- Powering HART™
- FOUNDATION™ Fieldbus
- Wireless devices and positioners
- Unit maintenance
- Troubleshooting the unit
- Device connectivity

**Topics**

E2300 AMS Trex Device Communicator is an introductory course with lessons on theory of operation, model number and spare part selection, communicator configuration, connecting, communicating, and/or powering HART™, FOUNDATION™ Fieldbus, and wireless devices and positioners, unit maintenance, and troubleshooting the unit and device connectivity

**Audience**

This is online E-course. No targeted audience.





BETTIS





## COURSE VA111

CEUs: 1.2

**Bettis MCP & M2CP Maintenance & Field Service Introduction****Overview**

Fundamental overview of the construction, assembly, hardware, software and configuration of Emerson's Bettis™ MCP & M2CP actuators. Students attending this program will demonstrate an ability to identify actuators, hardware, components and assemblies. All students will demonstrate the ability to setup, configure, check and verify operation of various actuator configurations using appropriate hardware or software.

**Topics**

- Identify main mechanical components and understand the function of Emerson's Bettis M2CP and MCP actuators
- Identify main components and understand function of the modular control package (MCP)
- Identify main components and understand function of the second generation modular control package (M2CP)
- Setup and Commissioning
- Identify function and main components of bevel gears and worm gears
- Introduction to DCMLink

**Prerequisites**

Students should have a minimum of one year field service experience and a working knowledge of Bettis M2CP actuators.

## COURSE VA114

CEUs: 1.2

**Bettis TEC2 Maintenance & Field Service Introduction****Overview**

Fundamental overview of the construction, assembly, hardware, software and configuration of Emerson's Bettis TEC2000 and TEC2 actuators. Students attending this program will demonstrate an ability to identify actuators, hardware, components and assemblies. All students will demonstrate the ability to setup, configure, check and verify operation of various actuator configurations using appropriate hardware or software.

**Duration:**

2 Days

**Who Should Attend:**

- Field Service Technicians
- Sales Engineers
- Quotation Managers
- Instrumentation and Control Technicians

**Topics**

- Identify main mechanical components and understand the function of Emerson's Bettis TEC2 actuators
- Identify main components and understand function of the non-intrusive TEC2 control package
- Setup and Commissioning
- Identify function and main components of bevel gears and worm gears
- Introduction to DCMLink

**Prerequisites**

Students should have a minimum of one-year field service experience and a working knowledge of Bettis TEC2 actuators.

## COURSE VA134

CEUs: 1.2

**Bettis XTE3000 Maintenance & Field Service Introduction****Overview**

This course presents the fundamental aspects of Bettis XTE3000 actuators. Attendees are presented with essentials of design and operation and how they operate the valves. Basic components and assemblies are identified to aid in understanding the basic controls, applications, and mechanical operation. Each student will learn how to set travel limits, torque limits and operate an actuator on or off the valve. Model number interpretation, document relevance (Spec Sheet; Manuals; Wiring Diagrams; Outlines; Assembly Drawing) and support resources will be discussed.

**Topics**

- Identify main mechanical and electrical components
- Understand the control inputs, feedback outputs, and optional modules for the Bettis XTE3000 actuator
- Setup and Commissioning
- Status LED codes and fixes
- Configuration with AManager software
- Diagnosing and resolving error codes

**Audience**

- Field Service Technicians
- Sales Engineers
- Quotation Managers
- Instrumentation and Control Technicians

**Prerequisites**

Students should have a minimum of one-year field service experience and a working knowledge of Bettis XTE3000 actuators.

**COURSE VA123****CEUs: 1.2****Bettis RTS Electric Actuator Product & Service Introduction****Overview**

This 2-day course presents the fundamental aspects of RTS actuators. Attendees are presented with essentials of design and operation and how they operate the valves. Basic components and assemblies are identified to aid in understanding the basic controls, applications, and mechanical operation. Each student will learn how to set travel limits, torque limits and operate an actuator on or off the valve. Model number interpretation, document relevance (Spec Sheet; Manuals; Wiring Diagrams; Outlines; Assembly Drawing) and support resources will be discussed. How to identify and order parts from local distributors or online store. Control Package wiring diagram interpretation and basic maintenance are all presented in a combination hands-on / instructor led lecture format. Any original course documentation and certificates are provided to all attendees for company records at the end of the program.

**Topics**

- Fail-Safe Operational Theory
- Mechanical assemblies for all RTS platforms CM - CL - FL - FQ
- Detailed focus on Ball Screw assemblies & Spring Canisters
- Detailed focus on both Brake (Fail-Safe & Spring Damping) assemblies
- Focus on optional Hand-Wheel over-ride assemblies
- Electronic Board Sets: Logic Board - VFD - Encoder - Motor / location, function, functionality
- Programming / Set-Up including Speed Controls both (pulsing & non-pulsing) speed changes. Binary Inputs / outputs
- Alarm function code identification & clearing.
- Smart Tool II Training

**Audience**

Repair techs of end users, LBP's, distributors, Final Control Lifecycle Service techs, etc.

**Prerequisites**

It is recommended that students bring an android device for Smart Tool AppTraining. A dongle is required for IRDA communication. A single demo device is available for the training.

**COURSE VA112****CEUs: 1.8****Bettis M2CP & TEC2 Actuator Maintenance & Field Service Intermediate****Overview**

This advanced course teaches students how to install and configure optional control modules for the Bettis M2CP and TEC2 actuators. All students will be tested on the ability to setup, configure, and troubleshoot various actuator control modules. Students will configure DCMLink to utilize advanced diagnostics tools, live monitoring, and transfer configuration files.

**Topics**

- Install and configure M2CP Intermediate Switch Modules
- Install and configure TEC2 Optional Control Modules
- Interpret and diagnose Error Alarms and Messages
- Installing DCMLink Software, setting up Networks and troubleshooting

**Prerequisites**

VA111 or a minimum of 2 years of hands on experience with the products.

**COURSE VA135****CEUs: 1.6****Bettis XTE3000 Maintenance & Field Service Intermediate****Overview**

This advanced course teaches students how to install and configure optional control modules for the Bettis M2CP and TEC2 actuators. All students will be tested on the ability to setup, configure, and troubleshoot various actuator control modules. Students will configure DCMLink to utilize advanced diagnostics tools, live monitoring, and transfer configuration files.

**Topics**

- Install and configure M2CP Intermediate Switch Modules
- Install and configure TEC2 Optional Control Modules
- Interpret and diagnose Error Alarms and Messages
- Installing DCMLink Software, setting up Networks and troubleshooting

**Prerequisites**

VA111 or a minimum of 2 years of hands on experience with the products.



## COURSE VA103

CEUs: 2.8

### Bettis Pneumatic Rack & Pinion and Scotch Yoke Actuator Maintenance Intermediate

#### Overview

A 4-day class introducing comprehensive information concerning the installation, operation and maintenance of Emerson Bettis™ Houston WACC products.

#### Topics

- Valve Automation Center Contract Review
- Installation/Maintenance Instruction Manuals
- Product Serial Numbers Review
- Service Procedure Index Review
- General Operating/Maintenance Instructions
- General Servicing Information on RPB, RPC, RPD, RPE, CB, CBA, CBB, CBAx30, HD, T, and G-Series Actuators Review
- Hands-on Training-EG; Conversions of actuator fail directions from CW to CCW and CWW to CW
- Field Service Work Performed by VAC's, Bettis Houston WACC Procedure Review
- Five days of Practical Exercises Involving the Disassembly and Reassembling of Emerson Bettis™ Houston WACC Products
- Features and Benefits Emerson Bettis Houston WACC Products for field maintenance
- How to trouble shoot field problems
- How to add features (options) to existing actuators
- Introduction to pneumatic controls
- Introduction to actuator to valve mounting hardware

#### Prerequisites

Students should have a minimum of one year field service experience and a working knowledge of Bettis M2CP actuators.

## COURSE VA133

CEUs: 1.2

### Bettis SCE 300 & Keystone EPI2 Product & Service Introduction

#### Overview

This 2-day course presents the fundamental aspects of Bettis SCE actuators and the Keystone EPI2. Attendees are presented with essentials of design and operation and how they operate the valves. Basic components and assemblies are identified to aid in understanding the basic controls, applications, and mechanical operation. Each student will learn how to set travel limits, torque limits and operate an actuator on or off the valve. Model number interpretation, document relevance (Spec Sheet; Manuals; Wiring Diagrams; Outlines; Assembly Drawing) and support resources will be discussed. How to identify and order parts from local distributors or online store. Control Package wiring diagram interpretation and basic maintenance are all presented in a combination hands-on / instructor led lecture format. Any original course documentation and certificates are provided to all attendees for company records at the end of the program.

#### Topics

- Quarter Turn applications
- Historical Perspective Bettis small ¼ turn electric actuators
- Mechanical Principal of Operation
- Electrical Principal of Operation
- Model number identification
- Wiring diagram interpretation
- Control Inputs- analog and discreet
- Feedback outputs – analog and discreet
- Optional Modules OM1 and OM13
- Optional Module OM3
- Stepper motor theory and practical function
- Speed output adjustment
- Torque output adjustment
- Status LED codes and fixes.
- Bluetooth and Amanager for analog units.
- DeviceNet and Profibus Optional Modules
- Part numbers, ordering and inventory

#### Prerequisites

Experience with electric actuator (EIM, Biffi, Bettis, etc.)

#### Audience

Repair techs of end users, LBP's, distributors, Final Control Lifecycle Service techs, etc.

# DELTAV





**COURSE 7027 & 7027V****DeltaV System Administration****Overview**

This 4-1/2-day course is designed for control system administrators, process control engineers and IT specialist responsible for managing, installing, and commissioning a DeltaV system. This course includes access to a virtual DeltaV system to practice and review course workshops complete with brief recorded demonstrations available after course completion.

**Topics**

- Overview of system components and topologies
- DeltaV domain setup, including independent DeltaV domain controllers
- DeltaV installation procedures
- Licensing
- Import and export of configuration
- Firmware upgrades
- Controller health diagnostics
- User administration
- Configuration Database administration
- Creating additional workstations
- Auto Update services
- Continuous historian administration
- Advanced continuous historian administration
- Remote desktop services
- Event chronicle administration
- Network Time Protocol configuration/diagnostics
- Backup and restore procedures

**Prerequisites**

Course 7009 DeltaV Implementation I or 7023 DeltaV Information Technology for Automation Personnel, or 7409 Using DeltaV Live Operator Interface Implementation I.

**Audience**

This course is designed for control system administrators, process control engineers and IT specialist responsible for managing, installing, and commissioning a DeltaV system.

**Course Type**

Classroom & Virtual

**COURSE 7072 & 7072V****DeltaV Continuous Operation with PCSD****Overview**

This 2-day course (14 hrs.) uses lectures and hands-on workshops to train operators for continuous process operation using generic DeltaV Operate user interface with the PMO Configuration Standards for DeltaV (PCSD) library (for the DeltaV Live user interface, please select course 7472).

**Topics:**

- DeltaV Distributed Control System Overview
- DeltaV Operator Interface
- DeltaV Multi-Monitor Workstations
- Operating Discrete and Analog Control Modules
- Alarms and Events
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS

**Prerequisites**

None

**Audience**

This course is for operators, supervisors and managers responsible for the operation of continuous processes using the DeltaV Operate user interface.

**Course Type**

Classroom & Virtual

**COURSE 7201 & 7201V****DeltaV Advanced Control Suite****Overview**

This 4-1/2 day course introduces students to the advanced control tools available within the DeltaV and how they may be used to improve plant operations. The principal technology that is utilized in each product will be discussed. The areas of improvement that may be achieved will be detailed. Also, each student will gain hands on experience with these tools in class exercises based on realistic process simulations.

**Topics**

- The Control Foundation in DeltaV
- Traditional Tools e.g. Override, Cascade, Ratio Improvements Provided by Advanced Control
- DeltaV Inspect with InSight
- Detection of Abnormal Conditions
- Performance Indices Performance Reports DeltaV Tune with InSight Measurement of Process Dynamics
- Tuning Methods
- Tuning Response Process Learning
- Adaptive Tuning Adaptive Control
- DeltaV Fuzzy Principles of Fuzzy Logic Control
- FLC Function Block, Tuning
- DeltaV Predict MPC for Multi-Variable Control
- Model Identification, Data Screening
- Simulation of Response, Tuning
- DeltaV Neural Creation of Virtual Sensor
- Data Screening, Training
- DeltaV Simulate Suite
- Process Simulation
- Simulate Pro

**Prerequisites**

7009, DeltaV Implementation I or 7409 DeltaV Live Operator Interface Implementation I or equivalent field experience

**Course Type**

Classroom & Virtual



**COURSE 7425 & 7425V****DeltaV Live Graphics Interface Advanced****Overview**

This 4-1/2 day course is for process control engineers responsible for configuring graphics in the DeltaV Live operator interface. This course teaches basic options through advanced configuration topics.

**Topics:**

- Graphics Studio
- Environment Customization
- DeltaV Live
- DeltaV Live Administration
- Display Interactions
- Conversion Functions
- Class Based Graphical Element Modules (GEMs)
- Contextual Displays
- Custom Faceplates
- Pop Up Pictures
- Forms
- Layout Configuration - Multi Monitor Configuration
- Display Frame Customization
- Publishing
- Display Hierarchy
- Script Assistant
- Language Changes
- Theme GEMs
- Importing and Exporting Displays

**Audience**

This course is designed for process & process control engineers responsible for obtaining key production data, maintaining, configuring and troubleshooting a DeltaV system with the DeltaV Live Operator Interface.

**Prerequisites:**

7009, 7409, or 7025

**Course Type**

Classroom & Virtual

**COURSE 7472 & 7472V****DeltaV Continuous Operations with PCSD using Live****Overview**

This 2-day course (14 hrs.) uses lectures and hands-on workshops to train operators for continuous process operation using generic DeltaV Live user interface with the PMO Configuration Standards for DeltaV (PCSD) library (for the DeltaV Operate user interface, please select course 7072).

**Topics**

- DeltaV Distributed Control System Overview
- DeltaV Operator Interface
- DeltaV Multi-Monitor Workstations
- Operating Discrete and Analog Control Modules
- Alarms and Events
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS

**Audience**

This course is for operators, supervisors and managers responsible for the operation of continuous processes using the DeltaV Live user interface.

**Prerequisites:**

None

**Course Type**

Classroom & Virtual

**COURSE 7225 & 7225V****DeltaV Advanced Display Design using Live****Overview**

This 2-day course uses a combination of lectures and hands-on workshops to provide the students the knowledge and understanding of the operational benefits that can be achieved by Advanced Operator Display design, based on the industry standard, ISA 101.01. Students will learn how to apply human factor techniques required to design best-practice HMI displays to achieve operator performance gains using the DeltaV Live interface.

**Topics**

- Improving Operator Performance
- Human Machine Interfaces for Process Automation Systems ANSI ISA101.01
- Advanced Operator Displays
- DeltaV Live Conversion Options
- DeltaV Live
- Display Sets and Display Hierarchy
- Alarm Rollups
- High Performance GEMs
- Custom Layouts
- Graphics Studio

**Audience**

This course is designed for process control engineers and operations personnel (Operations Managers and Engineers) responsible for designing, implementing, using and/or managing their HMI, particularly those who are planning for a conversion to DeltaV Live.

**Course Type**

Classroom & Virtual

**COURSE 7226 & 7226V****DeltaV Cybersecurity Administration****Overview**

This 3-day course describes why and how cybersecurity mechanisms are paramount in today's open architecture automation systems. Digital Transformation relies on plant floor data being available to enterprise level analytics, while remaining secure at the same time. This course describes how cybersecurity solutions deployed on a DeltaV system can be properly administered throughout the lifecycle of the system.

**Topics**

- McAfee Electronic Policy Orchestrator
- Maintaining ePO using the Management Console
- Deploying Application Whitelisting
- ePO Reports
- Advanced Patch Management
- Patch Management Network Architecture
- Advanced Patch Management Console
- Applying Software Updates
- Patch Management Reports
- Backup and Recovery Overview
- Installing DeltaV Backup and Recovery
- Performing Backups
- Monitoring Backup and Recovery
- Performing Recovery
- Backup and Recovery Reports

**Audience**

This course is designed for system administration personnel responsible for Cybersecurity.

**Prerequisites**

None

**Course Type**

Classroom & Virtual

## COURSE 7229

**DeltaV Virtualization with HCI****Overview**

This 4 1/2-day course will allow students to perform the installation and configuration of HCI servers with DeltaV Virtual Studio. Additionally, students will learn to configure virtual networking, deploy VMs from template, configure various thin clients, and identify key health metrics and troubleshooting information. The course uses a combination of lectures and hands-on workshops to enable an understanding of the underlying technology and gain skills to implement the solution at site.

**Topics**

- Virtualization and Failover Clustering Overview
- Virtualization Hardware Bill of Materials Review
- Network Architecture Planning
- Installation Map / Flow
- Install and Configure the Host Server Operating System
- Using Dell Integrated Dell Remote Access Controller (iDRAC)
- Configuring Remote Direct Memory Access (RDMA)
- Configuring Virtual LANs (VLANs)
- Configure a Hirshmann Greyhound GRS105 switch
- Build Cluster Domain Controller
- Create Cluster Domain
- Install and License DeltaV Virtual Studio (DVS)
- Create a Failover Cluster
- Configure Cluster Quorum
- Storage Pool Operation and Monitoring
- Virtual Switch Configuration
- Review Virtual Machine (VM) Templates
- Create VMs from Templates
- Import/Export VMs
- Creating additional DeltaV Workstation VMs
- Using Various Tools Available in DVS
- Configure Amulet Hotkey DX1600 Thin Client
- Configure Lenovo ThinkCentre M70q Thin Client
- Configure P&F BTC12 Thin Client
- Review Troubleshooting Guides and Information Required for Support Calls
- Enabling HCI Passthrough Alarms into the DeltaV DCS Alarm Banner
- Review Failover Cluster Diagnostics

**Audience**

This course is designed for system administrators responsible for installing and maintaining DeltaV Workstations on a virtual platform.

**Prerequisite**

Course 7023 or 7027 or equivalent work experience

**Course Type**

Classroom

## COURSE 7202 &amp; 7202V

CEUs: 2.4

**DeltaV Model Predictive Control****Overview**

This 3-1/2-day course is designed for process and control engineers who are applying DeltaV Predict and Predict Pro. It provides practical examples of how to determine the benefits of MPC application and how this control may be used to meet specific application requirements.

Students will gain hands on experience through lab exercises based on realistic dynamic process simulations.

**Topics**

- How to Justify an MPC Project
- Evaluating the Cost of Process Variation
- Estimating the Reduction in Variation that is possible using MPC
- Calculating the Benefit of Maximizing throughput when plant production is restricted by Input Limits or Measurable Constraint
- Meeting Application Requirements
- Meeting Control Requirements when the Response Times are Very Different
- Understanding the Design and Testing of an Integrating Process
- Tailoring Control Performance
- Placing more Emphasis on Selected Control or Constraint Parameters
- Improving Control Performance when the Process is Dead Time Dominant
- Compensating for Large Changes in Process Gain or Dynamics
- Minimizing the Impact of Process Noise on Control Performance
- MPC Application
- Selecting and Applying MPC, MPC-Pro and MPC-Plus Blocks
- Optimizing Control
- Optimizing the Control Using the MPC-Pro or MPC-Plus Blocks

**Prerequisites**

7201 DeltaV Advanced Control Suite

**Audience**

This course is designed for process and control engineers who are applying DeltaV Predict and Predict Pro.

**Course Type**

Classroom & Virtual



## COURSE 7037

CEUs: 2.5

**DeltaV Communication Bus Interfaces****Overview**

This 3-1/2-day course covers the integration of fieldbus compliant devices using DeltaV systems. Upon completion of the course the student will be able to install, configure and verify proper operations of AS-I, Profibus DP, DeviceNet Serial, EtherNet IP, and Wireless HART® devices, including proper wiring practices. The AMS Intelligent Device Manager will be used to interrogate PROFIBUS DP and Wireless HART devices. The target audience usually does the following:

- Responds to work orders created to calibrate, troubleshoot, repair, service, and replace instruments and valves
- Monitors alerts to preemptively address problems prior to operators seeing a problem in the control room
- Provides loop testing and assistance with instrumentation on plant turnarounds, startups, and for project work
- Improves process availability and reduces operations and maintenance costs

**Topics**

- Communication Bus Introduction
- AS-I Overview
- AS-I: Wiring and Installation
- AS-I Network with DeltaV
- PROFIBUS DP Overview
- PROFIBUS Wiring and Installation
- Configuring a PROFIBUS Segment
- Device Net Overview
- Device Net Diagnostics and Configuration
- Troubleshooting
- Serial Interface
- HART® Overview
- Ethernet I/O Overview
- Wireless I/O Overview

**Audience**

The hands-on workshops with DeltaV along with AMS Device Manager will address areas relating to the instrument technician's daily tasks.

**Prerequisites**

7009 DeltaV Implementation I or 7018 DeltaV Hardware Installation and Troubleshooting.

## COURSE 9025

CEUs: 3.2

**DeltaV Control Loop Introduction****Overview**

This 4-1/2-day course for personnel new to automation and covers process control fundamentals as well as the practical aspects of control system design and applications. Upon completion of this course the student will be able to effectively understand and work with single and multi-loop control strategies. Interactive workshops allow the student to apply what they learn in the class.

**Topics**

- Background — Historic Perspective
- Measurements — Basic Transmitter Types, Limitations
- Analyzers — Examples of On-Line Analyzers
- Final Elements - Valves and Variable Speed Drives
- Field Wiring and Communications — Traditional, HART®, Foundation fieldbus, WirelessHART™
- Control Strategy Documentation — Plot Plan, Flow Sheet, P&ID, Loop Sheet
- Operator Graphics and Metrics — Considerations in Display Design
- Process Characterization — Identifying Process Dynamics and Gain
- Control Objectives
- Single Loop Control — Basis for PID, Guideline in Selecting PID Structure, Action
- Tuning and Loop Performance - Manual and Automated Tuning Techniques
- Multi-loop Control — Feedforward, Cascade, Override, Split-range, Valve Position Control
- Model Predictive Control — Addressing Difficult Dynamics, Interactive Processes
- Process Modeling — Development of Process Simulation for Control System Checkout
- Application Examples — Batch, Continuous, Combustion, Distillation, Unit Coordination

**Prerequisites**

Windows experience

**Audience**

This course is for engineers, managers, technicians, and others that are new to process control. This course includes the practical aspects of control design and process applications that course developers personally learned through years of hands on experience while designing and commissioning process control applications.

## COURSE 7026V

CEUs: 3.2

**DeltaV Cybersecurity****Overview**

The 4-1/2-day DeltaV Cybersecurity course focuses on the DeltaV Security Manual and the practical implementation of the guidance provided within. Students will engage in activities to properly apply Emerson's Defense-in-Depth strategies so that students can have the skills to apply these same strategies on their DeltaV systems. Students are encouraged to read the DeltaV Security Manual before attending class.

**Topics****DeltaV Deployment Guidelines & Physical Security**

- Define the expected DeltaV installation environment
- Define physical access rules (cabinets, switches, consoles, etc.)

**DeltaV Area Control Network**

- Define proper network segmentation and topology rules
- Use DeltaV Firewall-IPD and Smart Switches
- Lock and protect embedded nodes

**Communications Security & Remote Access to DeltaV**

- Define communication and security requirements for remote access
- Use Emerson Smart Firewall
- Deploy Remote Desktop Gateway server
- Configure DeltaV remote desktop server

**Active Directory Design & User Account Management**

- Define Active Directory implementation guidelines
- Create customized DeltaV users and groups
- Audit user privileges
- Configure password policies through Group Policy Objects

**Device Hardening & Event Logging**

- Define device internal and interface protection rules
- Deploy DeltaV Endpoint protection and Application Whitelisting
- Configure Windows Firewall
- Create USB/Removable media Group Policy Object
- Configure syslog and other device logs to report to a System Information and Event Management (SIEM) appliance
- Configure DeltaV Network Security Monitoring appliance
- Use and customize SIEM dashboard to show system events

**Software Patching**

- Define how to obtain and install security patches
- Use Emerson's Automated Patch Management solution

**Backup & Recovery**

- Define best practices and available technologies to backup critical data
- Use the DeltaV Backup & Recovery (Acronis) software

**Prerequisites**  
7027

**Audience**  
DeltaV System Administrators  
or IT personnel responsible for  
implementing DeltaV security.

**Course Type**  
Classroom & Virtual

## COURSE 7051C

**DeltaV Essential Operator Training Solution****Overview**

DeltaV™ Essential Operator Training Solution is an engineered, hands-on, customized learning environment to up-skill your operations workforce. Operators will learn DeltaV operating concepts using curriculum based on their specific displays as well as hands-on practice workshops relevant to their process.

The DeltaV Essential Operator Training Solution includes instructional materials, customized student curriculum, and workshops all customized to your specific graphics and module types. Student workshops include low fidelity tieback simulation to demonstrate module functionality and perform workshops.

DeltaV Essential Operator Training Solution is available in three delivery formats.

- Traditional classroom with live instructors and equipment
- Virtual classroom environment with live online instruction and DeltaV distributed control systems (DCS)
- A new blended learning environment that uses state-of-the-art technologies to host training in the cloud.

**COURSE 7032****CEUs: 2.8****DeltaV Fieldbus Devices Configuration & Control****Overview**

This 4-day lecture/lab course provides maximum hands-on experience working with FOUNDATION™ fieldbus instruments such as: the FIELDVUE™ Digital Valve Controller, Rosemount Pressure and Temperature Transmitters. The student will use the DeltaV control system to commission fieldbus devices, assign foundation fieldbus function blocks to field devices, troubleshoot using diagnostics and AMS Device Manager to manipulate device parameters.

**Topics**

- DeltaV Saleable System Overview
- Macro Cycle Execution
- Fieldbus Function Blocks
- FIELDVUE™ Theory of Operation
- Transmitter Theory of Operation
- AMS Device Manager Methods
- Fieldbus Wiring Practices
- System Troubleshooting
- Accessing Fieldbus Devices
- Alarms and Alerts at DeltaV Workstations
- Segment Checkout Procedures
- Replace Wizard

**Prerequisites**

Course 7009, DeltaV Implementation I or 7018, DeltaV Hardware Installation and Troubleshooting

**Audience**

This course is for individuals responsible for maintaining, troubleshooting, calibrating, and modifying FOUNDATION™ fieldbus device parameters.

**COURSE 7018****CEUs: 2.8****DeltaV Hardware & Troubleshooting****Overview**

This course provides an overview of the DeltaV Control Network, M- and S-series hardware, and software applications. Upon completion, you will be familiar with the hard-ware and be able to perform troubleshooting techniques. This 4-day course focuses on the hardware components that make up the DeltaV system: M-series controllers and I/O, S-series controllers and I/O (including CHARMs), and DeltaV Smart Switches. Using a combination of lectures and workshops, you will learn how to use operator and diagnostic tools to identify and locate hard-ware-related fault conditions. Workshops provide the opportunity to disassemble and reassemble the M- and S-series hardware and return the system to an operating state. If your systems include bus technologies such as Foundation Fieldbus, we recommend courses 7030, 7032, or 7037. The 7018 course satisfies the Prerequisites requirement for these bus course (except 7032)

**Topics**

- DeltaV Overview
- Operator Alarms
- DeltaV Diagnostics
- DeltaV Smart Switches
- DeltaV I/O Cards and Carriers
- Controllers and Power Supplies
- Electronic Marshalling (CHARMs)
- HART® I/O
- Redundant I/O

**Prerequisites**

Windows Experience

**Audience**

This course is recommended for instrumentation and maintenance technicians, managers, and configuration engineers who need to know about DeltaV hardware.

**COURSE 7017 & 7017V****CEUs: 3.2****DeltaV Implementation II Intermediate****Overview**

During the 4-1/2 day course, the student will be able to identify function block structures, interpret function block status values, design error masking, define nodes, configure class-based control modules using the Command-Driven algorithm. This course includes access to a virtual DeltaV system to practice and review course workshops complete with brief recorded demonstrations available after course completion. Configuration of Equipment Modules for Supervisory Control Custom Faceplates and Dynamos

**Topics**

- Function Block Structures & Status Values
- Analog Control Palette Blocks PID Bias/Gain, Deadtime, Ratio, Signal Characterizer, Splitter
- HART Inputs and Outputs
- HART Device Alarms
- AMS Intelligent Device Manager
- Unit Alarms
- DeltaV Tune with InSight
- Device Control Options
- Class Based Control Modules

**Prerequisites**

Course 7009, DeltaV Implementation I or 7409, Using DeltaV Live Operator Interface Implementation I

**Audience**

This course is for process control engineers responsible for designing, implementing and testing configuration using the DeltaV system.

**Course Type**

Classroom & Virtual



**COURSE 7201CV****CEUs: 0.7****DeltaV InSight [Virtual]****Overview**

This 1-day course introduces students to DeltaV InSight and how it may be used to improve the plant operations. The measurement of the process dynamics will be discussed, and the DeltaV Tune application will be introduced and used with Adaptive Tuning and Adaptive Control. Also, each student will gain hands on experience with these tools in class exercises based on realistic process simulations.

**Topics**

- DeltaV Tune with InSight
- Measurement of Process Dynamics
- Tuning Methods
- Tuning Response
- Process Learning
- Adaptive Tuning
- Adaptive Control
- DeltaV Inspect with InSight
- Detection of Abnormal Conditions
- Performance Indices
- Performance Reports

**Prerequisites**

7009, DeltaV Implementation I or equivalent field experience.

**COURSE 7014 & 7014V****CEUs: 1.8****DeltaV Batch Operation****Overview**

This 2 ½ - day course (18 hrs.) uses lectures and hands-on workshops to train operators for batch process operation based on the ISA-88 Standard using the generic DeltaV Operate user interface (for the DeltaV Live user interface, please select course 7414).

**Topics**

- DeltaV Distributed Control System Overview
- DeltaV Operate Interface
- Display Navigation
- Operating Discrete and Analog Control Modules
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- Alarms and Events
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS
- Batch Process Simulation
- Batch Process Overview
- Operating Unit Modules
- Batch Operator Interface and/or DeltaV Operate Batch Controls
- DeltaV Batch Historian
- DeltaV Campaign Manager

**Prerequisites:**

None

**Audience**

This course is for operators, supervisors, and managers responsible for the operation of batch processes using the DeltaV Operate user interface.

**Course Type**

Classroom & Virtual

**COURSE 7023 & 7023V****CEUs: 2.1****DeltaV Information Technology for Automation Personnel****Overview**

This 3-day course will provide students with a set of essential information technology (I.T.) skills required to successfully setup, maintain, and troubleshoot a DeltaV distributed control system using a combination of lecture and hands-on workshops. The increase in adoption of technologies such as virtualization, cybersecurity, business system integration, and complex networking demand a new set of skills. This course will distill the core learnings and techniques required from the I.T. skill set, providing a targeted launch point for process control engineers, instrumentation/electrical technicians, I.T. staff, and others whose responsibilities require them to adopt and successfully use these technologies. After attending, students will be prepared to dive deeply into these technologies by attending other higher-level courses.

**Topics**

- Overview
- Networking
- Virtualization
- Domain
- Servers
- DeltaV
- Security
- Troubleshooting

**Prerequisites**

None

**Audience**

DeltaV System Administrators, Process Control Engineers, Instrumentation/Electrical Technicians, and I.T. staff supporting the DeltaV system.

**Course Type**

Classroom & Virtual

## DeltaV Continuous Operation

### Overview

This 2-day course (14 hrs.) uses lectures and hands-on workshops to train operators for continuous process operation using the standard DeltaV Operate user interface (for the DeltaV Live user interface, please select course 7412). Students who complete this course will:

- Access operator main displays
- Manipulate various control module operating parameters to operate the process
- Access face plates and detail displays
- Understand process indications from graphics dynamos
- Monitor and acknowledge different alarm conditions
- Monitor process performance
- View real-time and historical trend data
- Access historical data and event chronicle

Generic curriculum uses the out-of-the-box DeltaV configuration standards library. In most cases, the site configuration will differ from the generic library. After taking the generic course, students will be able to understand the basic layout of the graphics - e.g. the toolbar vs alarm banner, how to access the Alarm Summary page and acknowledge alarms, use of dynamos, where to click to access the Faceplate and Detail Displays. This is considered platform training on DeltaV, not process training. For curriculum customized for your site please contact Education Services for a proposal.

### Topics

- DeltaV Distributed Control System Overview
- DeltaV Operator Interface
- DeltaV Multi-Monitor Workstations
- Operating Discrete and Analog Control Modules
- Alarms and Events
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS

### Prerequisites

None

### Audience

This course is for operators, supervisors and managers responsible for the operation of continuous processes using the DeltaV Operate user interface.

### Course Type

Classroom & Virtual



## COURSE 7012B

CEUs: 1.2

**DeltaV Continuous Operation [Blended]****Overview**

This course uses lectures and hands-on workshops to train operators for continuous process operation using the standard generic DeltaV™ Operate user interface (for the DeltaV Live user interface, please select course 7412B). Blended training provides the most flexibility in course scheduling. This is a self-paced training with courses available 24/7 on Emerson's Learning Management System (LMS). Blended courses are comprised of pre-recorded lectures and a cloud based DeltaV machine for workshop exercises using standard generic DeltaV configuration. Even though this is self-paced, ideally this course could be completed in 2-days (14 hrs.) Students who complete this course will:

- Access operator main displays
- Manipulate various control module operating parameters to operate the process
- Access face plates and detail displays
- Understand process indications from graphics dynamos
- Monitor and acknowledge different alarm conditions
- Monitor process performance
- View real-time and historical trend data
- Access historical data and event chronicle

Generic curriculum uses the out-of-the-box DeltaV configuration standards library. In most cases, the site configuration will differ from the generic library. After taking the generic course, students will be able to understand the basic layout of the graphics - e.g. the toolbar vs alarm banner, how to access the Alarm Summary page and acknowledge alarms, use of dynamos, where to click to access the Faceplate and Detail Displays. This is considered platform training on DeltaV, not process training. For curriculum customized for your site please contact Education Services for a proposal.

**Topics**

- DeltaV Distributed Control System Overview
- DeltaV Operator Interface
- DeltaV Multi-Monitor Workstations
- Operating Discrete and Analog Control Modules
- Alarms and Events
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS

**Prerequisites**

None

**Audience**

This course is for operators, supervisors and managers responsible for the operation of continuous processes using the DeltaV Operate user interface.

## COURSE 7076 &amp; 7076V

CEUs: 3.2

**DeltaV PMO Configuration Standard****Overview**

This 4-½ day course will introduce students to the PCSD structure and commonly used PCSD templates for analog, discrete and regulatory control. Students will also learn how to implement new DeltaV control modules using the PCSD library. Upon completion of this course, the student will be able to:

- Modify existing control strategies while maintaining consistency with the PCSD library
- Add control strategies while maintaining consistency with the PCSD library

**Topics**

- Benefits of a structured approach to configuration
- PCSD Structure
- Operator graphics standards
- Configuration of the following using PCSD class-based modules:
  - Analog value reading and setting
  - Control of discrete devices
  - Loop control
  - Sequential control using Equipment Modules
- Modification of existing PCSD-based control configuration
- PCSD methods for:
  - Module arbitration
  - Mode locking
  - Mode, state and failure propagation
  - Inter-module interfacing
  - Interlocks, permissive and force set points

**Prerequisites**

Course 7009, DeltaV Implementation I and familiarity with process control.

**Audience**

This course is designed for engineers and technicians who maintain a DeltaV system configured using the PMO Configuration Standards for DeltaV (PCSD) library.

**Course Type**

Classroom & Virtual

## COURSE 7303

CEUs: 2.1

**DeltaV Safety Instrumented System with SLS 1508 Maintenance****Overview**

This 3-day course is a hands-on instructor-led course. The course covers the architecture of the DeltaV SIS including Rosemount SIS instruments and Fisher™ SIS Digital Valve Controllers. Students will gain a working knowledge of the hardware and software allowing them to troubleshoot and maintain the system.

**Topics**

- Safety Lifecycle
- DeltaV SIS Overview
- DeltaV SLS1508 Hardware
- Safety Instrumented Functions
- Rosemount SIS Instruments
- AMS Device Manager
- Fisher™ SIS Digital Valve Controller
- SISNet Repeaters

**Prerequisites**

Course 7018, DeltaV Hardware and Troubleshooting, is a requirement.

**Audience**

This course is for Electrical & Instrument technicians, maintenance technicians, E&I/reliability engineers and other personnel responsible for maintaining a DeltaV SIS SLS 1508.

## COURSE 7074 &amp; 7074V

CEUs: 2.1

**DeltaV Operate Batch Operation with PCSD****Overview**

This 3-day course (21 hrs.) uses lectures and hands-on workshops to train operators for batch process operation based on the ISA-88 Standard using generic DeltaV Operate user interface with the PMO Configuration Standards for DeltaV (PCSD) library (for the DeltaV Live user interface, please select course 7474). Students who complete this course will:

- Access operator main displays
- Manipulate various control parameters and operate the process Access face plates and detail displays
- Understand process indications from graphics dynamos
- Monitor and acknowledge different alarm conditions
- Monitor process performance
- Create real-time and historical data charts
- Access historical data and event chronicle
- Understand basic batch terminology Manipulate Unit Module parameters
- Access different Batch Operator Interfaces
- Run recipe batches
- Review batch history data

For customized curriculum, designed around your site graphics and processes, please contact Education Services ([education@emerson.com](mailto:education@emerson.com)).

**Topics**

- DeltaV Distributed Control System Overview
- DeltaV Operator Interface
- Operating Discrete and Analog Control Modules
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- Alarms and Events
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS
- Batch Process Simulation
- Batch Process Overview
- Operating Unit Modules
- Batch Operator Interface and/or DeltaV Operate Batch Controls
- Procedures
- DeltaV Batch Historian DeltaV Campaign Manager

**Prerequisites**

None

**Course Type**

Classroom & Virtual

**Audience**

This course is for operators, supervisors and managers responsible for the operation of continuous processes using the DeltaV Operate user interface.



## COURSE 7474 &amp; 7474V

CEUs: 2.1

**DeltaV Batch Operations with PCSD using Live****Overview**

This 3-day course (21 hrs.) uses lectures and hands-on workshops to train operators for batch process operation based on the ISA-88 Standard using generic DeltaV Live user interface with the PMO Configuration Standards for DeltaV (PCSD) library (for the DeltaV Live user interface, please select course 7074).

Students who complete this course will:

- Access operator main displays
- Manipulate various control parameters and operate the process
- Access face plates and detail displays
- Understand process indications from graphics dynamos
- Monitor & acknowledge different alarm conditions
- Monitor process performance
- Create real-time and historical data charts
- Access historical data and event chronicle
- Understand basic batch terminology
- Manipulate Unit Module parameters
- Access different Batch Operator Interfaces
- Run recipe batches
- Review batch history data

For customized curriculum, designed around your site graphics and processes, please contact Education Services ([education@emerson.com](mailto:education@emerson.com))

**Topics**

- |  |  |
|--|--|
| • DeltaV Distributed Control System Overview     | • Unit Alarms  |
| • DeltaV Operator Interface                      | • Operating Equipment Modules                                |
| • Operating Discrete and Analog Control Modules  | • DeltaV SIS   |
| • Operating Motor Control Modules                | • Batch Process Simulation                                   |
| • Operating Regulatory & Cascade Control Modules | • Batch Process Overview                                     |
| • Alarms and Events                              | • Operating Unit Modules                                     |
| • DeltaV Trending                                | • Batch Operator Interface and/or DeltaV Live Batch Controls |
|  | • Procedures   |
|  | • DeltaV Batch Historian                                     |
|  | • DeltaV Campaign Manager                                    |

**Prerequisites**

None

**Audience**

This course is for operators, supervisors, and managers responsible for the operation of batch processes using the DeltaV Live user interface.

**Course Type**

Classroom & Virtual

## COURSE 7474B

CEUs: 2.1

**DeltaV Batch Operations with PCSD using Live [Blended]****Overview**

This 3-day course (21 hrs.) uses lectures and hands-on workshops to train operators for batch process operation based on the ISA-88 Standard using generic DeltaV Live user interface with the PMO Configuration Standards for DeltaV (PCSD) library (for the DeltaV Live user interface, please select course 7074).

Students who complete this course will:

- Access operator main displays
- Manipulate various control parameters and operate the process
- Access face plates and detail displays
- Understand process indications from graphics dynamos
- Monitor & acknowledge different alarm conditions
- Monitor process performance
- Create real-time and historical data charts
- Access historical data and event chronicle
- Understand basic batch terminology
- Manipulate Unit Module parameters
- Access different Batch Operator Interfaces
- Run recipe batches
- Review batch history data

For customized curriculum, designed around your site graphics and processes, please contact Education Services ([education@emerson.com](mailto:education@emerson.com))

**Topics**

- |  |  |
|--|--|
| • DeltaV Distributed Control System Overview     | • Unit Alarms  |
| • DeltaV Operator Interface                      | • Operating Equipment Modules                                |
| • Operating Discrete and Analog Control Modules  | • DeltaV SIS   |
| • Operating Motor Control Modules                | • Batch Process Simulation                                   |
| • Operating Regulatory & Cascade Control Modules | • Batch Process Overview                                     |
| • Alarms and Events                              | • Operating Unit Modules                                     |
| • DeltaV Trending                                | • Batch Operator Interface and/or DeltaV Live Batch Controls |
|  | • Procedures   |
|  | • DeltaV Batch Historian                                     |
|  | • DeltaV Campaign Manager                                    |

**Prerequisites**

None

**Audience**

This course is for operators, supervisors, and managers responsible for the operation of batch processes using the DeltaV Live user interface.

**COURSE 7305 & 7305V****CEUs: 3.2****DeltaV SIS Implementation****Overview**

This 4-1/2-day course is a hands-on instructor led course. The course covers complete DeltaV SIS Implementation including hardware and software architecture. Students will be able to design a DeltaV SIS Network and Safety Instrumented Functions (SIFs). Additionally, students will be able to configure smart SIS instruments and their associated alerts, including partial stroke testing.

**Topics**

- DeltaV SIS Overview
- DeltaV SIS SLS 1508 Hardware Architecture
- DeltaV SIS with Electronic Marshalling Hardware Architecture
- DeltaV Safety Instrumented Functions
- Rosemount SIS Instruments
- AMS Device Manager relating to DeltaV SIS
- Fisher™ SIS Digital Valve Controllers
- SISNet Repeaters
- DeltaV SIS Security
- DeltaV Version Control
- Local Safety Network Bridges

**Prerequisites**

Course 7009 is a requirement. Recommend IEC 61511 knowledge.

**Audience**

This course is for personnel who design, implement, commission and service DeltaV SIS.

**Course Type**

Classroom & Virtual

**COURSE 7304****CEUs: 2.1****DeltaV SIS with Electronic Marshalling Maintenance****Overview**

This 3-day hands-on instructor led course covers the architecture of the DeltaV SIS with Electronic Marshalling including Rosemount SIS instruments and Fisher™ SIS Digital Valve Controllers. Students will be able to identify the DeltaV SIS with Electronic Marshalling hardware and software components. Students will practice troubleshooting and maintenance techniques with DeltaV SIS simulators throughout the course.

**Topics**

- Safety Lifecycle
- DeltaV SIS Overview
- DeltaV SIS with Electronic Marshalling Hardware architecture including power requirements
- Commissioning and Downloading the DeltaV SIS with Electronic Marshalling components
- Safety Instrumented Functions
- Rosemount SIS Instruments
- AMS Device Manager
- Fisher™ SIS Digital Valve Controller
- DeltaV Diagnostics
- DeltaV SIS with AMS Intelligent Device
- Local Safety Network Bridges

**Prerequisites**

Course 7018 DeltaV Hardware & Troubleshooting is a requirement.

**Audience**

This course is for Electrical & Instrument technicians, maintenance technicians, E&I/reliability engineers and other personnel responsible for maintaining DeltaV SIS with Electronic Marshalling.

**COURSE 7016 & 7016V****CEUs: 3.2****DeltaV Systems Batch Implementation****Overview**

This 4-1/2-day course covers the implementation of a complete batch application. A process simulator will provide a batch application. Students will use DeltaV Batch software to configure recipe entities including, Aliasing, Equipment Trains, Dynamic Unit Allocation, Phase Logic, Operations and Unit Procedures. Equipment entities will also be configured including, Units modules and Process cells.

This course includes access to a virtual DeltaV system to practice and review course workshops complete with brief recorded demonstrations available after course completion.

**Topics**

- Batch Overview
- Unit Phase
- Alias Definition
- Unit Module
- Process Cell
- Class Based Control Modules
- Class Based Equipment Modules
- Operation
- Unit Procedure
- Procedure
- Equipment Trains
- Unit Aliasing
- Dynamic Unit Allocation

**Prerequisites**

Course 7009, DeltaV Implementation I or 7409, Using DeltaV Live Operator Interface Implementation I

**Audience**

This course is designed for individuals responsible for configuring and commissioning DeltaV Batch software.

**Course Type**

Classroom & Virtual

**COURSE 7009 & 7009V****CEUs: 3.2****DeltaV Operate Implementation I Introduction****Overview**

During the 4-1/2-day course, the student will be able to define system capabilities, define nodes, configure continuous and sequential control strategies, create process alarms, operate the system, troubleshoot the system and modify operator displays.

This course includes access to a virtual DeltaV system to practice and review course workshops complete with brief recorded demonstrations available after course completion.

**Topics**

- System Overview
- DeltaV Explorer
- DeltaV Diagnostics
- Control Modules
- Motor Control with Interlocking and Permissive Conditions
- Cascade Control
- Regulatory Control
- DeltaV Operate
- System Operation
- Alarms & Process History View
- Sequential Function Charts
- Configure Theme Dynamos

**Prerequisites**

Microsoft Windows experience. Prospective attendees lacking process control experience should first attend Control Loop Foundation, Course 9025. Prospective attendees new to DeltaV should first attend PlantWeb/DeltaV Introduction, DeltaV Hardware & Troubleshooting, Course 7018.

**Audience**

This course is designed for process & process control engineers responsible for obtaining key production data, maintaining, configuring and troubleshooting a DeltaV system.

**Course Type**

Classroom & Virtual



## COURSE 7409 &amp; 7409V

CEUs: 3.2

**DeltaV Implementation using DeltaV Live Introduction****Overview**

During the 4-1/2-day course, the student will be able to define system capabilities, define nodes, configure continuous and sequential control strategies, create process alarms, operate the system, troubleshoot the system and modify operator displays using the DeltaV Live Operator Interface introduced with DeltaV Version 14.3.

This course includes access to a virtual DeltaV system to practice and review course workshops complete with brief recorded demonstrations available after course completion.

**Topics**

- System Overview
- DeltaV Explorer
- DeltaV Diagnostics
- Control Modules
- Control Studio
- Motor Control with Interlocking and Permissive Conditions
- Cascade Control
- Regulatory Control
- DeltaV Live
- Graphics Studio
- System Operation
- Alarms & Process History View
- Alarm Help
- Sequential Function Charts
- Configure Theme Dynamos
- Electronic Marshalling (CHARMS)

**Prerequisites**

Microsoft Windows experience. Prospective attendees lacking process control experience should first attend Control Loop Foundation, Course 9025.

**Audience**

This course is designed for process & process control engineers responsible for obtaining key production data, maintaining, configuring and troubleshooting a DeltaV system.

**Course Type**

Classroom & Virtual

## COURSE 7412 &amp; 7412V

CEUs: 1.4

**DeltaV Using DeltaV Live Operator Training for Continuous Operation****Overview**

This 2-day course (14 hrs.) uses lectures and hands-on workshops to train operators for continuous process operation using the standard generic DeltaV Live user interface (for the DeltaV Operate user interface, please select course 7012). Students who complete this course will:

- Access operator main displays
- Manipulate various control module operating parameters to operate the process
- Access face plates and detail displays
- Understand process indications from graphic GEMs
- Monitor and acknowledge different alarm conditions
- Monitor process performance
- View real-time and historical trend data
- Access historical data and event chronicle

Generic curriculum uses the out-of-the-box DeltaV configuration standards library. In most cases, the site configuration will differ from the generic library. After taking the generic course, students will be able to understand the basic layout of the graphics - e.g. the toolbar vs alarm banner, how to access the Alarm Summary page and acknowledge alarms, use of GEMs, where to click to access the Faceplate and Detail Displays, etc. This is considered platform training on DeltaV, not process training. For curriculum customized for your site please contact Education Services for a proposal.

**Topics**

- DeltaV Distributed Control System Overview
- DeltaV Live Operator Interface
- Operating Discrete and Analog Control Modules
- Alarms and Events
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS

**Prerequisites**

None

**Audience**

This course is for operators, supervisors and managers responsible for the operation of continuous processes using the DeltaV Live user interface.

**Course Type**

Classroom & Virtual

**COURSE 7029 & 7029V****CEUs: 3.2****DeltaV Virtualization****Overview**

This 4-1/2-day course focuses on the installation, configuration and system administration of a virtualized DeltaV distributed control system. Using a combination of lectures and workshops students will learn skill sets that enable them to properly plan, implement and maintain a robust DeltaV Virtual Studio (DVS) system intended for online (production) use. A key objective of this course is to prepare students for all aspects of owning a DVS system with special emphasis on providing highly available, reliable and secure access for end users of the DVS system.

**Topics**

- Virtualization Primer — Basics of How Virtualization Works
- Overview of DeltaV Virtualization Solutions
- Planning a DeltaV Virtual Studio System
- Installing and Configuring a VRTX Chassis and Blade Servers
- Creating DeltaV Virtual Machines including a ProfessionalPlus Node
- Configuring a WYSE or a Pepperl+Fuchs Thin Client and Redundant Thin Client Networks
- Create a Highly Available Failover Cluster
- Patching and Hardening of Cluster Nodes
- Cluster Health Monitoring and Troubleshooting
- Disaster Recovery and Replication
- Upgrading and Capacity Expansion

**Prerequisites**

Course 7027, DeltaV Systems Administration for Windows 7 and Server 2008

**Audience**

This course is designed for system administrators responsible for installing and maintaining DeltaV Workstations on a virtual platform.

**Course Type**

Classroom & Virtual

**COURSE 7028 & 7028V****CEUs: 2.1****DeltaV Virtualization Administration****Overview**

This 3-day DeltaV Virtualization course focuses on the various software that is used in the management of a DeltaV Virtualization environment. Students will engage in workshops that will reinforce the material discussed to successfully run and maintain a Virtualized DeltaV system.

**Topics**

- Virtualization Hardware Setup
  - Overview of a typical virtualization system
  - Differences between a Host and DC Servers
  - Role of a DC
  - Networks within a virtualized system
  - Clusters
  - Virtual Networks
- Virtual Machines
  - Review Templates
  - Process to create Virtual machines
  - Overview of classroom setup
  - Create additional DeltaV Workstations
- DeltaV Virtual Studio Tools
  - Grouping
  - VM Modifications
  - Edit Collection Settings
- Thin Clients
  - DeltaV Remote Desktop Connection (DRDC)
  - Redundant Thin Client Networks
- Replication & Disaster Recovery
  - Install/Configure Replication
  - Examine replication options
  - Recover from failovers
- Health Monitoring & Troubleshooting
  - Emerson SHM
  - DVS/Cluster Diagnostics
  - DeltaV Alarming
  - Failure Scenarios
- Host Patching & Moving VMs
  - Patching Procedures, Verification

**Prerequisites**

7027 DeltaV System Administration

**Audience**

This course is designed for system administration personnel that will be maintaining DeltaV workstations on a virtual platform after installation.

**Course Type**

Classroom & Virtual

## DeltaV Batch Operation Using Live

### Overview

This 2½ - day course (18 hrs.) uses lectures and hands-on workshops to train operators for batch process operation based on the ISA-88 Standard using the standard DeltaV Live user interface (for the DeltaV Operate user interface, please select course 7014). Students who complete this course will:

- Access operator main displays
- Manipulate various control module operating parameters to operate the process
- Access face plates and detail displays
- Understand process indications from graphic GEMs
- Monitor and acknowledge different alarm conditions
- Monitor process performance
- View real-time and historical trend data
- Access historical data and event chronicle
- Understand basic batch terminology
- Manipulate Unit Module parameters
- Access different Batch Operator Interfaces
- Run recipe batches
- Review batch history data

Generic curriculum uses the out-of-the-box DeltaV configuration standards library. In most cases, the site configuration will differ from the generic library. After taking the generic course, students will be able to understand the basic layout of the graphics - e.g. the toolbar vs alarm banner, how to access the Alarm Summary page and acknowledge alarms, use of GEMs, where to click to access the Faceplate and Detail Displays, etc. This is considered platform training on DeltaV, not process training. For curriculum customized for your site please contact Education Services for a proposal.

### Topics

- DeltaV Distributed Control System Overview
- DeltaV Live Operator Interface
- Display Navigation
- Operating Discrete and Analog Control Modules
- Operating Motor Control Modules
- Operating Regulatory and Cascade Control Modules
- Alarms and Events
- DeltaV Trending
- Unit Alarms
- Operating Equipment Modules
- DeltaV SIS
- Batch Process Simulation
- Batch Process Overview
- Operating Unit Modules
- Batch Operator Interface and/or DeltaV Live Batch Controls
- Procedures
- DeltaV Batch Historian
- DeltaV Campaign Manager

### Prerequisites

None

### Audience

This course is for operators, supervisors, and managers responsible for the operation of batch processes using the DeltaV Live user interface.

### Course Type

Classroom & Virtual



**COURSE 7999****CEUs: 1.4****DeltaV New Features****Overview**

This 2.0-day course covers the new features and enhancements made to the DeltaV Distributed Control System in v13 and v14 using a combination of lectures, demos and hands-on workshop exercises. Students who complete the course will:

- Understand the new features and enhancements introduced in DeltaV v13 and v14
- Understand the benefits of the new features
- Understand how to apply the new features
- Perform workshop exercises implementing the new features

**Topics**

The course includes 40 core topics and 32 optional topics categorized under the following functional areas:

- Administration
- Alarm Management
- Batch
- Hardware
- Logic Configuration
- Miscellaneous
- Operator Interface
- Security
- SIS

The 40 core topics require 2 days to complete. The course may be customized based on the individual site's topics of interest. For customized course delivery, the course duration will be determined based on the topics to be included or excluded.

**Prerequisites**

Course 7009, 7409 or 7018

**Audience**

This course is intended for plant personnel responsible for configuring, administering, securing, maintaining and operating DeltaV. This includes control system engineers, administrators, maintenance engineers and technicians.

**COURSE 7400 & 7400V****CEUs: 0.7****DeltaV Standalone PK Controller****Overview**

This 1-day course provides lectures and hands-on workshops about PK controller, its hardware components and administration for a standalone application.

**Topics**

- Benefits of PK Controller
- Sizing PK Controller
- PK Controller Capacity and Specifications
- PK Hardware Components
- Installing PK Hardware Components
- PK Controller Administration
- PK Controller Commissioning
- PK Controller Lock and Unlock Functions
- PK Merge Utility

**Prerequisites**

Windows experience and DeltaV configuration background.

**Audience**

This course is designed for engineers and technicians responsible for installing and maintaining PK controller standalone application.

**Course Type**

Classroom & Virtual



# ENTECH





COURSE 9036 &amp; 9036V

CEUs: 0

## EnTech Process Troubleshooting & Optimization [Virtual]

### Overview

Process Troubleshooting is a practical hands-on course that fills the gap between theory and effective application of a methodical approach to process troubleshooting. The focus is on process variability: what it is, how it is measured, how it propagates through the process, how it can be identified and how it can be reduced. The students will learn how to troubleshoot process and control problems using the tools available within the DCS, as well as specialized tools like the EnTech Toolkit, to identify sources of variability and opportunities to develop and implement components of a process improvement program that includes topics such as: process design, control equipment design, control strategy design and tuning design with a focus on the process objectives. The course content includes lectures, process control examples and hands-on lab simulation to enhance the students understanding of lecture material. Approximately 40% of the course is devoted to lab work, where the students learn how to apply the troubleshooting tools and techniques presented in the course.

### Objectives

The students will learn how to troubleshoot process and control problems using the tools available within the DCS, as well as specialized tools like the EnTech Toolkit, to identify sources of variability and opportunities to develop and implement components of a process improvement program that includes topics such as: process design, control equipment design, control strategy design and tuning design with a focus on the process objectives.

### Prerequisites

Participants should have an understanding of instrumentation and basic knowledge of process control.

### Audience

EnTech 9036 Process & Control Troubleshooting is a practical hands-on course that fills the gap between theory and effective application of a methodical approach to process troubleshooting.

The focus is on process variability: what it is, how it is measured, how it propagates through the process, how it can be identified and how it can be reduced. The students will learn how to troubleshoot process and control problems using the tools available within the DCS, as well as specialized tools like the EnTech Toolkit, to identify sources of variability and opportunities to develop and implement components of a process improvement program that includes topics such as: process design, control equipment design, control strategy design and tuning design with a focus on the process objectives.

The course content includes lectures, process control examples and hands-on lab simulation to enhance the students understanding of lecture material. Approximately 40% of the course is devoted to lab work, where the students learn how to apply the troubleshooting tools and techniques presented in the course.

### Course Type

Classroom & Virtual





FISHER





## ELEARNING COURSE E1500

CEUs: 0.4

**Control Valve Fundamentals****Overview**

This e-course provides basic control valve fundamentals covering industry standards for control valves, flow characteristics, operation and function of sliding stem and rotary valves & actuators, positioners, and control valve accessories.

**Topics**

- Introduction to Control Valves
- Control Valve flow characteristics
- Sliding Stem Control Valves
- Sliding Stem Actuators
- Ball valves and Eccentric Plug valves
- Butterfly Valves
- Rotary Actuators
- Positioners
- Control Valve Accessories

## COURSE 1300

CEUs: 2.1

**Fisher Control Valve Engineering I Introduction****Overview**

This 4-day course reviews design and operating principles of control valves, actuators, positioners and related accessories. It describes the sizing and selection methods for a broad variety of control valves assemblies. Students will solve several demonstration sizing and selection problems using Fisher Specification Manager software and published materials, plus participate in equipment demonstrations and hands-on workshops. Students who complete this course will:

- Select the proper valve characteristic for a given process
- Choose suitable styles of control valves for an application
- Size control valves and actuators
- Properly apply positioners and instruments

**Topics**

- Control valve selection: rotary/sliding stem
- Actuator selection and sizing
- Liquid valve sizing
- Gas valve sizing
- Positioners and transducers
- Valve guidelines
- Valve characteristics
- Valve packing considerations

**Delivery Options**

This training is also available as a remote virtual classroom course 1300V.

**Prerequisites**

Some experience with industrial control equipment including control valves and actuators would be helpful.

**Audience**

This course is for engineers, technicians and others responsible for the selection, sizing, and application of control valves, actuators and control valve instrumentation.

## COURSE 1400

CEUs: 2.1

**Fisher Valve Trim & Body Maintenance****Overview**

This 4-day course and hands-on workshop explains how valves and actuators function and how they are installed and calibrated. It emphasizes installation, troubleshooting, parts replacement, and calibration of control valves, actuators, and FIELDVUE™ digital valve controllers. Those who complete this course will be able to:

- Correctly perform installation procedures
- Perform basic troubleshooting
- Properly apply and calibrate Fisher FIELDVUE DVC6200 digital valve controllers
- Change valve trim, gaskets and packing

**Topics**

- Control valve terminology
- Globe valves
- Packing
- Actuators, and digital valve controllers
- Bench set
- Seat leak testing
- Ball valves
- Butterfly valves
- Eccentric disc valves
- Valve characteristics

**Prerequisites**

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

**Audience**

This introductory course is for valve mechanics, maintenance personnel, instrument technicians, and others who are responsible for maintaining control valves, actuators and control valve instrumentation.

## COURSE 1450

CEUs: 2.1

**Fisher Control Valve & Instrument Troubleshooting Introduction****Overview**

This 4-day course uses a very hands-on approach for troubleshooting and correcting many common control valve problems. The class will be introduced to the practice of basic valve sizing and selection. Valve problems such as cavitation, flashing, and aerodynamic noise are also discussed as well as common solutions to these problems using different control valve trims and materials. Instrumentation topics are expanded from course 1400 and 1700 to include troubleshooting and advanced calibration for split ranging, non-compatible signals, or using additional instruments such as a volume booster and trip valves. Loop performance issues due to stick-slip, high friction, and instrument operation are discussed.

**Topics**

- Control loop basics
- Influences on loop performance
- Control valve selection and sizing
- Valve troubleshooting
- Actuator troubleshooting
- Instrument selection
- Basic instrument troubleshooting
- Severe service considerations

**Prerequisites**

Completion of courses 1400 and 1700.

**Audience**

This course is for experienced valve mechanics and maintenance personnel, instrument technicians, and others who will benefit from a broadened perspective of control valve performance and effect on total loop operation.

## COURSE 1751

CEUs: 2.1

**Fisher HART based FIELDVUE™ Digital Valve Controllers using Emerson Field Communicators & ValveLink™ Mobile****Overview**

This 3-day course provides hands-on experience working with FIELDVUE™ digital valve controllers using an Emerson 475 or AMS Trex™ Communicator. The class will discuss basic operation and installation of the FIELDVUE digital valve controllers. Students will practice installing and mounting FIELDVUE digital valve controllers onto sliding stem and rotary control valve assemblies, as well as perform basic configuration and calibration of FIELDVUE Instruments. Troubleshooting the digital valve controller using ValveLink™ Mobile software will be performed and basic data interpretation will be introduced.

**Topics**

- FIELDVUE digital valve controller theory of operation
- FIELDVUE instrument installation
- Diagnostic troubleshooting and data interpretation using ValveLink Mobile with AD and PD tier devices

**Prerequisites**

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

**Audience**

This course is for technicians, engineers and others responsible for installing, calibrating and basic troubleshooting Fisher FIELDVUE instruments using the Emerson Field Communicators with ValveLink Mobile.



## COURSE 1752

CEUs: 2.1

**Fisher HART based FIELDVUE Digital Valve Controllers using Emerson Field Communicators & ValveLink Software****Overview**

This 3-day course provides hands-on experience working with FIELDVUE™ digital valve controllers and ValveLink™ software. Students will be able to execute ValveLink software calibration and diagnostic routines and create an instrument database.

**Topics**

- Introduction to ValveLink Solo software
- Configuration with ValveLink software
- Calibration with ValveLink software
- ValveLink software advanced and performance Tier Diagnostics
- Troubleshooting
- Introduction to diagnostic data interpretation
- 

**Delivery Options**

This training is also available as a remote virtual classroom course training by attending courses 1760V, 1761V, 1762V, and 1763V

**Prerequisites**

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

**Audience**

This course is for technicians, engineers and others responsible for installation, calibration and diagnostics for FIELDVUE digital valve controllers and ValveLink software. The primary focus of this course is to provide a comprehensive experience in managing digital valve controllers using the ValveLink software.

## COURSE 1759

CEUs: 2.1

**Diagnostic Data Interpretation using ValveLink Software for Fisher FIELDVUE Digital Valve Controllers****Overview**

This 3-day course uses practical exercises and discussions to teach the student to interpret and analyze diagnostic data obtained using FIELDVUE™ digital valve controllers and ValveLink software™. Students will perform diagnostic tests on a variety of valve/actuator combinations and use the data to determine bench set, dynamic error band, seat load, spring rate and other pertinent parameters. Students will also perform comparison tests on valve/ actuator assemblies containing configuration or operating flaws and use the data for troubleshooting purposes.

**Topics**

- Review of ValveLink software diagnostic tests
- Data interpretation
- Troubleshooting techniques
- Comparison testing techniques
- Performance diagnostics

**Prerequisites**

Students must have completed one of the following: 1751, 1752, or 1760V Series (1760V, 1761V, 1762V, 1763V).

**Audience**

This course is for technicians, engineers and others responsible to collect and interpret valve diagnostic tests performed using ValveLink™ software.

## COURSE 1766

CEUs: 1.4

**Fisher FIELDVUE Digital Valve Controller DVC6200 SIS with ValveLink Software****Overview**

This 2-day course provides hands-on experience working with FIELDVUE digital valve controllers DVC6200 Safety Instrument Systems (SIS) and ValveLink software.

**Topics**

- Safety Instrumented System Basics
- Digital Valve Controllers for Safety Instrumented Systems
- Configuration with ValveLink software
- Calibration with ValveLink software
- Detailed Setup and Device Diagnostics
- Local Control Panel wiring and set-up

**Prerequisites**

Some experience in instrument calibration and control valve maintenance, installation, and operation would be helpful.

**Audience**

This course is for technicians, engineers, and others responsible for installation, calibration and diagnostics for FIELDVUE digital valve controllers DVC6200 SIS and ValveLink software.

## COURSE 7036

CEUs: 2.1

**Fisher FIELDVUE Digital Valve Controller DVC6200 fieldbus with ValveLink Software****Overview**

This 2-day course reviews the role and function of control valve positioners followed by a series of hands-on exercises to disassemble, inspect, assemble, install, and commission a FOUNDATION™ fieldbus FIELDVUE™ digital valve controller.

**Topics**

- Positioner Basics
- FOUNDATION fieldbus overview
- FIELDVUE digital valve controller installation and mounting
- Modes and status
- Configuration and calibration with AMS Trex™ Communicator and ValveLink Mobile
- ValveLink software guided Setup /Detailed Setup
- Tuning
- Tag management
- Pressure control
- ValveLink software diagnostics
- FIELDVUE instrument troubleshooting

**Prerequisites**

Some experience in instrument calibration and control valve maintenance, installation, and operation would be helpful.

**Audience**

This course is for technicians, engineers, and others responsible for installation, calibration and diagnostics of FOUNDATION fieldbus digital valve controller.

## COURSE 1720V

CEUs: 0.4

### Fisher Pneumatic Pressure Controller Maintenance & Calibration [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. It will explain the technical operation and maintenance of pneumatic pressure controllers and explain the basics of the proportional, integral, and derivative response. Maintenance of common components such as bourdon tubes and bellows elements will be discussed along with the proper procedures for calibrating various Fisher controllers.

- Fisher C1 pressure controller
- Fisher 4150/4160 pressure controller
- Fisher type 4195 pressure controller

#### Topics

- PID Actions
- Operational overview
- Zero and Span Calibration
- Changing control action
- Bourdon tube replacement C1/4150/4160
- Linkage adjustment 4195
- Flapper Leveling 4195

#### Prerequisites

None, however some experience and familiarity to process control and general valve operation is recommended.

#### Audience

This course offers a technical perspective of the working of Fisher pneumatic pressure controllers. The course is especially useful to anyone with responsibilities to repair, maintain, calibrate, and tune pressure controllers.

## COURSE 1730V

CEUs: 0.4

### Fisher Pneumatic Level Controller Maintenance & Calibration [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. It will explain the technical operation and maintenance of pneumatic level controllers and transmitters. A detailed overview of displacer based level methods for applications including single fluid level, interface, and density will be covered. Basics of proportional, integral, and derivative actions are discussed as well as the proper procedures for mounting, calibrating and configuring the devices.

- Fisher 249 Displacer Sensors
- Fisher 2500 level controller
- Fisher 2502 level controller

#### Topics

- Common level measurement methods
- Displacer basics
- Torque tube construction
- Displacer mounting
- Fisher 249 displacer sensor maintenance
- Mounting and calibrating Fisher 2500
- Mounting and calibrating Fisher 2502

#### Prerequisites

None, however some experience and familiarity to process control and general valve operation is recommended.

#### Audience

This course offers a technical perspective of Fisher pneumatic level controller and transmitter operation. The course is especially useful to anyone with responsibilities to repair, maintain, calibrate, and tune level controllers and transmitters.

## COURSE 1731V

CEUs: 2.1

### Fisher FIELDVUE DLC3010 Digital Level Controller Maintenance and Calibration [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. This course will explain the technical operation and maintenance of FIELDVUE digital level controllers. An overview of displacer based level methods for applications including single fluid level, interface, and density will be covered. The class will also discuss connecting to the device and using AMS™ Device Manager software or a field communicator to perform configuration and calibrations procedures

- Fisher 249 Displacer Sensors
- Fisher FIELDVUE DLC3010

#### Topics

- Displacer basics
- Torque tube construction
- Displacer mounting
- Fisher 249 displacer sensor maintenance
- Mounting Fisher FIELDVUE DLC3010
- Configure FIELDVUE DLC3010 using guided setup for level
- Configure the FIELDVUE DLC3010 for interface applications

#### Prerequisites

None, however some experience and familiarity to process control and general valve operation is recommended. Completion of 1730V is strongly encouraged.

#### Audience

This course offers a technical perspective of the Fisher™ FIELDVUE digital level controller DLC3010. The course is especially useful to anyone with responsibilities to repair, maintain, and calibrate FIELDVUE digital level controllers.



## COURSE 9006V

CEUs: 0.8

### Fisher Simulated Controller Tuning [Virtual]

#### Overview

This 8-hour virtual classroom course event consists of 4 parts, 2 hours for each part. Students will be introduced to the fundamentals of PID control. The control and response characteristic of each PID component will be explained and students will have the opportunity to see their effect using simulated loop software accessed through a virtual machine. Using the software, the class will also work through and discuss different strategies for tuning various process loops. These strategies include non-calculation based methods like trial and error, as well as, calculation based methods such as lambda tuning.

#### Topics

- Elements of PID control
- Load upsets; process noise
- Self-regulating process
- Integrating process
- Valve dead band and stick/slip
- Limit cycling
- Trial and error tuning
- Lambda tuning

#### Delivery Options

This training is also available as an Instructor Led course 9006.

#### Prerequisites

Some basic understanding of process measurement and control is recommended.

#### Audience

This course is designed for those who have the job responsibility of tuning or monitoring industrial process control loops. Students will learn to tune controllers to meet the needs of each loop.

## COURSE 1751

CEUs: 2.1

### Fisher HART based FIELDVUE Digital Valve Controllers using Emerson Field Communicators & ValveLink Mobile Introduction

#### Overview

This 3-day course provides hands-on experience working with FIELDVUE digital valve controllers using an Emerson 475 or AMS Trex™ Communicator. The class will discuss basic operation and installation of the FIELDVUE digital valve controllers. Students will practice installing and mounting FIELDVUE digital valve controllers onto sliding stem and rotary control valve assemblies, as well as perform basic configuration and calibration of FIELDVUE Instruments. Troubleshooting the digital valve controller using ValveLink™ Mobile software will be performed and basic data interpretation will be introduced.

#### Topics

- FIELDVUE digital valve controller theory of operation
- FIELDVUE instrument installation
- Diagnostic troubleshooting and data interpretation using ValveLinkMobile with AD and PD tier devices

#### Prerequisites

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

#### Audience

This course is for technicians, engineers and others responsible for installing, calibrating and basic troubleshooting Fisher FIELDVUE instruments using the Emerson Field Communicators with ValveLink Mobile.

## COURSE 1752

CEUs: 2.1

### Fisher ValveLink Solo Software for Configuration & Calibration of FIELDVUE Digital Valve Controllers

#### Overview

This 3-day course provides hands-on experience working with FIELDVUE digital valve controllers and ValveLink software. Students will be able to execute ValveLink software calibration and diagnostic routines and create an instrument database.

#### Topics

- Introduction to ValveLink Solo software
- Configuration with ValveLink software
- Calibration with ValveLink software
- ValveLink software advanced and performance Tier Diagnostics
- Troubleshooting
- Introduction to diagnostic data interpretation

#### Delivery Options

This training is also available as a remote virtual classroom course training by attending courses 1760V, 1761V, 1762V, and 1763V

#### Prerequisites

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

#### Audience

This course is for technicians, engineers and others responsible for installation, calibration and diagnostics for FIELDVUE digital valve controllers and ValveLink software. The primary focus of this course is to provide a comprehensive experience in managing digital valve controllers using the ValveLink software.

## COURSE 1760V

CEUs: 0.4

### Fisher FIELDVUE Digital Valve Controllers [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. It covers detailed operation of Fisher FIELDVUE digital valve controllers. Class discussions are centered on what individual components within a digital valve controller are, and how they can affect overall control valve performance. Common maintenance practices are detailed, and include proper care and handling of internal components, such as the I/P and Relay. Calibration procedures of the FIELDVUE DVC6200 digital valve controller will be conveyed using ValveLink™ software connected to a live device. Course focus includes:

- Identify and understand components of a digital valve controller
- Describe and demonstrate proper instrument mounting
- Connect to a live device using ValveLink Software
- Discuss and perform a guided setup routine
- Discuss and perform an auto travel calibration routine

#### Topics

- Pneumatic instrument principle overview
- Operation of a FIELDVUE digital valve controller for travel control
- Operation of a FIELDVUE digital valve controller for pressure control
- Replacing FIELDVUE digital valve controller components
- Mounting a FIELDVUE digital valve controller
- Calibrating a FIELDVUE digital valve controller

#### Prerequisites

Experience and familiarity of process control and general valve operation is recommended. Completion of course 1700 is strongly encouraged.

#### Audience

This course is designed for those who have the job responsibility to repair, mount, configure, and calibrate Fisher FIELDVUE digital valve controllers.

## COURSE 1762V

CEUs: 0.4

### Fisher FIELDVUE Digital Valve Controller HART Communicating Tier [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom part, 2 hours for each part. It introduces data collection methods for offline diagnostic testing and troubleshooting of the FIELDVUE digital valve controllers with Advanced Diagnostic (AD) Tier. Students will have access to a live FIELDVUE DVC6200 using ValveLink™ software, and will discuss the proper setup and execution of diagnostic functionality within the AD tier. Dynamic scan and step response tests will be conducted, and the class will interpret analyzed data and review the details of diagnostic graphs for each. Areas of focus for AD diagnostic functionality include:

- Step Response Test - stroking speed
- Step Response Test - 9 -point step test
- Step Response Test - performance test
- Step Response Test - 3-point ramp
- Step Response Test - supply pressure
- Step Response Test - drive signal
- Valve Signature - graph and analyzed data
- Dynamic Error Band
- Drive Signal

#### Topics

- Verifying specification sheet information
- Viewing/initializing AD related diagnostic information
- Identifying common features of diagnostic graphs
- Interpreting AD tier diagnostics

#### Prerequisites

Successful completion of 1760V and 1761V is required.

#### Audience

This course is designed for those with job responsibilities to configure and perform diagnostic tests as well as interpret diagnostic data of the FIELDVUE digital valve controller with AD tiering.

## COURSE 1763V

CEUs: 0.4

### Fisher ValveLink Solo Software for Configuration & Calibration of FIELDVUE Digital Valve Controllers

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours each part. It introduces data collection methods for online diagnostic testing and troubleshooting of the FIELDVUE digital valve controllers with Performance Diagnostic (PD) Tier. Students will have access to a live FIELDVUE DVC6200 device using ValveLink™ software, and will discuss the proper setup and execution of diagnostic functionality within the PD tier. Permanent tiering step-up options are discussed, including the free one-time step up to PD tier, as well as specific procedures to follow when changing a digital valve controller's diagnostic tier.

Diagnostic functions of interest include:

- PD One Button
- Profiles
- Triggered Profiles
- Friction
- Friction Trends

#### Topics

- Verifying specification sheet information
- Running a PD One Button Test
- Viewing/analyzing PD related diagnostic information
- Configuring scheduler to run diagnostics
- Configuring/Activating trending and network alert scan functions
- Understanding digital valve controller diagnostic tiering levels

#### Prerequisites

Successful completion of 176V, 1761V, and 1762V is required.

#### Audience

This course is designed for those with job responsibilities to perform and interpret online diagnostic tests associated with the FIELDVUE digital valve controller with PD tiering.

**COURSE C1500****CEUs: 0.4****Fisher Control Valve Introduction****Overview**

This curriculum contains e1500, e1501, e1502, and e1503 - the course group introduces the basic terminology of control devices: including control valve types, uses, roles, flow characteristics and to the various entities that define codes and standards for control devices. Sliding stem, rotary, and the basics of an actuator, lists the types of actuators for sliding stem and rotary control valves, states the general components of an actuator and lists general actuator selection guidelines.

**COURSE 1300 & 1300V****CEUs: 2.1****Fisher Control Valve Engineering Introduction****Overview**

This 3-day course reviews design and operating principles of control valves, actuators, positioners and related accessories. It describes the sizing and selection methods for a broad variety of control valves assemblies. Students will solve several demonstration sizing and selection problems using Fisher Specification Manager software and published materials, plus participate in equipment demonstrations and hands-on workshops. Students who complete this course will:

- Select the proper valve characteristic for a given process
- Choose suitable styles of control valves for an application
- Size control valves and actuators
- Properly apply positioners and instruments

**Topics**

- Control valve selection: rotary/sliding stem
- Actuator selection and sizing
- Liquid valve sizing
- Gas valve sizing
- Positioners and transducers
- Valve guidelines
- Valve characteristics
- Valve packing considerations

**Delivery Options**

This training is also available as a remote virtual classroom course 1300V.

**Prerequisites**

Some experience with industrial control equipment including control valves and actuators would be helpful.

**Audience**

This course is for engineers, technicians and others responsible for the selection, sizing, and application of control valves, actuators and control valve instrumentation.

**Course Type**

Classroom & Virtual

## COURSE 9006V

CEUs: 0.8

### Fisher ValveLink Solo Software for Configuration & Calibration of FIELDVUE Digital Valve Controllers [Virtual]

#### Overview

This 8-hour virtual classroom course event consists of 4 parts, 2 hours for each part. Students will be introduced to the fundamentals of PID control. The control and response characteristic of each PID component will be explained and students will have the opportunity to see their effect using simulated loop software accessed through a virtual machine. Using the software, the class will also work through and discuss different strategies for tuning various process loops. These strategies include non-calculation based methods like trial and error, as well as, calculation based methods such as lambda tuning.

#### Topics

- Elements of PID control
- Load upsets; process noise
- Self-regulating process
- Integrating process
- Valve dead band and stick/slip
- Limit cycling
- Trial and error tuning
- Lambda tuning

#### Delivery Options

This training is also available as an Instructor Led course 9006.

#### Prerequisites

Some basic understanding of process measurement and control is recommended.

#### Audience

This course is designed for those who have the job responsibility of tuning or monitoring industrial process control loops. Students will learn to tune controllers to meet the needs of each loop.

## COURSE 1752

CEUs: 2.1

### Fisher Control Valve Engineering Introduction

#### Overview

This 3-day course provides hands-on experience working with FIELDVUE digital valve controllers and ValveLink software. Students will be able to execute ValveLink software calibration and diagnostic routines, and create an instrument database.

#### Topics

- Introduction to ValveLink Solo software
- Configuration with ValveLink software
- Calibration with ValveLink software
- ValveLink software advanced and performance Tier Diagnostics
- Troubleshooting
- Introduction to diagnostic data interpretation

#### Delivery Options

This training is also available as a remote virtual classroom course training by attending courses 1760V, 1761V, 1762V, and 1763V

#### Prerequisites

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

#### Audience

This course is for technicians, engineers and others responsible for installation, calibration and diagnostics for FIELDVUE digital valve controllers and ValveLink software. The primary focus of this course is to provide a comprehensive experience in managing digital valve controllers using the ValveLink software.

## COURSE 1760V

CEUs: 0.4

### Fisher FIELDVUE Digital Valve Controllers [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. It covers detailed operation of Fisher FIELDVUE digital valve controllers. Class discussions are centered on what individual components within a digital valve controller are, and how they can affect overall control valve performance. Common maintenance practices are detailed, and include proper care and handling of internal components, such as the I/P and Relay. Calibration procedures of the FIELDVUE DVC6200 digital valve controller will be conveyed using ValveLink™ software connected to a live device. Course focus includes:

- Identify and understand components of a digital valve controller
- Describe and demonstrate proper instrument mounting
- Connect to a live device using ValveLink Software
- Discuss and perform a guided setup routine
- Discuss and perform an auto travel calibration routine

#### Topics

- Pneumatic instrument principle overview
- Operation of a FIELDVUE digital valve controller for travel control
- Operation of a FIELDVUE digital valve controller for pressure control
- Replacing FIELDVUE digital valve controller components
- Mounting a FIELDVUE digital valve controller
- Calibrating a FIELDVUE digital valve controller

#### Prerequisites

Experience and familiarity of process control and general valve operation is recommended. Completion of course 1700 is strongly encouraged.

#### Audience

This course is designed for those who have the job responsibility to repair, mount, configure, and calibrate Fisher FIELDVUE digital valve controllers.



**COURSE 1761V****CEUs: 0.4****Fisher FIELDVUE Digital Valve Controllers [Virtual]****Overview**

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. It covers the detailed setup of the FIELDVUE digital valve controllers. The class will discuss navigating through the detailed setup menus to change device operation and configuration parameters, as well as set alerts and alarms and correctly complete the device specification sheet. Students will have access to a live FIELDVUE DVC6200 using ValveLink™ software. In conjunction with HC tiering capabilities, a basic understanding of functions and troubleshooting within ValveLink software is discussed at length. Course focus includes:

- Detailed Setup - basic page group
- Detailed Setup - alert page group
- Detailed Setup - specification sheet
- Status Monitor
- Stroke Valve Test

**Topics**

- Saving device configuration as found
- Viewing device datasets
- Comparing current datasets to historical datasets
- Restoring historical datasets
- Using status monitor
- Interpreting data from status monitor
- Performing a stroke valve test

**Prerequisites**

Successful completion of 1760V is required.

**Audience**

This course is designed for those who have the job responsibility to perform detailed configurations and basic diagnostic troubleshooting of FIELDVUE digital valve controllers with HC tier.

**COURSE 1762V****CEUs: 0.4****Fisher FIELDVUE Digital Valve Controller HART Communicating Tier [Virtual]****Overview**

This 4-hour remote virtual classroom course event consists of 2 virtual classroom part, 2 hours for each part. It introduces data collection methods for offline diagnostic testing and troubleshooting of the FIELDVUE digital valve controllers with Advanced Diagnostic (AD) Tier. Students will have access to a live FIELDVUE DVC6200 using ValveLink™ software, and will discuss the proper setup and execution of diagnostic functionality within the AD tier. Dynamic scan and step response tests will be conducted, and the class will interpret analyzed data and review the details of diagnostic graphs for each. Areas of focus for AD diagnostic functionality include:

- Step Response Test - stroking speed
- Step Response Test - 9 -point step test
- Step Response Test - performance test
- Step Response Test - 3-point ramp
- Step Response Test - supply pressure
- Step Response Test - drive signal
- Valve Signature - graph and analyzed data
- Dynamic Error Band
- Drive Signal

**Topics**

Verifying specification sheet information  
Viewing/initializing AD related diagnostic information  
Identifying common features of diagnostic graphs  
Interpreting AD tier diagnostics

**Prerequisites**

Successful completion of 1760V and 1761V is required.

**Audience**

This course is designed for those with job responsibilities to configure and perform diagnostic tests as well as interpret diagnostic data of the FIELDVUE digital valve controller with AD tiering.

**COURSE 1763V****CEUs: 0.4****Fisher FIELDVUE Digital Valve Controller Performance Diagnostics Tier(Virtual)****Overview**

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours each part. It introduces data collection methods for online diagnostic testing and troubleshooting of the FIELDVUE digital valve controllers with Performance Diagnostic (PD) Tier. Students will have access to a live FIELDVUE DVC6200 device using ValveLink™ software, and will discuss the proper setup and execution of diagnostic functionality within the PD tier. Permanent tiering step-up options are discussed, including the free one-time step up to PD tier, as well as specific procedures to follow when changing a digital valve controller's diagnostic tier. Diagnostic functions of interest include:

- PD One Button
- Profiles
- Triggered Profiles
- Friction
- Friction Trends

**Topics**

- Verifying specification sheet information
- Running a PD One Button Test
- Viewing/analyzing PD related diagnostic information
- Configuring scheduler to run diagnostics
- Configuring/Activating trending and network alert scan functions
- Understanding digital valve controller diagnostic tiering levels

**Prerequisites**

Successful completion of 176V, 1761V, and 1762V is required

**Audience**

This course is designed for those with job responsibilities to perform and interpret online diagnostic tests associated with the FIELDVUE digital valve controller with PD tiering.

**COURSE 1751****CEUs: 2.1****Fisher HART based FIELDVUE Digital Valve Controllers using Emerson Field Communicators & ValveLink Mobile Introduction****Overview**

This 3-day course provides hands-on experience working with FIELDVUE digital valve controllers using an Emerson 475 or AMS Trex™ Communicator. The class will discuss basic operation and installation of the FIELDVUE digital valve controllers. Students will practice installing and mounting FIELDVUE digital valve controllers onto sliding stem and rotary control valve assemblies, as well as perform basic configuration and calibration of FIELDVUE Instruments. Troubleshooting the digital valve controller using ValveLink™ Mobile software will be performed and basic data interpretation will be introduced.

**Topics**

- FIELDVUE digital valve controller theory of operation
- FIELDVUE instrument installation
- Diagnostic troubleshooting and data interpretation using ValveLinkMobile with AD and PD tier devices

**Prerequisites**

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

**Audience**

This course is for technicians, engineers and others responsible for installing, calibrating and basic troubleshooting Fisher FIELDVUE instruments using the Emerson Field Communicators with ValveLink Mobile.

**COURSE 1400****CEUs: 2.1****Fisher Valve Trim & Body Maintenance****Overview**

This 3-day course and hands-on workshop explains how valves and actuators function and how they are installed and calibrated. It emphasizes installation, troubleshooting, parts replacement, and calibration of control valves, actuators, and FIELDVUE™ digital valve controllers. Those who complete this course will be able to:

- Correctly perform installation procedures
- Perform basic troubleshooting
- Properly apply and calibrate FisherFIELDVUE DVC6200 digital valve controllers
- Change valve trim, gaskets and packing

**Topics**

- Control valve terminology
- Globe valves
- Packing
- Actuators, and digital valve controllers
- Bench set
- Seat leak testing
- Ball valves
- Butterfly valves
- Eccentric disc valves
- Valve characteristics

**Prerequisites**

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

**Audience**

This introductory course is for valve mechanics, maintenance personnel, instrument technicians, and others who are responsible for maintaining control valves, actuators and control valve instrumentation.

**COURSE 1700****CEUs: 2.1****Fisher Control Valve Instrument Maintenance & Calibration****Overview**

This 3-day course and hands-on workshop covers the principles of operation, calibration and installation procedures for electronic and pneumatic instruments. The class will discuss maintenance procedures for Fisher sliding stem and rotary actuator assemblies. Hands on workshop exercises and lectures to discuss the operation and calibration of many Fisher instruments such as I/P transducers, pneumatic positioners, electro-pneumatic positioners, and Fisher FIELDVUE™ digital valve controllers will be covered. Students will:

- Calibrate a variety of pneumatic and electronic instruments
- Correctly perform installation procedures
- Perform basic troubleshooting of control valve instruments

**Topics**

- Actuators and bench set
- Current to pneumatic (I/P) transducers
- Instrument terminology
- Pneumatic and electro-pneumatic positioners
- Fisher FIELDVUE digital valve controller

**Prerequisites**

Some experience in electronic and pneumatic instrument maintenance and calibration would be helpful.

**Audience**

This course is for instrument technicians and others, responsible for pneumatic and electronic instrument calibration, installation and troubleshooting.

**COURSE 1450****CEUs: 2.1****Fisher Control Valve & Instrument Troubleshooting Introduction****Overview**

This 3-day course uses a very hands-on approach for troubleshooting and correcting many common control valve problems. The class will be introduced to the practice of basic valve sizing and selection. Valve problems such as cavitation, flashing, and aerodynamic noise are also discussed as well as common solutions to these problems using different control valve trims and materials. Instrumentation topics are expanded from course 1400 and 1700 to include troubleshooting and advanced calibration for split ranging, non-compatible signals, or using additional instruments such as a volume booster and trip valves. Loop performance issues due to stick-slip, high friction, and instrument operation are discussed.

**Topics**

- Control loop basics
- Influences on loop performance
- Control valve selection and sizing
- Valve troubleshooting
- Actuator troubleshooting
- Instrument selection
- Basic instrument troubleshooting
- Severe service considerations

**Prerequisites**

Completion of courses 1400 or and 1700.

**Audience**

This course is for experienced valve mechanics and maintenance personnel, instrument technicians, and others who will benefit from a broadened perspective of control valve performance and effect on total loop operation.

**COURSE 1751****CEUs: 2.1****Fisher HART based FIELDVUE Digital Valve Controllers using Emerson Field Communicators & ValveLink Mobile Introduction****Overview**

This 3-day course provides hands-on experience working with FIELDVUE digital valve controllers using an Emerson 475 or AMS Trex™ Communicator. The class will discuss basic operation and installation of the FIELDVUE digital valve controllers. Students will practice installing and mounting FIELDVUE digital valve controllers onto sliding stem and rotary control valve assemblies, as well as perform basic configuration and calibration of FIELDVUE Instruments. Troubleshooting the digital valve controller using ValveLink™ Mobile software will be performed and basic data interpretation will be introduced.

**Topics**

- FIELDVUE digital valve controller theory of operation
- FIELDVUE instrument installation
- Diagnostic troubleshooting and data interpretation using ValveLinkMobile with AD and PD tier devices

**Prerequisites**

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

**Audience**

This course is for technicians, engineers and others responsible for installing, calibrating and basic troubleshooting Fisher FIELDVUE instruments using the Emerson Field Communicators with ValveLink Mobile.

## COURSE 1752

CEUs: 2.1

### Fisher ValveLink Solo Software for Configuration & Calibration of FIELDVUE Digital Valve Controllers

#### Overview

This 3-day course provides hands-on experience working with FIELDVUE digital valve controllers and ValveLink software. Students will be able to execute ValveLink software calibration and diagnostic routines, and create an instrument database.

#### Topics

- Introduction to ValveLink Solo software
- Configuration with ValveLink software
- Calibration with ValveLink software
- ValveLink software advanced and performance Tier Diagnostics
- Troubleshooting
- Introduction to diagnostic data interpretation
- Delivery Options
- This training is also available as a remote virtual classroom course training by attending courses 1760V, 1761V, 1762V, and 1763V

#### Prerequisites

Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

#### Audience

This course is for technicians, engineers and others responsible for installation, calibration and diagnostics for FIELDVUE digital valve controllers and ValveLink software. The primary focus of this course is to provide a comprehensive experience in managing digital valve controllers using the ValveLink software.

## COURSE 1450V

CEUs: 0.4

### Fisher FIELDVUE Digital Valve Controllers [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. It covers detailed operation of Fisher FIELDVUE digital valve controllers. Class discussions are centered on what individual components within a digital valve controller are, and how they can affect overall control valve performance. Common maintenance practices are detailed, and include proper care and handling of internal components, such as the I/P and Relay. Calibration procedures of the FIELDVUE DVC6200 digital valve controller will be conveyed using ValveLink™ software connected to a live device. Course focus includes:

- Identify and understand components of a digital valve controller
- Describe and demonstrate proper instrument mounting
- Connect to a live device using ValveLink Software
- Discuss and perform a guided setup routine
- Discuss and perform an auto travel calibration routine

#### Topics

- Pneumatic instrument principle overview
- Operation of a FIELDVUE digital valve controller for travel control
- Operation of a FIELDVUE digital valve controller for pressure control
- Replacing FIELDVUE digital valve controller components
- Mounting a FIELDVUE digital valve controller
- Calibrating a FIELDVUE digital valve controller

#### Prerequisites

Experience and familiarity of process control and general valve operation is recommended. Completion of course 1700 is strongly encouraged.

#### Audience

This course is designed for those who have the job responsibility to repair, mount, configure, and calibrate Fisher FIELDVUE digital valve controllers.

## COURSE 1761V

CEUs: 0.4

### Fisher FIELDVUE Digital Valve Controller HART Communicating Tier [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours for each part. It covers the detailed setup of the FIELDVUE digital valve controllers. The class will discuss navigating through the detailed setup menus to change device operation and configuration parameters, as well as set alerts and alarms and correctly complete the device specification sheet. Students will have access to a live FIELDVUE DVC6200 using ValveLink™ software. In conjunction with HC tiering capabilities, a basic understanding of functions and troubleshooting within ValveLink software is discussed at length. Course focus includes:

- Detailed Setup - basic page group
- Detailed Setup - alert page group
- Detailed Setup - specification sheet
- Status Monitor
- Stroke Valve Test

#### Topics

- Saving device configuration as found
- Viewing device datasets
- Comparing current datasets to historical datasets
- Restoring historical datasets
- Using status monitor
- Interpreting data from status monitor
- Performing a stroke valve test

#### Prerequisites

Successful completion of 1760V is required.

#### Audience

This course is designed for those who have the job responsibility to perform detailed configurations and basic diagnostic troubleshooting of FIELDVUE digital valve controllers with HC tier.



## COURSE 1762V

CEUs: 0.4

### Fisher FIELDVUE Digital Valve Controller Advanced Diagnostics Tier [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom part, 2 hours for each part. It introduces data collection methods for offline diagnostic testing and troubleshooting of the FIELDVUE digital valve controllers with Advanced Diagnostic (AD) Tier. Students will have access to a live FIELDVUE DVC6200 using ValveLink™ software, and will discuss the proper setup and execution of diagnostic functionality within the AD tier. Dynamic scan and step response tests will be conducted, and the class will interpret analyzed data and review the details of diagnostic graphs for each. Areas of focus for AD diagnostic functionality include:

- Step Response Test - stroking speed
- Step Response Test - 9 -point step test
- Step Response Test - performance test
- Step Response Test – 3-point ramp
- Step Response Test - supply pressure
- Step Response Test - drive signal
- Valve Signature - graph and analyzed data
- Dynamic Error Band
- Drive Signal

#### Topics

- Verifying specification sheet information
- Viewing/initializing AD related diagnostic information
- Identifying common features of diagnostic graphs
- Interpreting AD tier diagnostics

#### Prerequisites

Successful completion of 1760V and 1761V is required.

#### Audience

This course is designed for those with job responsibilities to configure and perform diagnostic tests as well as interpret diagnostic data of the FIELDVUE digital valve controller with AD tiering.

## COURSE 1763V

CEUs: 0.4

### Fisher FIELDVUE Digital Valve Controller Performance Diagnostics Tier [Virtual]

#### Overview

This 4-hour remote virtual classroom course event consists of 2 virtual classroom parts, 2 hours each part. It introduces data collection methods for online diagnostic testing and troubleshooting of the FIELDVUE digital valve controllers with Performance Diagnostic (PD) Tier. Students will have access to a live FIELDVUE DVC6200 device using ValveLink™ software, and will discuss the proper setup and execution of diagnostic functionality within the PD tier. Permanent tiering step-up options are discussed, including the free one-time step up to PD tier, as well as specific procedures to follow when changing a digital valve controller's diagnostic tier. Diagnostic functions of interest include:

- PD One Button
- Profiles
- Triggered Profiles
- Friction
- Friction Trends

#### Topics

- Verifying specification sheet information
- Running a PD One Button Test
- Viewing/analyzing PD related diagnostic information
- Configuring scheduler to run diagnostics
- Configuring/Activating trending and network alert scan functions
- Understanding digital valve controller diagnostic tiering levels

#### Prerequisites

Successful completion of 176V, 1761V, and 1762V is required.

#### Audience

This course is designed for those with job responsibilities to perform and interpret online diagnostic tests associated with the FIELDVUE digital valve controller with PD tiering.

## COURSE 1759

CEUs: 2.1

### Fisher Diagnostic Data Interpretation Using ValveLink Software for FIELDVUE

#### Overview

This 3-day course uses practical exercises and discussions to teach the student to interpret and analyze diagnostic data obtained using FIELDVUE digital valve controllers and ValveLink software. Students will perform diagnostic tests on a variety of valve/actuator combinations and use the data to determine bench set, dynamic error band, seat load, spring rate and other pertinent parameters. Students will also perform comparison tests on valve/ actuator assemblies containing configuration or operating flaws and use the data for troubleshooting purposes.

#### Topics

- Review of ValveLink software diagnostic tests
- Data interpretation
- Troubleshooting techniques
- Comparison testing techniques
- Performance diagnostics

#### Prerequisites

Students must have completed one of the following: 1751, 1752, or 1760V Series (1760V, 1761V, 1762V, 1763V).

#### Audience

This course is for technicians, engineers and others responsible to collect and interpret valve diagnostic tests performed using ValveLink™ software.

## COURSE 1427

CEUs: 2.8

**Fisher Nuclear Data Acquisition & Interpretation Introduction****Overview**

This 4 1/2-day course uses lecture and hands-on labs to teach students to properly acquire and analyze diagnostic data using the QUIKLOOK 3-FS valve diagnostic system. This course teaches proper setup of hardware and software, accurate entry of data, and other procedures that are required to ensure accuracy when acquiring data. Also covered are good techniques in interpreting and analyzing the collected data. Actual case histories form a basis for teaching interpretation skills. Students will test and diagnose a sampling of valves in which specific problems have been introduced. Students who complete this will:

- Navigate features of QUIKLOOK 3-FS software
- Correctly mount sensors and related valve diagnostic system hardware on standard air-operated valves (AOV's)
- Enter valve, instrument, and actuator data
- Correctly enter test parameters
- Perform various step and stroking tests to collect diagnostic data
- Analyze typical and atypical, valve diagnostic data
- Create/view standard valve diagnostic system reports

**Topics**

- QUIKLOOK 3-FS valve diagnostic system hardware/software overview
- In-depth software navigation
- Setup and testing techniques
- Data entry & test criteria best practices
- Data management
- Report generation/expected results
- Background software routines and equations for the analysis numbers
- Case study analysis- including discussions of valve/instrument/installation problems
- Laboratory activities/support

**Audience**

This course is designed for personnel who will perform and interpret control valve diagnostic testing using a QUIKLOOK 3-FS valve diagnostic system.

**Prerequisites**

Knowledge and experience of valves, actuators, control valve instrumentation operation and basic maintenance. Completion of 1400, 1700, and 1450 courses is recommended but not required.

## COURSE 1428

CEUs: 2.1

**Fisher Nuclear Data Acquisition & Interpretation Introduction****Overview**

This 3-day course starts with a brief review of QUIKLOOK 3-FS valve diagnostic system software confirms student familiarity with test setups, pressure and travel channels, and the objectives of all available test procedures. The course is based on a structured combination of lectures and hands-on labs to teach students how to identify problems in control valve assemblies. Emphasis is placed on determining and confirming overall control assembly: I/P, positioner, actuator, and valve body. Report generation and some field tips are also presented. To capitalize on learning from shared experiences, students are encouraged to bring in test data from an interesting scenario or a current problem. Those who complete this course will:

- Select the appropriate QUIKLOOK 3-FS valve diagnostic system test for a given scenario.
- Understand the impact of scan rates on the appearance and interpretation of acquired data.
- Analyze valve diagnostic test data to determine overall control valve health by evaluating the condition of the various components of the assembly.
- Identify multiple anomalies in a single assembly.
- Use QUIKLOOK 3-FS valve diagnostic system functions to generate quick reports.
- Learn how to perform a step test on a discrete valve without interrupting power to the valve.

**Topics**

- Review of various valve diagnostic tests and specific objectives of each
- Impact of test configuration errors
- Data interpretation from tests of bugged valve assemblies
- Multiple anomalies found in control valves
- Exporting data
- Generating quick reports
- Interpretation of difficult to detect control valve problems

**Prerequisites**

A pre-test and a control valve awareness test are used to confirm applicant readiness. Course 1427 and a minimum of six months of diagnostic testing with the QUIKLOOK 3-FS valve diagnostic system.

**Audience**

This course is designed for personnel who are responsible for interpreting plots and other diagnostic data that is acquired with the QUIKLOOK 3-FS valve diagnostic system. This course focuses on data interpretation. Data acquisition is taught in course 1427.



# MACHINERY HEALTH





## COURSE 2070 &amp; 2070V

CEUs: 2.8

**AMS Machinery Manager Advanced****Overview**

This 4-day course is the third in our series of AMS Machinery Manager courses. Its focus is on the management, modification and optimization of the existing AMS Machinery Manager database. Students will learn how to modify existing Wizard configurations, add and edit users, statistically adjust alert and fault levels, make global database changes, and many other very useful database functions. This course is based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Wireless technology, Infrared Analysis, Motorview, Online Monitor and Oilview modules are covered in other course offerings and are not part of this course.

**Topics**

- Advanced Analysis Features in Vibration Analysis Module
- Problem Reporting
- Status-at-a-Glance Operation and Reporting
- Nspectr®
- Wizard - Reporting Techniques and Modification/Addition of Setup Information
- Austostat
- Database Utility
- Database Zip Utility
- Network Administration
- Data Locker Management

**Prerequisites**

Intermediate Vibration (course 2032) or one-year vibration analysis experience are recommended. Experience with the Windows operating system is recommended.

**Audience**

This course is intended for the advanced user who has already created a machinery database and has been acquiring, storing and analyzing data for six months or more.

**Course Type**

Classroom & Virtual

## COURSE 2074 &amp; 2074V

CEUs: 2.8

**AMS Machinery Manager Intermediate****Overview**

This 4-day course teaches some of the more advanced machinery analysis techniques available in AMS Suite Machinery Health™ Manager Software. This course focuses more on analysis and reporting with the use of Vibration Analysis module, Reporting module, Exception Analysis, PEAKVUE™ technology and full version of RBMview.

This course is based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Wireless technology, Infrared Analysis, Motorview, Online Monitor and Oilview modules are covered in other course offerings and are not part of this course.

**Topics**

- PEAKVUE™ Technology
- Vibration Analysis module
- Reporting Module
- Exception Analysis
- Nspectr
- BMview
- Data Transfer
- Route Modification

**Prerequisites**

Intro to AMS Machinery Health™ Manager (course # 2068), Basic Vibration Analysis course or 6 months vibration analysis experience are recommended.

**Course Type**

Classroom & Virtual

## COURSE 2068 &amp; 2068V

CEUs: 2.8

**AMS Machinery Manager Introduction****Overview**

In this 4-day class students learn methods of database creation and vital features of route creation such as collecting reference data, analyzer/computer communication, and the basic concepts of Analysis Parameter Sets, Alarm Limit Sets, and Fault Frequency Sets. A machinery analyzer is used to demo the process of loading routes for data collection. This course will also include a basic overview of the vibration plotting application and reporting functions.

This course is based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Wireless technology, Infrared Analysis, Motorview, Online Monitor and Oilview modules are covered in other course offerings and are not part of this course.

**Topics**

- RBMwizard
- Database Setup
- Route management and Data transfer
- Reports
- Vibration Analysis module

**Prerequisites**

Computer experience with the Windows operating system and some vibration analysis experience are recommended.

**Audience**

This course was designed for the new users of AMS Machinery Manager.

**Course Type**

Classroom & Virtual

## COURSE E2130

CEUs: 0.6

**Machinery Health Analyzer CSI 2130 Introduction****Overview**

Emerson's Machinery Health™ training now includes Fundamentals of the 2130 eLearning course, designed to provide you with the tools you need to perform data collection using the CSI 2130 Machinery Health Analyzer. This course provides guided demonstrations through the processes of installing necessary drivers, uploading updated firmware, and loading updated or newly-purchased programs necessary for data collection. Learn how to load a pre-defined route into the CSI 2130, gather general data as well as specialized data, and then interface the data back with a computer for further diagnostic analysis.

**Topics**

- Analyzer-Computer Communication
- Predefined Route Data Collection
- Off-Route Data Collection and Setup
- Monitor Mode Measurements
- Peak and Phase Measurements

## COURSE 2076 &amp; 2076V

CEUs: 1.4

**Machinery Health AMS 2140 Introduction****Overview**

This 2-day hands-on course focuses on the basic operation of the AMS 2140 Machinery Health™ Analyzer. Students collect data on lab machines. Note: You may take with Fundamentals of Vibration as a 4-day course.

**Topics**

- Analyzer/Computer Communication
- Predefined Route Data Collection
- Job Data Collection and Setup
- Manual Mode Measurements
- Introduction to AMS 2140 Analysis Expert Functions

**Prerequisites**

Understanding of vibration analysis. Familiar with basic vibration collection principles.

**Audience**

This course is designed for personnel with little or no experience with Emerson analyzers, but who are experienced in the field of vibration data collection and analysis.

**Course Type**

Classroom & Virtual

## COURSE E2069

CEUs: 0.2

**Machinery Health Vibration Introduction****Overview**

The course introduces the technology of vibration analysis by explaining what vibration analysis is and how it plays a critical role in any predictive maintenance program. Students are led through a self-paced discussion on how vibration analysis works with many examples of the types of faults that can be detected. Students will also gain an understanding of where and how vibration is measured with an emphasis on good data collection techniques. Students will learn important terminology that will be critical to their success as they progress to the next level of training in vibration analysis; Emerson's Basic Vibration Analysis course.

**Topics**

- Chapter 1: Fundamentals of Vibration
- Chapter 2: How is Vibration Measured?
- Chapter 3: Understanding the Vibration Signal
- Chapter 4: Vibration Units
- Chapter 5: Analysis Parameters
- Chapter 6: Data Analysis: Where to begin?

**Audience**

This e-course provides instruction to individuals with no prior experience in vibration analysis.



## COURSE 2014V

CEUs: 2.8

**Machinery Health Vibration & AMS 2140 Introduction [Virtual]****Overview**

This 4-day course is for those with no prior experience in vibration analysis. Students learn about causes of vibration and methods of measurement. The AMS 2140 analyzer portion of the course focuses on the basic operation of the AMS 2140 Machinery Health Analyzer. Students collect data on lab machines.

**Topics**

- Introduction to Vibration
- Components of a Predictive Maintenance Program
- Basic Fault Identification
- Vibratory Fault Characteristics and Patterns
- Information to Help Jump Start a Vibration Program.
- Analyzer/computer communication
- Predefined route data collection
- Job data collection and setup
- Manual mode measurements
- Introduction to AMS 2140 Analysis Expert Functions

**Prerequisites**

None

## COURSE E2140

CEUs: 0.6

**Machinery Health AMS 2140 Introduction****Overview**

Emerson's Machinery Health™ training now includes the Fundamentals of the AMS 2140 eLearning course, designed to provide you with the tools you need to perform data collection using the AMS 2140 Machinery Health Analyzer. The course leads you through a basic introduction of the analyzer including panel descriptions and reviews of the purpose and function of all connectors, ports, slots, keys, indicators and buttons. The user learns how to load a pre-defined route into the analyzer, take general data as well as specialized data, and then dump that data back into the computer for further diagnostic analysis.

**Topics**

- Analyzer/Computer Communication
- Predefined Route Data Collection
- Job Data Collection and Setup
- Manual Mode Measurements
- Introduction to AMS 2140 Analysis Expert Functions

**Prerequisites**

Understanding of vibration analysis. Familiar with basic vibration collection principles.

**Audience**

This course is designed for personnel with little or no experience with Emerson analyzers, but who are experienced in the field of vibration data collection and analysis.

## COURSE 2031

CEUs: 3.0

**Machinery Health Vibration Analysis Category I****Overview**

This 4-day course complies with Category I Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. Although this training course is not product specific, students will use Emerson's AMS technologies for demonstration purposes. The class shows the student how to use the vibration analyzer in conjunction with Emerson AMS Machinery Manager software to analyze basic vibration defects. Participants will receive a complimentary copy of the Pocket Vibration Analysis Trouble-Shooter Guide

**Topics**

- Introduction to Vibration
- Measurement Setup
- Data collection and analysis
- Basic analyzer functions
- The class shows the students how to recognize machine defects such as:
  - Imbalance
  - Shaft misalignment
  - Looseness
  - Rolling element bearing defects
  - Gear problems
  - Resonance
  - Belt Defects
  - AC Induction Motors
  - Journal Bearings
  - Rotating Equipment

**Prerequisites**

Fundamentals of vibration or up to six months of vibration experience is recommended.

**Audience**

This course is intended to enable students to operate single channel machinery analyzers, dump and load routes, recognize the difference between good and bad data, and compare vibration measurements against pre-established alert settings.

## COURSE 2021EX

CEUs: 2.8

**Machinery Health Vibration Analyst Exam Category I****Overview**

Test Format: Written  
Duration: 2 hours  
Passing Grade: 70%

**Eligibility for Examination**

- Min. Duration of Training (hours): 30
- Min. Duration of Cumulated Exp. (months): 6

## COURSE 2022EX

CEUs: 2.8

**Machinery Health Vibration Analyst Exam Category II****Overview**

Test Format: Written  
Duration: 3 hours  
Passing Grade: 70%

**Eligibility for Examination**

- Min. Duration of Training (hours): 70
- Min. Duration of Cumulated Exp. (months): 18
- Passing Category I exam is NOT a Prerequisite

## COURSE 2023EX

CEUs: 2.8

**Machinery Health Vibration Analyst Exam Category III****Overview**

Category III exam, available at the end of 2033  
Test Format: Written  
Duration: 4 hours  
Passing Grade: 70%

**Eligibility for Examination**

- Min. Duration of Training (hours): Category II + 38
- Min. Duration of Cumulated Exp. (months): 36
- Has taken and passed the Category II exam.

## COURSE 2032 &amp; 2032V

CEUs: 2.8

**Machinery Health Vibration Analysis Category II****Overview**

This 4-day course complies with Category II Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. Category II vibration analysts are expected to be able to select appropriate vibration measurement techniques, set up instruments for basic resolution of amplitude, frequency, and time, perform basic spectrum analysis, maintain a database of results and trends, perform single-channel impact tests, classify, interpret, and evaluate test results in accordance with applicable specifications and standards, recommend minor corrective actions, and understand basic single plane field balancing concepts.

This course also features the use of the Emerson Machinery Analyzer in conjunction with advanced machinery analysis techniques. Discussions of case histories on machinery faults are one of the focal points of this course. Students will receive a complimentary copy of the Simplified Handbook of Vibration Analysis, Volume I, by Art Crawford.

**Topics**

Recognition of Machine Defects including:

- Reference Standards
- Imbalance
- Misalignment
- Bent Shaft
- Soft Foot
- Anti-friction and Journal Bearings
- Looseness
- Resonance
- Electrical Defects
- Gearboxes
- Belts

**Prerequisites**

Basic Vibration Analysis course and a cumulative 18 months of field experience are recommended.

**Course Type**

Classroom & Virtual

## COURSE 2033

CEUs: 2.8

**Machinery Health Vibration Analysis Category III****Overview**

This 4-day course complies with Category III Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. This course expands on the subjects covered in the Intermediate Vibration course (Category II), especially in the areas of fault analysis and corrective actions. The class details advanced analysis techniques. The dual channel Machinery Health™ analyzer features are introduced including the use of AMS Machinery Manager Software to set up the advanced analyzer features and the powerful download-able programs for data collection. The transient Machinery Health analyzer capabilities are covered such as long-term time waveform. The class covers advanced resonance detection using a variety of testing methods, including triggered data collection.

Students will receive a complimentary copy of the Simplified Handbook of Vibration Analysis, Volume I, by Art Crawford.

**Topics**

- Specify Appropriate Vibration Instrumentation Hardware and Software for both Portable and Permanently Installed Systems
- Perform Spectrum and Time Waveform Analysis Under both Steady-State and Unsteady Operating Conditions
- Measure and Analyze Basic Operational Deflection Shapes (ODS)
- Slow Speed Technology (SST®)
- Zoom Analysis
- Transient Techniques
- Digital Signal Processing
- Demodulation
- Resonance Detection

**Prerequisites**

Intermediate Vibration Analysis course and a cumulative three years of field experience are recommended.

**Course Type**

Classroom & Virtual

## COURSE 2088

CEUs: 2.8

### Machinery Health AMS Online Prediction Operation & Maintenance

#### Overview

This 4-day course best suits those who have a CSI 4500, AMS 6500, AMS 2600 or XP32 system installed and operational prior to attending the course.

#### Topics

- Vibration basics and terminology relating to the CSI 4500, AMS 6500, AMS 2600 or XP32
- System overview: functionality and system components
- Online Watch - used to monitor the system daily
- Online Config - adding a new machine to an existing database
- Vibration Analysis Module - spectrums, waveforms and trend data
- PEAKVUE™ technology Processing
- Transient setup and capture evaluation
- Review of customer databases

#### Prerequisites

Knowledge of vibration and industrial machinery is helpful, but not necessary.

#### Audience

- System users or analysts
- Personnel using the CSI 4500, AMS 6500, AMS 2600 or XP32 daily
- Those responsible for configuring databases and analyzing data

## COURSE 2082

CEUs: 2.8

### Machinery Health Lubrication Introduction & Intermediate

#### Overview

Guidelines and instruction for starting an oil analysis program will be provided in this 4-day course. The course focuses on the basic properties of lubricants and lubricant specifications including additive packages. An overview of laboratory testing methods and interpretation of test data is taught. In addition, instruction is provided on proper storage and handling of new, unused lubricants, as well as sample point identification and best practices for collecting samples from machinery. Basic contamination control and wear debris analysis and identification is covered. The focus of the level two portion of the course is the use of oil analysis with other predictive technologies to enhance a machinery health program. Machine life extension and reduction of unscheduled downtime will be covered in depth. Training includes introductions to lubricant engineering, failure concepts, and failure prevention. Information will be provided on greases and synthetic lubricants, including advantages and applications. The importance of Wear Debris Analysis and contamination control and their impact on reliability will be stressed. Guidelines and step-by-step procedures will be offered for consolidating lubricants, setting alarm limits, as well as managing and enhancing existing lubrication programs. Optional Level I & Level II Lubrication Certification exams will be administered at the end of the course for no charge.

#### Topics

- The productive lubricant analysis program
- Analyzing oil data
- Identifying common types of wear debris, their origins, and corrective actions
- The importance of contamination control
- Designing sampling, storage and handling procedures
- The components of RBM lubrication program
- Methods for extending machine life
- The importance of Wear Debris Analysis and
- Contamination Control
- Lubricant consolidation
- Establishing alarms

#### Audience

This course is designed for individuals who have limited or no oil analysis experience.



## COURSE 2086

CEUs: 2.1

**Machinery Health AMS 6500 ATG Operation & Maintenance****Overview**

This 3-day hands-on training course is for any user or analyst involved with operating and maintaining an AMS 6500 ATG System. Workshops include practice with module and software configuration.

**Topics**

- Overview of hardware and modules
- Rack and module configuration
- Machine Studio software functionality, navigation and configuration
- System troubleshooting and maintenance
- ATG View App

**Audience**

This 3-day course is a hands-on training for anyone involved with operating and maintaining an AMS6500 ATG System.

## COURSE 2081

CEUs: 2.8

**Machinery Health Electric Motor Diagnostics & MotorView Introduction****Overview**

This 4-day course is intended for personnel who are experienced in vibration analysis and diagnostics and focuses on the theoretical concepts of motor diagnostics. This course uses labs and case histories to demonstrate the functionality of the MotorView software in determining rotor bar defects using current and flux data. This course is designed for mechanical and electrical skilled personnel who may not have a background in motor theory, operation and construction.

**Topics**

- Basic electrical principles
- AC/DC motor theory and design
- Variable frequency drives
- Data collection methods
- Current spectra and waveform analysis
- Flux spectra analysis and data evaluation
- Temperature data
- Shaft current
- Analysis of case histories
- Windows configuration for MotorView operation

**Audience**

The MotorView course is designed for students who are experienced in vibration analysis and diagnostics and focuses on the theoretical concepts of motor diagnostics.



# MIMIC





**COURSE 7601 & 7601V****CEUs: 2.1****Mimic Dynamic Simulation****Overview**

In this three-day course, students explore fundamental features of Mimic Simulation Software. The course focuses on installation and setup, building low and medium fidelity models, complete integration with a control system for configuration or logic checkout, operator training and instructor graphics creation. Completion of this class will enable the student to build a dynamic simulator and successfully integrate it with a control system.

**Topics**

- Mimic installation and overview
- Communications setup with Simulated IO Drivers
- Discrete and analog modeling
- Database generation utilities
- Development of training scenarios and snapshots using Mimic Operator Training Manager
- Software tools and options to increase efficiency
- System maintenance

**Audience**

This course is designed for process & process control engineers responsible for configuring and maintaining Mimic simulation software.

**Course Type**

Classroom & Virtual

**COURSE 7602 & 7602V****CEUs: 1.4****Mimic Fluid Modeling Advanced****Overview**

This two-day course will build on foundations taught in Dynamic Simulation with Mimic while focusing on developing high fidelity models. Mimic's Advanced Modeling Objects will be used to create end-to-end, unified pressure driven flow networks while incorporating complete mass and energy balances across the entire model. The student will learn to create high fidelity models of processes that contain both liquid and vapor in numerous unit operations. Through lectures, demonstrations and workshops, students will learn to construct a first principles and unit operations based model.

**Topics**

- Advanced modeling object configuration
- Model layout and flow network development
- Standard and advanced model aggregation
- Tuning and optimization

**Audience**

This course is for process and process control engineers responsible for configuring and maintaining high fidelity models of processes that contain both liquid and vapor in numerous unit operations.

**Prerequisites**

Dynamic Simulation with Mimic - 7601

**Course Type**

Classroom & Virtual

**COURSE 7603****CEUs: 1.4****Mimic Solids Handling Advanced****Overview**

This two-day course will build on foundations taught in Dynamic Simulation with Mimic and Advanced Fluid Modeling with Mimic in constructing high fidelity models with liquids, vapors and solids. Mimic's Mining Advanced Modeling Objects will be introduced and used to incorporate material balances and particle size tracking across the entire model. The student will learn to create high fidelity models of processes that contain solids and slurries in a variety of different comminution and separation unit operations.

**Topics**

- Introduction to the advanced mining modeling package
- Configuration and layout of a plant model
- Tuning and optimization of slurry and solid streams
- Supporting standard modeling for improved process responses

**Audience**

This course is for process and process control engineers responsible for configuring and maintaining a Mimic simulation model with solids handling.

**Prerequisites**

None

**COURSE 7610****CEUs: 2.1****DeltaV Industrial Ethernet with VIM2****Overview**

In this VIM2 Hardware and Software training course, students explore basic setup and configuration of VIM2 hardware and software. The course begins with an introduction to the VIM and firmware options, moving through setup, tuning and configuring the various drivers. Completion of this class will enable the student to better use their VIM2 and successfully integrate it with DeltaV.

**Topics**

- Introduction to the VIM and firmware options
- VIMNet Explorer and DeltaV Explorer Setup
- VIM Tuning
- Diagnostics
- Configurations of the different drivers
- Integration Best Practices

**Audience**

This course is for process and process control engineers responsible for configuring the VIM2 card.



# OPERATIONAL CERTAINTY





## COURSE 7625

CEUs: 1.4

**Operational Certainty Operator Displays Advanced****Overview**

A properly implemented human machine interface (HMI) can reduce operator work load, improve situational awareness and aid the operator in preventing minor deviations from becoming major incidents. The combination of HMI philosophy and style guides provides a rational and structured basis for ensuring all areas of importance relating to the human machine interface are successfully addressed. During the two-day course, capture best practice philosophy and standards for use in the design and development of the operator interface for your DCS.

**Topics**

- HMI Lifecycle
- System Standards Development (New System Entry Point)
- Philosophy
- Style Guide
- HMI Toolkit
- Design (Existing System with New Displays or Display Changes Entry Point)
- User, Task and Functional Requirements
- Console Design
- HMI System Design
- Display Design
- Implement
- Operate
- Design
- Users - Definitions according to ISA 101.01
- Tasks (Things to Consider)
- Normal Operating Conditions
- Known Abnormal Operating Conditions
- Routine Operating Adjustments
- Functional Requirements
- Console Design
- HMI System Design
- Control System
- Third Party Interfaces
- Display Design
- Goals of HMI Design According to ISA 101.01
- Types of Displays
- Levels of Display
- Level 1 – Functional Overview
- Level 2 – Schematic Overview
- Level 3 – Detailed Process
- Level 4 – Other
- Navigation
- Execution Method for an Advanced HMI Project

**Audience**

This course is ideal for operators and process or controls engineers involved in the Human Machine Interface.

## COURSE 7621

CEUs: 2.1

**DeltaV Industrial Ethernet with VIM2****Overview**

During the three-day course, become an expert on eliminating alarm floods for your site and meeting ISA 18.2 KPI performance metrics. Dynamic alarm management can increase productivity, reduce downtime and improve safety. This course is specifically designed to help you realize these benefits through the optimal dynamic management of your control system with AgileOps software. This course includes hands-on workstations with access to a live AgileOps system, allowing the student to fully understand the ease of use of AgileOps.

**Topics**

- Alarm Management and Philosophy
- Master Control System Database
- Branch Management
- Auto Discovery
- Alarm Templates
- Dynamic Management
- Creating Workspaces
- List Management
- Exclusion Lists
- Operator Helper
- EventKPI Reporting
- Configuration
- User Security
- Area Mapping
- KPI Targets
- Troubleshooting

**Audience**

This course is ideal for managers and engineers in plant operations, process, process controls and safety and reliability.

**Prerequisites**

None

**COURSE 7620**

**CEUs: 1.4**

**Operational Certainty Alarm Management**

**Overview**

Dynamic Alarm Management and the rationalization of alarms based on process state or mode is rapidly becoming recognized as the key solution path to eliminating alarm floods. Reducing alarm floods is vital to meeting the standards (ISA18.2, ISO/IEC 62682 and EEMUA 191) adopted by governing bodies (OSHA & IEC) and industry (AIChE). In addition, automated alarm shelving management has proven as another best practice for near elimination of long standing alarm lists on the operator's console. Our process engineers will share the experiences and best practices learned through rationalizing and implementing Dynamic Alarm Management on hundreds of operator workstations worldwide. The results captured by this work has made significant impact on the safety and operational awareness of every operator and is still paying dividends to the operating companies who have embraced the application of sound process engineering principles.

**Topics**

- Introduction to Alarm Management
- The Alarm Management Lifecycle
- Alarm Philosophy
- Identification, Rationalization and Detailed Design
- Management of Change, Implementation, Operation and Maintenance
- Monitoring and Assessment and Audit
- Dynamic Management and Alarm Shelving Concepts
- Project Execution Phases and Example
- Discussions

**Audience**

This course is ideal for managers and engineers in plant operations, process, process controls and safety and reliability.

**Prerequisites**

None

**COURSE REL005**

**CEUs: 2.8**

**Operational Certainty Planning Principles Advanced**

**Overview**

This intensive, four-day hands-on course is designed to simulate real-world situations and teach participants how to effectively execute the planning function.

**Topics**

- Work Order Approval
- Job Scoping
- Job Plan Development
  - Developing Procedures and Instruction
  - Performing Time Estimates
  - Material Requirements
  - Identifying Reference Material
  - Developing Post-Maintenance Checks and Completion Testing Requirements
- Utilizing Craft Comments and Incorporating Feedback
- Explain Backlog and Compile Backlog Trend and Reports

**Audience**

This course is for process and process control engineers responsible for configuring the VIM2 card.

**COURSE REL003**

**CEUs: 1.4**

**Operational Certainty Planning Principles Advanced**

**Overview**

This two-day course is an introduction to the basic maintenance strategy model that will act as the foundation of developing RCM techniques, choosing and deploying PMs and creating an effective maintenance strategy to support an efficient maintenance environment.

**Topics**

- Maintenance Strategy Models
- Basic RCM Techniques
- PM Task Selection
- Basic PM Tools
- PM Program Design
- PM Development Principles
- PM Scheduling Techniques
- PM Program Monitoring

## COURSE REL004

CEUs: 1.4

### Operational Certainty Planning & Scheduling Principles Introduction

#### Overview

This introductory two-day course is designed to provide participants with an understanding of the fundamentals of creating and maintaining an efficient planning and scheduling program.

#### Topics

- Planning and Scheduling World Class Model
  - Advantages of the Planning Process
  - Characteristics of the Planning and Scheduling World Class Model
  - Characteristics of Planning and Scheduling World Class Model
  - Ratios of Planner, Scheduler and Supervisor to Craftsmen
  - Use and benefit of Predictive Maintenance Technologies
  - Material management impact on Planning and Scheduling
- Planning Principles
  - Planning Fundamentals
  - Basic Job Plan Requirements
  - Requirements of Basic Job Plan Writing
  - Importance of Quantitative Preventative Maintenance Tasks
  - Basic Job Plan Writing and Estimating
  - Work Requests versus Work Orders
- Scheduling Principles
  - Criteria of Scheduling Priorities
  - Criteria for PM Schedule Development
  - Scheduling Fundamentals
  - Relationship Between Resource Availability and Resource Allocation
- Planning and Scheduling Program Monitoring
- Successful Implementation of the Planning and Scheduling Model
- Quality Program Performance Measures
- Selection and Utilization of an Integrated CMMS System

## COURSE REL009

CEUs: 2.8

### Operational Certainty Foundational Awareness

#### Overview

This comprehensive four-day course is designed to provide participants with an understanding and appreciation of the many foundational elements required for success in the maintenance and reliability field. Both technical and non-technical areas must be understood and integrated in order to be most effective in the maintenance and reliability profession.

#### Topics

- Business and Management:
  - Strategic Direction and Plan
  - Selling Programs and Change to Stakeholder
  - Create Measurement and Performance Evaluation System
  - Business Case Preparation
  - Communicate to Stakeholders
  - Plan and Budget Resources
  - Maintenance/ Operations Performance Agreements/Specifications
- Manufacturing Process Reliability:
  - Maintain Process and Industry Standards and Specifications
  - Understand the Manufacturing Process
  - Manufacturing Effectiveness Techniques
  - Safety, Health, Environmental Issues
  - Manage Effects of Changes to Processes and Equipment
- Equipment Reliability:
  - Determine Equipment and Process Performance Expectations from the Business Plan
  - Establish Current Performance Levels and Analyze Gaps
  - Establish a Maintenance Strategy to Assure Performance
  - Cost-Justify (Budget) Tactics Selected for Implementation
  - Execute a Maintenance Strategy
  - Review Performance and Adjust Maintenance Strategy
- People Skills:
  - How to Assess Organizational Competence and Direction
  - How to Develop the Maintenance and Reliability Organization Structure and Staff
  - How to Communicate Maintenance and Reliability to the Organization
- Work Management:
  - Comprehensive Work Identification
  - Plant-Wide Formal Prioritization System; Effective Work Planning Prior to Scheduling
  - Cooperative Work Scheduling and Backlog Management
  - Effective Resource Management (People, Materials, Financial)
  - Document Work Execution and Update of Records/History
  - Equipment History Review and Failure Identification
  - Effective Performance Measures and Follow-up
  - Capital Project Planning Requirements
  - Effective Use of Information Technologies (CMMS, etc)



**COURSE REL001**

**Operational Certainty The Reliability Game**

**Overview**

The Reliability Game focuses on participants' attention on the maintenance function at a facility. This one-day game is a simulation that clearly demonstrates the value of proactive reliability practices and the positive effects it has on the bottom line. The simulation is both fun and educational. The simulation also provides a mechanism to help the participants create a common understanding of basic reliability business goals.

**Topics**

- The Financial Opportunity Associated with Proactive Maintenance
- Where the Money Goes
- How to Stop Wasting Money
- The Value of Proactive Maintenance to Their Maintenance Processes
- The Power of Teamwork
- The Logic Behind Emerson Benchmark Data
- Concept of the Failure Interval on the Potential Failure Curve (P-F Interval) and its Relationship to the Planning Process
- Proactive Maintenance Model

**COURSE REL008**

**CEUs: 0.7**

**Operational Certainty Maintenance 101/201**

**Overview**

It is well documented that managing the maintenance function in a proactive rather than a reactive manner results in lower costs and superior asset performance. This is easy to say but difficult to do in actual practice. This one-day course will explore twenty of the most basic fundamentals that every Maintenance Manager must have in place in order to make a proactive maintenance organization a reality.

**Topics**

- Introduction
- Elements of a Proactive Maintenance
- Philosophy
- Equipment Failures Are Unacceptable
- Important Work vs. Urgent Work
- The Maintenance-Operations Partnership
- The Importance of Good Data
- Entropy as It Applies to Maintenance
- Precision Maintenance - The Last Frontier
- The System Wins Every Time
- Effective Methods for Reducing Maintenance Costs
- Processes that Must Be in Place
- Build a Solid Foundation First
- The Work Management System
- Planning
- Scheduling
- Storeroom Inventory Management
- The Importance of Predictive Maintenance
- Organizational Structure Considerations
- Why Reliability Engineers Are Critical
- The Importance of Field Supervision
- The Importance of Procedures

**COURSE REL006**

**CEUs: 1.4**

**Operational Certainty Materials Management Strategies**

**Overview**

This introductory two-day course is designed to provide participants instruction about how to manage, organize and control inventory risk through strategic MRO inventory management.

**Topics**

- Topics
- Introduction
- Maintenance Storeroom Purpose
- Maintenance Storeroom Functions & Expectations
- Meeting Expectations
- Purpose and Strategic Importance
- Role of Stores
- Best Practices to Achieve Effective Stores Management and Implement Reliability
- Organizing for Maintenance Stores and Management Control
- Inventory Management Key Elements
- Inventory Record Accuracy (IRA)
- Storeroom Access and Control
- Inventory Catalog
- Stores Management Tools
- Stores/Inventory Cost
- Obsolete Parts and Location
- Stores Control Methods
- The Replenishment Process
- Inventory Record Accuracy (IRA) Benefits
- High Performance Stores
- Storeroom Best Practice Guidelines
- Quality Control
- Stores KPI Metrics and World Class Benchmarks

**COURSE REL011**

**CEUS: 1.6**

**Operational Certainty Predictive Maintenance Technology Awareness**

**Overview**

This seminar increases personnel awareness of the need for a “precision” approach through use of extensive case histories and success stories. It explores the effective implementation of Machinery Reliability Programs; provides an overview of the current PdM technologies and their appropriate applications; and provides information on proven methods for justifying the investment in PdM tools, time and training.

**Topics**

- Unit 1 Introduction
- Unit 2 Machinery Reliability Overview
- Unit 3 Intro to Vibration Detection & Analysis
- Unit 4 Introduction to Ultrasonics
- Unit 5 Introduction to Infrared Thermography
- Unit 6 Introduction to Oil Analysis
- Unit 7 Application of Condition Monitoring Technologies to Common Problems
- Unit 8 Work Performance, Job Plan Improvement and Equipment Reliability Improvement Processes

**Audience**

Management, Reliability Staff, Maintenance Staff

**Prerequisites**

None

**COURSE REL002**

**Operational Certainty Reliability Awareness Featuring the Reliability Game**

**Overview**

This two-day combination of The Reliability Game and expanded topics around the development of a Reliability Based Maintenance Program. The Reliability Game focuses participants’ attention on the maintenance function at a facility. The game is a simulation that clearly demonstrates the value of proactive reliability practices and the positive effects it has on the bottom line. The simulation is both fun and educational. The simulation also provides a mechanism to help the participants create common understanding of basic reliability business goals. The Reliability Overview discusses the essential elements learned through playing the Reliability Game and reinforces how a strong reliability program helps corporations achieve success.

**Topics**

- The Financial Opportunity Associated with Proactive Maintenance
- Where the Money Goes
- How to Stop Wasting Money
- The Value of Proactive Maintenance to Their Maintenance Processes
- The Power of Teamwork
- The Logic Behind Emerson Benchmark Data
- Concept of the Failure Interval on the Potential Failure Curve (P-F Interval) and its Relationship to the Planning Process
- Proactive Maintenance Model
- Financial Benefit of Advanced Planning of Maintenance Work
- Typical Preventative Maintenance (PM) Programs seen in Industry Today
- Criticality Ranking Process
- Nature of Failures
- Process for Conducting a Reliability Centered Maintenance (RCM) and a Failure Modes and Effects Analysis (FMEA)
- Importance of PM and Predictive Maintenance (PDM) Development, Including the concept of Quantitative PMs
- The Key Concepts of Change Management

**COURSE REL006**

**CEUs: 1.4**

**Operational Certainty Reliability Centered Maintenance Principles**

**Overview**

Reliability Centered Maintenance Analysis (RCM) is a key foundational element of a Reliability Based Maintenance program. This two-day course covers all important aspects of Reliability Centered Maintenance Analysis and Implementation. Participants will learn how to effectively participate in an RCM program and have all necessary information to support such an implementation.

**Topics**

- Introduction
  - History of RCM
  - Why RCM
  - Selecting Candidate Equipment
  - Team Approach
  - RCM Philosophies
- Conducting RCM Analysis
  - RCM Terms and Definitions
  - Identifying System Parameters
  - Answering the 7 Questions of RCM
  - Determining Failure Mitigation Strategies
  - Implementing the Results of RCM Analysis
  - Facilitating RCM at Your Site
  - Who should Lead
  - Choosing the Appropriate Analysis Tools
  - Tracking Progress through to Completion
  - Avoiding the Causes of Failed RCM Implementations
  - Leveraging the Benefits of RCM
  - Lateral Deployments
  - The FMEA Library
  - Celebrating Results
  - Showing the Business Case
  - Quality Control
  - Stores KPI Metrics and World Class
  - Benchmarks

# OVATION





**COURSE OV275 & OV275V****Ovation AMS Suite Intelligent Device Manager****Overview**

The OV275 - Virtual course is designed to enable the end-user to configure and use the Emerson's AMS Suite: Intelligent Device Manager with the Ovation™ control system. Students will receive hands-on experience using the Ovation and AMS Device Manager to configure Smart Devices on the Ovation network. Students will also configure and examine Ovation PlantWeb Alerts generated from the Smart Devices. This course will provide instruction on how to configure and troubleshoot the Ovation system and AMS Device Manager.

**Topics**

- Upon successful completion of this course, using the reference material provided, the student will be able to:
- Understand the basic topology of an Ovation network that includes an AMS Intelligent Device Manager Station
- Recognize AMS Suite software applications
- Understand AMS Intelligent Device Manager licensing
- Complete normal AMS Intelligent Device Manager administrative functions
- Use basic AMS Intelligent Device Manager functions
- Understand AMS Intelligent Device Manager SNAP-ON capabilities
- Update AMS Intelligent Device Manager DD files

**Prerequisites**

Ovation – Data Acquisition – OV100 and Ovation – HART and Smart Devices – OV270

**Course Type**

Classroom & Virtual

**COURSE OV345****Ovation Applications with DeviceNet****Overview**

The OV345 is designed to provide the end-user with a thorough knowledge of DeviceNet applications as applied to an Ovation™ system. Taught subjects include: Ovation DeviceNet Module, segment design, device commissioning, point mapping and basic troubleshooting. Students will be provided with hands-on experience implementing DeviceNet architecture.

**Prerequisites**

OV100 - Starting with Data Acquisition and OV200 - Building and Maintaining Ovation Control. OV275 - AMS Suite: Intelligent Device Manager - is recommended but not required.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Define Ovation DeviceNet architecture
- Understand DeviceNet operation and communication
- Implement an Ovation specific DeviceNet scheme and topology
- Build Ovation points for use in DeviceNet architecture
- Implement control loops in fieldbus and feedback to Ovation
- Configure Ovation graphics to function with a fieldbus system
- Analyze the timing of the system when fully operational



**COURSE OV350****Ovation Applications with Profibus****Overview**

The OV350 course is designed to provide the end-user with a thorough knowledge of Profibus applications as applied to the Ovation™ system. Topics for discussion include: Ovation Profibus Module, segment design, device commissioning, point mapping and basic troubleshooting. Students will gain hands-on experience implementing Profibus architecture.

**Topics**

Upon successful completion of this course, using the reference material provided, and the student will be able to:

- Define Ovation Profibus architecture
- Understand Profibus operation and communications
- Identify the required hardware and software needed for an Ovation Profibus interface
- Update the Ovation/Sycon Device list
- Demonstrate the Sycon engineering tool to configure Profibus devices
- Build Ovation points for use in Profibus architecture
- Implement an Ovation specific Profibus scheme and topology

**Prerequisites**

Ovation – Data Acquisition -OV100

**COURSE OV367 & OV367V****Ovation AV Management****Overview**

The OV367 course is designed for the end-user charged with maintaining the anti-virus solutions for the Ovation™ System. Course will focus on installing endpoint software, obtaining and distributing virus definitions, upgrading anti-virus versions and configuring the AV servers.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Configure the anti-virus server
- Run reports
- Update virus definitions
- Install anti-virus software on endpoints

**Course Type**

Classroom & Virtual

**COURSE OV400****Ovation Base Certification****Overview**

The OV400 course is offered to the end-user as a stand-alone or web-based exam or implemented with a pre-testing review at the Training Center. The student's proficiency is measured in areas related to database building, control implementation, control graphic linkage and troubleshooting on a system-wide basis. For both offerings, a multi-point examination is administered, and participants are required to achieve a grade score >80% to successful gain certification.

**Topics**

Upon completion of this course and achieving a successful level of competency in the online examination, the student will receive an Ovation™ certification award. This achievement affirms and recognizes that the student is fully cognizant and possesses the necessary skills to successfully engineer and maintain an Ovation control system for their organization. The student has demonstrated proficiency in the following areas:

- Building saving and implementing the Oracle database
- Constructing control sheets using both Boolean and Analog logic
- Loading and configuring the Ovation™ Controller
- Designing graphics with control implementation
- Troubleshooting procedures as related to I/O and Controller modules

**Prerequisites**

Ovation – Data Acquisition – OV100, Ovation – Building and Maintaining Ovation Control – OV200, Ovation - Building Ovation Graphics – OV210 and Ovation Troubleshooting - OV300

**COURSE OV301 & OV301V****Ovation AV Management****Overview**

The OV301 course is designed to provide the end-user with the knowledge and methods to maintain a reliable Ovation™ DCS working system with regard to: Ovation database, OPH configuration techniques, network monitoring, control task monitoring, best graphics practices, I/O reliability, patching, backups, Anti-Virus and engineering gathered utilities.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Perform backups on the Ovation system
- Install anti-virus programs on the Ovation system
- Monitor the overall reliability of the Ovation system
- Install software patches on the Ovation System
- Install anti-virus software on endpoints

**Prerequisites**

Ovation - Data Acquisition - OV100, Ovation – Building and Maintaining Ovation Control – OV200 and Ovation – Building Ovation Graphics – OV210

**Course Type**

Classroom & Virtual

**COURSE OV380****Ovation Boiler Control****Overview**

The OV380 course is an introduction to boiler control for those who interface with control programs or may make modifications to their existing control programs. Using previous control-building knowledge, the student will learn how to implement and design pertinent boiler control logic in an Ovation™ environment. Instruction will emphasize the proper selection, configuration and application of algorithms in a typical Ovation boiler control system. The writing of control logic is included as course work.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Review the history of boilers
- Review the development of boiler safety and the development of standards
- Discuss the typical control logic used in the water, steam, air and fuel systems
- Discuss and review SAMA and ISA control symbols
- Discuss and review measuring elements and final control elements used in boiler control
- Discuss and review compensations, conversions and voting in measuring elements
- Discuss and review three element drum control, cross limiting control, de-superheat control, furnace pressure control, fuel calculations and O<sub>2</sub> correction
- Discuss and review stoichiometric relationships in boiler control
- Discuss the typical types of control utilized in boilers: ratio, feed forward, cascade, single element, two element, and three element
- Discuss and review the different components of a boiler: reheat, wall burners, tangentially fired burners, ID and FD fans, mills and feed pumps

**Prerequisites**

Ovation - Data Acquisition - OV100, Ovation – Building and Maintaining Ovation Control – OV200

**COURSE OV200****Ovation Building & Maintaining Ovation Control****Overview**

The OV200 course is designed to provide proficiency in reading Ovation™ functional control schemes. Tuning, building and implementing new control schemes to improve performance are covered. Both modulating (analog) and discrete digital control schemes are included in the scope of the course. Discussions include the various types of control algorithms available and how they can be used to create effective control. The course is further intended for people who work with Ovation Controllers to tune and build analog and digital control schemes in a Windows environment.

**Topics**

Upon successful completion of this course and using the reference materials provided, the student will be able to:

- Interpret and apply a control functional to the Ovation Windows-based system.
- Interpret and tune implemented control using the available tools.
- Edit existing control schemes
- Demonstrate proficiency in building digital and analog control.
- Design and implement a tracking scheme to meet specific control requirements.
- Recognize the relationship between control schemes and graphic diagrams.
- Implement given control requirements using the Control Builder.
- Evaluate and determine the proper operation of a control scheme using the tools and methods provided.

**Prerequisites**

Students must have a good understanding of the Ovation system architecture and how database point records are built and maintained in the Ovation Windows-based system. Student should attend the OV100 prior to attending this course.

**COURSE OV210****Ovation Building Ovation Graphics****Overview**

The OV210 course was designed to teach the end-user how to construct graphic diagrams that depict the controlled process. Students will use the Ovation™ Graphics Builder program to build process diagrams, implement the display of static and dynamic objects, and provide for control linkage and conditional changes that occur due to alarm conditions or process changes. Methods for standardizing information entities, control interfaces and troubleshooting problems within the graphics code are also covered.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Describe the different building areas within the graphic source code
- Build graphics to display static and dynamic plant data
- Employ various drawing techniques to create 3D graphics
- Directly link graphics to actual control using poke fields
- Design and implement MACROS used within graphics
- Implement conditional statements to create dynamic indications within the graphic
- Employ various techniques that enable the graphic code to execute more efficiently
- Use various application programs within a graphic to perform a specific function
- Assess and correct problems in graphics using available tools

**Prerequisites**

OV100 and OV200 are strongly recommended

**Course Type**

Classroom & Virtual

**COURSE OV330 & OV330V****Ovation Control Techniques Advanced****Overview**

The OV330 - Virtual offered course is designed for end-users who will implement their own control programs or who will make significant modifications to existing programs. Using previous control-building knowledge, the student will learn how to implement control design in an Ovation™ environment. The course will emphasize the proper selection, configuration and application of algorithms in the Ovation control system.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Apply, tune and track all appropriate algorithms in open-and-closed loop configurations
- Select, filter and compensate transmitter inputs
- Implement complex sequential control
- Appreciate important closed-loop control forms
- Configure general math computations
- Describe the interface of selected algorithms to I/O hardware
- Use algorithms for timing, counting, accumulation and system-time applications

**Prerequisites**

Ovation - Building and Maintaining  
Ovation Control - OV200

**Course Type**

Classroom & Virtual

**COURSE OV302 & OV302V****Ovation Database/Troubleshooting Advanced****Overview**

This course is designed for engineers and technicians that have used Ovation Developer Studio on a consistent basis. Troubleshooting is a primary role for technicians and engineers. Topics covered include controller failures, networking, algorithm troubleshooting, Ovation services, NTP problems, HART, 3rd party and remote I/O issues.

**Topics**

- Review Ovation tools for troubleshooting
- Identify and solve advanced troubleshooting problems

**Course Type**

Classroom & Virtual

**COURSE OV100****Ovation Data Acquisition****Overview**

For those new to the Ovation™ system, the Ovation Data Acquisition course covers Ovation terminology, Operator functions and the Ovation Controller physical layout. The course offers practice using the Ovation engineering tools that are designed to simplify data acquisition. Data acquisition types include digital, analog and analog temperature sensing sources, as well as introducing the end-user to the Developer Studio for point building and I/O module configuration.

**Topics**

- Identify the major components in an Ovation™ system
- Understand basic Ovation terminologies
- Identify the major devices and subsets in an Ovation Controller Cabinet
- Demonstrate basic Ovation operator functions
- Understand data movement in an Ovation system
- Utilize the Ovation Developer Studio to create and modify digital and analog process points
- Configure I/O modules for temperature data acquisition
- Address, hardwire and test I/O modules

**Prerequisites**

Ovation - Building and Maintaining  
Ovation Control OV200



**COURSE OV376****Ovation Digital Generator Control****Overview**

The OV376 is designed for the end-user that will interface and maintain the DGC system. The course provides the history and fundamentals of generator excitation with an overview of the excitation types and concepts of SCR bridges. Course topics include the DGC and its elemental components, maintenance and troubleshooting, data retrieval and analysis.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Navigate the control software and review alarm
- Understand basic DGC troubleshooting and maintenance procedures
- View the DGC Application Software Display, Log-view and Sequence of Events
- Understand basics of Amplifiers, Firing Circuits and the Controller
- Review the fundamentals and technology associated with the DGC

**COURSE OV248 & OV248V****Ovation EDS Enterprise Data Server****Overview**

This course is designed to give students a detailed understanding of the EDS™. Upon completion of this course, the student will be able to configure an EDS server to collect point data from an existing Ovation™ system. An EDS client will be properly configured and the applications of the EDS station will be covered extensively. This course is designed for anyone who will be using or managing the EDS.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Illustrate the functions of the EDS system and architecture
- Explain how an EDS server is loaded and configured
- Configure and EDS client to communicate with an existing EDS
- Manage the data storage of the EDS
- Demonstrate how to view and interpret error messages
- Build reports using the EDS Report Builder

**Course Type**

Classroom & Virtual

**COURSE OV115****Ovation Evergreen Upgrade****Overview**

This course is designed to teach the Ovation™ Windows software utility packages from a higher level. The course provides instruction on the Ovation Windows studio of application programs including the building of point records, control sheets, graphic displays and the loading, saving and downloading of each entity. Topics for discussion include: basic networking, Ovation architecture and components, Operator functions, Developer Studio features, control and graphics building and basic system configuration.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Describe the functions and differences of the Ovation Windows network and its components.
- Monitor plant processes using Ovation Windows data acquisition tools.
- Navigate and understand the Ovation Developer Studio.
- Demonstrate a basic level of proficiency using the Ovation Control Builder.
- Demonstrate a basic level of proficiency using the Ovation Graphics Builder.
- Understand and implement some basic Ovation Windows configuration changes.

**COURSE OV246****Ovation OPH Report Building****Overview**

The OV246 - Virtual offered course was designed to teach the end-user how to configure and retrieve historical data using the Ovation™ Process historian (OPH) and Crystal Reports. Students will use the OPH Report Manager to define (Alarm, SOE, and Operator Event) reports. Using the same manager, students will learn how to configure (On-Demand, Triggered and Timed) reports. Students will also use Crystal Reports to create new report formats for use in the OPH Report Manager.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Describe the functions of the Ovation™ Process Historian and its related components
- Recognize the Ovation Process Historian Database Schema
- Understand the concept of a Relational Database Management System
- Schedule, automate and manipulate reports
- Distribute reports using printers and various output files
- Create custom reports using 3rd party applications such as Crystal Reports and MS Excel

**Prerequisites**

Ovation - Data Acquisition – OV100

**COURSE OV249V****Ovation Enterprise Data Server Administration [Virtual]****Overview**

This course is designed to give students a more in-depth understanding of the EDS server and feeders. Upon completion of the course, students will be able to configure an EDS server to collect point data from an existing Ovation system. An EDS client will be properly configured as well as an EDS feeder. The course is designed for anyone managing the EDS server & feeders. Report building from terminal and the Excel plug-in will also be incorporated into the 5-day training.

**Topics**

- Describe the functions of the EDS and related components
- Recognize the hardware used in an EDS
- Understand EDS server configuration and setup
- Load and configure data interfaces to ovation
- Load and configure an EDS server
- Load and configure database access software components
- Navigate and understand the database access application
- Load and configure EDS terminal software components
- Troubleshoot common EDS issues
- Maintain the EDS
- Define reports using the report editor application
- Building reports in excel
- Monitor reports using the report monitor application
- Recognize the function of the messages application

**COURSE OV296****Ovation Ethernet Link Controller with Third Party I/O****Overview**

The OV296 course was designed to enable the end-user to configure, network and troubleshoot Ethernet Link Controllers and third-party I/O points. Topics covered include: configuration of the ELC in Developer Studio, using the ELC Configuration Tool, simplex and redundant ELC's, networking, communication protocols, editing XML files, graphics, troubleshooting and building third-party I/O points. Students will configure the ELC to communicate with RTU's via both the Ethernet and Serial links.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Explain the workings of an ELC as well as its purpose
- Distinguish differences between switches and routers
- Explain how IP addresses and subnet masks work
- Differentiate between TCP and serial products
- Configure both simplex and redundant ELC's in Developer Studio
- 6. Install the ELC Configuration Tool and license the communication protocols
- Download firmware to the ELC module
- Utilize the ELC Configuration Tool to build servers, ports, lines, RTU's and scan-blocks
- Edit XML files to perform mass edits of the ELC
- Build graphics to monitor and troubleshoot the ELC
- Configure third-party I/O points
- Map Ovation™ points to third-party RTU's over various protocols

**COURSE OV265 & OV265V****Ovation Expert Transition****Overview**

The OV265 course was designed to provide the end-user with proficiency in updating the Ovation™ interface after a change has been made to the Bailey I/O. Students will learn the basic mechanics of using the Ovation OPC client and OPC90 Server (ROVISYS) applications. Course elements include layout and implementation of the hardware and software required for the migration. Simple methods for troubleshooting faults will also be discussed.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Understand the different methods of a Bailey to Ovation™ migration
- Recognize hardware components used for the Bailey to Ovation migration
- Recognize software components used for the Bailey to Ovation migration
- Understand Bailey block to Ovation point mapping
- Use the Bailey to Ovation migration tool
- Update the Ovation interface when changes are made to the Bailey I/O
- Troubleshoot the Ovation interface using ROVISYS and OPC Client Mapper

**Prerequisites**

Ovation - Data Acquisition – OV100

**Course Type**

Classroom & Virtual

**COURSE OV310 & OV310V****Ovation Graphics Advanced****Overview**

The OV310 course is designed to provide the end-user with enhanced graphic programming skills: Topics for discussion include: Macros, Pointers, special application programs, trigger statements, sub-routines and correct coding for increased graphic execution speed.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Define the different memory segments available in the graphic subsystem
- Build graphics utilizing pointer commands with segmented memory
- Interpret and use the library of application programs
- Use the trigger section of the graphics code for efficiency
- Use graphic commands only available in a text editor
- Troubleshoot graphics code using available tools

**Prerequisites**

Ovation - Data Acquisition – OV100

Ovation – Building & Maintaining Ovation Control – OV200

Ovation – Building Ovation Graphics – OV210

**Course Type**

Classroom & Virtual

**COURSE OV216****Ovation Hardware Project****Overview**

The OV216 course is designed for the end-user whose primary interest and/or assignment is maintaining Ovation™ hardware. Selected topics from several courses are incorporated and expanded upon. Topics included are the replacement and set-up of an Ovation Controller and Flask Disk. Several different power supply configurations are discussed. Attendees will install new I/O Thermocouple/RTD modules and build several temperature-derived points. Students will install a HART® (4-20) ma analog input module and transmitter. Each student will install and configure an Ovation Remote Node Controller with fiber connections.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Utilize documentation to analyze faults or problem conditions in the Ovation™ System
- Interpret Ovation system error messages
- Demonstrate remote I/O technology
- Understand recovery or hard-drive failures on MMI's
- Configure CISCO switches & routers
- Monitor status LED's of the Ovation system
- Build various RM records
- Implement closed loop control strategies
- Evaluate and determine operation of power supplies

**Prerequisites**

Ovation - Data Acquisition – OV100, Ovation - Building and Maintaining Ovation Control – OV200 and Ovation – Software Project – OV215a



**COURSE OV270 & OV270V****Ovation HART & Smart Devices****Overview**

The OV270 - Virtual offered course was designed to provide the end-user with the skills to fully utilize the special features of I/O related to HART® and Smart Field Devices attached to the Ovation™ system. Students will learn the basic components of an Ovation system. Items discussed will include physical attachment of field devices to the Ovation I/O modules, and diagnosis of problems that may occur.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Identify the configuration of components in an Ovation™ system using HART/Smart Devices
- Attach HART/Smart Field Devices to the Ovation I/O cards
- Build database point for the Field Devices
- Use AMS Suite to obtain data from the Field Devices
- Diagnose common problems and configuration errors

**Prerequisites**

Ovation - Data Acquisition – OV100

**Course Type**

Classroom & Virtual

**COURSE OV277****Ovation Machinery Health Monitor Vibration****Overview**

This course will cover general concepts regarding the Ovation Machinery Health Monitor I/O module for measuring and recording plant vibration data. The student will configure the I/O module, install multiple types of vibration inputs and monitor the feedback data utilizing Emerson vibration sensors. Configuration of the Machine Works Application will also be discussed.

**Topics**

- Introduction to MHM and types of Vibration Sensors
- Inserting the MHM module into Ovation
- Verification of IO module Firmware and updating firmware
- Build Vibration points
- Setting Up Ovation Machine Works Application

**Note:**

At the current time this course does not cover the utilization of Bentley Nevada or other Manufacturers vibration sensors into the MHM Module.

**COURSE OV280****Ovation SCADA System****Overview**

The OV280 - Virtual offered course was designed to provide the end-user with knowledge on the Ovation™ SCADA system. Student will learn the basic components of an Ovation SCADA system with discussions centered on SCADA servers, (RTU's) Remote Terminal Units, scan blocks, lines, ports, configuration tool, protocol analyzers and etc. Students will engage and establish communication using a variety of Allen-Bradley, MODBUS or DNP 3.0 protocols.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Identify the purpose and components in an Ovation™ SCADA system
- Identify the licensing requirements of an Ovation SCADA system
- Use the configuration tool to access and modify the system
- Analyze the communication protocols used with and Ovation SCADA system
- Utilize the protocol analyzer to interpret signal traffic between the SCADA Server and the RTU's
- Interpret scan block data
- Create Ovation graphics to interface to the Ovation SCADA system

**Prerequisites**

Ovation - Data Acquisition – OV100 and Ovation – Building Ovation Graphics – OV210

**COURSE OV320****Ovation Network Administration****Overview**

The OV320 course is designed to provide the end-user with a general understanding of networking concepts as well as Ovation™-specific network configurations for Fast Ethernet systems. Students will learn the basic networking skills required for general network administration and troubleshooting. Students will also be provided with hands-on knowledge of switch and route configurations for use in Ovation systems. This course will serve as one of the pre-requisites toward completing the Ovation Certification program.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Explore basic networking concepts including the OSI reference model, MAC addressing, TCP/IP, IP addressing, multi-cast addressing and local area networks
- Implement an Ovation™-specific network addressing scheme and network topology
- Define and explore basic network commands
- Define network devices and media and their relation to the OSI reference model
- Configure CISCO 2600 series routers, CISCO 3550 series switches and CISCO 2950 series switches for use in an Ovation network
- Configure and implement SNMP for Ovation
- Troubleshoot inter-networked systems with network tools and software
- Configure and apply third-party networking software

**Prerequisites**

Ovation – System Administration – OV230

**COURSE OV246V****Ovation OPH Report Building [Virtual]****Overview**

The OV246 - Virtual offered course was designed to teach the end-user how to configure and retrieve historical data using the Ovation™ Process historian (OPH) and Crystal Reports. Students will use the OPH Report Manager to define (Alarm, SOE, and Operator Event) reports. Using the same manager, students will learn how to configure (On-Demand, Triggered and Timed) reports. Students will also use Crystal Reports to create new report formats for use in the OPH Report Manager.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Describe the functions of the Ovation™ Process Historian and its related components
- Recognize the Ovation Process Historian Database Schema
- Understand the concept of a Relational Database Management System
- Schedule, automate and manipulate reports
- Distribute reports using printers and various output files
- Create custom reports using 3rd party applications such as Crystal Reports and MS Excel

**Prerequisites**

Ovation - Data Acquisition – OV100

**COURSE OV010 & OV010V****Ovation Operator****Overview**

This course is designed to provide students with the ability to efficiently perform routine plant operations using the Ovation control system. Key topics include data acquisition, process analysis and control interfaces. Students will be able to use the tools provided to monitor processes controlled by the Ovation system and will learn to take appropriate actions to control these processes. This course is intended for all Operations personnel using the Ovation system.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- List the major components of the Ovation control system.
- Display process diagram graphics.
- Use process diagrams to interface with the control system
- Evaluate point alarm conditions and acknowledge emergent alarms.
- Differentiate various point types and use the Point Information system to find and edit point records.
- Create live and historical trends.
- Navigate through control tuning diagrams.
- Analyze system problem conditions.
- Use system reporting procedures.
- Describe the function of Ovation application icons.
- Demonstrate familiarity with menu bars and tool bars in various process diagram windows.
- Demonstrate familiarity with the task bar and other Windows utilities.

**Course Type**

Classroom & Virtual

**COURSE OV377****Ovation Excitation System****Overview**

This course is for Ovation excitation. The course is intended for engineers and I&C Technicians that interface and maintain an Ovation excitation system and includes a review of the history and fundamentals of excitation, types of excitation, and the concepts of SCR bridges. The course discusses excitation and its elemental components, maintenance and troubleshooting, data retrieval and analysis. No required Prerequisites as this course does not require knowledge of Ovation DCS. Course content is primarily by lecture with minimal hands-on equipment.

**Topics**

- Review fundamentals of excitation
- Use ovation applications to maintenance and troubleshooting

**COURSE OV245 & OV245V****Ovation Excitation System****Overview**

The OV245 course was designed to teach the end-user how to configure the Ovation™ Process Historian (OPH) to retrieve real-time and historical data. The Ovation Process Historian hardware and database schema is reviewed in detail and various methods or data retrieval will be discussed including Report Manager, Crystal Reports, Historical Reviews and Trends.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Describe the functions of the Ovation™ Process Historian and related components
- Configure scanners and points for collection
- Recognize the Ovation Process Historian database scheme
- Understand the concept of a Relational Database Management System
- Install and configure the Ovation Process Historian Report Manager
- Schedule, automate and manipulate reports
- Create custom reports using third-party applications such as Crystal Reports, MS Excel, MS Access and SQL
- Create historical trends and build global trend groups
- Create historical Point, Alarm, Operator-Event, ASCII and common reviews
- Analyze the Ovation Process Historian with the diagnostic tools available

**Prerequisites**

Ovation - Data Acquisition – OV100

**Course Type**

Classroom & Virtual

**COURSE OV370 & OV370V****Ovation Turbine Control****Overview**

The OV370 is designed to afford the end-user with in-depth knowledge on the Ovation™ Turbine Control System (TCS). A hydraulic test stand with LVDT's and Servo Valves will be used to demonstrate turbine operation and graphics. The course includes defining I/O points, RVP and speed modules, calibration and troubleshooting exercises of the speed detector and valve positioner modules. Students will also demonstrate RVP card tuning.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Review the history of the steam turbine
- Review and evaluate typical turbine control logic
- Discuss the LVDT and speed probe functionality
- Configure I/O points for RVP and speed cards
- Configure and set up the RVP and speed I/O modules
- Using a hydraulic valve test stand connect an LVDT and servo valve for simulation
- Discuss troubleshooting procedures for LVDT's and servo valves
- Discuss and setup hyperlink terminal to RVP cards
- Perform LVDT tests and setup using the valve calibration graphic and hyperlink terminal
- Tune the RVP card in conjunction with the hydraulic test stand
- Using a speed wheel test the speed probes

**Prerequisites**

Ovation – Data Acquisition – OV100 and Ovation – Building and Maintaining Ovation Control – OV200

**Course Type**

Classroom & Virtual

**COURSE OV280V****Ovation SCADA System [Virtual]****Overview**

The OV280 - Virtual offered course was designed to provide the end-user with knowledge on the Ovation™ SCADA system. Student will learn the basic components of an Ovation SCADA system with discussions centered on SCADA servers, (RTU's) Remote Terminal Units, scan blocks, lines, ports, configuration tool, protocol analyzers and etc. Students will engage and establish communication using a variety of Allen-Bradley, MODBUS or DNP 3.0 protocols.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Identify the purpose and components in an Ovation SCADA system
- Identify the licensing requirements of an Ovation SCADA system
- Use the configuration tool to access and modify the system
- Analyze the communication protocols used with and Ovation SCADA system
- Utilize the protocol analyzer to interpret signal traffic between the SCADA Server and the RTU's
- Interpret scan block data
- Create Ovation graphics to interface to the Ovation SCADA system

**Prerequisites**

Ovation - Data Acquisition – OV100 and Ovation – Building Ovation Graphics – OV210



**COURSE OV360****Ovation Security Administration****Overview**

The OV360 course is designed as a guide for the end-user in the proper planning and installation of security for Ovation™ 2.4 and higher-level systems. Students will understand Ovation external and internal security concerns and learn how to apply safeguards. Students will install and configure Ovation compatible Windows Server 2003 Domain Controllers, Windows XP service packs and Windows security patches. Students will configure Ovation security using the Ovation Security Manager.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Identify and explain Ovation-specific internal and external security threats
- Plan and implement Ovation software installation including Windows 2003 Server, Windows service packs and Windows security patches
- Describe the function of the Ovation Security Manager
- Create and manage user accounts, computer accounts and Ovation roles and group policies
- Create and manage Ovation point security groups
- Manage and understand domain policies
- Create and manage Ovation domain administrators
- Design and implement a specific Ovation security configuration
- Explore the Windows group policy objects

**Prerequisites**

Ovation – System Administration – OV230

**COURSE OV365 & OV365V****Ovation Security Center****Overview**

The OV365 consists of a suite of security modules designed to assist the end-user in reducing the cost of complying with the NERC CIP standards. The security modules functions include Vulnerability Scan and Patch Management (VSPM), Malware Prevention (MP) and Security Incident and Event Management (SIEM). The course covers the configuration, implementation and administration of the modules. The course supports Ovation™ 2.4 and newer for the Windows environment and Ovation 1.7.2 and newer for the Solaris environment.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Identify the modules of the Ovation Security center
- Demonstrate the Patch Management module
- Demonstrate the Malware Prevention module
- Demonstrate the Security Incident and Event Management module
- Demonstrate the Anti-Virus module
- Implement new Virtual Machines into the Virtual Host machine
- Recommend proper management techniques for the modules

**Prerequisites**

Ovation – Network Administration – OV320 and Ovation – Security Administration - OV360

**Course Type**

Classroom & Virtual

**COURSE OV295 & OV295V****Ovation Serial Link Controller/RLC****Overview**

The OV295 - Virtual offered course provides the end-user with the knowledge of how to create specialized I/O links to non-Ovation™ field devices using both serial-link modules and the Ovation Ethernet Highway. Topics include configuring and loading link controller modules, creating third-party points, memory mapping, adding third-party drivers to controllers and the Ovation addressing requirements.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Understand the architecture and functionality of the Ovation Fast Switched Ethernet highway and the need to protect it from external sources
- Apply the RLC module
- Define MAC and IP addressing and Ethernet protocols
- Understand how Ethernet switches work
- Understand the various options for connecting third-party I/O to the Ovation highway
- Understand the Modbus register concept
- Understand the Modbus commands available in Ovation releases
- Apply and install Ovation Modbus drivers
- Apply and build Ovation point records for communication to Modbus
- Verify successful communications between Ovation and the PC Modbus simulation

**Prerequisites**

Ovation – Data Acquisition – OV100 and Ovation – Building and Maintaining Ovation Control – OV200

**Course Type**

Classroom & Virtual

**COURSE OV366 & OV366V****Ovation Security Incident & Event Management Report Building****Overview**

The OV366 course focuses on Security Incident and Event Management (SIEM) reporting through the Nitroview/McAfee SIEM module of the Ovation™ Security Center. The course centers on managing preloaded templates, manipulating the templates and also creating reports utilizing the report building features of the SIEM. Attendees will have a clear understanding of the available templates and demonstrate the ability to add, modify, delete and export reports upon completion.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Describe the basic functions of the Security Incident and Event Management tool
- Identify differences between Signature and Normalized ID's and how they are essential to reporting
- Identify the templates available and how they relate to different regulations and determine the most useful
- Locate the area where reports are saved
- Demonstrate knowledge of SIEM report building features
- Build reports using the correct templates
- Replace already built templates with custom templates
- Prepare reports for export to a Windows machine

**Prerequisites**

Ovation – Network Administration – OV320, Ovation - Security Administration – OV360 and Ovation - Security Center - OV365

**Course Type**

Classroom & Virtual

**COURSE OV315****Ovation Smart Process Global Performance Advisor****Overview**

The OV315 course is designed for the end-user who will install, maintain and/or use the Global Performance Advisor (GPA) in power plants. It offers a good resource to those who have not purchased a GPA but are interested in understanding the true potential of a GPA. The course describes the capabilities and limitations of a GPA, hardware and software requirements and provides exercises to install, use and backup the GPA. Hands-on exercises to include: Building Feed-Water Heater Performance Calculations, Building Steam Turbine Performance Calculations and Building Condenser Calculations.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Identify and explain the GPA's capabilities and limitations
- Recognize the process data required to use the GPA effectively
- Understand GPA hardware and software requirements
- Load GPA software on a Workstation
- Create and reopen GPA projects and Workspaces
- Understand GPA tools and algorithms
- Understand Data Agents
- Create tags and import data
- Build and display example performance calculations
- Recognize communication techniques
- Understand backing up a GPA system

**Prerequisites**

Basic knowledge in power plant processes, Microsoft Windows Operating System, Ovation™ hierarchy of drops.

**COURSE OV215 & OV215V****Ovation Software Project****Overview**

The OV215 course was designed for end-users that require a good overall understanding of the Ovation™ system software utility packages. The course contains selected elements from the OV100, OV200, OV210, OV230 and OV300 courses. The topics covered include Ovation application functions: Developer Studio, process-point building, creating and modifying process control sheets and graphics, backing-up MMI's and the Domain Controller.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Identify the major components of an Ovation system
- Understand basic Ovation terminologies
- Demonstrate basic Ovation Operator functions
- Understand data movement within the Ovation system
- Understand the hierarchy and basic functions within the Ovation Developer Studio
- Use the Ovation Developer Studio to create process points
- Monitor control previously implemented in an Ovation system
- Interpret and tune implemented control using available tools
- Build and modify control schemes using the Developer Studio
- Interpret and modify tracking schemes to meet specific control requirements
- Recognize the relationship between control schemes and graphic diagrams
- Implement given control requirements using the Developer Studio
- Evaluate and determine the proper operation of a control scheme using the tools and methods provided

**Course Type**

Classroom & Virtual

**COURSE OV375****Ovation Steam Turbine Mechanical Hydraulics****Overview**

The OV375 course is designed to give the end-user expert knowledge of the Emerson Mechanical Hydraulic products. Students will learn how to maintain the Emerson equipment.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Understand the basic function and turbine components
- Identify primary hydraulic components, pumps, accumulators and etc.
- Trace components using hydraulic diagrams and drawings
- Identify and describe operational characteristics of directional, proportional and servo valves
- Identify common problems with LVDT, settings, RVP basic settings and etc.
- Understand the Speed Probe operation
- Demonstrate knowledge on hydraulic oil used - type, temperature, gasket materials, tank filling and the need for cleanliness.

**Prerequisites**

Ovation - Turbine Control – OV370

**COURSE OV230****Ovation System Administration****Overview**

The OV230 course was designed for the end-user charged with maintaining the integrity of the Ovation™ DCS. Students who attend this course will learn all the configuration parameters of the Ovation Developer Studio tree (ex. Quality Configuration, Alarm Configuration, Point Review Configuration, Right Click Menu Configuration), as well as all right click functions (ex. Control functions, Search, Engineer, Back/Restore). Backups will be discussed in detail and each student will perform a database restore.

**Topics**

Upon successful completion of this course and using the reference material provided, the student will be able to:

- Navigate and understand the Ovation™ Developer Studio
- Understand Ovation system licensing
- Implement Process control and user security in the Ovation system
- Apply system configuration changes to the Ovation system
- Add new and modify existing drops to the Ovation system
- Navigate and understand Ovation file systems, structure, sharing and security
- Backup the Ovation database and required files to various media
- Load an Ovation system
- Recover the Ovation database and required files from backup
- Understand upgrading and maintaining the Ovation hardware
- Use Developer Studio to implement given control requirements
- Map and share directories and files in the Windows environment

**Prerequisites**

OV100 and OV200 highly recommended



**COURSE OV305****Ovation System Troubleshooting Advanced****Overview**

The OV400 course is offered to the end-user as a stand-alone or web-based exam or implemented with a pre-testing review at the Training Center. The student's proficiency is measured in areas related to database building, control implementation, control graphic linkage and troubleshooting on a system-wide basis. For both offerings, a multi-point examination is administered, and participants are required to achieve a grade score >80% to successful gain certification.

**Topics**

Upon completion of this course and achieving a successful level of competency in the online examination, the student will receive an Ovation™ certification award. This achievement affirms and recognizes that the student is fully cognizant and possesses the necessary skills to successfully engineer and maintain an Ovation control system for their organization. Student proficiency has been demonstrated in the following areas:

- Building saving and implementing the Oracle database
- Constructing control sheets using both Boolean and Analog logic
- Loading and configuring the Ovation™ Controller
- Designing graphics with control implementation
- Troubleshooting procedures as related to I/O and Controller modules

**COURSE OV296/OV300****Ovation Third Party ELC/ Troubleshooting****Overview**

The OV296/OV300 is a combined and condensed version of the two courses. Offered over a 5-day period the condensed course will enable the students to configure, network, troubleshoot the Ethernet Link Controllers, third-party I/O and the Ovation™ system as-a-whole. Students will configure an ELC in Developer Studio and learn best practices when troubleshooting the Ovation DCS.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Configure third-party points
- Explain the purpose of an ELC and its addressing
- Download firmware to ELC module
- Interpret DCS error messages
- Perform systematic approach to fault analysis; isolate & correct the fault

**COURSE OV11****Ovation Troubleshooting Using Applications****Overview**

This 5 - day course, as the title suggests, is to understand how to troubleshoot using the alarm package, point information and control logic. Trending, point review and system viewer are also presented. These necessary software tools are available without the use of Ovation Studio. Explore a device's alarm through point information and/or control schemes. Understand a controller's fault diagnostics using system status and system viewer. This course is taught with the support of Ovation workstations and controllers

**Topics**

- Review the major components of a typical Ovation Distributed Control System
- Review usage of Ovation Applications
- Utilize the Ovation Applications for live troubleshooting of processes and instruments

**COURSE OV300 & OV300V****Ovation Troubleshooting****Overview**

The OV300 course is designed to provide the end-user with the skills and methods to troubleshoot and repair faults in the data acquisition and control functions of the Ovation™ system. Students will be required to isolate faults through-out the signal path- from field terminations to I/O modules, through the controller, across the network and onto the graphic display. Multiple problem scenarios will be presented.

**Topics**

Upon successful completion of this course, using the reference material provided, the student will be able to:

- Identify and resolve selected hardware, system administration and software problems
- Troubleshoot the system using documentation and available tools to analyze system faults or problem conditions
- Interpret system error messages
- Recognize and resolve problems with the system administration tool
- Using a systematic approach to fault analysis, isolate and correct selected network, port and printer faults

**Prerequisites**

Ovation – Data Acquisition – OV100,  
Ovation – Building and Maintaining Ovation Control – OV200 and Ovation – Building Ovation Graphics – OV210

**Course Type**

Classroom & Virtual



# PACSYSTEMS™ AND MOVICON™





## COURSE 7700 &amp; 7700V

CEUs: 2.4

**PLC Controller Maintenance Logic Developer****Overview**

The PLC Controller Maintenance - Logic Developer course features the PACSystems RX3i Controller to provide the student with the skills necessary to troubleshoot and repair faults in Emerson Controllers. The class is taught using Logic Developer PLC software, which is part of PAC Machine Edition.

**Topics**

- Control System Fundamentals
- Controller Hardware Overview
- Operating PAC Logic Developer PLC
- Configuring Controller and IO
- Working with Controllers
- Working with Variables
- Introduction to Ladder Diagram (LD) Programming
- Monitor Application Variables
- Monitor Controller Without Original Project
- Modify Existing Program
- Controller Equality Status
- Manage Controller Forces
- Application Troubleshooting
- Controller and IO Faults

**Prerequisites**

Participants should be comfortable operating in a Microsoft Windows environment. Participants should have a basic understanding of electrical/control fundamentals.

**Audience**

This course is intended for anyone who will be troubleshooting control systems using PAC Logic Developer PLC software. It is designed for electrical technicians, electricians, and/or engineers beginning to work with Logic Developer PLC, who will be tasked with modifying and maintaining PLC programs and hardware.

**Course Type**

Classroom & Virtual

## COURSE 7701 &amp; 7701V

CEUS: 3.2

**PLC Controller Programming Logic Developer****Overview**

Learn programming for Emerson Controllers in this PAC Machine Edition class featuring the PACSystems RX3i Controller. This class covers programming techniques and the advanced features of the PACSystems Controller using Logic Developer PLC PAC Machine Edition software. Starting with the controller software architecture, students are taught how to effectively develop control applications using building block concepts. This course builds upon Object-Oriented concepts with PACSystems User-Defined Function Blocks (UDFBs), as well as the development of application components using Ladder Diagram (LD), Function Block Diagram (FBD) and Structured Text (ST) programming languages.

**Topics**

- Describe Control System Architecture & Operational Fundamentals
- Operate PAC Machine Edition
- Establish and Utilize Communications to the Controller
- Configure a Controller and its Associated Hardware Modules
- Effectively Use and Create Controller Variables
- Create Projects in Ladder Diagram (LD), Function Block Diagram (FBD), and Structured Text (ST)
- Understand and Program Arithmetic, Timer, Counter, and Move Operations
- Utilize Programming Guidelines for Developing Robust Control Applications
- Use User Defined Function Blocks (UDFBs) to Build Structured Applications
- Effectively Use the Machine Edition Tool chest as Repository for Application Building Blocks
- Create, Monitor, and Modify Running Controller Applications

**Prerequisites**

Participants should be comfortable operating in a Microsoft Windows environment, and have a basic understanding of electrical/control fundamentals.

**Audience**

This course is intended for those who are or will be involved in the development, modification, and troubleshooting of control systems using PAC Logic Developer PLC and PACSystems Controllers.

**Course Type**

Classroom & Virtual

**COURSE 7702 & 7702V****PLC QuickPanel & View Operator Interface Programming****Overview**

The PLC QuickPanel & View Operator Interface Programming course familiarizes the student with operating in the PACView Machine Edition development environment the QuickPanel+ machine level operator interface, creating operator interface graphical panels, writing scripts, configuring alarm & logging schemes and running Projects on the operator interface device.

**Topics**

- Describe the basic functions and benefits of a machine level operator interface
- Identify and navigate the various components of the Machine Edition Development Environment.
- Create, open and modify View Operator Interface Projects using the various Machine Edition tools
- Utilize the Panel Editor and drawing tools to generate, animate and control OI graphical Panels
- Create Application, Panel and Button Scripts, utilizing help tools to find commands, keywords and functions
- Configure Alarm Group
- Log and analyze data
- Configure security for users and access the advanced features of the View Runtime
- Configure information for Web Access using Web Publishing
- Create Custom Web documents for access by remote clients
- Configure the View Historian Collector to archive device data
- Download Operator Interface Applications to the QuickPanel+ operator interface

**Prerequisites**

Participants should be comfortable operating in a Microsoft Windows environment and have a basic understanding of control fundamentals.

**Audience**

This course is designed for programmers, operators and application designers who are beginning to work with the QuickPanel+ Operator Interface that is programmed using View, who will be tasked with developing, modifying and maintaining Operator Interface applications.

**Course Type**

Classroom & Virtual

**COURSE 7703 & 7703V****PLC PAC Productivity Suite Introduction****Overview**

The PAC Productivity Suite (PPS) Introduction course is designed to provide a good working knowledge of the PAC Productivity Suite used to develop hybrid process applications. This suite provides customers with the integrated tools they need to design, implement, operate and maintain a process control system. This course explores the solution architecture, features and configuration tools from the controller, through Data Acquisition and Management to Visualization. Valuable hands-on lab exercises are provided to guide students through the building and modification of the system and its constituent components.

**Topics**

- Introduce the PAC Productivity Suite (PPS) solutions
- Use the Engineering Workstation (EWS) to configure Controllers & IO
- Use the EWS to create a PPS project
- Configure PPS Control Hardware
- Program with EWS-Logic Developer
- Work with PPS Function Blocks
- Understand Ethernet Global Data (EGD) and the Global Namespace
- Configure EWS-CIMPLICITY and / or EWS iFIX project essentials
- Develop EWS-CIMPLICITY and / or EWS-iFIX visualization
- Design PPS Controller and IO networks
- Build Controller-based alarming
- Develop Alarm displays for CIMPLICITY and iFIX
- Work with EWS utilities
- Build reusable code (User-defined function blocks - UDFBs)
- Collect and review archived data with Historian
- Access system and configuration files with PAC Change Management
- Load and explore a sample project

**Prerequisites**

Participants should have a working knowledge of Windows operating systems. Control Systems experience and knowledge is an asset.

**Audience**

This course is designed for process, automation or instrumentation engineers and system integrators who will be developing, configuring and using applications on a fully integrated PAC Productivity Suite System.

**Course Type**

Classroom & Virtual



## COURSE 7704V

CEUs: 2.4

**Movicon NEXt Introduction [Virtual]****Overview**

This course explains the basic fundamentals of the Movicon.NEXt industrial software solution. The course uses lectures and labs to teach the students.

**Topics**

- · Introduction
- · Software Installation
- · Programming Environment
- · I/O Data Server
- · Client and Surroundings
- · Alarms
- · Historian and Data Logger
- · Trend and Data Analysis
- · Text and Languages
- · Security and User Management
- · Schedulers and Events
- · Recipes
- · WebClients

**Objectives**

Those who complete this class will be able to:

- Create a Movicon.NEXt Project along with basic HMI screen layout with animated elements.
- Configure I/O communications with multiple I/O data sources.
- Configure Alarms, Data Logging, and Data Trending for collection and display on HMI screens.

**Prerequisites**

Participants should be comfortable operating in a Microsoft Windows environment, and have a basic understanding of control fundamentals

**Audience**

This course is designed for process, automation or instrumentation engineers and system integrators who will be developing and configuring HMI solutions using the Movicon.NEXt industrial software solution.

**Course Type**

All

## COURSE 7705V

CEUs: 1.6

**Movicon NEXt Advanced [Virtual]****Overview**

This follow-up course builds on the basic fundamentals of the Movicon.NEXt industrial software solution to learn how to utilize advanced features such as Power Template and 3D Graphics. The course uses lectures and labs to teach the students.

**Topics**

- Screen Parametrization
- Power Templates
- Alias on Objects
- OPC-UA - Setting up and configuring in software
- VB.NET Scripting
- 21 CFR Part11 compliance
- D Graphics
- Alarm Dispatcher

**Objectives**

Those who complete this class will be able to:

- Apply Movicon.NEXt tools, such as Screen Parametrization, Power Templates, and Aliases for effective HMI application development.
- Set up and configure OPC-UA communications.
- Create and debug logic written in VB.NET Script
- Understand basic concepts of using 3D graphics
- Configure and apply the Alarm Dispatcher.

**Prerequisites**

Participants should be familiar with the Movicon.NEXt programming environment and its basic functions.

**Audience**

This course is designed for process, automation or instrumentation engineers and system integrators who will be developing and configuring HMI solutions using the Movicon.NEXt industrial software solution.



# REGULATORS & RELIEF VALVES





**COURSE 8000****CEUs: 3.2****Regulators Gas Control Conference****Overview**

This 4-1/2 day conference demonstrates the fundamentals of natural gas regulators in gas pressure control. This course emphasizes natural gas distribution and also covers natural gas transmission.

**Topics**

Students who complete this conference will be able to:

- Evaluate the difference between direct-operated and pilot-operated regulators
- Evaluate the different methods of overpressure protection
- Properly size regulators for natural gas applications
- Troubleshoot a wide variety of regulator types

**Prerequisites**

At least one year's experience in the field of natural gas pressure regulation is recommended.

**Audience**

This conference is for those responsible for the selection, application, and operation of regulators in the natural gas industry.

**COURSE 8005V****CEUs: 1.8****Regulators Gas Control Seminar [Virtual]****Overview**

This virtual seminar is for those responsible for the selection, application, and operation of regulators in the natural gas industry. The seminar will last for 5 half-days and be presented Monday through Friday, 8:00 a.m. - noon each day. The seminar emphasizes natural gas distribution and also covers natural gas transmission.

**Topics**

- Self-Operated Regulators
- Regulator Design & Technology
- Testing Regulators
- Disassembling regulators
- Sizing
- Pilot-Operated Regulators
- Overpressure Protection
- Safety Relief Valves
- Second Layers of Overpressure Protection
- Testing Relief Valves
- Wide-Open Monitors and Working Monitors
- Troubleshooting
- Safety Relief
- Severe Service

**Prerequisites**

None

**Audience**

Natural Gas Industry Engineers and Engineering Management who work with Pressure Relief Valves and Regulators

**COURSE 1100****CEUs: 2.1****Regulators & Relief Valves Gas Regulator****Overview**

This 3-day course is designed primarily for technicians responsible for the installation and maintenance of natural gas regulators. Emphasizing hands-on training, this course teaches students to install and adjust regulators. Students who complete this course will be able to:

- Perform maintenance on regulators
- Understand field problems

**Topics:**

- Self-Operated Regulators
- Pilot-Operated Regulators
- Overpressure Protection
- Series Regulation
- Monitors
- Slam Shut Options
- Regulator Failure Analysis
- Installation Guidelines

**Prerequisites:**

At least one year's field experience with natural gas regulators is recommended.

**Audience**

This course is designed primarily for technicians responsible for the installation and maintenance of natural gas regulators.

**COURSE 1100V****CEUS 2.1****Regulators & Relief Valves Gas Regulator [Virtual]****Overview**

This course is designed primarily for technicians responsible for the installation and maintenance of natural gas regulators. Emphasizing hands-on training, this 5 day (1/2 days) course teaches students to install and adjust regulators.

**Topics**

- Self-Operated Regulators
- Pilot-Operated Regulators
- Overpressure Protection
- Installation and Troubleshooting Failure Analysis

**Prerequisites**

None

**Audience**

Natural Gas Regulator Technicians

## COURSE E7601

CEUs: 0.5

**Regulators & Relief Valves Principles of Self-Operated Regulators****Overview**

This online training includes audio presentations to provide an in-depth overview of available Mimic features and applications. Better understand how to easily build and maintain your Mimic simulation system. Note: Course access is 12 months.

**Topics**

- Accessing and starting Mimic applications
- Setup procedures for Simulated I/O Drivers
- Navigation in Mimic Explorer
- Modeling in the Simulation Studio interface
- Discrete and Analog modeling
- Building unit operation models
- Configuring Advanced Modeling Objects
- Database generation utilities
- Using Operator Training Manager
- Building training scenarios and instructor screens
- Freezing and restoring process snapshots

**Prerequisites**

At least one year's experience in the field of natural gas pressure regulation is recommended.

**Audience**

Operators, supervisors, and managers responsible for operating and maintaining the Mimic simulation system.

## COURSE 8005V

CEUs: 1.8

**Regulators & Relief Valves Industrial Regulator [Virtual]****Overview**

Emphasizing hands-on training, this course teaches students to install, troubleshoot, and adjust regulators specific to the Industrial Market.

**Topics**

Students who complete this course will be able to do the following:

- Perform maintenance on regulators
- Troubleshoot field problems

**Audience**

This course is designed primarily for technicians responsible for the installation and maintenance of industrial regulators.

## COURSE 1114

CEUs: 2.1

**PRV University****Overview**

This course is designed for those responsible for the sizing, selection, application, and operation of pressure relief devices across industries. Technical expertise is provided to help designers and engineers meet pressure vessel code requirements and attain optimum pressure relief valve performance. During this 3-day course, each attendee will receive an engineering handbook containing materials covered in the seminar and a Certificate of Achievement that will contain the name, date, title, and material content of the seminar. This course may be used to fulfill the continuing education requirements for Professional Engineering certifications. Contact the state or local agency in your area to determine if this seminar can be used for your program

**Topics:**

- Principles of Operation
- ASME Pressure Vessel Code Requirements
- API Storage Tank Standards and Recommended Practices
- Advantages and Limitations of PRV Types
- Installation and Applications of Pressure Relief Devices
- Pressure Relief Device Hands-on Circuit | Assembly and Testing Facility Tour
- Operational Demonstrations of Devices at our ASME Certified Testing Laboratory

**Audience**

Customers of Anderson Greenwood, Crosby, and Varec. This would include designers and engineers.

## COURSE 1106

CEUs: 2.1

**Regulators & Relief Valves Gas Regulators Troubleshooting****Overview**

This 3-day course is designed primarily for technicians responsible for the installation and maintenance of natural gas regulators. Emphasizing hands-on training, this course teaches students to install and adjust regulators. Students who complete this course will be able to:

- Efficiently and safely troubleshoot common regulator operational performance problems
- Understand the influence of the service environment on regulator performance
- Understand the importance of correct installation procedures
- Understand the role of correct sizing as it impacts regulator performance
- Perform maintenance on regulators and troubleshoot field problems

**Topics**

- Review Self-Operated and Pilot-Operated Regulator Fundamentals and Overpressure Protection
- Sizing Overview for Technicians (as requested)
- Overpressure Protection
- Sizing Overview for Technicians
- Regulator Troubleshooting Principles, Procedures, and Best Practices including:
- Failure Analysis
- Stability Issues
- Installation Practices
- Pilot Interchangeability Practices
- Advanced Monitor Operations & Maintenance

**Prerequisites**

Completion of Gas Regulators - 1100 Or two years' experience with regulators.

**Audience**

This course is designed primarily for technicians with responsibility for installing, maintaining, and troubleshooting gas regulators.



# ENERGY & TRANSPORTATION SOLUTIONS



## COURSE RA1100 &amp; RA1100V

CEUs: 1.4

## Energy & Transportation Solutions Electronic Gas Measurement API 21.1 Standard & Emerson Flow Computer

### Overview

This 2-day course will provide a hands-on overview of API 21.1 standard for Electronic Gas Measurement and the Emerson FB1000/2000 Series Flow Computers. Participants are presented with the API standards while engaging in direct hands-on correlation to the flow computer's features for measurement, auditing and archiving, and more. Gain the necessary knowledge to effectively installation, configuration and maintenance. Each student will be provided with a PC with preinstalled software and all necessary hardware and courseware for the duration of the class. Participants are encouraged to bring their PC.

### Topics

#### Introduction

- Hardware Options
- I/O Options
- Calibrating the AI and AO
- FBxConnect Software
- Elements of Basic Configuration

#### Configuring the Flow Computer

- Communication Basics
- Setting the Flow Computer clock
- Alarm and Events Logs
- History layout
- Backing Up and Restoring Configurations
- Logic Blocks / Math Blocks
- Final Exercise
- Summary of course

### Prerequisites

Participants should have a working knowledge of their application/process and should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems.

### Audience

This Energy & Transportation Solutions course is for engineers, technicians, and others involved with the configuration and operation of the FBXX series products.

### Course Type

Classroom & Virtual

## COURSE RA331 &amp; RA331V

CEUs: 1.8

## Energy & Transportation Solutions ControlWave Troubleshooting Configuration

### Overview

This 2-1/2-day hands-on course covers the hardware, troubleshooting, configuration and maintenance of the ControlWave product family. This course will equip you with the necessary knowledge and practice needed to troubleshoot common problems and configure the ControlWave hardware. Learn to utilize software application programs to perform diagnostics and monitor live data and communication statistics.

### Topics

- Overview of ControlWave Hardware
- Overview of OpenBSI Software Utilities
- Basic Troubleshooting
- Basic ControlWave Configuration

### Prerequisites

Participants must be thoroughly familiar with Windows 2000/ XP or later versions. Participants should have formal instrument technician training and a working knowledge of their application/process.

### Audience

Field personnel whose responsibilities may include: installation, wiring, start-up, troubleshooting, configuration or maintenance of the ControlWave products. An individual who seeks a more thorough understanding of the ControlWave products.

### Course Type

Classroom & Virtual



## COURSE RA441

CEUs: 3.2

**Energy & Transportation Solutions ControlWave Designer Introduction****Overview**

This 4-1/2-day hands-on course covers programming the ControlWave product family using the ControlWave Designer IEC61131-3 software and the Designer function block library. This course will provide the participant the necessary knowledge and skills required to define and control inputs and outputs of related real-world applications. Participants will generate and debug simple control strategy programs using Function Block, Ladder Logic, Structured Text, and Sequential Function Chart programming. They will also learn the basics of ControlWave communications, historical data storage, alarming, hardware configurations and much more.

**Topics**

- Ladder Logic
- Structured Text
- Function Block Diagram
- Creating User Function Blocks

**Prerequisites**

Participants must have a strong working knowledge of personal computers and Windows XP or a later version. Participants should have a strong working knowledge of their application/process

**Audience**

Personnel responsible for programming and debugging in ControlWave Designer programming software.

## COURSE RA441C

**Energy & Transportation Solutions ControlWave Designer Introduction (Custom)****Overview**

This ControlWave Designer 2 day course provides the knowledge and skill required to define and control inputs and outputs of related real world applications, including basic communications and troubleshooting in an Interactive Plant Environment (IPE), with live equipment. The class project will help students generate and debug simple control strategy programs using Function Block, Ladder Logic, and Structured Text programming languages.

**Topics**

## Day 1

- ControlWave Designer Overview
- ControlWave File Conventions
- Program Organization Units (POU)
- Functions, Function Blocks, Programs
- Variables/ Types
- Tasks/ Program Instances
- Configuring ControlWave Flash Memory Parameters

## Day 2

- I/O Configuration to Field Equipment
- Verify that Values on Software match Field
- Equipment and Troubleshoot as needed
- Programming Languages Ladder Logic, Function
- Block Diagram, Structured Text
- Class Exercise with PID, verify Control Valve Responds
- Accordingly based on changes in Pressure in IPE.
- ALARM Function Blocks
- Programming for Alarms
- Programming for Audits/ Archives
- Debugging Techniques on Live Equipment
- Troubleshooting tips
- Establishing User Libraries
- Creating User Library of Function Blocks

**Prerequisites**

Participants much have a strong working knowledge of personal computers and Windows XP or a later version. Participants should have a strong working knowledge of their application/process.

**Audience**

A hands-on course that will give you as much exposure to ControlWave programming as possible in the shortest amount of time. Using the Interactive Plant Environment you will be connected to field devices and see live values from those devices as well as troubleshooting when necessary.

**COURSE RA441V****CEUs: 3.2****Energy & Transportation Solutions  
ControlWave Designer Introduction  
[Virtual]****Overview**

This 4-1/2-day hands-on course covers programming the ControlWave product family using the ControlWave Designer IEC61131-3 software and the Designer function block library. This course will provide the participant the necessary knowledge and skills required to define and control inputs and outputs of related real-world applications. Participants will generate and debug simple control strategy programs using Function Block, Ladder Logic, Structured Text, and Sequential Function Chart programming. They will also learn the basics of ControlWave communications, historical data storage, alarming, hardware configurations and much more.

**Topics**

- Ladder Logic
- Structured Text
- Function Block Diagram
- Creating User Function Blocks

**Prerequisites**

Participants must have a strong working knowledge of personal computers and Windows XP or a later version. Participants should have a strong working knowledge of their application/process

**Audience**

Personnel responsible for programming and debugging in ControlWave Designer programming software.

**COURSE RA444V****CEUs: 0.4****Energy & Transportation Solutions  
ControlWave Modbus Programming for  
ControlWave Devices [Virtual]****Overview**

This 4-hour Virtual Course provides the knowledge and skill required to programming for Modbus communications in ControlWave Devices. Each student will be provided remote access to a PC (ControlWave Designer installed), and connection to ControlWave device for programming and downloading capability.

**Prerequisites**

Participants should have:

- Completed course RA441 or have sufficient programming experience in ControlWave Designer.
- A strong working knowledge of personal computers and Windows XP or a later version.
- A strong working knowledge of their application/process.

**Audience**

This course is for engineers, technicians, and others involved with programming the ControlWave for Modbus communications.

**COURSE RA447 & RA447V****CEUs: 1.8****Energy & Transportation Solutions  
ControlWave® Station Manager  
Configuration****Overview**

The Gas Measurement Applications for technicians 2 ½ day course provides students with a thorough understanding of configuration of the Station Manager application for the ControlWave Micro. Participants will use TechView to configure the ControlWave Micro application to establish multiple gas measurement and control scenarios, historical log collections, calibrations, and much more.

**Topics**

- Hardware Overview
- Writing/Saving Configurations
- I/O Controls
- MVT Calibration
- Station Configuration

**Prerequisites**

The following are suggested, not mandatory:

- Participants should have a working knowledge of their application/process.
- Participants should be familiar with Windows XP or later versions and poses a general knowledge of gas measurement and production.

**Audience**

Personnel responsible for the installation, wiring, start-up, configuration and maintenance of ControlWave gas flow computers

**Course Type**

Classroom & Virtual



## COURSE RA442 &amp; RA442V

CEUs: 3.2

**Energy & Transportation Solutions ControlWave® Designer Communication Programming****Overview**

This 4-1/2-day course is a continuation of ControlWave® Designer Fundamentals course focusing on networking and communications. Participants will program the ControlWave to communicate to other devices in a network, as well as transfer and receive signal lists using serial and IP communications. Other application software will be utilized to configure, establish, and debug communications with these devices. Participants will learn the advanced methods of communicating to Bristol and ControlWave devices using Client/Server modules, and to Modbus protocol devices using custom function blocks.

**Topics**

- Client/Server Function Blocks
- Modbus Programming
- System Communication Variables
- BSAP Network Communications

**Prerequisites**

Successful completion of course RA441, ControlWave Designer Fundamentals. Participants must have a strong working knowledge of personal computers and Windows XP or later version. Participants should have a strong working knowledge of their application/process

**Audience**

Personnel responsible for the establishing of communication interfaces to ControlWave Automation products

**Course Type**

Classroom & Virtual

## COURSE RA446V

CEUs: 0.4

**Energy & Transportation Solutions Creating Your Own Function Block Using ControlWave Designer****Overview**

This 4-hour virtual course provides the knowledge and skill required to create your own Function Block from existing Function Blocks using ControlWave Designer software to test and trouble shoot the final project. Each student will be provided remote access to a PC (ControlWave Designer installed).

**Prerequisites**

Participants should have completed courses RA440 and RA441 or have sufficient programming experience in ControlWave Designer. Participants should have a strong working knowledge of personal computers and Windows 7 or a later version. Participants should have a strong working knowledge of their application/process.

**Audience**

This course is for engineers, technicians and others involved with programming ControlWave.

## COURSE RA1220

CEUs: 3.2

**Energy & Transportation Solutions FloBoss™ Configuration & Operations****Overview**

This 4-1/2-day course will provide an overall working knowledge of the FloBoss™ 103, FloBoss 107. Participants are presented with a comprehensive view of the FloBoss 103/107 hardware and ROCLINK800 software to obtain the necessary knowledge needed to effectively install, configure and maintain the FloBoss 103/107 products. Each student will be provided with a PC (ROCLINK800 preinstalled), a FloBoss 107RTU, a communications cable and a workbook for the duration of the class. However, participants are encouraged to bring their laptop to class.

**Topics**

- Flow Measurement Review
- FloBoss™ 103/107 Hardware Overview
- FloBoss
  - Check and Set ROC Information
  - Check and Set ROC System Flags
  - Communication Basics
  - Elements of a Basic Configuration
  - Configuring I/O Points
  - Calibrating AI and AO Points
  - Overview of MVS Products
  - Setup of Multi-dropping of MVS
  - Configuring AGA Flow Calculations
  - Configuring FloBoss History
  - Modbus Tables
  - PID Configuration
  - Building FloBoss Displays
  - FST Workshop

**Prerequisites**

Participants should have a working knowledge of their application/process and should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

**Audience**

This Energy & Transportation Solutions course is for engineers, technicians and others involved with the configuration and operation of the FloBoss™ 103 and 107 products.

## COURSE RA601

CEUs: 0

**Energy & Transportation Solutions DNP3 Protocol Introduction****Overview**

This 1/2 day hands on virtual course provides a basic understanding of DNP3 Protocol used in the FB3000 RTU. Participation will include configurations to map the FB3000 and monitor live data.

**Topics**

- SCADA overview
- History of DNP
- DNP Terms and Definitions
- DNP Pros / Cons
- Understanding a DNP Network
- Understanding Events and Event Buffering
- Understanding DNP3 Groups, Classes and Variations
- FB3000 supported Groups and Variations

**Objectives**

- To provide basic understanding of DNP3 protocol.
- To ensure users understand how to configure the FB3000 for DNP3 communications

**Audience**

SCADA and field personnel whose responsibilities may include:

- Installation
- Start up
- Troubleshooting
- Configuration or maintenance of the FB3000 products

**COURSE RA1250V CEUs: 0.35****Energy & Transportation Solutions FloBoss Modbus Configuration for ROC800 & FloBoss [Virtual]****Overview**

This 4-hour Virtual Course will provide an overall working knowledge of configuring the ROC800 and FloBoss™ Series for Modbus communications. Each student will be provided remote access to a PC (ROCLINK preinstalled), and a Energy & Transportation Solutions RTU device

**Topics**

- Configuration for Modbus Slave
- Configuration for Modbus Master
- Modbus Serial IP
- Basic Modbus Troubleshooting

**Prerequisites**

Completed course RA1220 or RA1240 or have sufficient working knowledge of configuring the ROC800 or FloBoss. Basic PC knowledge and familiar with Microsoft Windows operating systems (XP or later version).

**Audience**

This course is for engineers, technicians, and others interested in understanding the configuration and operation of the ROC800 using the SmartProcess Oil and Gas Applications.

**COURSE RA1160V****Energy & Transportation Solutions FB3000 Demo Introduction [Virtual]****Overview**

This no-cost 2 hour short course utilizes the Virtual Classroom to provide a basic configuration of the FB3000 RTU device.

**Topics**

- How Virtual Learning works
- Basic configuration selections using Field Tools software.

**Prerequisites**

None

**Audience**

This Energy & Transportation Solutions course is for engineers, technicians and others involved with the configuration and operation of the FloBoss™ 103 and 107 products.

**COURSE RA620 & RA620V****CEUs: 1.4****Energy & Transportation Solutions FB3000 Hardware Configuration****Overview**

This 2-day hands-on course covers the hardware, configuration and maintenance of the FB3000 RTU. This course will equip you with the necessary knowledge and practice needed to configure the FB3000 hardware for communications and I/O as well as Field Tools Software. Learn how to troubleshoot and utilize software application programs to monitor live data and communication statistics.

**Topics****Day 1**

- Intro to the FB3000
- Hardware Options
- Personality Modules
- Downloading/ Uploading a Configuration
- Saving a Configuration
- Local Serial Communications
- Mini USB Communications
- I/P Communication Setup
- Flashing Firmware
- File Types Used
- Replacing Boards
- Interpreting Status LED's?
- Memory Types Used

**Day 2**

- Using Field Tools Software
- Replacing Battery on CPU and Power Modules
- Setting up a AGA3 Configuration
- Setting up a AGA7 Configuration
- Configuring for History and Events
- Creating and Saving Configurations
- Cold Start/Warm Start Differences
- Configuring for Alarms
- Basic Troubleshooting Examples
- Using the Guided Setup Wizard
- Intro to Math Blocks
- Calibration

**Prerequisites**

Participants should have formal instrument technician training and a working knowledge of their application/process

- Participants must be thoroughly familiar with Windows10

**Audience**

Field personnel whose responsibilities may include:

- Installation
- Wiring, start-up
- Troubleshooting
- Configuration or maintenance of the FB3000 products
- An individual who seeks a more thorough understanding of the FB3000 products

**Course Type**

Classroom & Virtual

## COURSE RA900 &amp; RA900V

CEUs: 1.8

**Energy & Transportation FloBoss S600+ Operator Introduction****Overview**

The 2-day FloBoss™ S600+ Fundamentals course will have participants become familiar with the FloBoss S600+ hardware, the startup menu, fundamental features of the S600+ applications. Be able to operate FloBoss S600+ front panel and web-server. Be able to download and upload configurations. Be able to edit S600+ configuration files using PC Setup, Report Editor, Modbus Editor and Display Editor. The FloBoss S600+ Fundamentals course provides an overview into the hardware and operational aspects of the FloBoss S600+ flow computer.

**Topics**

- Introduction to S600+
- Standard Application Overview
- S600+ Hardware Overview
- Navigating Displays
- Editing Display Items
- Editing Configurations with Config600
- Using Config600 Transfer

**Prerequisites**

Participants should be familiar with metering techniques and standards. Participants should bring their own laptop computers to the course and should preferably have administrator privileges. Participants must be PC literate.

**Course Type**

Classroom & Virtual

## COURSE RA901 &amp; RA901V

CEUs: 1.8

**Energy & Transportation Solutions FloBoss S600+/Config600 Advanced****Overview**

The 2-1/2-day advanced course provides an insight into the generation of application configurations for the FloBoss™ S600+.

**Topics**

- Loading Config600 Pro Software License
- Firmware Versions
- Using System Editor Object Types
- Logical Editor
- Registering Tickets - Do's and Don'ts

**Prerequisites**

Participants should be familiar with metering techniques and standards. Participants should bring their own laptop computers to the course and should preferably have administrator privileges. Participants must be PC literate

**Audience**

This FloBoss S600+ Advanced Course is aimed at application engineers and system integrators who design and develop FloBoss S600+ applications for integration with metering systems and skids.

**Course Type**

Classroom & Virtual



## COURSE RA1230 &amp; RA1230V

CEUs: 1.8

## Energy & Transportation Solutions FloBoss Troubleshooting Configuration for Gas Measurement

### Overview

This 2.5 day course will provide a basic overall working knowledge of the FloBoss 107 Controller. (Contact Education Services for special discounting when enrolling in both course RA1230 Troubleshooting Configuration and course RA1231 Configurations - Advanced at 1-800-338-8158). Participants are presented with a basic view of the FloBoss 107 hardware and software to obtain the necessary knowledge needed to configure, calibrate, view live data and trouble shoot the FloBoss 107.

### Topics

#### Day 1

- Introduction and Overview of FloBoss
- FloBoss 107 CPU and I/O Cards
- ROCLINK 800 Configuration Software Overview Creating a Connection to the FloBoss 107 Local Operator Interface Port Ethernet Port
- Elements of Basic Configuration
- Configuring from Factory Defaults Reset System in ROC Flags Configure System Information

#### Day 2

- Configuring Communications
- Configuring Field I/O
- Calibrating the AI, AO, and RTD
- Configuring Station and Runs for the AGA3 and AGA7 Flow Calculations
- Configuring Historical Database

#### Day 3

- Alarm and Events Logs
- Saving and Restoring Configurations
- Using the System Utilities
- Troubleshooting

### Prerequisites

None

### Audience

This course is for engineers, technicians, and others involved with the configuration and operation of the FloBoss 107.

### Course Type

Classroom & Virtual

## COURSE RA902 &amp; RA902V

CEUs: 3.2

## Energy & Transportation Solutions FloBoss S600+ Combined Config600

### Overview

The 4-1/2-day course will provide participants hardware knowledge of the S600+. How to navigate the keypad display and be able to create and edit S600+ configurations using Config600 software. The FloBoss™ 600+ Combined Course is a combination of both the fundamentals course and the advanced course in one.

### Topics

- Standard Application Overview S600+
- Hardware Overview Navigating Displays
- Editing Display Items
- Editing Configurations with Config600 Using
- Config600 Transfer
- Loading Config600 Pro Software License
- Firmware Versions
- Using System Editor Object Types
- Logical Editor
- Registering Tickets - Do's and Don'ts

### Prerequisites

Participants should be familiar with metering techniques and standards. Participants should bring their own laptop computers to the course and should have administrative privileges. Participants must be PC literate.

### Course Type

Classroom & Virtual

## COURSE RA1220V

CEUs: 3.0

**Energy & Transportation Solutions FloBoss Configuration & Operations [Virtual]****Overview**

This 2-1/2-day virtual course will provide an overall working knowledge of the FloBoss™ 103, FloBoss 107. Participants are presented with a comprehensive view of the FloBoss 103/107 hardware and ROCLINK800 software to obtain the necessary knowledge needed to effectively install, configure and maintain the FloBoss 103/107 products. Each student will be provided access to a PC (ROCLINK800 preinstalled), a FloBoss 107RTU, a communications cable and a workbook for the duration of the class.

**Topics**

- Flow Measurement Review
- FloBoss™ 103/107 Hardware Overview
- FloBoss
  - Check and Set ROC Information
  - Check and Set ROC System Flags
  - Communication Basics
  - Elements of a Basic Configuration
  - Configuring I/O Points
  - Calibrating AI and AO Points
  - Overview of MVS Products
  - Setup of Multi-dropping of MVS
  - Configuring AGA Flow Calculations
  - Configuring FloBoss™ History
  - Modbus Tables
  - PID Configuration
  - Building FloBoss Displays
  - FST Workshop

**Prerequisites**

Participants should have a working knowledge of their application/process and should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

**Audience**

This Energy & Transportation Solutions course is for engineers, technicians and others involved with the configuration and operation of the FloBoss™ 103 and FloBoss 107 products.

## COURSE RA443V

CEUs: 0.2

**Energy & Transportation Solutions ControlWave Programming Introduction****Overview**

This FREE 2-hour short course utilizes the Virtual Classroom to provide basic programming steps in programming the ControlWave device using Ladder Logic and Function Block languages.

**Topics**

- How Virtual Learning works
- Programming in Ladder Logic
- Compiling & downloading application project
- Using Stimulation Mode
- Inserting a Function Block

**Prerequisites**

None

**Audience**

All personnel interested in a brief overview of programming ControlWave devices.

## COURSE RA630 &amp; RA630V

**Energy & Transportation Solutions FB3000 Programming & Configuration Advanced****Overview**

This 3-day hands-on course covers the Software and Advanced Configuration of the FB3000 RTU. This course will equip you with the necessary knowledge and practice needed to configure the FB3000 using Field Tools and FBxDesigner. Learn how to troubleshoot and utilize software application programs to monitor live.

**Topics**

## Day 1

- Intro to the FB3000
- Hardware Options
- Personality Modules
- Downloading/ Uploading a Configuration
- Using Field Tools Software and Menus
- Modbus Communications between FB3000's
- Using the Point Pickers to Configure
- Setting up a Station with Two Runs
- Engineering Units Setup

## Day 2

- Setting up the Clock
- PID Configuration
- Using FBxDesigner
- Create a Small Project in FBxDesigner
- Programming Languages Available in FBxDesigner
- Creating a Simple Display
- Setting up a AGA7 Configuration
- Configuring for History and Events
- Creating and Saving Configurations

## Day 3

- Application Management
- Application Information
- Viewing Reports
- Effects Examples
- Math Block Examples
- Device Licenses

**Prerequisites**

Participants should have formal instrument technician training and a working knowledge of their application/process.

- Participants must be thoroughly familiar with Windows 10.

**Audience**

Field personnel whose responsibilities may include:

- Installation
- Wiring, start-up
- Troubleshooting
- Configuration or maintenance of the FB3000 products
- An individual who seeks a more thorough understanding of the Programming Capabilities of the FB3000 products

**Course Type**

Classroom & Virtual

## COURSE RA1141 &amp; RA1141V

CEUs: 0.2

**Energy & Transportation Solutions ROCLink Configuration Introduction****Overview**

This FREE 2-hour demo provides a brief overview of the Virtual Classroom. In this demonstration, you will learn what the Virtual Classroom is and how it works. Learn some basics of configuring of the ROC800 or FloBoss.

**Topics**

- What is virtual training
- What is required
- Hands-on exercises
- Basic Configurations of the ROC800 or FloBoss

**Prerequisites**

None

**Audience**

All personnel whose responsibilities may include: configuring, start-up, troubleshooting, of maintenance of the ROC800 or FloBoss products.

**Course Type**

Classroom & Virtual

## COURSE RA703

CEUs: 3.2

**Energy & Transportation Solutions OpenEnterprise SCADA Systems Accelerated V2.8x****Overview**

This 4 ½ day course provides an accelerated approach to learning about the OpenEnterprise 2.8x SCADA System. At the conclusion of the class, students will be able to install a very simple OpenEnterprise Server and Workstation, configure communications with Energy and Transportation Solutions' RTU's, build basic HMI displays, configure trends and alarm windows, collect historical data, perform basic SQL queries, and develop a basic user interface using these products.

**Topics**

- Basic Concepts
- Product Architecture
- Database Explorer
- Database Structure
- Display Building
- Aliasing
- History
- SQL Queries
- OE Desktop
- Alarm Priorities
- Security

**Prerequisites**

- Participants much have a strong working knowledge of personal computers and Windows XP or a later version
- Participants much have a strong working knowledge of their application/process
- Participants should have a strong working knowledge of OpenBSI and ControlWave Designer and ROC Configuration

**Audience**

The class is intended for users who will install, configure and design a basic OpenEnterprise SCADA system.



**COURSE RA850V****CEUs: 1.8****Energy & Transportation Solutions  
OpenEnterprise Enhancements for  
SCADA Systems - Ver. 3.x [Virtual]****Overview**

This 2 ½ day virtual course addresses these new subsystems and improvements which were added to the previous 2.8x OpenEnterprise Server system. These enhancements are on a Windows 7 platform and will enable you to install an OpenEnterprise Server/Workstation and configure and perform various Server/Workstation functions. These functions include the ease of adding devices to the system, configuring database calculations, work flows, asset modeling, communicating to Modbus devices and more.

**Topics**

- Calculations
- Work Flows
- Administrative Tools
- MODBUS Data Collection
- Database Asset Modeling

**Prerequisites**

Participants should have formal RTU configuration training and a working knowledge of their application/process. Participants must be thoroughly familiar with Windows 7. Participants should have advanced PC and networking skills. Participants must have completed course RA701 Basic and RA702 Intermediate Courses version 2.8x.

**Audience**

This class is intended for engineers who have OpenEnterprise systems, version 2.8x transitioning to version 3.x.

**COURSE RA801 & RA801V****CEUs: 3.2****Energy & Transportation Solutions  
OpenEnterprise SCADA Systems V3.x  
Introduction****Overview**

This 4-1/2-day course provides a very brief introduction to the OpenEnterprise Server, and more detailed coverage of the OpenEnterprise Workstation and OpenEnterprise Reporting packages (version 3.x). At the conclusion of the class, students will be able to install a simple OE Server and Workstation, configure communications with Remote Automation Solution's RTU's and then begin building HMI displays, trends, alarm windows, and develop a basic user interface using these products.

**Topics**

- Database Structure
- Creating Display Objects
- Alarm Windows, Alarm & Event History
- Creating and Configuring Trends
- Data Export
- Creating Reports
- Calculation Server
- Communications Manager
- Data Collection
- Plant Area Grouping

**Prerequisites**

Participants must have a strong working knowledge of personal computers and Windows 7. Participants must have a strong working knowledge of their application/process. Participants should have a strong working knowledge of Energy and Transportation Solutions RTUs.

**Audience**

The class is intended for users who have experience with programming and configuration of Energy and Transportation Solutions RTUs.

**Course Type**

Classroom & Virtual

**COURSE RA802 & RA802V****CEUs: 3.2****Energy & Transportation Solutions  
OpenEnterprise SCADA Systems V3.x  
Intermediate****Overview**

This 4 ½ day course will equip the participant to be able to; configure the communications, security, historical, alarming, asset modeling and other major subsystems of an OpenEnterprise and Workstation (version 3.x). Most of the tools within the OpenEnterprise Administrative Tools will be covered during this class.

**Topics**

- Configure Security
- Historical Collections
- Alarming
- Asset Modeling
- Work Flows
- Local Signals and Alarms
- Administrative Tools

**Prerequisites**

Participants should have formal RTU configuration training and a working knowledge of their application/process. Participants must be thoroughly familiar with Windows 7. Participants should have advanced PC and networking skills. Participants must have completed course RA801 Basic OpenEnterprise Course version 3.x.

**Audience**

The course is intended for users who have experience with programming and configuration of Energy & Transportation Solutions RTUs.

**Course Type**

Classroom & Virtual

## COURSE RA1244 &amp; RA1244V

CEUs: 2.1

**Energy & Transportation Solutions ROC800L Configuration****Overview**

This 2-1/2-day course will provide an overall working knowledge of the ROC800L. Participants are presented with a comprehensive view of the ROC800L hardware and software to obtain the necessary knowledge and practice needed to install and configure a ROC800L. Participants will know the differences between the ROC809 and ROC800L. Each student will be provided with a PC (ROCLINK preinstalled), a Energy & Transportation Solutions RTU (ROC800L), a communications cable, and a workbook for the duration of the class. However, participants are encouraged to bring their laptop to class.

**Topics**

- Basic Concepts and Product features
- Install and configure a ROC800L RTU
- Convert ROC800 to RO800L
- Configuring an Application
- Updating Firmware and Software

**Prerequisites**

Participants should have formal RTU training, preferably with ROC800 series products, ROCLINK800 software and a working knowledge of their application/process. Participants should have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

**Audience**

This Energy & Transportation Solutions course is for engineers, technicians and others involved with the operation and maintenance of the ROC800L.

**Course Type**

Classroom & Virtual

## COURSE RA1240 &amp; RA1240V

CEUs: 3.2

**Energy & Transportation Solutions ROC800 Configuration & Operations****Overview**

This 4-1/2-day course will provide an overall working knowledge of the ROC800 series RTU. Participants are presented with a comprehensive view of the ROC800 series hardware and ROCLINK800 software to obtain the necessary knowledge needed to effectively install, configure and maintain the ROC800 series products. Each student will be provided with a PC (ROCLINK800 preinstalled), a Energy & Transportation Solutions RTU, a communications cable and a workbook for the duration of the course. However, participants are encouraged to bring their laptop to class.

**Topics**

- Flow Measurement Review
- ROC800 Series Hardware Overview
- Introduction to ROCLINK800 Software ROC800 Series Configuration
  - Check and Set ROC Information
  - Check and Set ROC System Flags
  - Communication Basics
  - Elements of a Basic Configuration
  - Configuring I/O Points
  - Calibrating AI and AO Points
  - Overview on MVS Product
  - Setup Multi-Dropping of MVS
  - Configuring AGA Flow Calculation
  - Configuring ROC History
  - Modbus Tables
  - PID Configuration
  - Building ROC Displays
  - FST Workshop

**Prerequisites**

Participants should have a working knowledge of their application/process and should be thoroughly familiar with Microsoft Windows operations systems (XP or later versions).

**Audience**

This Energy and Transportation Solutions course is for engineers, technicians, and others involved with the operation and maintenance of the ROC800 Series products.

**Course Type**

Classroom & Virtual

**COURSE RA1241 & RA1241V****CEUs: 1.8****Energy and Transportation Solutions  
ROC800 Series DS800 Programming****Overview**

This 2-1/2-day course will provide an overall working knowledge of the five different programming languages for the ROC800 series. The course emphasizes hand-on exercises using DS800 Development Suite to program the ROC800 series products. Each participant will be provided a PC (ROCLINK800 & DS800 preinstalled), a Energy and Transportation Solutions RTU, a communications cable and a workbook for the duration of the course. However, participants are encouraged to bring their laptop to class.

**Topics**

- DS800 Software Overview
  - Sequential Function Chart
  - Ladder Logic of Ladder Diagram
  - Function Block Diagram
  - Structured Text
  - Instruction List
- ROCLINK 800 Software

**Prerequisites**

Participants should have experience with ROC800 series hardware and ROCLINK800 software. A working knowledge of their application/process and should be thoroughly familiar with Microsoft Windows operating Systems (XP or later versions). Familiarity with IEC-61131 programming languages is not required, since it is covered in this course.

**Audience**

This Energy and Transportation Solutions Course is for engineers, technicians, and others involved with configuring the ROC800 products.

**Course Type**

Classroom & Virtual

**COURSE RA1242****CEUs: 2.1****Energy and Transportation Solutions  
DL800 Preset System Configuration****Overview**

This 2-1/2-day course will provide an overall working knowledge of the DL8000 Preset System Controller. Participants will be enabled to configure, operate and diagnose the DL8000 Preset System Controller. Each student will be provided with a PC (ROCLINK preinstalled), a Energy and Transportation Solutions RTU (DL8000), a communications cable, and a workbook for the duration of the class.

**Topics**

- Basic Concepts and Product features of the DL8000
- Set Up Parameters
- Meter Proving
- Hardware Diagnostics & Troubleshooting
- DL8000 Configuring Dynamic, Real-Time Display of Flow Parameters
  - Configuring for Additive Injection
  - Temperature Compensation
  - Data Logging
  - Communications
- Blending Methods and Flow Sequencing

**Prerequisites**

Participants should have formal RTU configuration training preferably with ROC800 series hardware and a working knowledge of their application/process. Participants should have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (2000/XP or later versions).

**Audience**

This Energy and Transportation Solutions course is for engineers, technicians, and others involved with the operation and maintenance of the DL8000 Preset System Controller product.

**COURSE RA502V****CEUs: 0.7****Energy and Transportation Solutions  
Terminal Manager Business  
Management Intermediate [Virtual]****Overview**

This 1-day virtual course helps participants understand the business components of the terminal process. This online customer order management process includes the execution of scheduling, delivery, and receipt of order. Other business entity topics include allocations of accounts, shippers, drivers and clients.

**Topics**

- Business Entity Configuration
  - Order Management
  - Allocations
  - Inventory Management

**Prerequisites**

- Participants must have completed course RA501 Terminal Manager Basics and Operations
- A strong working knowledge of personal computers and Windows 7 or later
- Participants must have a strong working knowledge of their application/process

**Audience**

The class is intended for users requiring the understanding of the business components of the terminal process.

**COURSE RA1260****CEUs: 1.4****Energy and Transportation Solutions ROC800 Operations & Configuration - Introduction****Overview**

This 2-day course will provide a basic overall working knowledge of the ROC800 Controller. (Contact Education Services for special discounting when enrolling in both course RA1260 Operation and Configurations Basic and course RA1261 Advanced Configurations at 1-800-338-8158). Participants are presented with a comprehensive view of the ROC800 hardware and software to obtain the necessary knowledge needed to configure, calibrate and view live data. PC's will be provided along with necessary hardware and courseware for the duration of the class but each participant is encouraged to bring their own PC.

**Topics****Day 1**

- Introduction
- Overview of ROC
- Wiring CPU and I/O Cards
- ROCLINK 800 Configuration Software Overview
- Elements of Basic Configuration
- Configuring Field I/O
- Firmware updates
- Configuring from Factory Defaults

**Day 2**

- Alarm and Events Logs
- Saving and Restoring Configurations
- Configuring Station and Runs for (AGA3 and AGA7) Flow Calculations
- Configuring Communications
- Calibrating the AI and AO module
- Configuring Historical Database

**Prerequisites**

Participants should have a working knowledge of their application/process and should also have advanced PC knowledge and be thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

**Audience**

This Energy and Transportation Solutions course is for engineers, technicians, and others involved with the configuration and operation of the ROC800.

**COURSE RA803V****CEUs: 1.4****Energy and Transportation Solutions OpenEnterprise SCADA Troubleshooting Introduction [Virtual]****Overview**

This 2-day course provides a common approach to OpenEnterprise SCADA troubleshooting. At the conclusion of the class, students will be equipped with a practical guide to solving basic problems regarding OE Server and Workstation, RTU configurations, communications, alarms and more.

**Topics**

At the conclusion of the class, students will be equipped with a practical guide to solving basic problems regarding OE Server and Workstation, RTU configurations, communications, alarms and more.

**Day 1**

- Troubleshooting Common Database Problems
- Troubleshooting Common ControlWave Problems
- Communications
- Project / FCP Concerns
- Alarms
- History
- Database Updating
- Troubleshooting Common ROC/FloBoss Problems
- Communications
- TLP Concerns
- Alarms
- History
- Database Updating

**Day 2**

- Common Troubleshooting Graphworx Display Aids
- Troubleshooting Common License Concerns
- Troubleshooting Common Server/Workstation Problems
- Troubleshooting Basic History Reporting Problems for ROC and CW

**Prerequisites**

- Participants must have completed the RA801 OpenEnterprise for SCADA Systems Basics Course
- Participants must have a strong working knowledge of their application/process

**Audience**

The class is intended for users who have experience with OpenEnterprise 3.2.



## COURSE 804V

CEUs: 1.1

### Energy and Transportation Solutionsra803 OpenEnterprise SCADA Troubleshooting Advanced [Virtual]

#### Overview

This 1 1/2-day course provides a common approach to OpenEnterprise SCADA advanced troubleshooting. At the conclusion of the class, students will be equipped with a practical guide to solving basic problems regarding OE Server and Workstation, RTU configurations, communications, alarms and more.

#### Topics

##### Day 1

- Troubleshooting Case 1 Archiving
- Troubleshooting Case 2 MODBUS
- Troubleshooting Case 3 Asset Modeling
- Troubleshooting Case 4 Backfilling a Trend
- Troubleshooting Case 5 Alarm Condition
- Database not starting problems

#### Objectives

- Participants must have completed the RA801 OpenEnterprise for SCADA Systems Basics Course and RA802 OpenEnterprise Intermediate.
- Participants must have a strong working knowledge of their application/process.

#### Prerequisites

Participants should be familiar with the Movicon.NEXt programming environment and its basic functions.

#### Audience

The class is intended for users who have experience with OpenEnterprise 3.2.

## COURSE RA1261

CEUs: 1.8

### Energy and Transportation Solutions ROC800 Troubleshooting & Configurations Advanced

#### Overview

This 2 ½ day course will help participants build upon the basic knowledge of configuring the ROC800 device. (Contact Education Services for special discounting when enrolling in both course RA1260 Operation and Configurations Basic and course RA1261 Advanced Configurations at 1-800-338-8158). Participants will learn how to diagnose symptoms and troubleshoot common field problems, create FST's, configure for Modbus communications to third part devices, and more. PC's will be provided along with necessary hardware and courseware for the duration of the course. Each participant is encouraged to bring their own PC.

#### Topics

##### Day 1

- Configuring Station and Runs for (AGA3 and AGA7) Flow Calculations
- Saving and Restoring Configurations
- Configuring Historical Database
- Sampler Odorizer Control
- PID Configuration
- Radio Controls
- Troubleshooting

##### Day 2

- Setting up Modbus Tables
- Wireless HART
- Network Radio Communications
- FST Workshop
- Displays
- Troubleshooting

##### Day 3

- Troubleshooting

#### Prerequisites

Participants should have completed the ROC800 Basic course or have a comparable working knowledge of the ROC800 product. A good understanding of their application/process is helpful along with advanced PC knowledge, thoroughly familiar with Microsoft Windows operating systems (XP or later versions).

#### Audience

This Energy and Transportation Solutions course is for engineers, technicians, and others involved with the configuration and operation of the ROC800.



# MEASUREMENT INSTRUMENTATION





COURSE 2384

CEUs: 0.7

## Micro Motion™ Coriolis & Rosemount™ 8700 Series Magnetic Flow Meters Introduction

### Overview

This 4-day course explains how pressure and temperature transmitters function and how they are installed and calibrated. It emphasizes installation, proper set-up and calibration of Analog and HART® Pressure and Temperature Transmitters. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- Correctly perform installation and setup procedures
- Properly configure transmitters
- Properly calibrate transmitters
- Perform basic troubleshooting

### Topics

- Basic 4-20 mA Loop Setup
- Pressure Sensors
- Temperature Sensors (TC, RTD)
- Analog Transmitters (1151)
- HART® Communication
- Field Communicator
- Pressure Transmitters
- Temperature Transmitters
- Using AMS Device Manager to Configure and Calibrate Transmitters
- Installation
- Configuration
- Calibration
- Troubleshooting

### Prerequisites

Some experience in instrument calibration, maintenance, installation and operation would be helpful.

### Audience

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of measurement instrumentation.

## COURSE 2387

CEUS: 0.7

**Micro Motion Coriolis & Rosemount 8800 Series Vortex Flow Meters Introduction****Overview**

This one-day field class provides hands-on training on both the Coriolis and Vortex Flow Meters. Typically, two-thirds of the course time is spent on the Micro Motion Coriolis meter and one-third on Rosemount 8800 Vortex Flow Meters. Theory of operation, meter components and installation of each Flow Meters are covered. The focus of the class is to provide a hands-on experience configuring and troubleshooting best practices. Students will learn the Micro Motion Series 1000 / 2000 transmitters using one of these configuration tools; Prolink III, HC475, AMS Device Manager or Series 3000 display interface devices. Public field classes typically use Prolink III for configuring the Micro Motion transmitters and the HC475 will be used for the Rosemount 8800 Vortex Flow Meters. Customers can choose which configuration device is used for classes held at their site.

**Topics**

Students will be able to do the following for both Micro Motion's Coriolis and Rosemount 8800 Vortex Flow Meter:

- Briefly explain the fundamentals for how each flow meters works and the function of the key components
- Have a basic understanding of the installation best practices for orienting, mounting and wiring the sensor and transmitter
- Perform a basic configuration of the metering system for various applications
- Diagnose and know how to correct the most common meter & process issues
- Configure the metering system to measure available process variables from the device for their application
- Learn a step by step process to perform basic troubleshooting of the most common meter and process issues

**Prerequisites**

Some prior experience with Micro Motion Coriolis & Rosemount 8800 Vortex Flow Meters. A basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing.

**Audience**

This combined class is intended anyone that is involved with properly configuring and troubleshooting a Micro Motion flow and density meter and Rosemount 8800 Vortex Flow Meters

## COURSE 2358

CEUS: 1.6

**Micro Motion Coriolis Product Intermediate****Overview**

This one-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting of Micro Motion sensors with the Series 1000 / 2000 transmitters and peripherals. This course includes hands-on exercises. Courses held at customer specified sites can be customized to address specific transmitters and configuration tools. Public registration classes cover a broader range of equipment based on the needs of the attendees. After completing this training, students will also get unlimited access to the Micro Motion's Online Training (e1010,e1011,e1012,e1013,e1014) for a year. This online training cost \$400 / license per year if purchased separately.

**Topics**

- Explain the fundamentals for how a micro motion coriolis meter works and the function of the key components
- Be able to apply the installation best practices for orienting, mounting and wiring the sensor and transmitter
- Configure the metering system to measure available process variables from the device for their application
- Learn a step by step process to perform basic troubleshooting of the most common meter and process issues

**Prerequisites**

A basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing is assumed.

**Audience**

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.



## COURSE 2339C

CEUS: 0.4

**Micro Motion Coriolis Flow Meters Introduction****Overview**

This half day course is a condensed version of the 2358 course. This course briefly reviews the theory of operation, meter components and installation. The focus of the class is to provide a hands-on experience configuring the Micro Motion metering system. Students will learn the Series 1000/2000 transmitters using one of these configuration tools: ProLink III, HC475, AMS Device Manager or the local operator interface. Public classes typically use ProLink III. Customers can choose which device is used for classes held at their site. This course also includes an introduction to the Micro Motion new 5700 transmitter. After completing this training, students will also get unlimited access to the Micro Motion's Online Training (e1010,e1011,e1012,e1013,e1014) for a year. This online training cost \$400/license per year if purchased separately.

**Topics**

- Briefly explain the fundamentals for how a micro motion coriolis meter works and the function of the key components
- Have a basic understanding of the installation best practices for orienting, mounting and wiring the sensor and transmitter
- Perform a basic configuration of the metering system to measure flow, density and temperature for various applications
- Diagnose and know how to correct the most common meter & process issues

**Prerequisites**

Some prior experience working with Micro Motion Coriolis meters is recommended. Students with no past experience can benefit if their learning objectives are to get a basic intro to operation, installation, configuration and troubleshooting. For all attendees, it is assumed they have a basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing.

**Audience**

This class is intended as a refresher course for anyone that is involved with properly configuring and troubleshooting a Micro Motion flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers. This class is also intended to be taught as two, halfday repeat sessions to accommodate customers who need to train their entire department but must also maintain the operation of their plant by scheduling their employees between an AM/PM training sessions.

## COURSE 2380

CEUS: 1.4

**Micro Motion Coriolis Flow Meters****Overview**

This two-day class is modeled after the 2352 factory course. It consists of a blend of lectures and extensive hands-on exercises that cover the installation, configuration and calibration of the Micro Motion metering system. Students will learn the Series 1000/2000 transmitters using either ProLink® III, AMS Device Manager, HC475 or L.O.I. Students will perform a master reset, configure the Series 1000/2000, perform a flow calibration and solve troubleshooting problems. Based on student need, we will cover one or all of the following topics: RFT9739, 9739MVD transmitter, T-Series, R-Series, or Series 3000 platform. On-site classes can be customized to cover the customer's installed base, preferred configuration tools and application questions. This course also includes an introduction to the Micro Motion new 5700 transmitter. After completing this training, students will also get unlimited access to the Micro Motion's Online Training (e1010,e1011,e1012,e1013,e1014) for a year. This online training cost \$400/license per year if purchased separately.

**Topics**

- Explain the fundamentals for how a micro motion coriolis meter works and the function of the key components
- Be able to apply the installation best practices for orienting, mounting and wiring the sensor and transmitter
- Configure the metering system to measure available process variables from the device for their application
- Learn a step by step process to perform basic troubleshooting of the most common meter and process issues

**Prerequisites**

A basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing is assumed.

**Audience**

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion Coriolis flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

## COURSE 2383

CEUS: 0.7

**Micro Motion Coriolis, Rosemount 8700 Magnetic & 8800 Vortex Wireless Flow Meters****Overview**

This one day course consists of a blend of lectures and hands-on exercises that cover a basic overview of wireless capabilities with a Micro Motion Coriolis, Rosemount 8700 Series Magnetic and 8800 Series Vortex meters. Based on customer need, the class can be taught for each of the individual products. The course provides a step by step process for the following: how to install and wire an Emerson Wireless 775 THUM Adapter to each transmitter, how to configure the THUM, how to configure the Emerson 1420 Wireless Gateway to the THUM using AMS Device Manager and how to add and view the Micro Motion and Rosemount transmitters to the gateway.

**Topics**

- Explain the fundamentals for how a Micro Motion Coriolis, Rosemount 8700 Series Magnetic & 8800 Series Vortex Flow Meters work with a 1420 Wireless Gateway and Emerson's Wireless 775 THUM Adapter
- Install and wire a 775 Smart THUM to Micro Motion and Rosemount Transmitters
- Connect to and configure the Micro Motion and Rosemount Transmitters to work with Emerson's 1420 Wireless Gateway
- Configure a 775 Smart THUM and the transmitters to communicate on the gateway using AMS Device Manager

**Prerequisites**

General understanding of the HART® protocol and operation and configuration of a Micro Motion Coriolis, Rosemount 8700 Magnetic and 8800 Vortex meters is assumed.

**Audience**

This course is intended for anyone that is involved with installing, wiring, configuring and troubleshooting a Micro Motion Coriolis, Rosemount 8700 Magnetic & 8800 Vortex Flow Meters with a Emerson's Wireless 775 THUM. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

## COURSE 5713

CEUS: 2.1

**Micro Motion Coriolis Flow Meters Advanced****Overview**

This three-day course is intended for advanced users of Micro Motion Coriolis products who are responsible for the installation and commissioning, maintenance and troubleshooting and advanced operation of the equipment. The format is a mix of lecture and hands-on activities, heavily weighted toward the latter.

**Topics**

This course covers the following advanced topics:

- Theory of operation advanced topics
- Advanced troubleshooting concepts, including performing and evaluating data logging
- Theory of Zero, Zero Offset and Zero Verification
- Custody Transfer and the use of Weights and Measures Software
- Modbus read / writes and the use of the Modbus Interface Tool
- Concentration Measurement
- 5700 Historian Files, Downloading and Evaluation
- Ethernet Basics
- Smart Meter Verification

After completing this training, students will also get unlimited access to the Micro Motion Online Training (e1010,e1011,e1012,e1013,e1014) for a year. This online training cost \$400 / license per year if purchased separately.

**Prerequisites**

Students should have completed either Micro Motion 2358, 2380, or 2352 or have six months to a year of field experience in the use and maintenance of Micro Motion Coriolis products. A basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing is assumed.

**Audience**

Typical job functions include: maintenance technicians, instrument technicians and instrumentation engineers.

COURSE 2339SV

CEUS: 0.4

## Rosemount 8800 Series Vortex Flow Meters Introduction

### Overview

This half-day field class is a condensed version of the 2341 course. Students will briefly review the theory of operation, meter components and installation. The focus of the class is to provide a hands-on experience configuring and troubleshooting of the Rosemount 8800 Vortex metering system. The students will learn the operation and capabilities of the Local Operator interface & HC475 and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

### Topics

- Explain the differences and capabilities of the Rosemount 8800 Series Vortex Flow Meters
- Explain the von Karman Effect and principles of operation of Rosemount Vortex Flow Meters
- Identify Rosemount Vortex parts and explain their functionality
- Configure and test the transmitters using the AMS Device Manager
- Properly install and troubleshoot the Rosemount 8800 Series Vortex Flow Meter System

### Prerequisites

Some prior experience working with Micro Rosemount Vortex Flow Meters meters is recommended. However, students with no past experience can also benefit if their learning objectives are to get a basic introduction to operation, installation, configuration and troubleshooting. For all attendees, it is assumed they have a basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing.

### Audience

This class is intended as a refresher course for anyone that is involved with properly configuring and troubleshooting a Rosemount 8800 Series Vortex Flow Meters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers. This class is also intended to be taught as two, half-day repeat sessions to accommodate customers who need to train their entire department but must also maintain the operation of their plant by scheduling their employees between an AM/PM sessions.

## COURSE E1011

CEUS: 0.2

### Micro Motion Coriolis 2700 Transmitter Wiring & Configuration Tools Intermediate

#### Overview

This course includes 5 lessons:

- Wiring Sensor to Transmitter
- Connecting Power, Inputs & Outputs
- Applying Power to the Transmitter
- Wiring the Configuration Tools to Transmitter
- Navigation of Configuration Tools Menus

#### Topics

- Wiring Sensor to Transmitter
- Connecting Power, Inputs & Outputs, Applying Power to the Transmitter
- Wiring the Configuration Tools to the Transmitter
- Connecting Between the Configuration Tools & Transmitter
- Navigation of Configuration Tools Menus

#### Prerequisites

Explain how to prepare both ends of a four-wire cable for wiring a sensor to a transmitter.

- Explain how to install a cable between the sensor and the transmitter.
- Explain how connect AC and DC power supply wiring to the Micro Motion Coriolis 2700 transmitter.
- Identify wiring connections to channel A, B and C.
- Identify which terminals to use for HART communication.
- Identify which terminals to use for Modbus communication.
- Identify which terminals are polarity sensitive.
- Explain how to establish communication using ProLink III, AMS and the HC475 with HART.
- Explain how to establish communication using ProLink III with Modbus.
- Identify the proper path through the ProLink III, AMS and HC475 menus to perform basic commissioning tasks.
- Explain how to perform these tasks using the configuration tool you use with your Micro Motion meters

#### Prerequisites

None

#### Audience

This course is designed for personnel responsible for the installation, configuration, verification and maintenance of Micro Motion Coriolis flow meters.

## COURSE E1012

CEUS: 0.2

### Micro Motion Coriolis 2700 Transmitter Configure Process Measurements Intermediate

#### Overview

This online training includes: Characterizing the Flow Meters, Configuring Flow Measurement for Liquids, Configuring Flow Direction and Damping, Configuring Density Measurement & Slug Flow Limits and Configuring Temperature Measurement

#### Topics

- Characterizing the Flow Meters
- Configuring Flow Measurement for Liquids
- Configuring Flow Direction and Damping
- Configuring Density Measurement & Slug Flow Limits
- Configuring Temperature Measurement

#### Objectives

- Explain how to characterize the Flow Meters
- Explain how to configure Flow Measurement For Liquids
- Explain how to configure Flow Direction and Damping
- Explain how to configure Density Measurement & Slug Flow Limits
- Explain how to configure Temperature Measurement

#### Prerequisites

None

#### Audience

This course is designed for personnel responsible for the installation, configuration, verification and maintenance of Micro Motion Coriolis flow meters.



## COURSE E1013

CEUS: 0.2

**Micro Motion Coriolis 2700 - Integrate the Meter with the System Intermediate****Overview**

This online training includes: Configuring the Input & Output Channel Assignments, Configuring Milliamp Outputs, Configuring Frequency Output, Configuring Output Fault Conditions, Configuring Digital Communications, Performing a Loop Test and Trimming Milliamp Outputs, if required

**Topics**

- Configuring the Input & Output Channel Assignments
- Configuring Milliamp Outputs
- Configuring Frequency Output
- Configuring Output Fault Conditions
- Configuring Digital Communications
- Performing a Loop Test
- Trimming Milliamp Outputs, if required

**Objectives**

- Explain how to Configure the Input & Output Channel Assignments
- Explain how to Configure Milliamp Outputs
- Explain how to Configure Frequency Output
- Explain how to Configure Output Fault Conditions
- Explain how to Configure Digital Communications
- Explain how to Perform a Loop Test
- Explain how to Trim Milliamp Outputs, if required

**Audience**

This course is designed for personnel responsible for the installation, configuration, verification and maintenance of Micro Motion Coriolis flow meters.

## COURSE E1014

CEUS: 0.2

**Micro Motion Coriolis 2700 - Configure Options & Final Checkout Intermediate****Overview**

This online training includes 7 sections: Operating & Viewing Process Variables, Enabling & Disabling Actions and Security, Working with Process & Inventory Totals, Configuring Informational Parameters, Zeroing the Flow Meters, Final Checkout Under Process Conditions and Backup / Save the Transmitter Configuration

**Objectives**

- Know how to operate & view process variables
- Know how to enable & disable actions and security
- Know how to work with process & inventory totals
- Know how to configure Informational parameters
- Know how to Zero the Flow Meters
- Know how to perform Final checkout under process conditions
- Know how to backup / save the transmitter configuration

**Topics**

- Operating & Viewing Process Variables
- Enabling & Disabling Actions and Security
- Working with Process & Inventory Totals
- Configuring Informational Parameters
- Zeroing the Flow Meters
- Final Checkout Under Process Conditions
- Backup / Save the Transmitter Configuration

**Prerequisites**

None

**Audience**

This course is designed for personnel responsible for the installation, configuration, verification and maintenance of Micro Motion Coriolis flow meters.

## COURSE E1015

CEUS: 0.2

**Micro Motion Coriolis 5700 Transmitter Installation & Configuration****Overview**

This course contains an overview of the features and advantages of the Micro Motion Coriolis 5700 transmitter. It also includes how to install, characterize and configure the Micro Motion Coriolis 5700 transmitter.

**Objectives**

- Understand the advantages of the Micro Motion Coriolis 5700 Transmitter
- Know the features and capabilities of the Micro Motion Coriolis 5700 transmitter
- Know how to use these features, such as the fully configurable and customizable display
- Understand how SMV works for the Micro Motion Coriolis 5700 transmitter
- Know how to characterize and configure the Micro Motion Coriolis 5700 Transmitter using the display and ProLink

**Topics**

- Micro Motion Coriolis 5700 Transmitter Advantages
- Micro Motion Coriolis 5700 Transmitter Features and Capabilities
- Micro Motion Coriolis 5700 Transmitter Wiring and Installation
- Micro Motion Coriolis 5700 Transmitter Characterization and Configuration

**Audience**

This course is designed for personnel responsible for the installation, configuration, verification and maintenance of Micro Motion Coriolis flow meters.

## COURSE E1016

CEUS: 0.2

### Micro Motion Coriolis 4200 Transmitter Characterize & Configure Intermediate

#### Overview

This course contains an overview of the features and advantages of the Micro Motion Coriolis 4200 transmitter. It also includes how to install, characterize and configure the Micro Motion Coriolis 4200 transmitters.

#### Objectives

- Understand the advantages of the Micro Motion Coriolis 4200 Transmitter
- Know the features and capabilities of the Micro Motion Coriolis 4200 transmitter
- Know how to use these features, such as how to rotate the display
- Understand how SMV works for the Micro Motion Coriolis 4200 transmitter
- Know how to characterize and configure the Micro Motion Coriolis 4200 Transmitter using the display and ProLink

#### Topics

- Micro Motion Coriolis 4200 Transmitter Advantages
- Micro Motion Coriolis 4200 Transmitter Features and Capabilities
- Micro Motion Coriolis 4200 Transmitter Wiring and Installation
- Micro Motion Coriolis 4200 Transmitter Characterization and Configuration

#### Audience

This course is designed for personnel responsible for the installation, configuration, verification and maintenance of Micro Motion Coriolis flow meters.

## COURSE E1050

CEUS: 0.2

### Micro Motion Density & Viscosity Measurement in Industry

#### Overview

This training is designed to bring awareness about the important role that density and viscosity measurement has in a process, the challenges of good measurement and examples of solutions that Emerson has to offer to help users achieve top quartile performance. This training covers four key industries, however, the challenges and solutions presented can be applied to just about any other industry.

#### Topics

- Density And Viscosity Measurement In Industry Introduction
- Density And Viscosity Fundamentals
- Importance Of Measuring Density And Viscosity & Sampling Analysis Challenges
- Overview Of Density And Viscosity Measurement Technologies

#### Audience

##### Management Team

Plant Manager, Production Manager, Quality Manager, Plant Controller, Lifecycle / Reliability Manager, Safety Manager, Environmental Manager and Shipping / Receiving Manager

##### Engineering Team

Process Engineer, Production Engineer, Quality Engineer, Instrument Engineer, Reliability Engineer, Fiscal Metering Engineer, Safety Engineer and Environmental Engineer

#### Objectives

Know common Density and Viscosity industries Understand the fundamentals of density and viscosity Understand the importance of measuring density and viscosity and sampling analysis challenges Know density and viscosity measurement technologies.

## Measurement & Analytical

### Measurement

2326, 2327, 2333, 2320, 2322, C2323, 2320V, 2370, 2375, 2376, e2977, 7021, 2305, 2307, 2308, 2310, 2345, 2321, 2324, 2328, 2309, 2332, 2336, 2337, 2393, 2395, 2396, 2398, 2329, 2808, 2821, 2896, 2898, 2829, 2850, 2875, e2330, e2396, e2309

### Flow

2394, 2339C, 2340, 2340A, 2339SV, 2341, 2341A, 5715, 5716, e1010, e1011, e1012, e1013, e1014, e1015, e1016, e1050

### Liquid

2201, 2205, 2800, e2396, e2601

### Tank Gauging

RTG101, RTG102, RTG110, RTG111, RTG120, RTG130, RTG210, RTG211, RTG220, RTG311, RTG320

### Gas Chromatographs

R4100, R4105, R4170, R4210, R4212, R4213/R4214, R4215, R4311, R4315/R4316, e4070

### Process Gas Analyzers

2170, 2171, 2110, 2156, 2157,

### Combustion

2153, 2154

### Flame & Gas

2349, 2350, 2351

### Ultrasonic

D4270, D4262, D4119, D4530,

## COURSE 2326

CEUs: 2.18

## Rosemount Pressure & Temperature Products I

### Overview

This 4-day course explains how pressure and temperature transmitters function and how they are installed and calibrated. It emphasizes installation, proper set-up and calibration of Analog and HART® Pressure and Temperature Transmitters. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- Correctly perform installation and setup procedures
- Properly configure transmitters
- Properly calibrate transmitters
- Perform basic troubleshooting

### Topics

- Basic 4-20 mA Loop Setup
- Pressure Sensors
- Temperature Sensors (TC, RTD)
- Analog Transmitters (1151)
- HART® Communication
- Field Communicator
- Pressure Transmitters
- Temperature Transmitters
- Using AMS Device Manager to Configure and Calibrate Transmitters
- Installation
- Configuration
- Calibration
- Troubleshooting

### Prerequisites

Some experience in instrument calibration, maintenance, installation and operation would be helpful.

### Audience

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of measurement instrumentation.

## COURSE 2327

CEUs: 2.18

## Rosemount DP Flow Products

### Overview

This 2-day course explains how DP flow instruments function and how they are installed and calibrated. It emphasizes installation, proper setup and calibration/verification of DP flow instruments. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- Correctly install configure, calibrate multi-variable DP Flow Transmitters
- Perform DP Flow troubleshooting

### Topics

- Basic DP Flow Fundamentals
- DP Flow Sizing Calculations
- Multi-variable Flow Transmitters
- AMS Device Manager with Engineering Assistant Snap-ON (3095)
- Engineering Assistant for 3051SMV
- Field Communicator
- Test Equipment Selection
- Installation
- Configuration
- Calibration /Verification
- Troubleshooting DP Flow Installations

### Prerequisites

Some experience in instrument calibration/ verification, maintenance, installation and operation would be helpful.

### Audience

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, verification, maintenance and troubleshooting of DP flow measurement instrumentation.

## COURSE 2333

CEUs: 2.1

**Rosemount DP Flow Products Level Products****Overview**

This 3-day course explains how level instruments function and how they are installed/calibrated/verified. It emphasizes installation, proper setup and calibration/verification of level instruments. The course uses lectures and labs to teach the students. Those who complete this class will be able to:

- Correctly install, configure, calibrate/verify, perform maintenance and troubleshooting on the following:
  - DP Level Transmitters
  - Guided Wave Radar Transmitters
  - Non-contacting Radar Transmitters
- Use Radar software for configuration and troubleshooting

**Topics**

- DP Level Fundamentals
- Electronic Remote Sensors
- Radar Applications
- Radar Instruments
- Radar PC Software
- Field Communicator
- Test Equipment Selection
- Installation
- Configuration
- Calibration /Verification
- Troubleshooting

**Prerequisites**

Experience in instrument calibration, maintenance, installation and operation would be helpful.

**Audience**

This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of level measurement instrumentation.

## COURSE 2320 &amp; 2320V

CEUs: 2.1

**Rosemount Process Measurement Instrumentation Introduction****Overview**

This 3-day course explains the measurement technology for Pressure, Temperature, Flow and Level instruments. It will also emphasize proper installation of these instruments.

**Topics**

- 4-20 mA Electrical Loops
- Pressure Sensors
- Pressure Instruments
- Temperature Sensors
- Temperature Instruments
- Analog Transmitters
- Smart Transmitters
- HART® Communication Protocol
- Field Communicator
- DP Flow
- Flow Technology Overview
- DP Level
- Electronic Remote Sensors
- Guided Wave Radar Level Instruments
- Non-Contacting Radar Level Instruments
- Self-Organizing Wireless Networks

**Prerequisites**

Students should have experience with process instrumentation and measurements.

**Audience**

This course is intended for engineers and other persons responsible for the selection and installation of instruments for measurement types of Pressure, Temperature, Level, and Flow.

**Course Type**

Classroom & Virtual



**COURSE 2370****CEUs: 2.1****Rosemount Fieldbus Measurement Instruments****Overview**

This 3-day class covers the integration of FOUNDATION™ fieldbus compliant measurement devices using the Field Communicator, Emerson USB Fieldbus Modem, AMS Device Manager, and other hosts. Upon completion of this course students will be able to: install, configure, calibrate, and troubleshoot Rosemount Fieldbus devices which include the 3051C and 3051S Pressure Transmitters, 644, 3144P and 848 Temperature transmitters 5600, 5400 and 5300 Radar Level Transmitters, and 752 Indicator.

**Topics**

- FOUNDATION™ fieldbus Overview
- Fieldbus: Wiring/Segment Design/Function Blocks
- Field Communicator Operation
- AMS Device Manager Operation
- Theory of Operation, Installation, Configuration, Maintenance, Calibration and Troubleshooting on the following:
  - 3051C Pressure Transmitter
  - 3051S Pressure Transmitter
  - 3144P, and 644 Temperature Transmitters
  - 848 Temperature Transmitter
  - 5600, 5400 and 5300 Radar Level Transmitters
  - 752 Fieldbus Indicator

**Prerequisites**

Experience in instrument calibration, maintenance, installation, and operation would be helpful.

**Audience**

This course is for individuals responsible for installing, configuring, calibrating, and troubleshooting FOUNDATION™ fieldbus measurement devices.

**Note**

Course may be conducted using other Fieldbus Hosts, such as AMS Device Manager.

**COURSE 2375****CEUs: 1.4****Rosemount Wireless Self-Organizing Network with Host Integration****Overview**

This 2-day course explains how Self-Organizing Wireless Networks function and how they are installed, setup, configured and integrated. It emphasizes planning, proper installation and startup, configuration, maintenance, and integration. The course uses lectures and labs to maximize the hands on experience and teach the students. Students who complete this course will:

- Correctly install and setup the 1420 & 1410 Wireless Gateway
- Properly install and configure Wireless Transmitters
- Properly integrate Host interfaces to the Wireless Gateway

**Topics**

- How Self-Organizing Networks Function
- Self-Organizing Networks Best Practices
- Network Components
- 1420 & 1410 Installation and Setup
- Network Parameters
- Wireless Transmitters Installation, Configuration, Maintenance and Calibration
- THUM Installation, Wiring and Configuration
- Integrating and Operating AMS Device Manager with the 1420 Wireless Gateway
- Operation of AMS Wireless SNAP-ON
- Modbus Serial Integration
- Modbus TCP Integration
- OPC Integration

**Prerequisites**

Some experience in Wireless Networks and Host integration would be helpful.

**Audience**

This course is intended for technicians, engineers and other plant personnel who need to know how to design, install, setup, configure, maintain and troubleshoot Wireless Self-Organizing Networks and their components.

**COURSE 2376****CEUs: 0.7****Rosemount Wireless Self-Organizing Network****Overview**

This 1-day course explains how Self-Organizing Wireless Networks function and how they are installed, setup, and configured. It emphasizes planning, proper installation and startup, configuration and maintenance. The course uses lectures and labs to maximize the hands on experience and teach the students. Students who complete this course will:

- Correctly install and setup the 1420 & 1410 Wireless Gateway
- Properly install and configure Wireless Transmitters

**Topics**

- How Self-Organizing Networks Function
- Self-Organizing Networks Best Practices
- Network Components
- 1420 & 1410 Installation and Setup
- Network Parameters
- Wireless Transmitters Installation, Configuration, Maintenance and Calibration
- THUM Installation, Wiring, Configuration
- Integrating and Operating AMS Device Manager with the 1420 & 1410 Wireless Gateway and Wireless Devices

**Prerequisites**

Some experience in Wireless Networks and Host integration would be helpful. Completion of the Wireless classes on Plantweb University would be beneficial.

**Audience**

This course is intended for technicians, engineers and other plant personnel who need to know how to install, setup, configure, maintain and troubleshoot Wireless Self-Organizing Networks and their components.

## COURSE E2977

CEUs: 0.7

**Rosemount Wireless Pressure Gauge****Overview**

The Wireless Pressure Gauge on-demand course offers a comprehensive set of “How to” lessons designed to bring an interactive learning environment over the internet directly to you at any time. By the end of the course, you will know how to specify, install, configure, maintain, and troubleshoot the gauge. In addition, the course provides learning to maximize the use of the Wireless Pressure Gauge’s new capabilities.

## COURSE 7021

CEUs: 2.1

**AMS Device Manager with Rosemount HART Instruments****Overview**

Learn the installation, calibration, maintenance, and troubleshooting of measurement instrumentation using AMS Device Manager. This 3-day course teaches maintenance and calibration of measurement devices using AMS Device Manager software to communicate and track information. The student will learn how pressure and temperature transmitters function, are installed, and calibrated using AMS Device Manager. The course uses hands-on training, labs, and lecture to teach the student how to:

- Configure and use AMS DeviceManager correctly perform transmitter installation and setup procedures
- Properly configure HART®transmitters
- Properly calibrate transmitters
- Perform basic troubleshooting-transmitters

**Topics**

- Configuring and Using AMS DeviceManager
- Viewing and Modifying Devices
- Creating a Plant Database Hierarchy and Adding Devices
- AMS Device Manager Browser Functions
- Audit Trail
- HART® Communication
- HART Transmitters (3051C, 3144P)
- Test Equipment Selection
- Transmitter Installation and Configuration
- Transmitter Calibration
- AMS Calibration Assistant
- Intelligent Calibrators
- Transmitter Troubleshooting

**Audience**

The hands-on focus is on skills required by engineers, technicians, or others that are new to the plant or instrument environment.

## COURSE 2305

CEUs: 0.7

**Rosemount 3051 Pressure Transmitter****Overview**

This 1-day course uses lectures and labs to teach the student how to install, configure, calibrate and maintain the Rosemount 3051 Pressure Transmitter. The student will also learn the operation of the Field Communicator. Students will:

- Explain the differences between Smart & Analog transmitters
- Identify 3051 parts and functionality
- Explain the principles of operation of the 3051
- Configure, calibrate and test 3051 Smart Pressure Transmitters using the Field Communicator or AMS Device Manager
- Properly install/troubleshoot the 3051 Smart transmitter

**Topics**

- Smart and Analog Transmitters
- 3051 Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the 3051 Smart Transmitter
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

**Prerequisites**

Knowledge of basic pressure fundamentals and pressure instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount 3051 Pressure Transmitter.

**Note**

This product is also included in the 2-day course 2329.

**COURSE 2307****CEUs: 0.7****Rosemount 3051 Fieldbus Pressure Transmitter****Overview**

This 1-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate and maintain the Rosemount 3051 Fieldbus Pressure Transmitter. The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- Identify 3051 parts and functionality
- Explain the principles of operation of the 3051
- Design and build a Fieldbus segment
- Configure, test, and calibrate the 3051 Fieldbus Pressure Transmitters using the Field Communicator or AMS Device Manager
- Properly install and troubleshoot the 3051 Fieldbus Transmitter

**Topics**

- 3051 Overview and Principles of Operation
- FOUNDATION™ Fieldbus Overview
- Fieldbus Wiring/Segment Design/Function Blocks
- Test Equipment Selection
- Bench Testing 3051 Fieldbus Transmitter
- Field Communicator Operation
- AMS Device Manager Operation
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

**Note**

Product is also part of course 2370.

**Prerequisites**

Knowledge of basic pressure fundamentals and pressure instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 3051 Fieldbus Pressure Transmitter.

**COURSE 2308****CEUs: 0.7****Rosemount 3051S Pressure Transmitter****Overview**

This 1-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate, troubleshoot, and maintain the Rosemount 3051S Pressure Transmitter. The student will also learn the operation of the Field Communicator or AMS Device Manager. Students who complete this course will be able to:

- Identify 3051S parts and functionality
- Explain the principles of operation of the 3051S
- Configure and test the 3051S HART® Pressure Transmitters using the Field Communicator or AMS Device Manager
- Properly install, configure, calibrate, and troubleshoot the 3051S HART transmitter

**Topics**

- 3051S Overview/Principles of Operation
- 3051S Installation and Options
- Test Equipment Selection
- Configure and Bench Testing the 3051S HART® Transmitter
- Configure & Test 3051S Advanced Features:
  - Alarm & Saturation Levels, Alarm Direction, Write Protection
  - Process Alerts, Scaled Variable
- Digital Trims/Calibration
- Troubleshooting and Maintenance

**Prerequisites**

Knowledge of basic pressure fundamentals and pressure instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting, and maintenance of the Rosemount 3051S Pressure Transmitter.

**COURSE 2310****CEUs: 0.7****Rosemount 3051S Multi-Variable Mass Flow Transmitter****Overview**

This 1-day course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, calibrate and maintain the Rosemount Model 3051SMV HART® Mass Flow Transmitter. Students who complete this course will:

- Identify transmitter parts and explain their functionality
- Explain the principles of operation of the transmitter
- Configure and test using the Field Communicator, AMS Device Manager, and the 3051SMV Engineering Assistant software
- Configure the compensated flow parameters using the 3051SMV Engineering Assistant Software
- Properly install & troubleshoot the 3051SMV transmitter

**Topics**

- DP Flow Fundamentals
- Overview and Principles of Operation
- Test Equipment Selection
- Temperature Sensor Wiring
- Bench Testing the Smart Transmitters
- 3051SMV Engineering Assistant Software
- Operation of the Field Communicator and AMS Device Manager
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

**Prerequisites**

Knowledge of basic Pressure, and DP Flow fundamentals and instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 3051S Multi Variable (MV) Transmitter.

**Note**

This product is also included in course 2327 & 2329.

**COURSE 2321****CEUs: 0.7****Rosemount 3144P Temperature Transmitter****Overview**

This 1-day course uses lecture and labs to teach the student how to install, configure, calibrate and maintain the Rosemount 3144P HART® Temperature Transmitters. The student will also learn the operation of the Field Communicator. Students who complete this course will:

- Identify 3144P parts and explain their functionality
- Explain the principles of operation of 3144P
- Configure, calibrate and test 3144P HART® Temperature Transmitters using the Field Communicator or AMS Device Manager
- Properly install and troubleshoot the 3144P Temperature Transmitters

**Topics**

- 3144P Overview and Principles of Operation
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing the 3144P HART® Transmitters
- Smart Transmitters
- Field Communicator Operation
- AMS Device Manager Operation
- Digital Trims/Calibration
- 3144P Dual Sensor Setup
- Configuration
- Installation and Start-Up
- Troubleshooting and Maintenance

**Prerequisites**

Knowledge of basic temperature fundamentals and temperature instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 3144P HART® Temperature Transmitters.

**Note**

This course can also be taught using the Rosemount 644. This product is also included in courses 2326 and 2329.

**COURSE 2324****CEUs: 0.7****Rosemount 3144P Fieldbus Temperature Transmitters****Overview**

This 1-day course uses lecture and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate, troubleshoot, and maintain the Rosemount 3144P Fieldbus Temperature Transmitters. The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- Identify 3144P parts & explain their functionality
- Explain principles of operation of the 3144P
- Design and build a Fieldbus segment
- Configure, calibrate, and test 3144P Fieldbus Temperature transmitters using the Field Communicator
- Properly install and troubleshoot the 3144P Fieldbus Transmitters

**Topics**

- 3144P Overview and Principles of Operation
- FOUNDATION™ fieldbus Overview
- Fieldbus Wiring
- Fieldbus Segment Design
- Fieldbus Function Blocks
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing 3144P Fieldbus Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

**Note**

This product is also part of 2370 course.

**Prerequisites**

Knowledge of basic temperature fundamentals and temperature instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3144P Fieldbus Temperature Transmitters.

**COURSE 2328****CEUs: 0.7****Rosemount 848 Fieldbus Temperature Transmitters****Overview**

This 1-day course uses lectures and labs to maximize the hands-on experiences and teach the student how to install, configure, troubleshoot, and maintain the Rosemount 848T Fieldbus Temperature Transmitters. The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- Explain the principles of operation of the 848T
- Configure, calibrate, and test the 848T Fieldbus temperature transmitter using the Field Communicator
- Design and build a Fieldbus segment
- Properly install and troubleshoot the 848T Fieldbus Transmitter

**Topics**

- 848T Overview and Principles of Operation
- FOUNDATION™ fieldbus Overview
- Fieldbus Wiring
- Fieldbus Segment Design
- Fieldbus Function Blocks (including the MAI, and ISEL Blocks)
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing the 848T Fieldbus Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance

**Note**

This product is also included in the 3-day 2370 Fieldbus Course.

**Prerequisites**

Knowledge of basic temperature fundamentals and temperature instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 848 Fieldbus Temperature Transmitters.



**COURSE 2309****CEUs: 0.7****Rosemount DP Level & Electronic Remote Sensor (ERS™) System****Overview**

This 1-day course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, calibrate, maintain, and troubleshoot the Rosemount 3051S ERS System. Students who complete this course will:

- Identify transmitter parts and explain their functionality
- Identify 3051S ERS Hi & Lo sensors
- Explain the principles of operation of the ERS System
- Configure and test the ERS system using AMS Device Manager and the Field Communicator
- Perform zero trims and calibrate the ERS Sensors
- Properly install & troubleshoot the 3051S ERS System

**Topics**

- DP Level Technology
- ERS Technology
- ERS Overview and Principles of Operation
- ERS / DP Level Installation
- ERS Wiring
- ERS Configuration with AMS Device Manager and the Field Communicator
- ERS Module Assignments
- ERS Scaled Variable
- Bench Testing the ERS System
- ERS Zero Trims and Calibration
- Troubleshooting and Maintenance

**Prerequisites**

Knowledge of basic Pressure, and DP Level fundamentals and instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting and maintenance of the Rosemount 3051S Electronic Remote Sensors (ERS) System.

**Note:**

This product is also included in course 2333.

**COURSE 2336****CEUs: 0.7****Rosemount 5408 Non-Contacting Radar Level Transmitter****Overview**

This 1-day course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount 5408 Radar Level Transmitters. Students who complete this course will:

- Explain principles of operation of 5408 Radar
- 5408 Radar parts & explain functionality
- Properly install and wire the 5408 Radar
- Instrument Inspector & Radar Master plus (RM+) operation
- Configure and test the 5408 Radar
- Understand how to setup the 5408 Radar to work in different applications
- Properly troubleshoot the 5408 Radar
- Transmitter and the Installation using Radar Master plus software

**Topics**

- 5408 Overview and Principles of Operation
- Installation of the 5408 Radar
- Wiring the 5408 Radar
- Configuration of the 5408 Radar
- Radar Master plus Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling using Radar Master plus Software

**Prerequisites**

Knowledge of basic fundamentals & instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5408 NC Radar Level Transmitter.

**Note**

This product is also included in other Level course: 2333, 2896, & 2396

**COURSE 2337****Rosemount 5300 Guided Wave Radar Level Transmitter****Overview**

This 1-day course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount 5300 High Performance GWR Transmitters. Students who complete this course will be able to:

- Explain principles of operation of 5300 GWR
- Identify 5300 GWR parts & explain functionality
- Understand the available probe options and when each should be used
- Properly install and wire the 5300 GWR
- Configure and test the 5300 GWR
- Understand how to setup the 5300 GWR to work in different applications
- Properly troubleshoot the 5300 GWR Transmitter & Installation using Radar Master software

**Topics**

- 5300 Overview and Principles of Operation
- Installation of the 5300 GWR
- Wiring the 5300 GWR
- Configuration of the 5300 GWR
- Bench Testing the 5300 GWR
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling Using Radar Master Software

**Prerequisites**

Knowledge of basic fundamentals & instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 5300 High Performance Guided Wave Radar (GWR) Series HART® Radar Level Transmitter.

**Note**

5300 GWR HART® Level transmitter is also included in the 3-day Level course 2333.

**COURSE 2395****CEUs: 0.7****Rosemount 3300 & 5300 Guided Wave Radar Level Transmitters****Overview**

This 1-day course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount 3300 & 5300 Series HART® Radar Level Transmitters.

**Topics**

Students who complete this course will be able to:

- Explain the principles of operation of the 3300/5300 GWR
- Identify 3300/5300 GWR parts and explain their functionality
- Understand available probe options and when each should be used
- Properly install and wire the 3300/5300 GWR
- Configure and test the 3300/5300 GWR
- Understand how to setup the 3300/5300 GWR to work in different applications
- Properly troubleshoot the 3300 & 5300 GWR and the Installation using Radar Master software

**Prerequisites**

Knowledge of basic level fundamentals and instrumentation

**COURSE 2398****CEUs: 0.7****Rosemount 3051 Pressure & 3144P Temperature Transmitter****Overview**

This 1-day course uses lectures and labs to teach the student how to install and maintain the Rosemount 3051C Pressure and 3144P Smart Temperature Transmitter. The student will also learn the operation and inter-face capabilities of the Field Communicator. Students will:

- Explain the differences between Smart & Analog transmitters
- Identify 3051C and 3144P parts and functionality
- Explain the principles of operation of the 3051C and 3144P Transmitters
- Configure and test the 3051C Pressure and 3144P Temperature Transmitters using the Field Communicator
- Properly install/ troubleshoot the 3051 Pressure and 3144P Temperature transmitters

**Topics**

- Smart and Analog Transmitters
- 3051C & 3144P Overview and Principles of Operation
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing the 3051C & 3144P Smart Transmitter
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

**Prerequisites**

Knowledge of basic pressure and temperature fundamentals and instrumentation.

**Audience**

This course is designed for those individuals responsible for the installation and maintenance of the Rosemount 3051 Pressure, and 3144P Temperature Transmitters.

**COURSE 2329****CEUs: 1.4****Rosemount Pressure, Temperature & Multi-Variable Flow Transmitters****Overview**

This 2-day course uses lectures and labs to maximize the hands-on experiences and teach the student how to install, configure, calibrate, troubleshoot, and maintain the Rosemount 3051, 3144P, and 3051SMV Transmitters.

**Topics**

- Field Communicator Operation
- 3051 Pressure Transmitter Installation, Configuration, Calibration and Troubleshooting
- 3144P Temperature Transmitter Installation, Configuration, Calibration and Troubleshooting
- 3051SMV Multi-variable DP Flow Transmitter Installation, Configuration, Calibration and Troubleshooting

**Prerequisites**

Students should have experience with process instrumentation and measurements.

**Note**

Students must attend both days. Reference course, 2305 and 2321 2310 for further details.

## COURSE E2330

CEUs: 0.2

**Rosemount 2140 Level Detector****Overview**

This two-hour eLearning course will teach the student how to install, configure, calibrate, maintain, & troubleshoot the Rosemount 2140 Level Detector.

**Audience**

Instrument Technicians, I&E, Techs

**Objectives**

Students who complete this course will be able to:

- Explain the principles of operation of the Rosemount 2140
- Configure the device using various configuration tools, 475 Field Communicator, AMS Trex, AMS Device Manager
- Properly install, adjust the level, and troubleshoot the device

## COURSE E2396

CEUs: 0.2

**Rosemount 5408 Non-Contacting Radar Level Transmitters****Overview**

This two-hour eLearning course will teach the student how to: install, configure, calibrate, maintain, and troubleshoot the Rosemount 5408 Non-Contacting Radar Level transmitter.

## COURSE E2309

**Rosemount DP Level & Remote Diaphragm Seal Systems****Overview**

This technical education course covers basic theory of pressure based level measurement (DP Level) and builds to provide in-depth, technical information on how to specify, install, and maintain remote diaphragm Systems. Target students are individuals responsible for the specification, installation, configuration, and/or maintenance of pressure-based level measurement instrumentation including remote diaphragm seals and Electronic Remote Sensors (ERS™) Technology.

**Topics**

- Learn how pressure based level systems works including wet/dry legs, remote diaphragm seals, level transmitters, and Rosemount 3051S Electronic Remote Sensors (ERS™) Technology
- Specify a Rosemount 1199 remote diaphragm seal, Level Transmitter, and 3051S ERS™ model number
- Discuss the application factors and product selections that affect system performance
- Install and configure both a remote seal and an entire pressure based level system
- Perform common maintenance and troubleshooting techniques on an installed remote diaphragm seal and Electronic Remote Sensors (ERS™) System

**Prerequisites**

None

**Audience**

I&E techs, Technicians, Maintenance Engineers and Process Engineers



## COURSE 2339C

CEUs: 0.4

**Micro Motion Coriolis Flow Meters Introduction****Overview**

This half day course is a condensed version of the 2358 course. This course briefly reviews the theory of operation, meter components and installation. The focus of the class is to provide a hands-on experience configuring the Micro Motion metering system. Students will learn the Series 1000/2000 transmitters using one of these configuration tools: ProLink III, HC475, AMS Device Manager or the local operator interface. Public classes typically use ProLink III. Customers can choose which device is used for classes held at their site. This course also includes an introduction to Micro Motion's new 5700 transmitter.

After completing this training, students will also get unlimited access to the Micro Motion's Online Training (e1010,e1011,e1012,e1013,e1014) for a year. This online training cost \$400/license per year if purchased separately.

**Topics**

- Briefly Explain the Fundamentals for How a Micro Motion Coriolis Meter Works and the Function of the Key Components
- Have a basic understanding of the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter
- Perform a Basic Configuration of the Metering System to Measure Flow, Density and Temperature for Various Applications
- Diagnose and Know how to Correct the Most Common Meter and Process Issues

**Prerequisites**

Some prior experience working with Micro Motion Coriolis meters is recommended. Students with no past experience can benefit if their learning objectives are to get a basic intro to operation, installation, configuration and troubleshooting. For all attendees, it is assumed they have a basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing.

**Audience**

This class is intended as a refresher course for anyone that is involved with properly configuring and troubleshooting a Micro Motion flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers. This class is also intended to be taught as two, 1/2-day repeat sessions to accommodate customers who need to train their entire department but must also maintain the operation of their plant by scheduling their employees between an AM/PM training sessions.

## COURSE 2340

CEUs: 0.7

**Rosemount 8700 Series Magnetic Flow Meters Intermediate****Overview**

This 1-day course consists of a blend of lectures and hands-on exercises that cover how to install, configure, and maintain the Rosemount 8700 Series Magnetic Flow Meters Systems composed of the Model 8712 and 8732 transmitters and the 8705 Flanged and 8711 Wafer Sensors. The students will learn the operation and capabilities of Local Operator Interface (LOI), 475 Field Communicator, and/or AMS Device Manager and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

**Topics**

- Explain the Difference and Capabilities of the Rosemount 8700 Series Magnetic Flow Meters
- Identify Transmitter and Sensor Parts and Explain Functionality
- Explain Faraday's Law and the Principles of Operation of Magnetic Flow Meters System
- Configure and Test Transmitters Using the LOI, Field Communicator, or AMS Device Manager
- Properly Install/Troubleshoot the Rosemount Magnetic Flow Meters System

**Prerequisites**

Knowledge of basic flow fundamentals and instrumentation.

**Audience**

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Magnetic Flow Meters. Typical job functions include: maintenance technicians, instrument technicians and instrumentation engineers.



## COURSE 2341

CEUs: 0.7

**Rosemount 8800 Series Vortex Flow Meters Intermediate****Overview**

This 1-day course consists of a blend of lectures and hands-on exercises that cover how to install, configure, and maintain the Rosemount 8800 Series Vortex Flow Meters systems. The students will learn the operation and capabilities of the Local Operator Interface and HC475 Field Communicator and how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered.

**Topics**

- Explain the Differences and Capabilities of the Rosemount 8800 Series Vortex Flow Meters
- Explain the von Karman Effect and the Principles of Operation of Vortex Flow Meters.
- Identify Vortex Parts and Explain Functionality
- Configure and Test Transmitters using Field Communicator or AMS Device Manager
- Properly Install and Troubleshoot the Rosemount 8800 Series Vortex Flow Meters System

**Prerequisites**

None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

**Audience**

This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8800 Series Vortex Flow Meters. Typical job functions include; maintenance technicians, instrument technicians, and instrument engineers.

**COURSE 2200****CEUs: 0.7****Rosemount Liquid Analysis pH, Conductivity & ORP Theory****Overview**

This 1-day course provides a solid theoretical background in pH, Conductivity, and ORP measurements. Students who complete this course will be able to:

- Understand how each measurement is made
- Recognize installation/application problems
- Configure and calibrate instruments
- Implement a maintenance program
- Troubleshoot problems using diagnostics

**Topics**

- What is pH/Conductivity/ORP
- How pH/Conductivity/ORP Measurements are Made
- Physical Process Properties and How They Effect On-Line Measurements
- Proper Calibration Techniques
- Cleaning and Maintenance of a Sensor
- Choosing Correct Sensor for Any Process
- How to Decipher Diagnostics Readouts
- pH/Conductivity Sensor Overview
- pH/Conductivity/ORP Analyzer Overview

**COURSE 2205****CEUs: 0.7****Rosemount Liquid Analysis Measurement Theory****Overview**

This 7-hour class is fully customized to cover the specific measurements that the customer requests. A certified trainer will cover up to 4 subjects in one day. The 4 subjects may be measurement or product related. The list of measurements that can be bundled into a tailored made training course are pH, ORP, contacting conductivity, toroidal conductivity, turbidity, chlorine, dissolved oxygen, and ozone. Each measurement theory has its own duration which can be modified to fit the customers' time frame needs.

**Topics**

- Installation and Application Problems
- Configuration of Outputs / Alarms (If applicable)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration & Maintenance
- Troubleshooting

**COURSE E2601****CEUs: 0.1****Rosemount 1056 Dual Input Analyzer****Overview**

Introduction to the 1056 Dual Input Analyzer, including overview of functions, mechanical and electronic installation, adding sensor boards and wiring sensors, and using the interface. Basic installation, configuration and calibration training in the 1056 Analyzer

## COURSE RTG101

CEUs: 3.5

**Rosemount Tank Gauging System Training****Overview**

This 5 day Tank Gauging Technical Product Training focuses on the 5900 System, our Wireless Tank Gauging System, a little bit about Pro & Rex and other field equipment relevant to the Rosemount Tank Gauging System. The training covers installation, configuration and troubleshooting of our products, as well as general TankMaster functions. Students who complete this course will be able to:

- Perform Installation and Setup Procedures
- Configure a Tank Gauging System
- Plan a Wireless Installation
- Perform Basic Troubleshooting

**Topics**

- System Overview
- Rosemount 2460 System Hub
- Rosemount 2410 Tank Hub
- Rosemount 5900 Gauges
- Rosemount 2230 Graphical Field Display
- Rosemount 2240S Multi-Input Temperature Transmitter
- Rosemount 5300/5408
- Field Communication and TCP/IP
- Electrical and Mechanical Installation
- System Configuration
- LNG and Other Liquefied Gases
- Emerson Wireless
- Emulation
- Overfill Prevention
- SIL
- Troubleshooting

**Prerequisites**

- Technical background.
- This course is suitable for service engineers and can also be good for project and sales engineers. It is a good introduction for both employees and customers.

**Audience**

This course is for service engineers and can also be good for project and sales engineers. The course includes both practical and theoretical training and is open for Emerson employees, LBPs and customers.

## COURSE RTG102

CEUs: 2.8

**Rosemount TankMaster Software Training****Overview**

This 4 day TankMaster Training covers more detailed information about TankMaster functions.

**Topics**

- System Overview
- Volume Calculations
- WinOpi Tools Menu
- TankMaster Mobile
- Host Communication, TCP/IP and OPC
- TankMaster Batch
- Custom Views and Translation
- Network Basics
- TankMaster to Enraf
- Redundancy
- Floating Roof Monitoring
- Administrator Program, Backup & Restore
- TankMaster Hybrid & HTG
- Troubleshooting

**Prerequisites**

It is required that you previously attended the RTG101 Rosemount Tank Gauging System Training course or have very good knowledge of the Rosemount Tank Gauging System.

**Audience**

This course is suitable for anyone who works with TankMaster, including customers who is using WinOpi as the operator interface. The course is open for Emerson employees, LBPs and customers. The course includes both practical and theoretical training.

## COURSE R4100

CEUs: 2.1

**Rosemount 500 Gas Chromatographs Introduction****Overview**

This 3-day course gives students a basic understanding of how the Rosemount Analytical 500 and 700 gas chromatographs (formerly Danalyzer GCs) work, emphasizing chromatograph fundamentals and basic theory.

**Topics**

- Reviewing Basic Chromatography Principles
- Understanding Chemistry, Flow Configuration, and Gas Systems
- Understanding Basic Sample Systems
- Working with Chromatograph Hardware
- Setting Timed Events, Retention Times, and Response Factors
- Understanding Data Calculations
- Identifying Problems Using Chromatograms

## COURSE R4105

CEUs: 2.1

**Rosemount 700XA Gas Chromatographs Introduction****Overview**

This 3-day course gives students basic understanding of how Rosemount Analytical gas chromatographs 700XA (formerly Danalyzer GCs) work, emphasizing chromatograph fundamentals and basic theory.

**Topics**

- Reviewing Chromatography Principles
- Understanding Chemistry, Flow Configuration, and Gas Systems
- Reviewing Sample Systems
- Working with Chromatograph Hdwe
- Setting Timed Events, Retention Times, and Response Factors
- Understanding Data Calculations
- Reading Chromatograms
- Calibrating a Gas Chromatograph

**Note**

Classes typically start at 8AM CST on Tuesday and end at 5PM CST on Thursday to accommodate travel.

## COURSE R4170

CEUs: 2.1

**Rosemount 370XA Gas Chromatograph Intermediate****Overview**

This 3-day training is a level 1 course and includes theory, operations and maintenance practices for the Rosemount Analytical 370XA Gas Chromatograph (formerly Danalyzer GC). Module overview hardware and software overview as well as basic troubleshooting skills.

**Topics**

- Chromatographic Theory
- Detector Theory
- Understanding Chromatograms
- Startup Procedures
- Natural Gas Sample Handling
- Using 370XA Software Assistants
- Cal-Saver™
- Running Auto Valve Timing
- Module Initializations
- Calibrations, Validation & Routine Maintenance (Valve Rebuilding)
- Troubleshooting the module
- 370XA Hardware
- MON2020 Software



## COURSE R4213/R4214

CEUs: 2.8

**Rosemount 700XA Process Gas Chromatograph Intermediate****Overview**

This 5-day course is appropriate for those who have either worked with a GC for at least six months or completed the introductory gas chromatograph course. It prepares participants to operate and repair a Rosemount Analytical 700XA Gas Chromatograph.

**Topics**

- Understanding Gas Chromatography and Gas Chromatographs
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation of the Gas Chromatograph
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

## COURSE R4210

CEUs: 2.8

**Rosemount 500 Process Gas Chromatograph Intermediate****Overview**

This 5-day course is appropriate for those who have either worked with a Gas Chromatograph for at least six months or completed the Introductory Gas Chromatograph course. It prepares participants to operate and repair a Model 500 Gas Chromatograph.

**Topics**

- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation of a Gas Chromatograph
- Troubleshooting the 2350A Controller
- Configuring the 2350A Controller User Directory Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

**Prerequisites**

Students that have at least 6 months experience with Emerson GC's, just purchased an Emerson GC or are seeking a refresher course after having worked on their Emerson GC benefit most from this course. Candidates from non-technical backgrounds should consider taking R4100 Introduction to GC's (for Model 500, 700 or 1000)

## COURSE R4213

CEUs: 2.8

**Rosemount Process Gas Chromatograph Intermediate****Overview**

This 5-day course is appropriate for those who have either worked with a GC for at least six months or completed the introductory gas chromatograph course. It prepares participants to operate and repair a Rosemount Analytical 700XA & 1500XA Gas Chromatograph.

**Topics**

- Understanding Gas Chromatography and Gas Chromatographs
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation of the Gas Chromatograph
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

**Prerequisites**

Students that have at least 6 months experience with Emerson GC's, just purchased an Emerson GC or are seeking a refresher course after having worked on their Emerson GC benefit most from this course. Candidates from non-technical backgrounds should consider taking R4105 Introduction to GC's (for 700XA).

**Audience**

This course is best suited for students working in a technical environment.

**COURSE 2170****Rosemount X-Stream Process Gas Analyzers****Overview**

This 3-day course is a classroom training where students learn principles and practical operation of X2 analyzers. Through hands-on training, the student will learn on how to install, maintain, and troubleshoot the X2 analyzer. Using X2 Analyzer demo units students will:

- Understand the Photometric measurement principles such as the theory of Infrared and Ultraviolet
- Spectrometry, Paramagnetic and Thermal Conductivity
- Learn the signal processing of the electronic boards.
- Learn the test procedure for troubleshooting and diagnostics

**Topics**

- Introduction to the function of Physical parts
- Function of Electronic boards
- Test points and procedure
- Mechanical Assembly / Disassembly
- Programming of software parameters
- Calibration setup manual (Auto calibration when available)
- Analog outputs, and Digital Inputs /Outputs and Modbus setup
- Save / Load configuration functionality
- Spare parts
- Troubleshooting Procedure

**Prerequisites**

Basic Knowledge of PGA Analyzers is preferred.

**COURSE 2153****CEUs: 0.7****Rosemount Oxygen Flue Gas & 6888A Analyzers****Overview**

This 1-day course covers combustion measurement principles and the theory of operation of oxygen analyzers. The class will discuss the installation, operation, calibration and maintenance of the Rosemount 6888A Oxygen Analyzer.

**Topics**

- Combustion Requirements
- Methods of Oxygen Analysis
- Typical Uses of Oxygen Analysis
- Combustion Efficiency
- Zirconia (ZrO<sub>2</sub>) Oxygen Analysis
- Theory of Operation
- Oxygen Analyzer
- Installation
- Hardware
- Maintenance
- Troubleshooting
- Hart Communications

**COURSE 2154****CEUs: 0.7****Rosemount OCX8800 Oxygen & Combustibles Transmitter****Overview**

This 1-day course covers combustion measurement principles and the theory of operation for oxygen analyzers in general and the installation, operation, calibration and maintenance of the Rosemount OCX8800 Analyzers.

**Topics**

- Combustion Requirements
- Methods of Oxygen Analysis
- Typical Uses of Oxygen Analysis
- Combustion Efficiency
- Zirconia (ZrO<sub>2</sub>) Oxygen Analysis
- Theory of Operation
- Oxygen Analyzer
- COe Analyzer
- Installation
- Hardware
- Maintenance
- Troubleshooting
- Hart Communications

**COURSE 2350****CEUs: 0.7****Rosemount Millennium II Gas Detector Transmitter****Overview**

This 1-day course covers Gas Detection measurement principles and theory of operation. The class will discuss the installation, configuration, operation, calibration, maintenance and troubleshooting of the Rosemount Millennium II Gas Detectors. Upon completion students will know how to properly install, wire, configure, test with appropriate gases, and basic troubleshooting.

**COURSE 2351****CEUs: 0.7****Rosemount 975 Flame Detector Transmitter****Overview**

This 1-day course covers Flame Detection measurement principles and theory of operation. The class will discuss the installation, configuration, operation, calibration, maintenance and troubleshooting of the Rosemount 975 Flame Detectors.

**Topics**

- Optical sensors technology: UV, UV/IR, Multi IR
- Fuel types
- System design considerations
- Installation
- Proper wiring: terminals, 4-20mA current output
- Optical path components
- Configuration using: 475 Field Communicator, Winhost software
- Testing with flame simulator
- Optics maintenance

**Prerequisite**

None

**COURSE D4270****CEUs: 1.4****Compact Prover Operation & Maintenance****Overview**

This 2-day course covers the operation, installation and maintenance of the Daniel Compact Prover™.

**Topics**

- Theory of Operation: Double Chronometry and Specifications
- Overview of the Parts Which Make up the Compact Prover such as Actuator Assembly, Pneumatic Spring Chamber, Piston and Poppet, Optical Switches, Hydraulic Motor and Pump, and Solenoid Valve
- Installation: Prover and Meter Location, Nitrogen Spring Plenum Setting, and Power Requirements
- Troubleshooting and Repair of: Safety Barriers, Seal and O-ring Replacement, Detector Switches, Interface Board, Hydraulic and Nitrogen System, and Spare Parts
- Overview of Calibration: Seal Leak Test, Upstream and Downstream Calibration, and Waterdraw Data Sheet
- Overview of Prover Electronics: Programming, Input and Data Modes Using Software/Local Display, Circuit Module Description, and Diagnostics
- Proving Operations: Direct Proving and Master Meter Proving
- Prover Maintenance

**Prerequisites:**

Basic knowledge of flow measurement.

**COURSE D4262****CEUs: 1.4****S600 + Flow Computers Operation and Maintenance****Overview**

This 2-day course provides students with an appreciation of the operation, design, capabilities and configuration of the S600+ flow computer. This hands-on course deals with file transfer and machine recovery as part of the maintenance scope. The instructor will make use of the latest configuration software. Full supporting literature will be available to all students.

**Topics**

- Introduction to the S600+
- Board Removal and Layout
- Keypad Access and Security
- Menu Navigation
- Data/Mode Changing
- Alarm Handling and Configuration
- Configuring and Generating Reports
- Application Specific Functions
- Cold/Warm Starting Modes
- File Back-Up and Download
- Using the Configuration Software

**Prerequisites**

Basic knowledge of flow measurement

## COURSE D4119

CEUs: 1.4

**Basic Fluid Flow Measurement****Overview**

This 2-day course is foundation training for technicians, operators, technical support staff, and others who require knowledge of fluid flow measurement, meter selection, maintenance and proving methods. This course relates theory to practice which gives participants a better understanding and appreciation of the oil and gas industry. It is recommended in advance of product specific training courses.

**Topics**

- Introduction to Fluid Flow Measurement
- Basic Flow Measurement Laws
- Types of Fluid Flow Measurement
- Basic Reference Standards
- From Theory to Practice
- Fluids
- Flow
- Operations Considerations
- Maintenance of Metering Equipment
- Measurement and Meters
- Differential Meters
- Linear and Special Meters
- Read outs and Related Devices
- Proving Systems
- Auditing

**Prerequisites**

It is recommended that participants have basic understanding of process instrumentation prior to taking this training.

## COURSE D4530

CEUs: 1.4

**Metering Systems: Applications, Operations & Maintenance Introduction****Overview**

This 2-day course is an introduction to high accuracy fluid flow measurement systems and good practice for system operation and maintenance.

**Topics**

- Background to High Accuracy Fluid Flow Measurement
- Custody Transfer, Fiscal and Allocation Metering
- Commercial Agreements and Legal Requirements
- Flow Measurement Methods
- Qualitative Measurement
- Reference Standards Employed
- Flow and Energy Calculations
- System Maintenance
- Good Metering Practices

**Prerequisites**

Students should have a background in Process Control and Instrumentation

**Audience**

The course is aimed at Metering Systems operators and maintainers.



# SYNCADE



## COURSE 7180

CEUs: 3.2

## Syncade Operations Implementation

### Overview

This 4.5-day course aims to equip the students to understand where Syncade fits on a production environment. This includes the applications of different modules that Syncade has in a manufacturing environment. These modules are Security & Audit (SA), Document Control & Archiving (DCA), Training & Development (TD), Equipment Tracking (ET), Materials and Inventory Management (MM & IM), Order Management (OM), Weigh & Dispense (WD), and Quality Review Manager (QRM). This course also allows the students to build a basic recipe to be created via Recipe Authoring (RA) application and simulate it via Workflow (WF).

### Topics

- Manufacturing Operations Management
- Security and Audit (SA)
- Portal
- Document Control & Archiving (DCA)
- Training & Development (TD)
- Process Simulation
- Equipment Tracking (ET)
- Materials Management (MM)
- Inventory Management (IM)
- Recipe Authoring (RA) Overview
- Enumeration Sets
- Work Instruction (WI)
- RA Database Items
- Operations (OP), Unit Procedures (UP), Procedures (PRC)
- Process Segment (PS)
- Master Recipe (MR)
- Order Management (OM)
- Weigh & Dispense (WD)
- Workflow (WF)
- Manufacturing and Quality Review (MR/QRM)

### Prerequisites

None

### Audience

Engineers and IT professional who are new to Syncade and will be involved in usage and configuration of Syncade modules.

## COURSE 7181 &amp; 7181V

CEUs: 2.8

## Syncade Recipe Authoring Principles

### Overview

A 4-day intensive recipe authoring course, which focuses on how users can effectively write recipes in Syncade Recipe Authoring application using different strategies. These may include combination of principles in defining the work instruction and its parameters, configuring effective recipe steps pathways, automating tasks through behaviors, and understanding parameter data links implementation. Other recipe authoring functions are also discussed with respect to its formula and recipe hierarchy definitions. Supplementary recipe authoring tools, which includes RA Behavior Editor and Resource Editor, will also be discussed. An overview on DeltaV-Syncade integration options will also be explored.

### Topics

- Batch Process Overview
- Defining the Batch Process
- Configuring Work Instructions
- Recipe Steps Pathway
- Behaviors
- Parameter Data Link
- Formula
- Resource Editor
- Configuring Recipes
- RA Database Update
- DeltaV Recipes
- Integrated Recipes Overview

### Prerequisites

7180 Syncade Operations Implementation

### Audience

Engineers and IT professionals who will be involved in authoring and validating Syncade recipes.

### Course Type

Classroom & Virtual

**COURSE 7182V****CEUs: 2.1****Syncade Quality Review Manager [Virtual]****Overview**

This course aims to equip students how to effectively configure and operate manufacturing review via review-by-exception methodology using the Quality Review Manager (QRM) of Syncade Operations suite. This course discusses QRM settings and exception generation methodologies with hands on workshop to facilitate learning. Exception reviews, resolution, and manufacturing review through the QRM will also be explored. This course allows the students to see the entire review-by-exception approach of closing an order.

**Topics**

- Quality Review Manager Overview
- QRM Administration
- General Settings
- Severities
- Resolutions
- Exception Types
- Perspectives
- Email Templates
- Subscriptions
- Manufacturing Review
- Syncade Exception Triggers
- Automation Exception Triggers
- Quality Review Manager Operations

**Prerequisites**

7181 (Recipe Authoring Principles)

**Audience**

MES Engineers, Process Engineers, Business Analyst, System Administration, Quality and Validation Engineers

**COURSE 7183V****CEUs: 2.1****Syncade Equipment Management [Virtual]****Overview**

This 3-day course will provide the user with the necessary skills to create, configure and maintain equipment used in the production process. Users will configure equipment classes and equipment that will provide a solution for managing equipment use, maintenance and calibration information. Events will be set upon the equipment class that define actions that can be performed, or need to be performed, on equipment created from the equipment class. Rules and groups will be configured to assist in implementing controls on equipment and when certain events need to occur. Schedules will be created to set up periodic preventive maintenance and work orders will be created to cover the unscheduled activities that may be needed to fully utilize production equipment. Recipes will be created to manage equipment hygienic, assembly, and usage states using default behaviors.

**Topics**

- Equipment Management Overview
- Equipment Class
- Equipment Instance
- Performing Events
- Groups & Rules
- Container Contents
- Parameter, Materials, Labor, & References
- Equipment Management Recipes
- Equipment Workflow
- Calibration
- Work Order
- Equipment Tracking Administration

**Prerequisites**

7181 (Recipe Authoring Principles)

**Audience**

MES Engineers, Recipe Authors, Process Engineers, and Quality Engineer

**COURSE 7184V****CEUs: 2.1****Syncade Suite Operations [Virtual]****Overview**

This course is for operators, supervisors, and managers responsible for fulfilling manufacturing activities using Syncade Operations. This 2.5-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the Syncade Operations modules. Activities that will be explored on a specific Syncade module in this course are as follows:

- Viewing effective documents (DCA)
- Training self-certification (TD)
- Perform equipment events and launch equipment workflows (ET)
- Understand basic batch terminology
- Understand order lifecycle and performing electronic workflows (OM, WD, and WF)
- Respond to batch exceptions and generating batch reports (QRM)

**Topics**

- Operations Management
- Documents and Trainings
- Simulated Process
- Equipment Management
- Materials and Inventory Management
- Recipe Overview
- Order Management and Execution
- Weigh & Dispense
- Workflows
- Manufacturing Review
- Quality Review Manager
- Syncade Portal

**Prerequisites**

None

**Audience**

Production personnel especially operators, supervisors, managers, or quality engineer.



**COURSE 7185V****CEUs: 2.8****Syncade Manufacturing Management [Virtual]****Overview**

This class will provide the user with the necessary skills to create and manage all types of materials as they flow into, through and out of the production environment during order execution. Users will create material masters to define the material characteristics, create inventory, create and execute orders, allocate materials, create material samples, track lots and containers and perform weigh and dispense activities. Recipes will also be created to accomplish these activities using Emerson standard behaviors.

**Topics**

- Manufacturing Management Overview
- Materials Management
- Inventory Management
- Lots and Containers
- Order Management
- Creating Orders.
- Material Allocation
- Material Dispensing
- Trusted Dispensing
- Consuming Inventory
- WD Equipment Recipes
- Material Handling Recipes
- Manufacturing and Quality Review
- Manufacturing Administration
- Materials Transaction

**Prerequisites**

7181 - Syncade Recipe Authoring Principles

**COURSE 7186V****CEUs: 2.8****Syncade Recipe Authoring Advanced [Virtual]****Overview**

This course aims to equip advanced users who are already familiar with elementary principles of creating recipes using the Syncade Recipe Authoring (RA) application and its interaction with other Syncade modules by building even more complex recipes. These complex recipes are designed to work with other systems, such as DeltaV. The recipe to be developed in this course explores different integration approach with DeltaV recipes such as early binding and late binding recipes. To understand these approaches, other Syncade tools are also to be discussed in this course such as Service Controller (SC) Consumer, Event Monitor, and Business Integrator.

**Topics**

- Recipe Fundamentals
- Simulated Process
- Parameters
- SC Consumer
- Event Monitor
- Bill of Materials
- Business Integrator
- Workflow Types
- Recipe Objects
- OPC Communications
- DeltaV Batch Modules and Recipes
- Integration Options

**Prerequisites**

7009/7409, 7016 (DeltaV Batch Implementation), 7183 (Equipment Management), 7185 (Manufacturing Management)

**Audience**

MES Engineers, DCS Engineers, Recipe Authors



# TRAINING CENTER CONTACTS



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**Micro Motion/Rosemount:**

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**Refining Process Training:**

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**Roxar Flow Measurement:**

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**Flow Europe Training Center**

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**Stavanger Training Center**

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**Baar Training Center**

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**United Kingdom (Leicester) Training Center**

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# LEARNING PATHS



PLANT PERSONNEL / ENGINEERING
7009V DELTAV OPERATION IMPLEMENTATION 1 - INTRODUCTION [Virtual]
7016V DELTAV SYSTEMS BATCH IMPLEMENTATION
7017V DELTAV SYSTEMS BATCH IMPLEMENTATION II [INTERMEDIATE]

ENGINEERING
7076V DELTAV PMO CONFIGURATION STANDARD [Virtual]
7201V ADVANCED CONTROL SUITE [Virtual]

ADMINISTRATION / TECHNICIANS
7202V DELTAV MODEL PREDICTIVE CONTROL
E7046 DELTAV BATCH ANALYTICS MODEL BUILDER INTRODUCTION
7305V DELTAV SIS IMPLEMENTATION [VIRTUAL]
7027 DELTAV SYSTEM ADMINISTRATION
7029 DELTAV VIRTUALIZATION
7039 AMS DEVICE MANAGER WITH DELTAV
7018 DELTAV HARDWARE & TROUBLESHOOTING
7030 DELTAV SIS IMPLEMENTATION [VIRTUAL]

PLANT PERSONNEL / ENGINEERING
7032 DELTAV FIELDBUS DEVICES CONFIGURATION & CONTROL
7037 DELTAV & COMMUNICATION BUS INTERFACES
7303 DELTAV SAFETY INSTRUMENTED SYSTEM WITH SLS 1508 MAINTENANCE

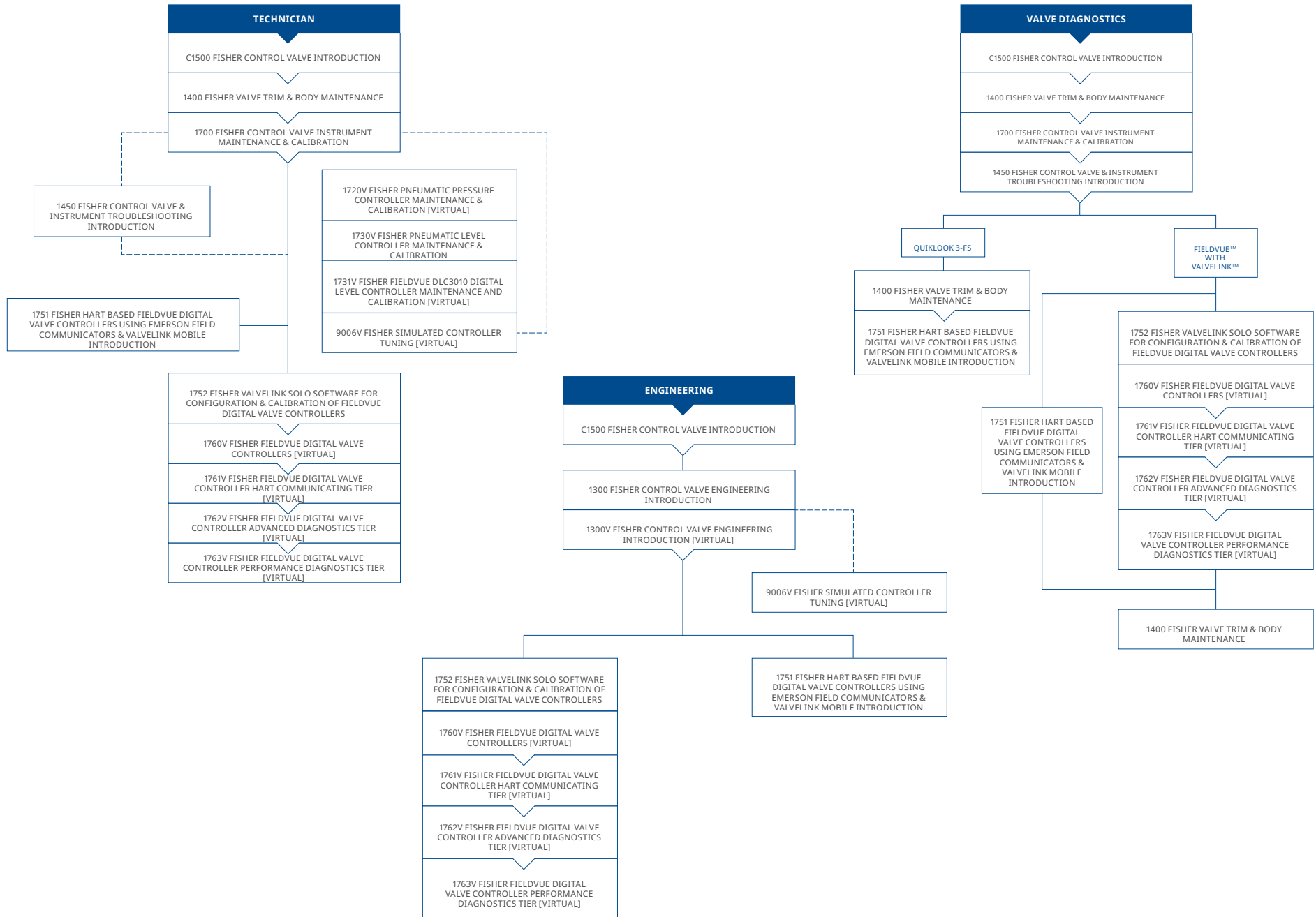
ENGINEERING
7304 DELTAV SIS WITH ELECTRONIC MARSHALLING MAINTENANCE
7014V DELTAV BATCH OPERATION - VIRTUAL
E7044 DELTAV CONTINUOUS OPERATION (V11/V12)
DELTAV ESSENTIAL OPERATOR TRAINING SOLUTION
2370 ROSEMOUNT FIELDBUS MEASUREMENT INSTRUMENTS
7030 DELTAV FIELDBUS DEVICES MAINTENANCE
7032 DELTAV FIELDBUS DEVICES MAINTENANCE



COURSE NUMBER	COURSE NAME	PLANT ENGINEERS	MAINTENANCE TECHNICIANS	PLANT OPERATORS	CONTROL SYSTEM ADMINISTRATORS	PLANT MANAGEMENT
7009	DeltaV Implementation I	C	A		C	
7012	DeltaV Operator Interface For Continuous Control			C		A
7014	DeltaV Operator Interface For Batch Control			C		A
7016	DeltaV Systems Batch Implementation	C				
7017	DeltaV Implementation Ii	A				
7018	DeltaV Hardware & Troubleshooting	A	C		A	
7020	Ams Device Manager	A	C			
7026	DeltaV CyberSecurity	A			C	
7027	DeltaV Systems Administration For Windows 7 & Server 2008				C	
7028	DeltaV Virtualization Administration	A			C	
7029	DeltaV Virtualization				A	
7030	Fieldbus Devices		A			
7032	Fieldbus Systems & Devices	A	A			
7037	Communication Interfaces With The DeltaV System	A	A			
7039	Ams Device Manager With DeltaV	A	C			
7076	DeltaV Pmo Configuration Standard	A				
7201	DeltaV Advanced Control	A				
7201cv	DeltaV Insight	A				
7202	DeltaV Model Predictive Control	A				
7203cv	DeltaV Advanced Control - Custom	A				
7303	DeltaV Safety Instrumented Systems With SIs Maintenance		A			
7304	DeltaV Safety Instrumented Systems With Electronic Marshalling Maintenance		A			
7305	DeltaV Sis Implementation	A				
7409	DeltaV Implementation Using DeltaV Live	C	A		C	
7412	DeltaV Live Continuous Operations			C		A
7414	DeltaV Live Batch Operations			C		A
7425	DeltaV Live Graphics Interface Advanced	A			A	
9025	Control Loop Foundation	P	P			P

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**KEY:** P - Primer C - Core A - Advanced / Additional Competencies



TECHNICIAN
2326 ROSEMOUNT PRESSURE AND TEMPERATURE PRODUCTS
2327 ROSEMOUNT DP FLOW PRODUCTS
2333 ROSEMOUNT DP FLOW PRODUCTS LEVEL PRODUCTS
7021 AMS DEVICE MANAGER WITH ROSEMOUNT HART INSTRUMENTS

ENGINEERING
2326 ROSEMOUNT PRESSURE AND TEMPERATURE PRODUCTS
2327 ROSEMOUNT DP FLOW PRODUCTS II
2333 ROSEMOUNT DP FLOW PRODUCTS LEVEL PRODUCTS
7021 AMS DEVICE MANAGER WITH ROSEMOUNT HART INSTRUMENTS
2370 ROSEMOUNT FIELDBUS MEASUREMENT INSTRUMENTS
2375 ROSEMOUNT WIRELESS SELF-ORGANIZING NETWORK WITH HOST INTEGRATION

## CONTINUOUS CONTROL OPERATORS

Your operators' process knowledge and skill levels affect how your process is run, which can directly impact your facility's bottom line.

Emerson Education Services can dramatically boost your personnel skills and performance and reinforce job competencies.

Emerson Operator Curriculum Path provides focused, in-depth, objective-based training on product-specific procedures for proper operation and maintenance of your DeltaV distributed control system. Your operators get practical application skills through dedicated classroom facilities and hardware. Train your operator for peak performance and process profitability.

### SELF-GUIDED PRIMERS

- e9025, Control Loop Foundation

### CORE COMPETENCIES

- 7012, DeltaV Operator Interface for Continuous Control
- DeltaV Essential Operator Training Solution

### ADDITIONAL COMPETENCIES

- 7009, DeltaV Implementation I

### JOB COMPETENCIES

- Ensure Safe and Effective Operation
- Communicate production status
- Work turnaround projects
- Management of Change process of standard operating procedures
- Recognize and effectively respond to unusual process issues
- Troubleshoot difficult production issues
- Suggest Production improvements
- Alarm Management
- Tune loops

## I&E MAINTENANCE TECHNICAL

Your maintenance technicians' process knowledge and skills can affect your facility's performance, up-time, and maintenance cost—and ultimately your bottom line.

Emerson Education Services can dramatically boost your personnel skills and performance and reinforce job competencies.

Emerson I&E maintenance Technician Curriculum Path provides focused, in depth, objective-based training on product-specific procedures for proper maintenance of your DeltaV distributed control system. Your maintenance technicians get practical applications skills through dedicated classroom facilities and hardware.

### SELF-GUIDED PRIMERS

- e9025, Control Loop Foundation

### CORE COMPETENCIES

- 7018, DeltaV Hardware & Troubleshooting
- 7020, AMS Device Manager or 7039, AMS DeviceManager with DeltaV

### ADDITIONAL COMPETENCIES

- 7009, DeltaV Implementation I
- 7016 DeltaV Batch Implementation
- 7030 Fieldbus Devices
- 7303/4, DeltaV SIS Maintenance
- 7037, Communication Bus Interfaces with DeltaV Systems

### JOB COMPETENCIES

- Maintain, troubleshoot, and make configuration changes to Basic Process Control System and Safety Instrumented Systems (SIS)
- Connect to HART® & Fieldbus devices
- Calibrate & commission devices, instruments and valves
- Proactively monitor devices for alerts, troubleshoot device problems & faulty assets
- Effectiveness of Maintenance Reliability Program



## BATCH OPERATORS

Your batch operators' process knowledge and skills levels affect how your process is run, which can directly impact your facility's bottom line.

Emerson Education Services can dramatically boost your personnel skills and performance and reinforce job competencies.

Emerson Batch Operator Curriculum Path provides focused, in depth, objective-based training on product-specific procedures for proper operation and maintenance of your DeltaV distributed control system. Your batch operators get practical application skills through dedicated classroom facilities and hardware.

## SELF-GUIDED PRIMERS

- e9025, Control Loop Foundation

## CORE COMPETENCIES

- 7014, DeltaV Operator Interface for Batch
- DeltaV Essential Operator Training Solution

## ADDITIONAL COMPETENCIES

- 7009, DeltaV Implementation I
- 7016 DeltaV Batch Implementation

## JOB COMPETENCIES

- Safely operate batches from start to finish
- Monitor batch for actionable information to keep batch within specification
- Perform manual batch tasks
- Update, review and report operator log book
- Manage sample collection with LIMS
- Provide production status during shift, anomalies, equipment, etc.



FINAL CONTROL										
PLANT MANAGEMENT & ENGINEERING LEARNING PATHS	PLANT MANAGEMENT					PLANT CONTROL & ENGINEERING				
	PLANT ENGINEERS	PRODUCTION MANAGER	ENGINEERING MANAGER	RELIABILITY MANAGER	OPERATOR	CONTROL SYSTEM ENGINEER	CONTROL SYSTEM ADMIN.	E&I ENGINEER	ENGINEER	PROCESS ENGINEER
Control Valve Engineering I	A	A	A	A		A			C	C
Control Valve Engineering II									C	A
Valve Technician I	A	A	A	A	A		A			A
FlowScanner Data Acquisition & Interpretation									A	
Advanced FlowScanner Diagnostic Interpretation									A	
Valve Technician II									A	
Instrument Technician							A	A		
FIELDVUE™ Digital Valve Controller Setup & Diagnostics using 475 Field Communicator & ValveLink™			A	A	A				A	A
ValveLink Software for Diagnostics of FIELDVUE – Digital Valve Controller									A	A
FOUNDATION™ fieldbus FIELDVUE Digital Valve Controller			A	C	A				A	A
Introduction to Fisher™ Control Valves	P	P	P	P	P	P	P	P	P	P

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PLANT MAINTENANCE & IT LEARNING PATHS	FINAL CONTROL									
	INSTRUMENT TECHNICIAN	VIBRATION ANALYST	ROTATING EQUIPMENT MECHANIC	RELIABILITY DATA COLLECTOR	ELECTRICIAN	LUBRICATION SPECIALIST	IT ADMIN.	INSTRUMENT. ENGINEER	UNIT MAINTENANCE ELECTRICIAN	MECHANIC
Control Valve Engineering I								C		
Control Valve Engineering II										
Valve Technician I	C				A			A	C	C
FlowScanner Data Acquisition & Interpretation	C			C					A	A
Advanced FlowScanner Diagnostic Interpretation	A			C						A
Valve Technician II	C								A	C
Instrument Technician	C			C				C	A	
FIELDVUE™ Digital Valve Controller Setup & Diagnostics using 475 Field Communicator & ValveLink™	A			C				A		A
ValveLink Software for Diagnostics of FIELDVUE – Digital Valve Controller	A			C				A		
FOUNDATION™ fieldbus FIELDVUE Digital Valve Controller	A			A	A			A	A	A
Introduction to Fisher™ Control Valves	P	P	P	P	P	P	P	P	P	P

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FLOW METERING				
PLANT MAINTENANCE LEARNING PATHS	MAINTENANCE MANAGER	MAINTENANCE SUPERVISOR	MAINTENANCE TECHNICIAN	INSTRUMENT TECHNICIAN
Basic Instrumentation (4-5)	X	X	X	
Flow Measurement (4-5)	X	X	X	X
Flow Measurement: Sizing And Selection (3)		X	X	X
Mmi Coriolis Technician (2)			O	X
Mmi Coriolis Advanced (2)			O	X
Mmi Coriolis Bi-Annual Refresher (1)				
Qualified Technician Mmi Coriolis (4-5)				
Bi-Annual Requalification Mmi Coriolis (2)				
Rf Vortex Technician (1)		X	X	X
Rf Vortex Advanced (1)			O	X
RF Vortex Bi-annual Refresher (0.5)			O	X
Qualified Technician RF Vortex (3)				
Bi-annual Requalification RF Vortex (0.5)				
RF Magmeter Technician (1)		X	X	X
RF Magmeter Advanced (1)			O	X
Bi-annual Requalification RF Vortex (0.5)			O	X
Qualified Technician RF Magmeter (2)				
Bi-annual Requalification RF Magmeter (0.5)				
Density Measurement (2)		X	X	X
Viscosity Measurement (2)		O	O	X
D4230 Gas Ultrasonic Flow Meters (2)		X	X	X
D4280 Liquid Ultrasonic Flow Meters (2)		X	X	X
D4270 Compact Prover (2)		X	X	X
D4260 FloBoss™ S600 Flow Computer (2)		X	O	X
D4530 Metering Systems Introduction (2)		O	X	X
D4540 DanPac Metering Supervisory (2)		X	X	X
D4109 Qualitative Measurement and Properties of Natural Gases (2)		X	X	X
D4520 Hydrocarbon Gas Flow Measurement Systems (2)		O	X	X
D4510 Hydrocarbon Liquid Flow Measurement Systems (2)		O	X	X

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KEY: 0 - Course Duration in Days X - Core Competencies O - Optional Additional Competencies



FLOW METERING					
PLANT ENGINEERING LEARNING PATHS	PLANT ENGINEERING MANAGER	ELECTRICAL & INSTRUMENT ENGINEER	PROCESS ENGINEER	CONTROL SYSTEM ENGINEER	METROLOGIST
Basic Instrumentation (4-5)	X		X	X	X
Flow Measurement (4-5)	X	X	X	X	X
Flow Measurement: Sizing and Selection (3)		O	X		
MMI Coriolis Technician (2)		X	O		X
MMI Coriolis Advanced (2)		X		O	X
MMI Coriolis Bi-annual Refresher (1)		X			
Qualified Technician MMI Coriolis (4-5)					
Bi-annual Requalification MMI Coriolis (2)					
RF Vortex Technician (1)		X	O	O	
RF Vortex Advanced (1)		X			
RF Vortex Bi-annual Refresher (0.5)		X			
Qualified Technician RF Vortex (3)					
Bi-annual Requalification RF Vortex (0.5)					
RF Magmeter Technician (1)		X	O	O	
RF Magmeter Advanced (1)		X			
RF Vortex Bi-annual Refresher (0.5)		X			
Qualified Technician RF Magmeter (2)					
Bi-annual Requalification RF Magmeter (0.5)					
Density Measurement (2)		X		O	X
Viscosity Measurement (2)		X		O	
D4230 Gas Ultrasonic Flow Meters (2)		X	X		X
D4280 Liquid Ultrasonic Flow Meters (2)		X	X		X
D4270 Compact Prover (2)		X	O		X
D4260 FloBoss™ S600 Flow Computer (2)		X	X		X
D4530 Metering Systems Introduction (2)	O	O	O		
D4540 DanPac Metering Supervisory (2)		X	O	X	
D4520 Hydrocarbon Gas Flow Measurement Systems (2)		X	X	O	O
D4510 Hydrocarbon Liquid Flow Measurement Systems (2)		X	X	O	O

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FLOW METERING					
PROJECT MANAGEMENT TEAM PATHS	PROJECT MANAGER	PROJECT ENGINEER	INSTRUMENT ENGINEER	INSTRUMENT TECHNICIAN	COMMISSION LEAD
Basic Instrumentation (4-5)	X	X			X
Flow Measurement (4-5)	X	X	X	X	X
Flow Measurement: Sizing and Selection (3)	O	X	O		
MMI Coriolis Technician (2)		O	X	X	X
MMI Coriolis Advanced (2)			X	O	O
MMI Coriolis Bi-annual Refresher (1)					
Qualified Technician MMI Coriolis (4-5)					
Bi-annual Requalification MMI Coriolis (2)					
RF Vortex Technician (1)			X	X	X
RF Vortex Advanced (1)			X	O	O
RF Vortex Bi-annual Refresher (0.5)			X	O	O
Qualified Technician RF Vortex (3)					
Bi-annual Requalification RF Vortex (0.5)					
RF Magmeter Technician (1)			X	X	X
RF Magmeter Advanced (1)			X	O	O
Bi-annual Requalification RF Vortex (0.5)			X	O	O
Qualified Technician RF Magmeter (2)					
Bi-annual Requalification RF Magmeter (0.5)					
Density Measurement (2)			X	X	X
Viscosity Measurement (2)			X	X	O
D4230 Gas Ultrasonic Flow Meters (2)		O	X	X	X
D4280 Liquid Ultrasonic Flow Meters (2)		O	X	X	X
D4270 Compact Prover (2)		O	X	X	
D4260 FloBoss™ S600 Flow Computer (2)		O	X	X	O
D4530 Metering Systems Introduction (2)	X	X	X	X	X
D4520 Hydrocarbon Gas Flow Measurement Systems (2)	O	O	X	X	X
D4510 Hydrocarbon Liquid Flow Measurement Systems (2)	O	O	X	X	X

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