On-site Traditional

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

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.

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.

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’s Blended Learning approach combines various learning methods using a variety of digital media. Blended Learning is Emerson’s unique approach to delivering quality education while reducing learner time away from the facility.

“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.”
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AMS - Advanced AMS Machinery Manager - 2070 CEUs - 2.8

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. Infrared Analysis, Motorview, CSI Online Machinery Health™ 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
- Nспект®
- Wizard - Reporting Techniques and Modification/Addition of Setup Information
- Austostat
- Database Utility
- Database Zip Utility
- Network Administration
- Data Locker Management

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.

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

AMS - Advanced AMS Machinery Manager, Virtual Classroom - 2070V – Continued...

Advanced AMS Machinery Manager, Virtual Classroom - 2070V – Continued...

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. Infrared Analysis, Motorview, CSI Online Machinery Health™ 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
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- Database Utility
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- Network Administration
- Data Locker Management

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.

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

AMS - AMS Device Manager – 7020 CEUs - 2.1

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. This instructor assisted course is operated in a hands-on, self-paced environment, which allows the student to work at their individual pace. Training can also be delivered at your plant with the help of our certified instructors.

Topics
- 7020-1 Configuring and Using AMS Device Manager
  - Viewing and Modifying Devices
  - Creating a Plant Database Hierarchy and Adding Devices
  - Using the Field Communicator with AMS Device Manager
  - Using the AMS Device Manager Browser Functions
  - Audit Trail
  - Calibrating Device - Calibration Assistant
  - Configuring and Monitoring System Alerts
- 7020-2 System Administration
  - AMS Device Manager System Overview
  - Installing an AMS Device Manager Server Plus Standalone
  - Starting AMS Device Manager for the First Time
  - Network Communication Interface Setup
  - AMS Device Manager Database Management
  - Installing a Distributed System
  - Installing Device Types from Media

7020-3 SNAP-ON™ Applications
AMS ValveLink™ SNAP-ON Application - Basics
  - MV Engineering Assistant SNAP-ON Application
  - QuickCheck™ SNAP-ON Application
  - AMS Device Manager OPC Server and the Matrikon OPC Explorer
  - AMS Device Manager Web Services
  - AlertTrack™ SNAP-ON Application
  - Wireless SNAP-ON Application/Audience

Audience
The training exercises focus on skills required by engineers and technicians, and are based on real-world tasks that most users will encounter on the job.

AMS Device Manager modules may be purchased for self-study for $200 each or $510 for all three paper/bound modules. To Order Training modules ONLY visit: www2.emersonprocess.com/en-USbrands/fisher/Contacts/Pages/contacts.aspx

AMS - Advanced AMS Machinery Manager, Virtual Classroom - 2070V CEUs - 2.8

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, AMS -
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
- Using the Field Communicator with AMS Device Manager
- Using the AMS Device Manager Browser Functions
- Audit Trail
- Calibrating Device - Calibration Assistant
- Configuring and Monitoring System Alerts

7020-1 Configuring and Using AMS Device Manager
- Viewing and Modifying Devices
- Creating a Plant Database Hierarchy and Adding Devices
- Using the Field Communicator with AMS Device Manager
- Using the AMS Device Manager Browser Functions
- Audit Trail
- Calibrating Device - Calibration Assistant
- Configuring and Monitoring System Alerts

7020-2 System Administration
- AMS Device Manager System Overview
- Installing an AMS Device Manager Server Plus Standalone
- Starting AMS Device Manager for the First Time
- Network Communication Interface Setup
- AMS Device Manager Database Management
- Installing a Distributed System
- Installing Device Types from Media

7020-3 SNAP-ON™ Applications
- AMS ValveLink™ SNAP-ON Application - Basics
- MV Engineering Assistant SNAP-ON Application
- QuickCheck™ SNAP-ON Application
- AMS Device Manager OPC Server and the Matrikon OPC Explorer
- AMS Device Manager Web Services
- AlertTrack™ SNAP-ON Application
- Wireless SNAP-ON Application

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

Prerequisites
Microsoft windows experience. Prospective attendees should first complete the eLearning e7020 AMS Device Manager Suite Primer. The purchase of this course includes access to the e7020 course at no extra charge. Upon confirmed enrollment, the student will receive access to the e7020 online course (via email) to take as a prerequisite prior to attending the instructor led course.
AMS - Intelligent Device Manager
Overview - e7020
CEUs - .20

Overview
This is a 2-hour (average) on-line course with AMS Device Manager screens including interactive practice sessions, workshops, demonstrations, audio presentations and quizzes.

*Note: Course access is 12 months

Topics
- Identify Areas that AMS Device Manager could be applied:
- Speed-Up Start-Ups and Commissioning
- Improve Quality and Uptime
- Reduce Costs — Both Fixed and Operating
- Simplify Safety System Use and Compliance Including Start-Ups
- Identify and Navigate the AMS Device Manager’s Screens

Audience
This course is for maintenance personnel and managers responsible for understanding the benefits of using the AMS Suite Intelligent Device Manager.

AMS - Intermediate AMS Machinery Manager - Virtual - 2074V
CEUs - 2.8

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. Infrared Analysis, Motorview, CSI Online Machinery Health™ Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Topics
- PEAKVUE™
- Vibration Analysis module
- Reporting Module
- Exception Analysis
- Nspector
- BMview

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

AMS - Introduction to AMS Machinery Manager - 2068
CEUs - 2.8

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. Advanced Vibration Analysis module, Infrared Analysis, Motorview, CSI Online Machinery Health™ Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Topics
- Navigation Database
- Creation Data
- Collection Basic
- Analysis and Reporting Link to RBMview

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

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

AMS - Introduction to AMS Machinery Manager, Virtual Classroom - 2068V
CEUs - 2.8

Overview
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. Advanced Vibration Analysis module, Infrared Analysis, Motorview, CSI Online Machinery Health™ Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Topics
Navigation Database, Creation Data collection, Basic Analysis and Reporting Link to RBMview

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

Prerequisites
Computer experience with the Windows operating system and some vibration analysis experience are recommended.
Overview
This 4-day course is the fourth in our series of AMS Machinery Manager courses. This course will instruct experienced users on database optimization techniques using an existing database and enhancing it by calculating and implementing improved Analysis Parameter (AP) sets. Students will learn how to identify when an AP set needs to be adjusted and how to make the adjustments effectively. The course will also focus on updating and optimizing alarm sets. Applications will include Vibration Analysis, Database Setup, Database Utility, Stored Data Management, and Autostat. This course will instruct experienced users on database optimization techniques using an existing database and enhancing it by calculating and implementing improved Analysis Parameter (AP) sets. Students will learn how to identify when an AP set needs to be adjusted and how to make the adjustments effectively.

Topics
- Devising and implanting new AP sets
- Calculating new AP sets
- Using Autostat to implement new Trend parameters and Alarms
- Using Stored Data Management for managing data and statistics
- Database Utility

This course is based on the current mass release of the AMS Machinery Manager software. Students may call to verify if the course is appropriate to the version they are using.

Prerequisites
Introduction to AMS Machinery Manager (course #2068), Intermediate AMS Machinery Manager (course #2074), Advanced AMS Machinery Manager (course #2070), Intermediate Vibration (course #2032) or two-years vibration analysis experience are strongly recommended.

AMS- Intermediate AMS Machinery Manager - 2074
CEUs - 2.8

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. Infrared Analysis, Motorview, CSI Online Machinery Health™ Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Topics
- PEAKVUE™
- Vibration Analysis module
- Reporting Module
- Exception Analysis
- Nspectr
- BMview

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

AMS- OilView for AMS Machinery Manager - 2083
CEUs - 2.8

Overview
In this 4-day course students learn database creation and modification, creation and modification, Analysis Parameter and Alarm Limit Sets. The course demonstrates how to set up and configure the OilView software module, discusses calibration and use of OilView instruments (including the CSI 5200 Trivector Analyzer) for analyzing oil samples onsite, and explains data interpretation and basic reporting.

Topics
- Introduction to Oil Analysis
- On-Site Analysis
- Reference Oil Database Management
- Database Construction and Modification
- Analysis Parameter Sets
- Alarm Limit Sets
- Best Practices for On-Site Analysis using OilView®
- Importing Laboratory data
- Basic Wear Debris Analysis
- Data Analysis and Reporting

Audience
This course is designed for those who are new to CSI onsite oil analysis instruments and experienced users who wish to use advanced OilView features in AMS Machinery Manager.
## Bettis™ - Gas/Hydraulic Product Servicing - VA101
**CEUs - 2.8**

### Overview
This 4-day course uses classroom style lectures and hands-on experience with working models to teach students on the following topics: assemble, install, operate and maintain a Bettis™ gas/hydraulic actuator; use troubleshooting techniques and test to identify problems in gas/hydraulic systems, and perform routine maintenance and emergency repairs on each component; install Bettis control component on the corresponding actuator, connect calibration equipment and carry out set-up and calibration procedures; adapt and install control upgrade or modification kits including all tubing connections and final adjustments; and identify graphic fluid schematic symbols, match to actual control device and integrate the symbols into a functioning relationship.

### Topics
- Gas/Hydraulic Actuators
- Gas/Hydraulic Control Systems
- Gas/Hydraulic Control Systems Accessories
- Control Applications
- Control Component Calibration

### Prerequisite
Students should be involved with the application, service or maintenance of Bettis™ gas/hydraulic actuator systems.

## Bettis™ Rack & Pinion & Scotch-Yoke Product Servicing - VA103
**CEUs - 2.8**

### Overview
This 4-day class provides 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, D, RPE, CBB, CBAX30, HD, T, and G-Series Actuators Review
- Field Service Work Performed by VAC's, Bettis™ Houston WACC Procedure Review
- Four days of Practical Exercises Involving the Disassembly and Reassembling of Bettis Crossridge Products
- Features and Benefits of Bettis Products for field maintenance
- How to trouble shoot field problems
- Conversions of actuator fail directions from CW to CCW and CWW to CW
- How to add features (options) to existing actuators

### Prerequisites
Work in the valve automation industry: shop assembly or field maintenance

## Bettis™ Rack & Pinion & Scotch-Yoke Products - VA104
**CEUs - 3.2**

### Overview
This 5-day class provides an introduction to the range of pneumatic and hydraulic valve actuators manufactured by Emerson Bettis™ in their Houston, Texas WACC facility. In addition to discussing product features and benefits, students will be given a broad overview of the valve automation industry and provided with training of product selection and applications. Common pneumatic and hydraulic control components and systems will also be discussed; and a review of competitive products.

### Topics
- RPE Series actuators review
- CBA300 Series actuators review
- CBB Series actuators review
- G-Series actuators review
- Bettis™ electronic data formats overview
- Torque mechanisms overview
- Manual overrides overview
- Actuator selection/sizing
- Common control components/control systems overview
- Valve mounting hardware overview
- Comparator product comparisons
- General practical work
- Features and Benefits of Bettis Products
- What is torque?
- Selection and sizing quarter turn actuators
- Selection and sizing basic control elements

### Prerequisites
Work in the valve automation industry: Sales, Quotations
### Overview
This 3-day course covers the application of metering to natural gas. Coverage of the latest concepts of design and equipment use will be presented to broaden the knowledge of the attendees.

### Topics
- Design of Meter Stations
  - Contract Requirements
  - Other Concerns
  - Single Versus Multiple Tubes
  - Design Problems
  - Economics Versus Accuracy
- Accuracy of Gas Flow Measurement
  - Definition
  - How Obtained
  - New Concepts
  - Influences in Gas Measurement
    - FERC 636 (Government)
    - Economics
    - Standards
    - New Technology
- New Metering Concepts
  - Computers as Analysis
  - New Devices
  - Ultrasonics
  - Vortex Shedding
  - Coriolis
- Future
  - Energy Forecasts
  - U.S. Gas Industry
  - World Gas Industry

### Summary

### Audience
The course is designed for experienced gas measurement personnel with basic fundamental knowledge of meters and their operation.

### Audience
The course is designed for Engineers, field technicians and accounting personnel. Practical examples of real metering facilities will be covered.
Daniel - Operation and Maintenance Control Valves and Turbines - D4290
CEUs – 2.1

Overview
This 3-day course covers the operation, installation and maintenance of the Daniel control valve and turbines.

Topics
• Theory of operation: Turbines, Valves, Digital Pilots
• Disassembly and Reassembly of Valve Internals
• Disassembly and Reassembly of Valve Cylinder Assemblies
• Disassembly and Reassembly of Digital Pilots
• Valve Needle Valve Adjustment
• 'A' series vs. 'B' Series Control Valves
• Turbine Pick-Off Sensor and Preamp
  o Flow Conditioning
  o Parity vs UMB Series Turbine
  o Meter Troubleshooting

Prerequisites
Basic knowledge of flow measurement.

Daniel - Operation and Maintenance Gas/Liquid Ultrasonic Meters - D4230/D4280
CEUs – 2.5

Overview
This 3-1/2-day course prepares students to install, operate, and maintain Daniel multipath ultrasonic flow meters. In addition to classroom instruction, the training course includes hands-on experience using the flowmeter, simulator and diagnostic software.

Topics
• Basics of Sound Waves
• How Ultrasonic Flow Meters Work and Their Advantages over other Meters
• The Performance Characteristics of Transit Time Ultrasonic Flow Meters
• System Components and Mark III Electronics, including the Central Processing Unit (CPU) Board and the Option Board
• Meter Mechanics
• Removal and Installation of Transducer Assemblies
• Volumetric and Mass Ultrasonic Gas Flow Measurement
• Meter Installation Considerations
• Inform the Instructor if Working on Liquid Meter

Prerequisites
Basic knowledge of flow measurement.

Daniel - Operation and Maintenance S600 Flow Computers - D4262
CEUs – 2.1

Overview
This 3-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.

Daniel - Senior Orifice Fitting - Introduction - D4420
CEUs – .7

Overview
The students will learn the operation and how to repair and troubleshoot the Model 2000.

Topics
• Theory of Operation
• "C" Style vs. Model 2000
• Maintenance
• Operation Instructions
• Installation
• Hands-On Learning
• Troubleshooting
• New Features of M2000

Audience
This 1-day course is for the beginner or experienced technicians.

Prerequisites
Basic knowledge for flow measurement.

Daniel - Ultrasonic Flowmeter with Mark III Electronics - Introduction - e4610

Overview
This Course introduces the basic elements and concepts of the Daniel Ultra Sonic Flow Meter, equipped with MarkIII Electronics. Historical look at transducers, concepts involved with Flow Meters, Wiring Connections, and MeterLink Software.

Basic understanding of USM with MarkIII Electronic
Dantorque™ Products - VA106  
CEUs – 1.4

Overview
This 2-day course product training course provides an overview of the valve automation products manufactured by Dantorque™. Primarily focused on product features & benefits, sizing/selection and applications; service/maintenance training can also be provided if requested in adv. of the class. Classes will be tailored to meet specific needs.

Topics
- Introduction
- Overview Dantorque™ Actuators
- Onshore, Offshore and Subsea Applications
- General Control Options
- Subsea Control Options
- ROV Overrides
- Actuator Sizing/Selection
- Question and Answer Session

Prerequisite
Students should be involved with the purchase, application, marketing, sales or service/maintenance of Dantorque™ products.
DeltaV - Systems Batch Implementation - Virtual - 7016V
CEUs – 3.2

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

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

Prerequisites
Course 7009, DeltaV Implementation I

DeltaV - Administration - Windows7/Server 2008 -7027
CEUs – 3.2

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 running on the Windows 7 operating system and Windows Server 2008.

Topics
- Overview/Review of System Components and Topologies
- DeltaV Licenses
- Database Administration
- User Administration
- Network Node Diagnostics
- Auto Update Service
- Cybersecurity Tools — Smart Firewall, Controller Firewall, Smart Switches
- Installation of the DeltaV Software and AMS Device Manager Components
- DeltaV Control Networks and Remote Access
- DeltaV Domains and Workgroups
- Network Security
- Backup and Restore Procedures
- Importing/Exporting
- DeltaV Zones

Audience
This course is designed for control system administrators, process control engineers and IT specialist responsible for managing, installing, and commissioning a DeltaV system running on the Windows 7 operating system and Windows Server 2008.

Prerequisites
Course 7009, DeltaV Implementation I, or Course 7018, DeltaV Hardware and Troubleshooting.

DeltaV - Administration - Windows7/Server 2008 Virtual Course - 7027V
CEUs – 3.2

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 running on the Windows 7 operating system and Windows Server 2008.

Topics
- Overview/Review of System Components and Topologies
- DeltaV Licenses
- Database Administration
- User Administration
- Network Node Diagnostics
- Auto Update Service
- Cybersecurity Tools — Smart Firewall, Controller Firewall, Smart Switches
- Installation of the DeltaV Software and AMS Device Manager Components
- DeltaV Control Networks and Remote Access
- DeltaV Domains and Workgroups
- Network Security
- Backup and Restore Procedures
- Importing/Exporting
- DeltaV Zones

Audience
This course is designed for control system administrators, process control engineers and IT specialist responsible for managing, installing, and commissioning a DeltaV system running on the Windows 7 operating system and Windows Server 2008.

Prerequisites
Course 7009, DeltaV Implementation I, or Course 7018, DeltaV Hardware and Troubleshooting.
DeltaV Advanced Control – Custom – 7203CV
CEUs – 3.2

Overview
This 4 ½ day course is designed for system engineers who will be using DeltaV Advanced Control features. This is a condensed course with selected content from Courses 7201 and 7202. The principal technology that is utilized in each product will be discussed. The course lectures and discussions will use Emerson’s virtual classroom and 50 percent of the course will be hands-on workshops. Students will log into DeltaV systems to apply the advanced control features to simulated process applications.

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
  - Tuning Response
  - Process Learning
  - Adaptive Tuning
  - Adaptive Control
- DeltaV Fuzzy
  - Principles of 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:
Courses 7009 – DeltaV Implementation I, or 7101 PlantWeb/DeltaV Introduction.
DeltaV - Batch Analytics Model Builder - e7046
CEUs - .80

Overview
This 8-hour (average duration) on-line course provides an orientation of Batch Analytics Model Builder. The course includes audio presentations, demonstrations, hands-on practices, hands-on workshops, and quizzes. Course access is 12 months. Upon completion of this course, the student will be able to:

- Define basic principles of Batch Data Analytics and their use in fault detection and quality parameter prediction
- Use the Batch Data Analytics Model Builder application to build and deploy a project for fault detection and quality parameter prediction
- Users will be able to recognize and navigate the screens needed to build a model in Batch Analytics
- Users need to define batch logic, stage logic, and initial condition logic needed for model development
- Users will be able to interpret analytic data of the Model Builder application using a saline example
- Users will be able to build a Batch Data Analytics model

Topics
- Batch Analytics Overview
- Batch Analytics Model Builder Overview
- Batch Analytics Viewer Overview
- Batch Saline Simulation
- Benefits of Using Batch Analytics
- Batch Analytics Manager Administration
- Batch Logic, Stage Logic, and Initial Logic Required to Build a Model
- Batch Analytics Model Builder – Equipment
- Batch Analytics Model Builder – Product
- Batch Analytics Model Builder – Model

Audience
This course is designed for Chemometricians, Process Engineers, Quality Engineers, and Process Control Engineers.

DeltaV - Batch Analytics Operator - e7044
CEUs - .6

Overview
This 6-hour (average duration) on-line course provides an orientation of Batch Analytics and how it is used in a production environment. The course includes audio presentations, demonstrations, hands-on practices, hands-on workshops, and quizzes. Upon completion of this course, the student will be able to:

- Define basic principles of Batch Analytics
- Identify how Batch Analytics is used in fault detection and quality parameter prediction
- Identify the Batch List, Quality Prediction, and Fault Detection screens
- Monitor a fault
- Interpret analytic data of a saline example
- Identify the root cause of a detected fault

Topics
- Batch Analytics Overview
- Batch Analytics Model Builder Overview
- Batch Analytics Viewer Overview
- Batch Saline Simulation
- Benefits of Using Batch Analytics
- Batch Analytics Viewer – Batch List Tab
- Batch Analytics Viewer – Fault Detection Tab
- Batch Analytics Viewer – Quality Prediction

Audience
This course is designed for operators, process engineers, and management.

Prerequisites
DeltaV Batch experience and Microsoft Windows experience is required.

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

For more information, contact your local Emerson sales office or visit: wwww.emersonprocess.com/education
### DeltaV - Communication Bus Interfaces w/the DeltaV System – 7037
**CEUs – 2.5**

**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, Profinet 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 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 v13.3.1 along with AMS Device Manager 13.5 will address areas relating to the instrument technician’s daily tasks.

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

### DeltaV - Control - Advanced – 7201
**CEUs – 3.2**

**Overview**
This 4-1/2-day course introduces students to the advanced control tools available within 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
  - Tuning Response
  - Process Learning
  - Adaptive Tuning
  - Adaptive Control
- DeltaV Fuzzy
  - Principles of 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:**
Courses 7101, PlantWeb/DeltaV Introduction or 7009, DeltaV Implementation I or equivalent field experience.

### DeltaV - Control Loop Foundation – 9025
**CEUs – 3.2**

**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 work with and commission 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

**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.

**Prerequisites**
Windows experience.
### DeltaV - DVOP Operations for Continuous Processes: Operator Training – 5185

Contact the registration office for class information at education@emerson.com or 800-338-8158.

### DeltaV - Fieldbus Devices – 7030
CEUs – 2.8

**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 PlantWeb Alerts at DeltaV Workstations
- Segment Checkout Procedures
- Replace Wizard

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

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

### DeltaV – Communication Bus Interfaces with the DeltaV System - 7037

**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 WirelessHART™ devices, including proper wiring practices. The AMS Intelligent Device Manager will be used to interrogate PROFI BUS DP and WirelessHART 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 startups, 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 v13.3.1 along with AMS Device Manager 13.5 will address areas relating to the instrument technician’s daily tasks.

**Prerequisites**
7009 DeltaV Implementation I or 7018 DeltaV Hardware and Troubleshooting.

### DeltaV - Control - Advanced – 7201
CEUs – 3.2

**Overview**
This 4-1/2-day course introduces students to the advanced control tools available within 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
  - Tuning Response
  - Process Learning
  - Adaptive Tuning
  - Adaptive Control
- DeltaV Fuzzy
  - Principles of 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:**
Courses 7101, PlantWeb/DeltaV Introduction or 7009, DeltaV Implementation I or equivalent field experience.
DeltaV - Control Loop Foundation – 9025
CEUs – 3.2

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 work with and commission 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

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.

Prerequisites
Windows experience.


Contact the registration office for class information at education@emerson.com or 800-338-8158.

DeltaV - Fieldbus Devices – 7030
CEUs – 2.8

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 Scalable 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 PlantWeb Alerts at DeltaV Workstations
• Segment Checkout Procedures
• Replace Wizard

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

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

DeltaV - Fieldbus Systems & Devices – 7032
CEUs – 2.8

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
• FOUNDATION™ fieldbus Overview
• Macro Cycle Execution
• Fieldbus Function Blocks
• Control Anywhere
• Fieldbus Wiring and Installation
• Segment Checkout Procedures
• Commissioning and Configuring Devices
• Control Strategy Configuration
• PlantWeb Alerts
• Configuring an Operator Display

Audience
This course is for individuals responsible for designing and configuring FOUNDATION™ fieldbus segments; as well as analyzing the fieldbus macro cycle, troubleshooting fieldbus segments/devices and modifying FOUNDATION™ fieldbus parameters.

Prerequisites
7009 DeltaV Implementation I or 7018 DeltaV Hardware Installation and Troubleshooting.
DeltaV - Graphics - Advanced – 7025
CEUs – 3.2

Overview
This 4-1/2-day course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface. This course expands on graphic topics covered in both the DeltaV Implementation, course 7009 and DeltaV Implementation II, course 7017.

Topics
- Visual Basic Primer
- Forms
- Modules
- Schedules
- User Preferences
- Picture Sizing
- Environment Customization
- Custom Faceplates
- Function Block Faceplates
- FRS Functions
- Pop Up Menus
- Color Threshold Tables
- Custom Dynamos
- Tag Groups
- Key Macro Editor
- Theme Dynamos

Audience
This course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface.

Prerequisites
Course 7009, DeltaV Implementation I

DeltaV - Graphics - Advanced - Virtual - 7025V
CEUs – 3.2

Overview
This 4-1/2-day course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface. This course expands on graphic topics covered in both the DeltaV Implementation course 7009 and DeltaV Implementation II course 7017.

Topics
- Visual Basic Primer
- Forms
- Modules
- Schedules
- User Preferences
- Picture Sizing
- Environment Customization
- Custom Faceplates
- Function Block Faceplates
- FRS Functions
- Pop Up Menus
- Color Threshold Tables
- Custom Dynamos
- Tag Groups
- Key Macro Editor
- Theme Dynamos

Audience
This course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface.

Prerequisites
Course 7009, DeltaV Implementation I

DeltaV - Hardware & Troubleshooting – 7018
CEUs – 2.8

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 prerequisite 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
- DeltaV and AMS Suite Intelligent Device Manager
- Redundant I/O

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

Prerequisites
Windows Experience
### DeltaV - Implementation I - 7009

**CEUs – 3.2**

**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
- Alarm Help
- Sequential Function Charts
- Configure Theme Dynamos
- Electronic Marshalling (CHARMS)

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

**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, Course 7101, or DeltaV Hardware & Troubleshooting, Course 7018.

### DeltaV - Implementation II – 7017

**CEUs – 3.2**

**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, and 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. Create custom faceplates and dynamos, configure modules with analog control palette blocks and create simulation for test purposes.

**Topics**
- Function Block Structures & Status Values
- Analog Control Palette Blocks PID Bias/Gain, Dead time, 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
- Configuration of Equipment Modules for Supervisory Control
- Custom Faceplates and Dynamos

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

**Prerequisites**
Course 7009, DeltaV Implementation I

### DeltaV - Implementation II - Virtual - 7017V

**CEUs – 3.2**

**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, and 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.

**Topics**
- Function Block Structures & Status Values
- Analog Control Palette Blocks PID Bias/Gain, Dead time, 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
- Configuration of Equipment Modules for Supervisory Control
- Custom Faceplates and Dynamos

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

**Prerequisites**
Course 7009, DeltaV Implementation I
DeltaV - Model Predictive Control – 7202
CEUs – 2.4

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
- Insuring Disturbance Inputs are Independent of Other Process Inputs
- 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

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

Prerequisites
7201 DeltaV Advanced Control

DeltaV - Model Predictive Control - Virtual – 7202V
CEUs – 2.4

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
- Insuring Disturbance Inputs are Independent of Other Process Inputs
- 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

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

Prerequisites
7201 DeltaV Advanced Control

DeltaV - Operate for PROVOX – 7060
CEUs – 2.8

Overview
This 4-day course will cover the complete hardware and software implementation for the DeltaV Operate for PROVOX console. Upon completion of this course the student will be able to install the hardware and define system capabilities, define nodes configures the system for continuous control, operate the system and define users and security.

Topics
- DeltaV Operate for PROVOX Console Hardware and Software Overview
- DeltaV Operate for PROVOX Common Console Configuration Using ENVOX
- DeltaV Architecture and Data Structure
- Operating the DeltaV Operate for PROVOX
- Display Configuration
- User Definition and Privileges
- Event Journal
- Software Installation Guidelines
- Hardware Installation Guidelines

Audience
This course is designed for process control engineers and senior maintenance technicians, using the DeltaV Operate for PROVOX console with either SR90 or SRX Controller and using ENVOX to configure the controller and console as well as creating the console displays.

Prerequisites
Any one of the following courses: 5360, 5370 or 5390.
DeltaV - Operator (v11) for Continuous Operations - e7012
CEUs – 1.2

Overview
This interactive on-line course includes audio presentations, demonstrations, practice sessions, workshops, quizzes, and a final examination. The average time to complete the course is 12 hours.
Note: Course access is 12 months.

Topics
- System Overview; Accessing DeltaV Operate
- Navigating in DeltaV Operate
- Discrete, Analog, Regulatory, and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing: Alarm Displays; Real-Time/Historical Trend Data; Process History View
- Using DeltaV Operate Themes

Audience
Operators, supervisors and managers responsible for the operation of continuous processes with a DeltaV System. Ideal students for this course are new to the DeltaV System but already have process control/plant experience.

DeltaV - Operator Interface for Batch – 7014
CEUs – 1.8

Overview
This 2-1/2-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. It includes all content in course 7012 plus students will:
- Understand basic batch terminology
- Manipulate Unit Module parameters
- Access the Batch Operator Interface
- Run procedures
- Review batch history data topics
- System Overview
- Accessing DeltaV Operate
- Window, Menus Displays and Directories
- Discrete, Analog, Regulatory and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Accessing Real-time/Historical Trend Data
- Accessing Process History View
- Sequential Function Chart Operation
- Phase and Recipe Controls
- Batch Operator Interface
- Batch Historian
- Campaign Manager

Audience
This course is for operators, supervisors, and managers responsible for the operation of batch processes using DeltaV system.

DeltaV - Operator Interface for Batch - Virtual - 7014V
CEUs – 1.8

Overview
This 2-1/2-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. It includes all content in course 7012 plus students will:
- understand basic batch terminology
- manipulate Unit Module parameters
- access the Batch Operator Interface
- run procedures
- review batch history data

Topics
- System Overview
- Accessing DeltaV Operate
- Window, Menus Displays and Directories
- Discrete, Analog, Regulatory and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Accessing Real-time/Historical Trend Data
- Accessing Process History View
- Sequential Function Chart Operation
- Phase and Recipe Controls
- Batch Operator Interface
- Batch Historian
- Campaign Manager

Audience
This course is for operators, supervisors, and managers responsible for the operation of batch processes using DeltaV system.
DeltaV - Operator Training for Continuous Operation – 7012
CEUs – 1.4

Overview
This 2-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. Students who complete this course will:
- access operator displays
- manipulate various control module operating parameters to operate the process
- respond to process alarms
- monitor process performance
- view real-time and historical trend data

Topics
- System Overview
- Accessing DeltaV Operate Window, Menus Displays and Directories
- Discrete and Analog Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Motor Control Module Operation
- Regulatory/Cascade Control Module Operation
- Accessing Real-time/Historical Trend Data
- Unit Alarms
- Sequential Function Chart Operation
- Phase Logic Modules

Audience
This course is for operators, supervisors and managers responsible for the operation of continuous processes using DeltaV system.

DeltaV - pH Control Solutions – 9060
CEUs – 1.0

Contact education@emerson.com or call 800-338-8158 for additional information

DeltaV - Operator Training for Continuous Operation - Virtual - 7012V
CEUs – 1.4

Overview
This 2-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. Students who complete this course will:
- access operator displays
- manipulate various control module operating parameters to operate the process
- respond to process alarms
- monitor process performance
- view real-time and historical trend data

Topics
- System Overview
- Accessing DeltaV Operate Window, Menus Displays and Directories
- Discrete and Analog Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Motor Control Module Operation
- Regulatory/Cascade Control Module Operation
- Accessing Real-time/Historical Trend Data
- Unit Alarms
- Sequential Function Chart Operation
- Phase Logic Modules

Audience
This course is for operators, supervisors and managers responsible for the operation of continuous processes using DeltaV system.

DeltaV - PlantWeb - Introduction – 7101
CEUs – 2.1

Overview
Students will perform basic workstation operations including accessing displays, accessing faceplates, accessing modules to make process changes, responding to alarms and observing/changing tunable configuration parameters. Students who complete this 3-day course will be able to:
- use and apply PlantWeb terminology and acronyms
- identify DeltaV Explorer components
- define the different types of downloads
- commission and download a controller
- identify DeltaV Operate functionality
- operate a process using faceplates, detail displays, and primary control displays using DeltaV Operate
- define the Foundation™ Fieldbus technology terminology
- view device alerts using AMS Suite: Intelligent Device Manager
- define the DeltaV SIS architecture

Topics
- DeltaV System Description
- DeltaV Hardware
- Engineering Application
- Operation & Maintenance
- Alarm Management
- Security
- Bus Architecture
- Safety Life Cycle
- DeltaV SIS Overview
- Data Integration
- Batch

Audience
This course is for plant managers, process and process control engineers, and maintenance personnel needing an introduction to how the PlantWeb technology is utilized in basic process control systems and safety systems.
Overview:
This 4½ 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:
- Support a production system by ensuring it is performing optimally
- 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

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

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

Overview:
This 4½ 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:
- Support a production system by ensuring it is performing optimally
- 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

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

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

Overview:
This course focuses on specific power and grounding requirements of a control system. You will learn:
- how to conduct site verifications
- how to audit using "hands-on" testing labs
- to detect power and grounding problems on existing sites

Topics:
- Review of Power Basics
- Power System Measurements
- Low Voltage Power Systems
- Power System Grounding
- Earthing vs. Grounding
- Connection to Earth
- Equipment Grounding
- Code Requirements
- Building Power Distribution
- Feeders and Branch Circuits
- Separately Derived Systems
- Power & Grounding for the DeltaV System
- Single Point Grounding
- Isolated Ground Installations
- Dedicated Circuits
- DC Grounding
- Verifying New Installations
- Power Quality Problems
- Applying Power Conditioning
- SIS Power and Grounding Installation
- Intrinsic Safety Devices

Audience:
This 2-day course is designed for personnel involved with the planning, installation and maintenance of DeltaV digital automation system and provides essential knowledge regarding the power and grounding system for DeltaV equipment.

Prerequisites:
A working knowledge of electronics and AC power basics is required.
DeltaV Safety Instrumented System with SLS 1508 Maintenance – 7303
CEUs – 2.1

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

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.

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

DeltaV - SIS Implementation – 7305 – Continued...

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

Prerequisites
Course 7009 is a requirement. Recommend IEC 61511 knowledge.

DeltaV - SIS Implementation - Virtual - 7305V
CEUs – 3.2

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

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

Prerequisites
Course 7009 is a requirement. Recommend IEC 61511 knowledge.

DeltaV - SIS with Electronic Marshalling Maintenance – 7304
CEUs – 2.1

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 be able to configure Partial Stroke Test using DeltaV SIS with Electronic Marshalling. 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
- Partial Stroke Test using DeltaV SIS with Electronic Marshalling
- Local Safety Network Bridges

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.

Prerequisites
Course 7018 DeltaV Hardware and Troubleshooting is a requirement.

DeltaV - Systems Administration: XP/Server 2003 – 7024
CEUs – 3.2

Contact the registration office for class information at education@emerson.com or 800-338-8158.
DeltaV - Systems Batch Implementation – 7016
CEUs – 3.2

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

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

Prerequisites
Course 7009, DeltaV Implementation I

DeltaV - Virtualization – 7029
CEUs 3.2

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 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

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

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

DeltaV- Implementation I - Virtual - 7009V
CEUs – 3.2

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

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

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, Course 7101, or DeltaV Hardware & Troubleshooting, Course 7018.
**EIM™ Products - VA113**  
CEUs – 2.8

**Overview**  
This 4-day course presents the fundamental aspects of Series 2000 actuator maintenance. Attendees are presented with the basics of actuators and how they operate valves. Basic components and assemblies are studied through actual disassembly and reassembly of an actuator. In that mechanical operation is learned. Each student will learn how to set travel limits, torque limits and operate an actuator on a variety of valves. Model number interpretation, how to order parts from local distributors, Control Package wiring diagram interpretation and basic maintenance are all presented in a combination hands-on / instructor led lecture format. At the end of the program all students complete a written performance based evaluation prior to leaving. Any original course documentation and certificates are provided to all attendees for company records at the end of the program.

**Topics**
- Identify the Basic Components and Assemblies of a Tec2/Model500 Actuator by Function and Operation
- Disassemble and Reassemble a Tec2/Model500 Actuator with Installed Controls:  
  - Multi-Turn Valve and Part Turn Valve
- Identify EIM™ Control Packages by Function with the Aide of a Control-Wiring Diagram
- Demonstrate the Correct Method to Set Position and Torque Limits:  
  - Multi-Turn Valve and Part Turn Valve
- Demonstrate the Operation of a Modulating Unit with Futronic II
- Perform Basic Maintenance Associated with the Operation of an Actuator

**Prerequisites**
Students interested in attending this program should have a background or equivalent work experience in basic mechanical and electrical practices and principles. No previous service experience necessary.

**El-O-Matic™ Products - VA107**  
CEUs – 2.1

**Overview**  
This 3-day class provides information on the ranges of pneumatic and electric actuators and accessories available from El-O-Matic™. Detailed information on electric actuator module boards/bus communication options will be addressed.

**Topics**
- **Electric Actuator Series (ELS/EL.ELD & ELQ)**  
  - Identification of Components;
  - Basic Bench Testing;
  - Installation Options;
  - Actuator Sizing/Selection;
  - Control Options;
  - Hands-on Training Covering Installation of Module Boards for Different Control Functionality;
  - Bus Communication Options
  - El-O-Matic™ Sizing Program
- **Pneumatic Actuator F, E & P Series**  
  - History;
  - Identification of Components;
  - Comparison of F, E & P Series Actuators;
  - 180° Rotation Actuators;
  - Actuator Sizing/Selection;
  - Available Accessories;
  - Hands-on Training Including: Spring Changes, Seal Changes, Travel Stop Adjustment and Mounting of Accessories;
  - El-O-Matic™ Sizing
- **QA Systems, Functions, RMA’s and Customer Complaint Handling**

**Prerequisite**
Students should be involved with the application, marketing, sales or service/maintenance of El-O-Matic™ products.
Entech - Applied Modern Loop Training – 9032 - CEUs – 2.1

Overview
Applied Modern Loop Tuning (9032) is a 3-day registration or on-site course that introduces participants to effective methods for determining optimal tuning parameters for regulation of processes. The non-oscillatory EnTech tuning techniques, based on Lambda tuning concepts, are taught with a focus on minimizing process variability. Effectiveness is gained by the implementation of a tuning strategy that matches control loop dynamics to process operating requirements. It contains formal lectures that are amply populated with process examples and supported with hands-on lab exercises using high-fidelity process simulation software. Participants learn how to recognize acceptable versus unacceptable control loop performance and to identify the most common source of problems. Fundamental tuning concepts, including the PID controller, process dynamics, valve motion characteristics (stick/slip), dead band (backlash) and resolution (stick/slip), set point tracking and regulatory control, integrating processes, and level control are reviewed and demonstrated using case study examples.

Topics
- Process Dynamics and Process Model Identification
- Open loop and Closed Loop Bump Tests Process Response — 1st and 2nd Order Self-Regulating Process and Integrating Process
- Process Model — Process Gain, Process Dead time and Process Time Constant
- Control Resolution and Valve Non-Linearity
- PID Forms and Structures
- Tuning Methods — Ziegler Nichols (QAD) and Model Based Lambda Tuning
- Self-Regulating process - Closed Loop Set point and Load Response Tuning
- Cascade Control Tuning
- Interactive Control Loops — Decoupling Control
- High-Fidelity Process Simulator Software - Engage Students in Hands-On Learning

Audience
This course is for engineers and technicians responsible for maintaining process control performance using instrumentation and control loop tuning.

Prerequisites
Some experience with process instrumentation and control is helpful.

EnTech - Applied Modern Loop Training & Advanced Regulatory Controls – 9035 CEUs – 2.8

Overview
This is a special combined 9032 and 9034 4-day course that teaches the practical principals of advanced regulatory controls and tuning techniques to achieve improvements that can exceed that of basic PID controls. The course will examine many advanced regulatory control technologies commonly available today and help participants understand which technologies are best suited and how to appropriately apply them given specific process dynamics and conditions. Formal lectures are amply populated with process examples and supported with hands-on lab exercises. Approximately 40% of the course is hands-on lab based workshops where students develop practical skills required to apply and tune advanced regulatory controls. A dynamic process simulator is used to simulate a variety of process unit dynamics and evaluate the benefits of different advanced regulatory control strategies.

Topics
- Lambda Tuning for Self Regulating and Integrating processes
- Process and Disturbance Dynamics
- PID Algorithms – PID, PI, PI-D, I-PD, PD, P-D, ID, I-D, 2 degrees of freedom control
- Cascade Control, Dynamic Feedforward
- Ratio Control, Override(selector) Control
- Split Range and Midrange Control
- Interactive Control Loops – Decoupling Control (2X2) and Lambda Tuning
- Dead time Compensation (Smith Predictor)
- Adaptive Control (Gain Scheduling, Auto Tuning)
- Introduction to Model Predictive Control (Multiple Inputs Single Output)

EnTech - Applied Regulatory Controls - Advanced – 9034 – Continued...

Overview
The course will examine many advanced regulatory control technologies commonly available today and help participants understand which technologies are best suited and how to appropriately apply them given specific process dynamics and conditions.
Overview
PCE II is a 4-day course that provides a power spectrum and autocorrelation function, are presented as tools for process and control auditing. The course uses formal lectures that are highlighted with ample repertoire of process examples and hands-on lab exercises. High fidelity process simulators are used as the basis for the labs and simulation analysis.

Topics
- Review Topics Presented in PCE I
- Use of Software for Identification of Process Dynamics, Lambda Tuning, Time Series Analysis
- Controller Tuning Troubleshooting - Dynamic Loop Interaction Problems
- Digital Control - Digital Controllers and Digital Sensors
- Signal Quantization, Signal Aliasing and Signal Filtering
- Time Series Analysis
- Power Spectrum
- Auto/Cross Correlation Function
- Interpreting Plant Process Data
- Process and Control Auditing Techniques
- Control Loop Evaluation- Power Spectrum
- Integrated Process and Control Design
- Advanced Process Control
- Mini-Audit Exercise

EnTech - Process Dynamics & Tuning Fundamentals – 9030 – Continued...

Topics
- Process Dynamics - Self Regulating and Integrating
- First Order Process Model
- Second Order Process Model
- Integrating Process Model
- Process & Control Nonlinearity
- Feedback Control & PID Controllers
- QAD Tuning & Lambda Tuning
- Set point & Load Response
- Frequency Response - Bode Plots
- Tuning Interactive Control Loops
- Coordinated Lambda Tuning for Unit Optimization

EnTech - Process Troubleshooting and Optimization for the Control Performance Specialist – 9036 – Continued...

Topics
- Troubleshoot using Power Spectrum and Cross Correlation
- Analyze Process Objectives
- Reducing Variability by process design
- Reducing Variability by tuning strategy
- Reducing Variability by Control element design
- Reducing Variability by Control strategy design

Audience
This course is for engineers and technicians who are process control or control performance specialistsPrerequisite: 9032- EnTech Applied Modern Loop Tuning

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

EnTech - Toolkit Training – 1430

Overview
This is a 3-day course that fully explores the various functions, options and capabilities that are built into the EnTech Toolkit software. The course starts with the data acquisition features of the Collect module as it is connected to field instrumentation or directly to digital systems. The power of the Analyzes time series analysis software for process trouble-shooting, auditing and reporting on performance is examined using process simulators. The Tuner module includes bump test analysis, calculation of controller tuning parameters, and simulation of controller response characteristics. Participants are asked to perform process audits and report on their findings and the improvements they make.

Audience
This course is for engineers, technicians or other persons who have responsibility for using the EnTech Toolkit as part of their role in process troubleshooting, minimizing variability, and improving or maintaining performance of operations.
FieldQ™ Products - VA110
CEUs – 2.0

Overview
This 3-day class provides the knowledge required for the student to understand, troubleshoot and even repair the Valve Automation FieldQ™ actuator and modules. The class covers the full range of the actuators and the modules used to interface to the actuator. Classes are held periodically but can be tailored to fit specific needs of the students in attendance.

Topics
- Basic Product Overview
  - Actuator, Control Modules
- Introduction to Actuators
  - Rack & Pinion Operation, FieldQ™ Features/Benefits, Data Sheets
- Introduction to Modules
- General Features and Benefits, Types, Construction, Functionality
  - Hands on
- Field Topics
  - Installation, Maintenance, and Troubleshooting
- Sales Training
  - Applications, Pricing, Configurations
- QA Systems, Functions, RMA s and Customer Complaint Handling

Prerequisite
Students should be involved with the purchase, application, marketing, sales, or / service / maintenance of the FieldQ™ Actuation System.
Overview
This blended learning 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 valve assemblies. Students will solve several demonstration sizing and selection problems using Fisher™ Specification Manager software and published materials. 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; and properly apply positioners and instruments.

Topics:
- Control valve selection: Rotary/sliding stem
- Actuator selection and sizing
- Liquid and gas valve sizing
- Positioners and transducers
- Valve application guidelines
- Valve characteristics
- Valve packing characteristics

Audience
This course event consists of 8 virtual classroom parts (2 hours each). It is intended for engineers, technicians and others responsible for the selection, sizing and application of control valves, actuators and control valve instrumentation.

Prerequisite
Some experience with industrial control equipment including control valves and actuators would be helpful.
Overview
This blended learning course reviews the basics of steam conditioning processes and associated equipment. It describes the common maintenance and repairs on control valve assemblies.

Prerequisites
Successful completion of 1301BL or 1300 is required. Familiarity with sizing, selection, and advanced applications of control valves is strongly encouraged.

Topics
- Cavitation and flashing
- Noise
- Corrosion
- Erosion
- Valve application guidelines

Audience
This course consists of 4 virtual classroom parts (2 hours each). It is designed for engineers, technicians and others responsible for the selection, sizing, and application of control valve assemblies.

Fisher™ - Control Valve Engineering II-1351BL
CEUs – 1.6

Overview
This blended learning course reviews advanced application-specific design and operating principles of control valve assemblies, instruments, and accessories installed in a variety of non-general service applications. Students will gain insight in sizing and selection methods utilized in selecting appropriate control valve assemblies, as they relate to advanced control topics. Fisher™ Specification Manager software, combined with published reference materials, will be used to solve several advanced sizing and selection problems. Students will also have the opportunity to ask Emerson certified Fisher engineering instructors clarifying questions to firmly understand the advanced fluid mechanics covered in this course. Students who successfully complete the course will:
- Properly apply knowledge learned from 1300/1301BL and 1302BL
- Review basic sizing of control valves and build on the complexity of applications
- Review basics of thermodynamics and how those concepts relate to the sizing model
- Discuss key ideas involving cryogenic control valve assembly applications
- Size and select control valves for two-phase flow of hydrocarbon mixtures and dissolved gas
- Size and select actuators and pneumatic accessories for stroking speed requirements
- Gain insight into instrument diagnostics and optimum loop performance
- Learn the basics of steam conditioning processes and associated equipment

Topics
- Cavitation and flashing
- Noise
- Basic thermodynamics
- Cryogenic valves
- Two-phase flow
- Stroking speed
- Steam conditioning
- Control valve optimum loop performance
- Control Valve Diagnostic Basics

Audience
This course consists of 8 virtual classroom parts of 2 hours each. It is specifically tailored to technicians, engineers and others responsible for the proper selection, sizing, and application of control valve assemblies.

Fisher™ - Valve Trim & Body Maintenance - 1401BL
CEUs – .8

Overview
This blended learning course will review the technical working of both sliding stem control valves and rotary control valves. Design principles for common sliding stem and rotary valve assemblies will be discussed as well as common maintenance involved in the repair and replacement of valve components using Fisher™ documents as a reference. Also discussed will be the actuators for both sliding stem and rotary control valves. The students will be involved in interactive discussions on the proper maintenance and upkeep of the Fisher valves. Students also have the option to attend a corresponding hands-on workshop, 1401W, following the completion of the virtual classroom portion of this course. Students who complete this course will:
- Identify and relate valve specification information such as pressure and leakage class to the operation of the control valve
- Identify various Fisher valve designs
- Use Fisher documentation to perform common maintenance and repairs on control valve assemblies

Topics
- Valve specifications
- Identify and maintain sliding stem valves
- Identify and maintain sliding stem actuators
- Identify and maintain rotary valves
- Identify and maintain rotary actuators

Audience
This course event consists of 4 virtual classroom parts (2 hours each) and offers a technical perspective for the working of Fisher™ control valves. The course is especially useful to anyone with responsibilities to repair and maintain control valves.

Prerequisite
None, however some experience and familiarity to process control and general valve operation is recommended.
## Fisher™ - Valve Trim & Body Maintenance Hands-on Workshop—1401W
CEUs – .8

### Overview
This is an 8-hour workshop that is offered as an optional component following the 1401BL virtual classroom event. Students will have the opportunity to perform hands on exercises on control valve bodies and actuators that reinforce the maintenance topics that were discussed during the online portion of the course. The workshop is hosted in Marshalltown, IA and a workshop facilitator will be present to assist the students with any questions they may have while performing the exercises.

### Workshops
- Fisher™ easy-e™ valve trim maintenance and repair
- Fisher sliding stem valve packing replacement
- Fisher Sliding stem actuator maintenance and repair
- Fisher 657 and 667 actuator bench set
- Fisher butterfly valve maintenance and repair
- Fisher ball valve maintenance and repair
- Fisher eccentric plug valve maintenance and repair
- Fisher rotary shaft valve packing replacement
- Fisher rotary actuator maintenance and repair
- Fisher rotary valve and actuator mounting

### Audience
This workshop is intended for any students that have completed the online component of the 1401BL course and would like to gain some hands on experience working with the control valve assemblies.

### Prerequisites
Must have successfully completed the 1401BL course.

## Fisher™ - Control Valve Instrument - Maintenance & Calibration - 1701BL
CEUs – .8

### Overview
This blended learning course will explain the technical operation and maintenance of both sliding stem and rotary actuators. Also discussed will be the design, operation, and calibration principles for both sliding stem and rotary pneumatic actuators. Finally, the course will cover the basic operation and calibration principles for Fisher™ FIELDVUE™ digital valve controllers. Fisher documentation will be referenced and used to perform calibration procedures during live interactive sessions. Students also have the option to attend a corresponding hands-on workshop, 1701W, following the completion of the virtual classroom portion of this course.

#### Topics
- Identify and discuss operation principles of Fisher actuators
- Identify and discuss operation principles of Fisher pneumatic actuators
- Identify and discuss operation principles of Fisher I/P transducers
- Identify and discuss operation principles of Fisher FIELDVUE digital valve controllers

### Audience
This course event consists of 4 virtual classroom parts (2 hours each) and offers a technical perspective for the working of Fisher™ positions for control valve operation. The course is especially useful to anyone with responsibilities to repair, maintain, and calibrate valve positioners.

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

## Fisher™ - Control Valve Instrument - Maintenance & Calibration Hands-on Workshop - 1701W
CEUs – .8

### Overview
This is an 8-hour workshop that is offered as an optional component following the 1701BL virtual classroom event. Students will have the opportunity to perform hands on exercises on control valve actuators and instrumentation that reinforce the maintenance topics that were discussed during the online portion of the course. The workshop is hosted in Marshalltown, IA and a workshop facilitator will be present to assist the students with any questions they may have while performing the exercises.

### Workshops
- Fisher™ sliding stem actuator maintenance and repair
- Fisher 657 and 667 actuator bench set
- Fisher rotary actuator maintenance and repair
- Fisher rotary valve and actuator mounting
- Fisher I/P transducer maintenance and calibration
- Fisher 3582 positioner maintenance and calibration
- Fisher 3610J and 3610JP positioner maintenance and calibration
- Fisher FIELDVUE™ DVC6200 digital valve controller maintenance and calibration

### Audience
This workshop is intended for any students that have completed the online component of the 1701BL course and would like to gain some hands on experience working with the control valve assemblies.

### Prerequisites
Must have successfully completed the 1701BL course.
Overview
This course 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

Audience
This course event consists of 2 virtual classroom parts (2 hours each) followed by 4 hours of hands-on workshop training and offers a technical perspective of the working of Fisher™ pressure controllers. The course is especially useful to anyone with responsibilities to repair, maintain, calibrate, and tune pressure controllers.

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

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

Audience
This course event consists of 2 virtual classroom parts (2 hours each) followed by 4 hours of hands-on workshop training and 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.

Prerequisite(s):
None, however some experience and familiarity to process control and general valve operation is recommended.
**Overview**

This course 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

**Audience**

This course event consists of 2 virtual classroom parts (2 hours each). 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.

**Prerequisites**

Successful completion of 1760BL is required.

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**Overview**

Students will have access to a live device using ValveLink™ software, and will discuss the operating parameters, alert parameters, and specification sheet information found in the detailed setup of the device. In conjunction with HC tiering capabilities, a basic understanding of functions within ValveLink software is discussed at length.

- Detailed Setup - basic page group
- Detailed Setup - alert page group
- Detailed Setup - specification sheet
- Status Monitor
- Step Response 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

**Audience**

This course event consists of 2 virtual classroom parts (2 hours each). 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.

**Prerequisites**

Successful completion of 1760BL is required.
### Fisher™ - FIELDVUE™ Digital Valve Controller – Performance Diagnostics (PD) Tier - 1763BL

**CEUs** - .4

#### Overview

Students will have access to a live 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

#### Audience

This course event consists of 2 virtual classroom parts (2 hours each). 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.

#### Prerequisites

Successful completion of 1760BL, 1761BL, and 1762BL is required.

### Fisher™ - Control Valve Engineering I – 1300

**CEUs** – 2.1

#### 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

#### Audience

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

#### Prerequisites

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

### Fisher™ - Control Valve Engineering II – 1350

**CEUs** – 2.1

#### Overview

This 3-day course reviews the basic control valve sizing practices and introduces advanced concepts when selecting and sizing control valves for severe service and unusual applications. The course includes lectures and numerous problem-solving sessions that make extensive use of Fisher™ Specification Manager software. Students who complete the course will:

- Select and size control valves to reduce aerodynamic noise
- Select and size control valves for cavitation applications
- Select valve types and options for corrosive and erosive fluids
- Size control valves for two-phase flow and hydrocarbon mixtures

#### Topics

- Steam conditioning valves
- High pressure/temperature issues
- Sizing for two phase flow, fluid mixtures
- Corrosive/erosive service
- Actuators: stroking speed, Hysteresis and other control application guidelines

#### Audience

This course is for practicing engineers and senior technicians who are seeking advanced training in control valve selection and sizing, and application problem solving.

#### Prerequisites

Completion of Control Valve Engineering I (1300 or 1301BL) and Control Valve Engineering Severe Service (1302BL) or have equivalent experience (minimum of two years specifying control valves and instrumentation). Familiarity with Fisher™ Specification Manager is required.
### Fisher™ - Valve Technician I - 1400

**CEUs – 2.1**

**Overview**
This 3-day course 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™ digital valve controllers
- Change valve trim, gaskets and packing
- Properly adjust sanitary valves

**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

**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.

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

### Fisher™ - Baumann™ Valve Technician - 1402 – Continued...

**Topics**
- 24000 general service valves
- Sanitary valves
- Low flow and specialty valves
- Packing
- Bench range
- Seat leak testing
- Actuators
- Positioners and FIELDVUE™ digital valve controllers

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

### Fisher™ - FlowScanner™ Data Acquisition & Interpretation – 1427 – Continued...

**Topics**
- 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 for personnel who will perform and interpret control valve diagnostic testing using a FlowScanner valve diagnostic system.

**Prerequisites**
Course 1400 and 1701BL or 1400 and 1710, or 1401BL and 1701BL, or 1401BL and 1710 or significant experience in valve and instrument operation/maintenance procedures. Completion of 1450 is recommended but not required.

### Fisher™ - FlowScanner™ Data Acquisition & Interpretation – 1427

**CEUs – 2.8**

**Overview**
This 4-day course uses lecture and hands-on labs to teach students to properly acquire and analyze diagnostic data using the FlowScanner 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 FlowScanner valve diagnostic system software
- Correctly mount sensors and related FlowScanner 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, FlowScanner valve diagnostic system data
- Create/view standard FlowScanner valve diagnostic system reports

**NOTE:** Educational Services supplies all control valve equipment and Flowscanners. No exceptions.

**Topics**
- Flowscanner valve diagnostic system hardware/software overview
- In-depth software navigation
- Setup and testing techniques
- Data entry & test criteria best practices
**Fisher™ FlowScanner™ Advanced Topics – 1428 CEUs – 2.1**

**Overview**
A pre-test and a control valve awareness test are used to confirm applicant readiness. A brief review of FlowScanner 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 valve health and condition by examining each of the major components of the 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 FlowScanner valve diagnostic system test for a given scenario.
- Understand the impact of scan rates on the appearance and interpretation of acquired data.
- Analyze FlowScanner valve diagnostic system 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 FlowScanner 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 FlowScanner valve diagnostic system 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

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**Fisher™ - FlowScanner™ Advanced Topics II – 1428 – Continued…**

**Audience**
This course is for personnel who are responsible for interpreting plots and other diagnostic data that is acquired with the Fisher™ FlowScanner valve diagnostic system. This course focuses on data interpretation. Data acquisition is taught in Course 1427.

**Prerequisites**
Course 1427 and a minimum of six months of diagnostic testing with the Flowscanner valve diagnostic system.

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**Fisher™ - Valve Technician II – 1450 CEUs – 2.1**

**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 1400/1401BL and 1710/1701BL 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

**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.

**Prerequisites**
Experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.

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**Fisher™ - Valve Maintenance with FIELDVUE™ Digital Valve Controller – 1451 CEUs: 2.8**

**Overview**
This 4-day course will cover sliding stem and rotary valves and actuators, valve and actuator setup, maintenance, repair and troubleshooting, installation and calibration of the Fisher™ FIELDVUE™ digital valve controllers using the 475 Field Communicator. An overview of ValveLink™ Mobile software will be included.

**Topics**
- Control valve terminology
- Globe valves/packing
- Actuators
- Bench set
- Ball valves / butterfly valves / eccentric disc valves
- Valve characteristics
- FIELDVUE™ digital valve controller theory of operation
- HART® communication signal
- FIELDVUE digital valve controller installation
- 475 Field Communicator
- Instrument configuration and calibration
- Instrument troubleshooting
- ValveLink™ Mobile overview

**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.

**Prerequisites**
Experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.
Overview
This 3-day course covers the principles of operation, calibration and installation procedures for electronic and pneumatic instruments. The course 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 assemblies

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

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

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

FIELDVUE™ Digital Valve Controller Setup & Diagnostics using 475 Field Communicator and ValveLink™ Software – 1750 CEUs: 2.8

Overview
The 4-day course provides the fundamental skills necessary to install and mount a FIELDVUE™ digital valve controller onto sliding stem and rotary valve / actuator, and to configure and calibrate FIELDVUE instruments using the 475 Field Communicator. Students will also be able to configure and calibrate FIELDVUE instruments using the 475 Field Communicator. Students will also be able to use ValveLink™ software to run diagnostics.

Topics
- FIELDVUE™ digital valve controller theory of operation
- FIELDVUE instrument installation
- 475 Field Communicator configuration and calibration
- Control loop wiring practices
- Introduction to ValveLink™ software
- ValveLink software tag and database issues
- Configuration and calibration with ValveLink software
- ValveLink software advanced diagnostics
- ValveLink software performance diagnostics
- Instrument troubleshooting using ValveLink software

Audience
This course is for technicians, engineers, and others responsible for installing, configuring, calibrating, and basic troubleshooting of FIELDVUE™ digital valve controllers using 475 Field Communicator and ValveLink™ software. This course is a combination of 1751 and 1752 taken in the same week.

Prerequisites
Some experience in instrument calibration and in control valve maintenance, installation, and operation would be helpful.
**Fisher™ - ValveLink™ Software for Configuration and Calibration of FIELDVUE™ Digital Valve Controllers – 1752**

**CEUs – 2.1**

**Overview**
This lecture/lab style 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™ software
- Configuration with ValveLink software
- Calibration with ValveLink software
- ValveLink software advanced and performance Tier Diagnostics
- Troubleshooting
- Introduction to diagnostic data interpretation

**Prerequisites**
Completion of 1450 is recommended but not required.

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**Fisher™ – Diagnostic Data Interpretation using ValveLink™ Software for FIELDVUE™ - Digital Valve Controllers – 1759**

**CEUs – 2.1**

**Overview**
This 3-day course teaches the techniques necessary to collect and interpret valve diagnostic tests performed using ValveLink™ software.

**Audience**
This course teaches the techniques necessary to interpret and analyze diagnostic data obtained using 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.

**Prerequisites**
Completion of 1450 is recommended but not required.

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**Fisher™ – FOUNDATION™ fieldbus FIELDVUE™ Digital Valve Controller – 7036 – Continued...**

**Audience**
This 3-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. During commissioning, students will learn the basics of the FOUNDATION fieldbus protocol, the role of function blocks, addressing, modes and status. Students will configure, calibrate, and commission devices using the 475 Field Communicator and ValveLink™ software. Hands-on exercises also teach students how to perform detailed setup routines and how to run and collect data for various FIELDVUE software diagnostics.

**Topics**
- Positioner Basics
- FOUNDATION™ fieldbus overview
- FIELDVUE™ digital valve controller installation and mounting
- Modes and status
- Configuration and calibration with the 475 Field Communicator
- ValveLink™ software guided Setup /Detailed Setup
- Tuning
- Tag management
- Pressure control
- ValveLink software diagnostics
- FIELDVUE instrument troubleshooting

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**Fisher™ - FOUNDATION™ fieldbus FIELDVUE™ Digital Valve Controller – 7036 – Continued...**

**Audience**
This 3-day course teaches the techniques necessary to collect and interpret valve diagnostic tests performed using ValveLink™ software.
Hytork™ Products - VA108
CEUs - 2.1

Overview
This 3-day class provides a solid grounding in valve automation solutions in general with detailed and specific information given on the range of actuators and control accessories available from Hytork™. Classes are tailored to fit specific student requirements.

Topics
- Overview of Hytork™
- Key Accounts and Markets
- Pneumatic Actuators, History, Theory and Different Types
- Comparison of Pneumatic Actuators to Electric, Hydraulic and Electro-Hydraulic Designs
- Advantages of the Rack & Pinion Design
- ISO Standards
- General Valve Automation Applications
- Hytork Actuators Variations and Evolution
- Valve Automation Accessories Including Limit Switches, Solenoids Valves, Speed Control Valves and Valve Mounting Options
- Mounting of Control Accessories
- Hytork Products Features and Benefits
- General Valve Types/Torque Characteristics
- Actuator Sizing Techniques, Test Questions
- Hytork Actuator Sizing
- Hytork Drawing Types and Procedures
- QA Systems, Function’s, RMA’s and Customer Complaint Handling
- Hytork Product Warranties
- Price Book Review
- Hands-on Actuator Assembly, Disassembly, Mounting and End-Stop Adjustment
- Question and Answer Session
- Final Test

Prerequisite
Students should be involved with the purchase, application, marketing, sales or service/maintenance of Hytork™ products.
Machinery Health™ - Balancing Theory & Application for CSI 2140 - 2016
CEUs - 2.8

Overview
This 4-day class (2 days on Balancing Theory and 2 days on Balancing Applications with CSI 2140) teaches how to perform single- and dual-plane balancing using both graphical and analyzer-based balancing methods. The class uses the CSI 2140 Machinery Health™ Analyzer on lab machinery.

Topics
- Imbalance identification
- Use of vectors
- Calculating influence coefficients
- Use of the auxiliary analyzer balance functions
- Use of UltraMgr module
- Calculating a system lag
- Estimate trial weights
- Balancing flexible rotor systems
- Balancing overhung rotors
- Applying balancing techniques in an industrial setting

Prerequisites
Understanding of vibration analysis is recommended.

Machinery Health™ - Windows- Based ODS/Modal - Introduction - 2039
CEUs - 2.8

Overview
This 4-day course is designed to teach Operating Deflection Shape (ODS) and Modal Analysis software. This course uses the CSI 2130 single- and dual-channel Machinery Health™ Analyzers to teach the practical concepts of ODS/modal measurement techniques and display options. The modal course is introductory and will not cover theory or mathematical background.

Topics
- Building of the Wireframe Model
- Measurement Considerations
- Collecting ODS Data With and Without a Tachometer Reference
- Utilizing an Impact Hammer with the CSI 2130/2140 Advanced Dual-Channel DLP
- Interpretation of Results

Prerequisites
Knowledge of dual-channel analyzers and at least one year of full-time vibration analysis experience is recommended.

Machinery Health™ - Balancing Theory & Application for CSI 2130 - 2015
CEUs - 2.8

Overview
This 4-day class (2 days on Balancing Theory and 2 days on Balancing Applications with CSI 2130) teaches how to perform single- and dual-plane balancing using both graphical and analyzer-based balancing methods. The class uses the CSI 2130 Machinery Health™ Analyzer on lab machinery.

Topics
- Imbalance identification
- Use of vectors
- Calculating influence coefficients
- Use of the auxiliary analyzer balance functions
- Use of UltraMgr module
- Calculating a system lag
- Estimate trial weights
- Balancing flexible rotor systems
- Balancing overhung rotors
- Applying balancing techniques in an industrial setting

Prerequisites
Understanding of vibration analysis is recommended.

Machinery Health™ - CSI Online Protection Operation and Maintenances – 2080
CEUs - 2.8

Overview
Workshops include practice with “live” monitors and racks.

Topics
- Overview of hardware components
- Rack configuration Operator display software
- Data acquisition software Interface with the CSI On-line prediction system
- System troubleshooting and maintenance.

Audience
This 4-day course is a hands-on training for anyone involved with operating and maintaining a CSI 6000/6500 System.

Machinery Health™ - IR Thermography Level I - 2019
CEUs - 2.8

Overview
Emerson thermography courses meet or exceed Level 1 ASNTTC- 1A recommended practices. Successful completion of the courses and passing of optional examinations may lead to Level I or Level II certification.

Topics
- Physics of infrared energy
- Components of infrared light
- System components and data collection
- Setting acceptance criteria for electrical and mechanical components
- Data storage, trending, and reports
- System coordination with other PdM technologies
- Built-up roofs

Audience
This 4-day class is intended for personnel who have limited or no experience in infrared thermography analysis and diagnostics.
Contamination control and their impact on the importance of Wear Debris Analysis and methods for extending machine life. The focus of 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 programs
- 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.

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**Machinery Health™ - PEAKVUE™ Mystery and Autocorrelation - 2035 CEUs - 2.1**

**Overview**
This 3-day course provides insight into advanced functionality of Emerson's unique PEAKVUE™ technology and Autocorrelation. Machine vibrations generate both macro and microscopic vibrations, and microscopic vibrations generate stress waves that have frequency ranges determined by the mass of the impacting object. The properties of these stress waves will be explained. The Autocorrelation section of the course will teach the power of the autocorrelation coefficient function for the analysis of vibration induced time wave form data. The autocorrelation function data generally are computed from the same time wave form data used to compute the spectrum. The strengths of the autocorrelation data are complimentary to the strengths of the spectral data. This course makes use of both case studies from real-life examples of common faults and live demonstrations illustrating specific mounting procedures to reliably detect certain faults. The difference between PEAKVUE techniques and demodulation will also be demonstrated.

**Topics**
- Proper PEAKVUE™ Set-Ups for all Speeds (as Low as 1 rpm)
- Sensor Selection and Sensor Mounting
- Setting Alarm Levels
- Choosing Trend Parameters
- Analyzing PEAKVUE™ Spectra and Waveforms
- Uses of the Circular Waveform Plot
- Introduce the Autocorrelation Coefficient
- Demonstrate the Computation of the Autocorrelation Coefficient Data from the Time Wave form Data
- Highlight the Strengths of the Autocorrelation Coefficient Function Data/Spectra Data
- Demonstrate the use of the Autocorrelation Coefficient Data as a Diagnostic Tool to Support the Spectra Data for Vibration Analysis Through Several Case Studies
- Identify Unique Patterns of the Autocorrelation Function Data for Certain Classes of Bearing Faults, Gearing Faults, etc.

**Prerequisites**
Students should be familiar with vibration data collection and analysis techniques and the use of AMS Machinery Manager Software.
Machinery Health™ - Vibration Analysis - Fundamentals - 2069
CEUs - 1.4

Overview
The 2-day class prepares participants for the Basic Vibration Analysis Course. Students learn about causes of vibration and methods of measurement. Although the training course does not provide instruction on Emerson’s CSI technologies, the class will use them to demonstrate vibration principles.

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

Audience
This vibration training course is for those with no prior experience in vibration analysis.

Machinery Health™ - Vibration Analyst Exam - Category I - 2021EX

Overview
Category I exam, available at the end of course# 2031
Test Format: Written exam
Duration: 2 hours, Passing Grade: 70%

Eligibility for Examination
- Recommended Minimum Duration of Cumulated Training (hours): 32
- Recommended Minimum Duration of Cumulated Experience (months): 6

Machinery Health™ - Vibration Analyst Exam - Category II - 2022EX

Overview
Category II exam, available at the end of course# 2032
Test Format: Written exam
Duration: 3 hours
Passing Grade: 70%

Eligibility for Examination
- Recommended Minimum Duration of Cumulated Training (hours): 70
- Recommended Minimum Duration of Cumulated Experience (months): 18
- Category I exam is NOT a prerequisite for taking Category II exam.

Machinery Health™ - Vibration Analyst Exam - Category III - 2023EX

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

Eligibility for Examination
- Recommended Minimum Duration of Cumulated Training (hours): 110
- Recommended Minimum Duration of Cumulated Experience (months): 36
- Has taken and passed the Category II exam.

Machinery Health™ - Wear Debris Analysis Workshop – 2084
CEUs - 1.4

Overview
Wear debris analysis is often referred to as the most important form of oil analysis. This 2-day course teaches how to apply conditions such as the environment and other outside factors to make an accurate root cause analysis. Attendees gain a basic understanding of wear particle generation, sample preparation techniques, identification and characterization of wear particles. Data generated using the OilView® instrumentation and how it applies to WDA is discussed as well as the use of the OilView® WDA module. WDA skills must be maintained by the student through regular practice and may be developed by reading further on the subject.

Topics
- Theory Presentation
- Wear Particle Generation
- Tribology, Friction, and Wear
- Lubrication Fundamentals
- Sample Screening: Discussion of How to IUe Preliminary Data and Equipment type to Select WDA Candidates and Sample Preparation Techniques
- Interpretation of Oil Analysis Results Related to WDA such as OilView Indices and Commercial Oil Laboratory Data
- Sample Preparation Techniques: Discussion of Sample Preparation for Grease, Oil, Hydraulic Fluid, and Synthetics
- Disciplined and Systematic Approach to WDA: Overview of the OilView WDA Module
- Particle Identification and Characterization Exercise
- Identification and Characterization of Wear Debris

Machinery Health™ - ARES™ - Introduction – 2040
CEUs - 2.8

Overview
This 4-day course was designed for new users of the ARES™ software. 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 new release of the ARES™ software. Advanced Vibration Analysis module, Infrared Analysis, Motorview, CSI On-line Machinery Health™ Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Prerequisites
Computer experience with the Windows operating system and some vibration analysis experience are recommended.
Machinery Health™ - ARES™ - Introduction - Virtual - 2040V
CEUs - 2.8

Overview
This 4-day course was designed for new users of the ARES™ software. 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 new release of the ARES™ software. Advanced Vibration Analysis module, Infrared Analysis, Motorview, CSI On-line Machinery Health™ Monitor and Oilview modules are covered in other course offerings and are not part of this course.

Topics
- Navigation
- Database creation
- Data collection
- Basic analysis and reporting
- Link to RBMview

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

Machinery Health™ - Basic Vibration Analysis – 2031 – Continued...

Topics
- Principles of Vibration
- Data acquisition & Signal Processing
- Condition monitoring & Corrective Action
- Equipment Knowledge
- Acceptance Testing
- Basic Analyzer Functions
- The Class Shows Students How to Recognize Machine Defects such as:
  - Unbalance Shaft Misalignment
  - Looseness
  - Rolling Element
  - Roaring Defects
  - Gear Problems
  - Resonance Introduction to Electrical Defects
  - Introduction to Electrical Defects

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

Machinery Health™ – Advanced CSI 2140 – 2094
CEUs - 2.1

Overview
This 3-day course is intended for personnel with single-channel vibration analysis experience and little or no multi-channel experience.

Topics
- PEAKVUE™
- Resonance Detection
- Dual Channel Data Collection
- Fundamentals of Cross-Channel Data Collection
- Introduction to Coherence and Cross-Channel
- Phase
- Orbit Data Collection
- Introduction to Operating Deflection Shape (ODS) Testing Methods
- Introduction to Modal Analysis Testing Methods
- Advanced Two-Channel DLPZoom Analysis, Cascade and Overall
- Transient Wave Form Capture and Analysis
- CSI 2130 Analysis Experts

Audience
This course is intended for personnel with single-channel vibration analysis experience and little or no multi-channel experience.

Prerequisites
Single channel vibration analysis experience is required.

Machinery Health™ – Advanced CSI 2130 – 2091
CEUs - 2.8

Overview
This 3-day class covers advanced signal processing using Emerson’s patented PEAKVUE technology for slow-speed analysis, transient capabilities, coherence and cross-channel phase, operating deflection shapes (ODS), modal analysis, and other advanced techniques.

Topics
- PEAKVUE™
- Resonance Detection
- Dual Channel Data Collection
- Fundamentals of Cross-Channel Data Collection
- Introduction to Coherence and Cross-Channel
- Phase
- Orbit Data Collection
- Introduction to Operating Deflection Shape (ODS) Testing Methods
- Introduction to Modal Analysis Testing Methods
- Advanced Two-Channel DLPZoom Analysis, Cascade and Overall
- Transient Wave Form Capture and Analysis
- CSI 2130 Analysis Experts

Audience
This course is intended for students with single-channel vibration analysis experience and little or no multi-channel experience.

Prerequisites
Single channel vibration analysis experience is required.

Machinery Health™ - Basic Vibration Analysis – 2031
CEUs - 2.8

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 CSI technologies for demonstration purposes. The class shows the student how to use the vibration analyzer in conjunction with Emerson Machinery Health™ supported software to analyze basic vibration defects. Participants will receive a complimentary copy of the Pocket Vibration Analysis Trouble-Shooter Guide.

Topics
- PEAKVUE™
- Resonance Detection
- Dual Channel Data Collection
- Fundamentals of Cross-Channel Data Collection
- Introduction to Coherence and Cross-Channel Phase
- Orbit Data Collection
- Introduction to Operating Deflection Shape (ODS) Testing Methods
- Introduction to Modal Analysis Testing Methods
- Advanced Two-Channel DLPZoom Analysis, Cascade and Overall
- Transient Time Waveform Capture and Analysis
- CSI 2140 Analysis Experts Functions

Audience
This course is intended for personnel with single-channel vibration analysis experience and little or no multi-channel experience.

Prerequisites
Computer experience with the Windows operating system and some vibration analysis experience are recommended.
### Machinery Health™ – Fundamentals CSI 2140 – 2076
**CEUs - 1.4**

**Overview**
This 2-day hands-on course focuses on the basic operation of the CSI 2140 Machinery Health™ Analyzer. Students collect data on lab machines. Note: You may take 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 CSI 2140 Analysis Expert Functions

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

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

### Machinery Health™ – CSI 6500 ATG
**Operation and Maintenance – 2086**
**CEUs - 2.8**

**Overview**
This 4-day hands-on training course is for any user or analyst involved with operating and maintaining a CSI 6500 ATG Protection System. Workshops include practice with module and software configuration. Instruction on the Operation and Maintenance of the CSI 6500 ATG system.

**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 4-day course is a hands-on training for anyone involved with operating and maintaining a CSI 6000/6500 System.

### Machinery Health™ - CSI Online
**Prediction Operation and Maintenance – 2088**
**CEUs - 2.8**

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

**Topics**
- Vibration basics and terminology relating to the CSI 4500, CSI 6500, CSI 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

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

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

### Machinery Health™ - CSI 6300 SIS
**Operation & Maintenance – 2087 – Continued...**

- Implemented System and Safety Routes
- In & Output Functionalities
- Machinery Requirements

**Audience**
This course is designed for System Users, Projects, Services and Support personnel for Emerson and its representatives.

**Prerequisites**
Participants should be familiar with vibration analysis, have basic computer skills and have a basic knowledge of electrical test equipment.

### Machinery Health™ – Fundamentals of CSI 2130 – e2130 -
**CEUs - 0.6**

**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
Overview
Emerson’s Machinery Health™ training now includes the Fundamentals of the CSI 2140 eLearning course, designed to provide you with the tools you need to perform data collection using the CSI 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 CSI 2140 Analysis Expert Functions

Machinery Health™ - Electric Motor Diagnostics & Basic Motorview – 2081
CEUs - 2.8

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.

Machinery Health™ - Fundamentals of Vibration & CSI 2140 – 2076
CEUs - 1.4

Overview
This 2-day hands-on course focuses on the basic operation of the CSI 2140 Machinery Health Analyzer. Students collect data on lab machines.

Topics
- Analyzer/computer communication
- Predefined route data collection
- Job data collection and setup
- Manual mode measurements
- Introduction to CSI 2140 Analysis
- Expert Functions

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

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

Machinery Health™ - Fundamentals of Vibration & CSI 2140 – 2014
CEUs - 2.8

Overview
Course 2014 is the course# for 2069 & 2076 combined.

Fundamentals of Vibration Analysis - 2069 (CEUs - 1.4)
The 2 1/2-day class prepares participants for the Basic Vibration Analysis Training Course. Students learn about causes of vibration and methods of measurement. Although the training course does not provide instruction on Emerson's CSI technologies, the class uses them to demonstrate vibration principles.

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.
### Machinery Health™ - Intermediate Vibration Analysis – 2032
**CEUs - 2.8**

**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 CSI 2130/2140 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**
- Equipment Testing and Diagnostics
- Reference Standards
- Reporting and Documentation
- Fault Severity Determination
- Analyzer Averaging Techniques
- Sensor Selection Guidelines
  - Introduction to Demodulation and PEAKVUE™
- Advanced Waveform Analysis
- Sideband Analysis
- Rolling Element Bearing Failure Modes
- Advanced Electrical Analysis Techniques
- Pump/fan Vibration
- Phase Analysis using Single and Dual Channel
- Perform Basic Single-Plane Field Balancing

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

### Machinery Health™ - Turbomachinery Diagnostics – 2089
**CEUs - 2.8**

**Overview**
This 4-day class covers details of the operation, maintenance, management, diagnostics and design of rotating machinery using vibration information. Emphasis is placed on interpreting start-up/shutdown and steady state vibration data plots, understanding the sources of rotating machinery vibration and recognizing common machinery malfunctions. This seminar makes extensive use of full featured field diagnostic equipment to reinforce lecture topics. This class is designed for engineers, supervisors, managers, and rotating equipment support professionals responsible for design, operation, and maintenance of rotating equipment. Case histories will be presented to reinforce class topics and facilitate class discussion. The operation, maintenance, management, diagnostics and design of rotating machinery using vibration information.

### Machinery Health™ - Vibration Analysis - Advanced – 2033
**CEUs - 2.8**

**Overview**
This 4-day course complies with Category II 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 AMSTM Suite: Machinery Health 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

### Machinery Health™ - Vibration Analysis - Advanced – 2033 – Continued...
- Establish Specifications for Vibration Levels and Acceptance Criteria for New Machinery
- Measure and Analyze Basic Operational/Deflection Shapes (ODS)
- Measure and Analyze PEAKVUE™ Measurements
- Slow Speed Technology (SST®)
- Zoom Analysis / Transient Techniques
- Dual Channel Machinery Analyzer Features
- Triggered Data Capture/Resonance Detection

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

### Machinery Health™ – AMS Machinery Manager: Vibration Analysis Workshop for the PDM Professional - 2008B
**CEUs - 1.4**

**Overview**
The purpose of this blended learning workshop is to provide the vibration analyst with an interactive learning environment that enhances their understanding of the features of the Vibration Analysis program using Emerson’s AMS Machinery Manager Software. This workshop was designed as a self-paced blended learning training experience. The student will be provided with a workbook, access to a Virtual Training Computer and an eLearning module. The workbook contains eleven topical exercises for use with the Vibration Analysis tab in AMS Machinery Manager. The student will also be given a link to a Virtual Training Computer to complete the exercises using AMS Machinery Manager. If there are questions on how to complete steps in the exercise, an eLearning module will provide assistance to the student.

If questions cannot be answered with the assistance of the eLearning module students will also be able to email questions to an instructor.
Machinery Health™- Laser Alignment for
CSI 2130 – 2092
CEUs - 1.8

Overview
This 2 1/2-day course provides training on
shaft alignment using CSI laser alignment
product line with focus on the CSI 2130
Machinery Health™ Analyzer. This course
includes hands-on training with horizontal
alignment and vertical alignment
demonstrators and covers management of
an alignment program using the AMS
Machinery Health Manager software.

Topics
- Alignment: What is it? Why?
- Required pre-shutdown checks
- Pre-alignment checks and corrections
- The science and art of alignment
- Tools & techniques for moving
equipment
- Time-savers
- User of CSI laser alignment product
line with CSI 2130 Machinery
Health™ Analyzer
- Alignment information
- Management systems: methods and
advantages

Audience
This class is intended for personnel who
have limited or no alignment experience
METCO - Hydrocarbon Liquid and Natural Gas Flow Measurement - M2650 CEUs - 2.4

Overview
This 3-day course addresses the concepts of custody transfer metering, principle of allocation in shared facilities, and the general operating principles of custody transfer instruments in both Natural Gas and Hydrocarbon Liquid Flow Metering.

Topics
- Why Meter?
- Traceability
- Uncertainty
- Allocation
- Flow Computer Overview
- Liquid Metering
- Meter Proving
- The Fast Loop
- Liquid Densitometers
- Automatic Sampling
- BS&W
- Gas Metering
- Gas Characterizations
- Gas Flow Meters
- Gas Metering Instrumentation
- The Gas Densitometer
- The Gas Chromatograph
- Dewpoint
- Wet Gas Metering
- The Audit Trail
- Procedures

Audience
This course is intended for those who are involved with metering but may not be metering specialists. Typical job functions include: maintenance technicians, supervisors and engineers.

Prerequisites
A basic knowledge of metering operations or maintenance is necessary for attendance for this course.

METCO - Measurement Audit Appreciation Course - M2665 CEUs - 1.6

Overview
This 2-day course is designed to give appreciation of the audit process.

Topics
- Introduction to Auditing
- Why Audit
- Audit Types
- The Audit Body
- ISO 9001 — Quality Management
- Measurement System Risk
- The Audit Process
- Audit Criteria
- Auditor Responsibilities
- Conducting the Audit
- Audit Reporting and Follow-up

Audience
This course is intended for those who carry out audits on flow measurement systems. Typical job functions: senior measurement specialists, measurement engineers, measurement consultants.

Prerequisites
Before this training course the candidate will have successfully completed the ISO 9001 Lead Auditors training.

METCO - Measurement Auditor Training - M2666 CEUs - 2.8

Overview
This 4-day course is designed to give an outcome such that the candidate will be able to carry out shadowed audits and go on to complete 3rd party audits.

Topics
- Introduction to Auditing
- The Audit Body
- The Auditor
- The Audit Process
- Audit Criteria
- HM 60 Guidelines for Auditing of Measurement systems
- Auditor Responsibilities

Audience
This course is intended for those who are not working with metering but have an involvement that requires an insight into metering to carry out their own job. Typical job functions include: plant operators and technical assistants. But is also applicable to: line managers, supervisors, engineers, commercial analysts and hydrocarbon accountants.

Prerequisites
A basic knowledge of metering operations or maintenance is necessary for attendance for this course.

METCO - Metering Appreciation for Operators - M2610 CEUs - 0.8

Overview
This 1-day course delivers an overview understanding of custody transfer flow measurement, together with the basic concepts of metering techniques and the function of flow computers.

Topics
- Why Meter?
- Metering Techniques
- Understanding Flow Computers
- Allocation Appreciation
- Reporting Procedures
- The Audit Trail. Operating
- Fault Conditions

Audience
This course is intended for those who are not working with metering but have an involvement that requires an insight into metering to carry out their own job. Typical job functions include: plant operators and technical assistants. Also applicable to: line managers, supervisors, engineers, commercial analysts and hydrocarbon accountants.

Prerequisites
No specialist metering knowledge is necessary for attendance on this course.
METCO - Metering Appreciation for Supervisors - M2620
CEUs - 0.8

Overview
This 1-day course delivers an overview understanding of custody transfer flow measurement, together with the basic concepts of metering techniques and the function of flow computers.

Topics
- Why Meter?
- Metering Techniques
- Understanding Flow Computers
- Allocation Appreciation
- Metering Management
- Choice of Meter
- The Audit Trail

Audience
This course is intended for those who are not working with metering but have an involvement that requires an insight into metering to carry out their own job. Typical job functions include: plant operators and technical assistants. But is also applicable to: line managers, supervisors, engineers, commercial analysts and hydrocarbon accountants.

METCO - Metering Technician Training - M2667
CEUs - 2.4

Overview
This 3-day course addresses the diverse knowledge requirements of the Metering Technician across various trades such as instrumentation, computers, analyzers maintenance and calibrations.

Topics
- Oil and Gas Process
- Flow Meters (Orifice, Turbine, Coriolis, Venturi, Magflow, Vortex)
- Pressure, Temperature Differential Pressure
- Density
- Oil and Gas Sampling
- BS & W Measurement
- Chromatography
- Flow Computers
- Reports
- Planned Maintenance
- Calibrations
- Calibration Software
- Logistics and Spares Management
- P & ID's
- Loop Diagrams

Audience
The course delivers an overall understanding of oil and gas process, custody transfer metering and the role and responsibilities of the Metering technician.

Prerequisites
A certain level of instrument knowledge is expected for this course.

METCO - Natural Gas Flow Measurement - M2640
CEUs - 1.6

Overview
This is a 2-day course addresses the concepts of custody transfer metering, principle of allocation in shared facilities, and the general operating principles of Natural Gas Custody Transfer Instruments.

Topics
- Why Meter?
- Traceability
- Uncertainty
- Allocation
- Flow Computer Overview
- Gas Characteristics
- Gas Flow Meters
- Gas Flow Metering Instrumentation
- The Gas Densitometer
- The Gas Chromatograph
- Dewpoint
- Wet Gas Metering
- Reporting Procedures
- The Audit Trail
- Operating Procedures
- Fault Conditions

Audience
This course is intended for those who are involved with Metering but may not be Metering Specialists. Typical job functions include: maintenance technicians, supervisors and engineers.

Prerequisites
A basic knowledge of metering operations or maintenance is necessary for attendance for this course.
Micro Motion - Coriolis & Rosemount 8700 Magnetic Flowmeters – 2384
CEUs - 0.7

Overview
This 1-day field class provides hands-on training on both the Coriolis and Magnetic Flowmeters. Typically, 2/3 of the course time is spent on Micro Motion’s Coriolis meter and 1/3 on Rosemount’s 8700 Magnetic Flowmeter. Theory of operation, meter components and installation of each flowmeter 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 8700 Magnetic flowmeter. Customers can choose which configuration device is used for classes held at their site.

Topics
After attending the course, the student will be able to do the following for both Micro Motion’s Coriolis and Rosemount 8700 Magnetic flowmeters:

- Briefly Explain the Fundamentals for How Each Flowmeter Works and the Function of the Key Components
- 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 and Process Issues

Audience
This combined class is intended anyone that is involved in properly configuring and troubleshooting a Micro Motion flow and density meter and Rosemount 8700 Smart Magnetic Flowmeters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Prerequisites
Some prior experience working with Micro Motion Coriolis & Rosemount 8700 Magnetic flowmeters is recommended. However, students with no past experience can also benefit. A basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing is assumed.

Micro Motion - Coriolis & Rosemount 8800 Vortex Flowmeters – 2387
CEUs - 0.7

Overview
This 1-day field class provides hands-on training on both the Coriolis and Vortex Flowmeters. Typically, 2/3 of the course time is spent on Micro Motion’s Coriolis meter and 1/3 on Rosemount’s 8800 Vortex Flowmeter. Theory of operation, meter components and installation of each flowmeter 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 flowmeter. 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 Flowmeters:

- Briefly Explain the Fundamentals for How Each Flowmeter 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 and 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

Audience
This combined class is intended anyone that is involved in properly configuring and troubleshooting a Micro Motion Coriolis Meter Works and the Function of the Key Components

Prerequisites
Some prior experience working with Micro Motion Coriolis & Rosemount 8800 Vortex

Micro Motion - Coriolis & Rosemount 8800 Vortex Flowmeters – 2387 – Continued...

flowmeters. A basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing.

Micro Motion - Coriolis & Rosemount 8800 Vortex Flowmeters – 2358
CEUs - 0.7

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 ($2353) 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

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.

Prerequisites
A basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing is assumed.
| Micro Motion - Coriolis Comprehensive Factory Training Class – 2352  
| CEUs - 2.1  
| **Overview**  
| This three-day class consists of a blend of lectures and 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 ProLink® III, HC475 and the Series 3000 platform and an introduction to the new Micro Motion’s 5700’s transmitter. Students will also learn the Modbus communications model, including RS-485 network requirements, memory structure, data types, functions, character framing, and message framing.  

After completing this training, students will also get unlimited access to the Micro Motion’s Online Training (e2353) for a year. This online training cost $400/license per year if purchased separately.

**Topics**  
After attending this course the student will be able to do the following:  
- Be able to explain the fundamentals for how a Micro Motion Coriolis meter works and the functions of the key components  
- Be able to apply the installation best practices for orienting, mounting and wiring the sensor and transmitter  
- Be able to configure the metering system to measure flow, density and temperature for the application  
- Be able to apply a step-by-step process to perform basic troubleshooting for the most common meter and process issues  
- Be able to explain the fundamentals for the Modbus protocol model.  
- Be able to configure, commission, read process data, view & analyze key diagnostic registers and loop test a batch application using a Micro Motion Meter.  

**Audience**  
This class 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; Micro Maintenance Technicians, Instrument Technicians and Instrumentation Engineers.

**Prerequisites**  
None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

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| Micro Motion - Coriolis Comprehensive Field Based Training Class – 2380  
| CEUs - 1.4  
| **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 and Series 3000 platform. Onsite classes can be customized to cover the customer’s installed base, preferred configuration tools and application questions. 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 (e2353) 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  
- Learn the Installation Best Practices for Orienting, Mounting and Wiring the Sensor and Transmitter  
- Configure the Metering System to Measure Flow, Density and Temperature for Various Applications  
- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Meter and Process Issues  

**Audience**  
This class 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; Micro Maintenance Technicians, Instrument Technicians and Instrumentation Engineers.

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| Micro Motion - Coriolis Comprehensive Factory Training Class – 2352 – Continued...  

| Micro Motion - Coriolis Meter: Configure Device Options & Meter Information -  
e2359  
| **Overview**  
| This class is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion flow and density meter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

**Prerequisites**  
Basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing are assumed.

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| Micro Motion - Coriolis Meter: Configure Process Measurements - e2357  
| **Overview**  
| This online training includes:  
Communicating Between Tools and Transmitter; Navigation of Configuration Tool Menus; Characterizing the Flowmeter Configuration Flow Measurements; Flow Direction and Damping; Density Measurement and Slug Flow Limits and Configuring Temperature$99 per student - unlimited access 12 months.

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| Micro Motion - Coriolis Meter: Final Checkout - e2360  
| **Overview**  
| $99 per student - unlimited access 12 months
Micro Motion - Coriolis Meter: Theory of Operation (e2354) CEUs - 0.10

Overview
This online training includes: Wiring Sensor to Transmitter; Connecting Power and Powering the Transmitter; Wiring the Configuration Tools to the Transmitter & more $99 per student - unlimited access 12 months.

Topics
- Coriolis Meter Fundamentals
- Wiring Sensor to Transmitter
- Connection & Use of Configuration Tools with 2700 Transmitter
- Configure Process Measurements
- Integrate the Meter with the Control/Operating System
- Configure Device Options & Meter Information
- Final Checkout

Audience
This eLearning course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion flow and density meter connected to a Series 2000 Transmitter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers. It can be taken as a full curriculum with assessments. Students that view all of the content and successfully complete the assessments can print out a Certificate of Completion with CEU’s awarded. The content can also be used as just-in-time refresher material after attending one of our instructor lead training classes.

Prerequisites
None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Micro Motion - Coriolis Meter: Integrate the Meter with the Control/Operating System - e2358

Overview
Integrate the Meter with the Control/Operating System

Micro Motion - Coriolis Meter: Wiring & Navigating Tools - e2356 CEUs - 0

Overview
This online training includes: Wiring Sensor to Transmitter; Connecting Power and Powering the Transmitter; Wiring the Configuration Tools to the Transmitter & more $99 per student - unlimited access 12 months.

Micro Motion - Online Instrument & Electrical (I&E) - e2353

Overview
This course is made up of a total 26 topics that cover basic installation, wiring and configuration of a Micro Motion 2700 transmitter with configurable input/outputs and any compatible Micro Motion sensor series. Each topic starts with a short overview of each step of the commissioning process followed by modules that provide the viewer an interactive experience for using the four configuration tools; ProLink III, AMS Device Manager, HC475 Field Communicator or integral display. An online website is also provided that points to online resources, instructions manuals and other tools associated with installation, startup and com-misioning of Micro Motion meters.

Topics
- Coriolis Meter Fundamentals
- Wiring Sensor to Transmitter
- Connection & Use of Configuration Tools with 2700 Transmitter
- Configure Process Measurements
- Integrate the Meter with the Control/Operating System
- Configure Device Options & Meter Information
- Final Checkout

Audience
This eLearning course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion flow and density meter connected to a Series 2000 Transmitter. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers. It can be taken as a full curriculum with assessments. Students that view all of the content and successfully complete the assessments can print out a Certificate of Completion with CEU’s awarded. The content can also be used as just-in-time refresher material after attending one of our instructor lead training classes.

Prerequisites
None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.
Micro Motion - Coriolis Short Course - 2339C – Continued...

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 (e235) 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

Audience
This eLearning course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion flow and density meter connected to a Series 2000 Transmitter. Typical job functions include: maintenance technicians, instrument technicians and instrumentation engineers. It can be taken as a full curriculum with assessments. Students that view all of the content and successfully complete the assessments can print out a Certificate of Completion with CEU’s awarded. The content can also be used as just-in-time refresher material after attending one of our instructor lead training classes.

Prerequisites
None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Micro Motion - Coriolis Short Course - 2339C
CEUs - 0.40

Overview
This half day course is a condensed version of the 2358 course. This course briefly reviews the theory of operation, meter...
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<th>Audience</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro Motion - Density and Viscosity Product Training – 5708</td>
<td>CEUs - 1.40</td>
<td>Overview</td>
<td>This two-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting of Micro Motion transmitters and peripherals. 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.</td>
<td>After attending this course the student will be able to do the following:</td>
<td>- Explain the principle of operation for how a Micro Motion Density &amp; Viscosity meter works and the function of the key components.</td>
<td>None required. However, basic understanding of the fundamentals of the behavior/properties of gases and gas density measurement are helpful. Basic electricity, analog &amp; frequency signal processing knowledge are also assumed.</td>
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</tr>
<tr>
<td>Micro Motion - Interactive Plant Environment – 5705</td>
<td>CEUs - 1.40</td>
<td>Overview</td>
<td>This two-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting of Micro Motion transmitters and peripherals. The course includes hands-on exercises within the Interactive Plant Environment training facility. Customer exclusive classes can be customized to address specific transmitter and configuration tools specific to that customer. This course also includes an introduction to Micro Motion's new 5700 transmitter.</td>
<td>After attending this course the student will be able to do the following:</td>
<td>- Explain the principle of operation for how a Micro Motion Coriolis meter works and the function of the key components.</td>
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<td></td>
</tr>
<tr>
<td>Micro Motion - Interactive Plant Environment – 5705</td>
<td>CEUs - 1.40</td>
<td>Overview</td>
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<td>After attending this course the student will be able to do the following:</td>
<td>- Apply a step by step process to perform basic troubleshooting of the most common meter and process issues.</td>
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<tr>
<td>Micro Motion - Interactive Plant Environment – 5705</td>
<td>CEUs - 1.40</td>
<td>Overview</td>
<td>This two-day course consists of a blend of lectures and hands-on exercises that cover the installation, configuration, calibration checks and troubleshooting of Micro Motion transmitters and peripherals. 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.</td>
<td>After attending this course the student will be able to do the following:</td>
<td>- Experience hands on simulated plant environment with operating flow meters.</td>
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<tr>
<td>Micro Motion - Modbus Digital Communications – 2381</td>
<td>CEUs - 0.40</td>
<td>Overview</td>
<td>This 1/2-day class consists of a blend of lectures and hands-on exercises. Students will learn the Modbus communications model, including RS-485 network requirements, memory structure, data types, functions, character framing, and message framing. Students will use Micro Motion’s Modbus documentation set and Modbus tool to configure transmitter features, read process data, reset totals, read and acknowledge alarms, analyze diagnostic registers, zero the flowmeter, perform a loop test and manage a batch process. Troubleshooting will also be covered.</td>
<td>- Explain the Principle of Operation for how a Micro Motion 3098 Gas Specific Gravity Meter Works and the Function of the Key Components</td>
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<tr>
<td>Micro Motion - Specific Gravity Meter Training Class - 2386</td>
<td>CEUs - 1.70</td>
<td>Overview</td>
<td>This 1-day course consists of a blend of lectures and hands-on exercises that cover an overview of the operating principle, key components and applications of a 3098 Micro Motion Gas Specific Gravity meter. The process of commissioning a 3098 is covered including: installation, wiring, configuration and field calibration at initial startup. Troubleshooting of commonly seen issues is also covered. This course includes hands on demonstrations.</td>
<td>- Learn the Installation Best Practices for Orienting, Mounting, Piping and Wiring the 3098</td>
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</tr>
<tr>
<td>Micro Motion - Specific Gravity Meter Training Class - 2386</td>
<td>CEUs - 1.70</td>
<td>Overview</td>
<td>This 1-day course consists of a blend of lectures and hands-on exercises that cover an overview of the operating principle, key components and applications of a 3098 Micro Motion Gas Specific Gravity meter. The process of commissioning a 3098 is covered including: installation, wiring, configuration and field calibration at initial startup. Troubleshooting of commonly seen issues is also covered. This course includes hands on demonstrations.</td>
<td>- Configure the 3098 and Perform the Required Field Calibration</td>
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<tr>
<td>Micro Motion - Specific Gravity Meter Training Class - 2386</td>
<td>CEUs - 1.70</td>
<td>Overview</td>
<td>This 1-day course consists of a blend of lectures and hands-on exercises that cover an overview of the operating principle, key components and applications of a 3098 Micro Motion Gas Specific Gravity meter. The process of commissioning a 3098 is covered including: installation, wiring, configuration and field calibration at initial startup. Troubleshooting of commonly seen issues is also covered. This course includes hands on demonstrations.</td>
<td>- Learn a Step by Step Process to Perform Basic Troubleshooting of the Most Common Issues Customers Encounter</td>
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Ovation™ - AMS Suite: Intelligent Device Manager - OV275

CEUs - 0

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

Ovation™ - Applications with DeviceNet - OV345

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.

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

Ovation™ - Applications with Fieldbus - OV340 – Continued...

- Demonstrate the Sycon engineering tool to configure DeviceNet devices
- Identify hardware and software for an Ovation™ DeviceNet interface
- Update the Ovation/Sycon Device list

Overview
The OV340 is designed to provide the end-user with a thorough knowledge of fieldbus applications as applied to an Ovation™ system. Students will be provided with hands-on experience implementing fieldbus architecture on an Ovation system. Foundation fieldbus will primarily be covered with further discussions on Profinet and DeviceNet.

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

- Define and explore basic fieldbus architecture.
- Implement an Ovation™-specific fieldbus scheme and topology
- Build Ovation database points for use in a fieldbus 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

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

Ovation™ - Applications with Profibus - OV350

Overview
The OV350 course is designed to provide 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

Ovation™ - Applications with Profibus - OV350 – Continued...

- 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

Ovation™ - AV Management - OV367

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

Ovation™ - AV Management - OV367

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

Ovation™ - AV Management - OV367

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
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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

Ovation™ - AV Management - OV367

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

Ovation™ - AV Management - OV367

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
Ovation™ - Base Certification - OV400

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

Ovation™ - Best Practices - OV301

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

Ovation™ - Boiler Control - OV380

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 O2 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

Ovation™ - Building and Maintaining Ovation Control - OV200

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.
Ovation™ - Building Ovation Graphics - OV210

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

Ovation™ - Control Techniques - Advanced - OV330

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

Ovation™ - Data Acquisition - OV100

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

Ovation™ - Digital Generator Control - OV376

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

Ovation™ - EDS™ (Enterprise Data Server) - OV248

Overview
This (virtual) 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
Ovation™ - Ethernet Link Controller with Third Party I/O - OV296

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 ELCs, 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

Ovation™ - Evergreen Upgrade - OV115

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.

Ovation™ - Expert Transition - OV265

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

Ovation™ - Graphics - Advanced - OV310

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
Upon successful completion of this course, topics discussed will include physical attachment components of an Ovation system.

**Topics**
- Devices attached to the I/O related to skills to fully utilize the special features of
- The OV270

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**Ovation™ - Hardware Project - OV216**

**Overview**
The OV216 course is designed for the end-user whose primarily 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 Flash 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 MMIs
  - Configure CISCO switches and 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

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**Ovation™ - HART® and Smart Devices - OV270**

**Overview**
The OV270 - Virtual offered course was 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, 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, multicast 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
  - Troubleshoot inter-networked systems with network tools and software
  - Configure and apply third-party networking software

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**Ovation™ - Network Administration - OV320**

**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, 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 MMIs
  - Configure CISCO switches and 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

---

**Ovation™ - Process Historian (OPH) - OV245**

**Overview**
The OV245 course was designed to teach the end-user how to configure the Ovation™ Process Historian 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 schema
  - Understand the concept of a Relational Database Management System
Ovation™ - Process Historian (OPH) - OV245 – Continued…

- 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

Ovation™ - SCADA System - OV280
CEUs - 0

Overview
The OV280 - Virtual offered course was designed to provide the end-user with knowledge on the Ovation™ SCADA system. Students 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

Ovation™ - Security Administration - OV360
CEUs - 0

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, 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

Ovation™ - Security Center - OV365

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 aforementioned 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, 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

Ovation™ - Serial Link Controller/RLC - OV295

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, 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
Ovation™ - SIEM - Report Building - OV366

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, 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

Ovation™ - Smart Process Global Performance Advisor - OV315 – Continued...

- 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.

Ovation™ - Smart Process Global Performance Advisor - OV315

Overview
The OV315 course is 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, 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

Ovation™ - Software Project - OV215

Overview
The OV215 course was designed for end-users who 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, 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

Ovation™ - Steam Turbine Mechanical Hydraulics - OV375

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, 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
Ovation™ - System Administration - OV230

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 the course, 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

Ovation™ - System Troubleshooting - Advanced - OV305 – Continued...

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

Ovation™ - Third Party ELC/Troubleshooting - OV296/OV300

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

Ovation™ - Troubleshooting - OV300

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.

Ovation™ - Troubleshooting - OV300 – Continued...

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

Ovation™ - Turbine Control - OV370

CEUs - 0

Overview
The OV370 course 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, 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

Ovation™ - System Administration - OV230
**PROVOX - Batch Control Config. Using ENVOX PROVUE – 5290**

**CEUs - 3.2**

**Overview**
This 4-1/2-day course will concentrate on the batch functionality for the SR90/SRX controller. The console resident activity point will also be covered. At the completion of this course the student will be able to:

- configure Operations and Unit Points to control a batch process
- create Procedures, Point Sets and Console Activity Points
- create console Batch End Reports
- perform advanced scripting for the PROVOX Operator Console

**Topics**
- Unit and Operation Configuration
- Multiple Units and Operations
- Activity and Procedure Configuration
- Point Sets and Acquire Sets for Parallel Processes
- Batch End Reporting

**Audience**
This course is designed for process control and maintenance engineers, and operations personnel responsible for the configuration of a fully functional Unit Operations Controller and operator interface.

**Prerequisites**
With the retirement of the PROVOX product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.

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**Topics**
- Advanced Point Configuration
- Logic Control Points
- Loop Points
- Enhanced DCD’s
- Graphics Studio Scripting
- Dynamos for Graphics Studio

**Prerequisites**
Course 5190, PROVOX System Configuration Using ENVOX and PROVOX Operator Console

**Overview**
Contact the registration office for class information at education@emerson.com or 800-338-8158.

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**PROVOX - Continuous Control Config - ENVOX & OWP – 5370**

**CEUs - 3.2**

**Overview**
This 4-1/2-day course teaches students advanced configuration of the OWP Console and the controller used for continuous process control. At the completion of this course, students will be able to:

- perform advanced OWP Console point operations
- create and modify Cascade Loops, enhanced DCDs, and Group Points
- create Function Sequence Tables (FSTs) and Logic Control Points (LCPs)
- create and download an advanced OWP Console configuration
- utilize Trace/Tune software to troubleshoot FST programs
- use the display editor to create basic and advanced displays
- create Console Reports

**Topics**
- Advanced Point Configuration
- Logic Control Points
- Cascade Loop Control
- Enhanced DCDs
- Intelligent Device Interface (Optional)
- Advanced Display Creation

**Audience**
This course is designed for process control and maintenance engineers, and operations personnel responsible for the configuration of an Operator Workplace Console and IFC/UOC SR90/SRX Controller using ENVOX on a DEC-Based Platform.

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**PROVOX - Continuous Control Config - ENVOX & OWP – 5370 – Continued**

**Prerequisites**
With the retirement of the PROVOX product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.

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**PROVOX - Continuous Control Config - ENVOX & OWP – 5371**

**CEUs - 3.2**

**Overview**
This 4-1/2-day course teaches students adv. configuration of the OWP Console and the IFC device used continuous process control.

- create/modify Cascade Loops, and Group Points using Control Desktop software
- ENVOX software- create Enhanced DCD’s
- create Logic Control Points (LCP’s) and their Function Sequence Tables (FST’s) using CD software with ENVOX
- create/download adv. OWP configuration
- troubleshoot FST programs with Trace/Tune
- create adv. displays- ENVOX display editor
- create Console Reports
Students who complete this course will be able to:
- perform advanced PROVUE Console point operations with multiple PPAs, PMAs, and alarm priorities
- create and modify a Cascade Loop, advanced DCDs, and Group Point
- create Function Sequence Tables (FSTs) and Logic Control Points (LCPs)
- create and download an advanced PROVUE Console configuration
- utilize Trace/Tune software to troubleshoot FST programs
- use the display editor to create basic and advanced displays create Console Reports

Topics
- Advanced Point Configuration
- Logic Control Points
- Cascade Loop Control
- Advanced Display Creation

Audience
This course is designed for process control engineers, maintenance engineers, and operations personnel responsible for the configuration of a PROVUE Operations Console, SR90/SRX Controller, using ENVOX on a DEC-Based Platform.

Prerequisites
With the retirement of the PROVOX product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.

Overview
This 4-1/2 day course teaches students advanced configuration of the PROVUE Operations Console and the controller used for continuous process control. At the completion of this course, students will be able to:
- demonstrate increased productivity and optimum creativity in writing effective FST programs
- maintain FSTs in an existing system without disturbing the on-line system
- develop FSTs from logic diagrams of the control system
- test their own control solution techniques before establishing them

The software simulation program used in the course is available as an optional add-on to the course fee. For more information, call 800-338-8158 or 641-754-3771.

Prerequisites
Students should have experience configuring PROVOX IFC or UOC devices and have completed at least one of the following courses: 5200, 5260, 5270, 5300, 5360, 5370 or 5391.

Topics
- PROVUE Console Configuration
- Envox Configuration Software
- Provox Basic Point Configuration

Overview
This 4-1/2 day course teaches configuration of a PROVUE console and controller using ENVOX configuration software. A controller containing Data Acquisition Points, DCD’s and loop points will be created. The student will also configure a functional PROVUE Console including displays, PMA’s, and PPA’s, using ENVOX configuration software. Students who complete this course will be able to:
- perform PROVUE Console operations
- use the ENVOX software to create, modify, and document the PROVUE database elements
- IFC/UOC, SR90/SRX
- create, modify, and delete Data Acquisition, DCD and Loop Points
- create, generate and download a basic PROVUE Console configuration containing PPA’s and PMA’s, and basic displays

Overview
This 4-1/2 day course teaches configuration of a PROVUE console and controller using ENVOX configuration software. A controller containing Data Acquisition Points, DCD’s and loop points will be created. The student will also configure a functional PROVUE Console including displays, PMA’s, and PPA’s, using ENVOX configuration software. Students who complete this course will be able to:
- perform PROVUE Console operations
- use the ENVOX software to create, modify, and document the PROVUE database elements
- IFC/UOC, SR90/SRX
- create, modify, and delete Data Acquisition, DCD and Loop Points
- create, generate and download a basic PROVUE Console configuration containing PPA’s and PMA’s, and basic displays

Overview
This 4-1/2 day course teaches configuration of a PROVUE console and controller using ENVOX configuration software. A controller containing Data Acquisition Points, DCD’s and loop points will be created. The student will also configure a functional PROVUE Console including displays, PMA’s, and PPA’s, using ENVOX configuration software. Students who complete this course will be able to:
- perform PROVUE Console operations
- use the ENVOX software to create, modify, and document the PROVUE database elements
- IFC/UOC, SR90/SRX
- create, modify, and delete Data Acquisition, DCD and Loop Points
- create, generate and download a basic PROVUE Console configuration containing PPA’s and PMA’s, and basic displays

Topics
- PROVUE Console Configuration
- Envox Configuration Software
- Provox Basic Point Configuration
PROVOX - System Configuration Using Control Desktop and DeltaV Operate – 5197 – Continued...

- generate and download a basic DeltaV Operate for PROVOX Console Configuration containing PPA's, PMA's, and basic displays

Topics
- DeltaV Operate for PROVOX Console Configuration
- Control Desktop Configuration Software with ENVOX
- PROVOX Basic Point Configuration

Audience
This course is designed for process control engineers, senior maintenance technicians, and supervisory personnel responsible for using ENVOX P5.0 Control Desktop software to configure a DeltaV Operate for PROVOX Console and either a SR90 or SRX Controller. This course is the prerequisite for the Advanced Continuous and Batch Schools.

Prerequisites
With the retirement of the PROVOX product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.

PROVOX - System Configuration Using Control Desktop and DeltaV Operate – 5397 – Continued...

Overview
This 4-1/2 day course teaches configuration of the DeltaV Operate for PROVOX and the SR90/SRX Controller. At the completion of this course, the student will be able to:

- create and modify Loops, Cascade pairs, Advanced DCD's and Group points
- create Function Sequence Tables (FST's) and Logic Control Points
- utilize Trace Tune Utility Program to troubleshoot FST Programs
- use DeltaV Configure and run modes to create and test more advanced operator displays

Topics
- Advanced Point Configuration
- Logic Control Points
- Loop Points
- Enhanced DCDs
- DeltaV Configure
- Advanced Scripting and Dynamo Creation

(PROVOX - System Configuration Using Control Desktop and DeltaV Operate – 5397 – Continued...

Audience
This course is for configuration personnel responsible for configuration of the advanced function of the SR90/SRX controller and the DeltaV Operate for PROVOX operator interface using ENVOX P5.0/Control Desktop.

Prerequisites
With the retirement of the PROVOX product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.

PROVOX - System Configuration Using ENVOX & OWP - Introduction – 5170 CEUs - 3.2

Overview
This 4-1/2 day course teaches the base configuration of an OWP and controller using ENVOX configuration software. A controller containing Data Acquisition Points, DCD’s and loop points will be created. The student will also configure a functional Operator Workplace Console including displays, PMA’s, and PPA’s using ENVOX configuration software. Students who complete this course will be able to:

- perform OWP console operations
- use the ENVOX software to create, modify, and document the PROVOX database elements
- create, generate and download an IFC/UOC controller
- create, modify, and delete Data Acquisition, DCD and Loop Points
- create, generate and download a basic OWP configuration containing PPA’s, PMA’s and basic displays

Topics
- OWP Console Configuration
- ENVOX Configuration Software
- PROVOX Basic Point Configuration

Audience
This course is designed for process control engineers, senior maintenance technicians, and supervisory personnel responsible for specifying and configuring an OWP based PROVOX DCS Operations Console and controller. This course will include the basic configuration for the operator workplace console (OWP) and an SR90/SRX controller using ENVOX on a DEC-Based Platform.

Prerequisites
With the retirement of the PROVOX product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.
Overview
This 7-1/2-day hands-on course covers hardware/troubleshooting of the data highway, console, and SRx, Controller with serial I/O using ENVOX diagnostic tools.

Topics
Hardware/Troubleshooting of:
- PROVOX Data Hwy II;
- Control (serial) I/O Hardware; - Intelligent
- Device Interface (IDI).
- SRx Controllers;
- PROVOX Operations (POC) Console;
- DC Power System; ENVOX Diagnostics; Downloading/Databases; Communications (PROVOX & Ethernet)

Audience
This course is for those responsible for the hardware/troubleshooting of a PROVOX system.

Prerequisite
With the retirement of the PROVOX product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.
Regulators - Gas Regulator Technician – 1100
CEUs - 2.1

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, troubleshoot, and adjust gas regulators. Students who complete this course will be able to:
- perform maintenance on regulators and relief valves
- troubleshoot field problems

Topics
- Self-Operated Regulator
- Pilot-Operated Regulators
- Overpressure Protection
- Series Regulation
- Monitors
- Slam Shut Options
- Regulator Failure Analysis
- Troubleshooting and Installation

Audience
This course is designed primarily for technicians responsible for the installation and maintenance of natural gas regulators.

Prerequisites
At least one year’s field experience with natural gas regulators is recommended.

Regulators - Gas Regulator Troubleshooting – 1106 – Continued...

Topics
- Review:
  - Self-Operated Regulator Fundamentals
  - Pilot-Operated Regulator Fundamentals
  - Overpressure Protection
  - Sizing Overview for Technicians
  - Regulator Troubleshooting Principles, Procedures, and Best Practice
  - Failure Analysis
  - Stability Issues
  - Installation Practices
  - Pilot Interchangeability Practices
  - Advanced Monitor Operations and Maintenance

Audience
This course is designed primarily for technicians with responsibility for installing, maintaining, and troubleshooting gas regulators.

Prerequisites
1100 Gas Regulator Technician recommended but not required.

Regulators - Industrial Regulator Technician – 1102
CEUs - 2.1

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.

Regulators - Principles of Self-Operated Regulators - e7601
CEUs - 0.5

Overview
This course introduces self-operated regulator fundamentals for those with newly assigned responsibilities for regulator selection, maintenance, or procurement. Upon completion of this module, students will be able to describe the construction components and operating principles behind most self-operated regulators. Students will be able to describe how changing some of these components will increase or decrease a regulator’s performance for a given application.

Audience
This course introduces self-operated regulator fundamentals for those with newly assigned responsibilities for regulator selection, maintenance, or procurement.

Regulators - Principles of Self-Operated Regulators – e7601
CEUs - 0.5

Overview
This course introduces self-operated regulator fundamentals for those with newly assigned responsibilities for regulator selection, maintenance, or procurement. Upon completion of this module, students will be able to describe the construction components and operating principles behind most self-operated regulators. Students will be able to describe how changing some of these components will increase or decrease a regulator’s performance for a given application.

Audience
This course introduces self-operated regulator fundamentals for those with newly assigned responsibilities for regulator selection, maintenance, or procurement.
Reliability - Maintenance 101 / 201 - REL008
CEUs -.7
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 1-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

Reliability - Introduction to Planning & Scheduling Principles - REL004
CEUs - 1.4
Overview
This introductory 2-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

Reliability - Introduction to Developing Reliability-Based Maintenance Strategies – REL003
CEUs - 1.4
Overview
This 2-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

Introduction to Developing Reliability-Based Maintenance Strategies – REL003
CEUs - 1.4
Overview
This intensive, 4-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

Reliability - Advanced Planning Principles - REL005
CEUs - 2.8
Overview
This 2-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
- Basic RCM Techniques
- PM Task Selection
- Basic PM Tools
- PM Program Design
- PM Development Principles
- PM Scheduling Techniques
- PM Program Monitoring
### Reliability - Materials Management Strategies - REL006
**CEUs - 1.4**

**Overview**
This introductory 2-day course is designed to provide participants instruction about how to manage, organize, and control inventory risk through strategic MRO inventory management.

**Topics**
- Introduction
- Maintenance Storeroom Purpose
- Maintenance Storeroom Functions and Expectations
- Meeting Expectations
- Purpose and Strategic Importance
- Role of Stores
- Best Practices to Achieve Effective Storeroom and Implement Reliability
- Organizing for Maintenance Stores and Management Control
- Inventory Management Key Elements
- Inventory Record Accuracy (IRA)
- Storeroom Access and Control
- Inventory Catalog
- Storeroom 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
- Storeroom KPI Metrics and World Class Benchmarks

### Reliability Awareness Featuring - The Reliability Game - REL002 – Continued...

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

### Reliability - Reliability Centered Maintenance Principles - REL007 – Continued...

- 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

### Reliability - The Reliability Game - REL001
**CEUs - .7**

**Overview**
The Reliability Game focuses on participants' attention on the maintenance function at a facility. This 1-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

### Reliability - Reliability Centered Maintenance Principles - REL007
**CEUs - .7**

**Overview**
Reliability Centered Maintenance Analysis (RCM) is a key foundational element of a Reliability Based Maintenance program.

This 2-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

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**Reliability - The Reliability Game - REL001**
**CEUs - .7**

**Overview**
The Reliability Game focuses on participants' attention on the maintenance function at a facility. This 1-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

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**Reliability - Reliability Centered Maintenance Principles - REL007**
**CEUs - .7**

**Overview**
Reliability Centered Maintenance Analysis (RCM) is a key foundational element of a Reliability Based Maintenance program.

This 2-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

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**Reliability - Materials Management Strategies - REL006**
**CEUs - 1.4**

**Overview**
This introductory 2-day course is designed to provide participants instruction about how to manage, organize, and control inventory risk through strategic MRO inventory management.

**Topics**
- Introduction
- Maintenance Storeroom Purpose
- Maintenance Storeroom Functions and Expectations
- Meeting Expectations
- Purpose and Strategic Importance
- Role of Stores
- Best Practices to Achieve Effective Storeroom and Implement Reliability
- Organizing for Maintenance Stores and Management Control
- Inventory Management Key Elements
- Inventory Record Accuracy (IRA)
- Storeroom Access and Control
- Inventory Catalog
- Storeroom 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
- Storeroom KPI Metrics and World Class Benchmarks
Remote Automation Solutions - ControlWave - Configuration - RA331
CEUs - 1.8

Overview
This 2-1/2-day hands-on course covers the hardware, configuration and maintenance of the ControlWave product family. This course will equip you with the necessary knowledge and practice needed to configure the ControlWave hardware for communications. Learn how to troubleshoot and 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

Remote Automation Solutions - ControlWave - Configuration - Virtual - RA331V – Continued...

Remote Automation Solutions - ControlWave - Designer - Fundamentals - Virtual - RA441V
CEUs - 3.2

Overview
This 4-1/2-day virtual 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, alarm-ing, hardware configurations and much more.

Audience
Personnel responsible for programming and debugging in ControlWave Designer programming software

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.

Topics
- Ladder Logic
- Structured Text
- Function Block Diagram
- Creating User Function Blocks

Remote Automation Solutions - ControlWave - Configuration - RA331
CEUs - 1.8

Overview
This 2-1/2-day virtual course covers the hardware, configuration and maintenance of the ControlWave product family. This course will equip you with the necessary knowledge and practice needed to configure the ControlWave hardware for communications. Learn how to troubleshoot and 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

Remote Automation Solutions - ControlWave - Designer - Fundamentals - RA441
CEUs - 3.2

Overview
This 4-1/2-day virtual 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, alarm-ing, hardware configurations and much more.

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.

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.

Remote Automation Solutions - ControlWave - Configuration - Virtual - RA331V

Remote Automation Solutions - ControlWave - Designer - Fundamentals - Virtual - RA441V

Remote Automation Solutions - ControlWave - Configuration - RA331

Remote Automation Solutions - ControlWave - Designer - Fundamentals - RA441
Overview
A hands-on course that will give you as much exposure to ControlWave programming as possible in the shortest amount of time. The ControlWave Designer short 2 ½ 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. The class project will help students generate and debug simple control strategy programs using Function Block, Ladder Logic, and Structured Text programming languages, including programming for Modbus communications.

Topics
- Understand How IEC-61131-3, ControlWave Designer and On-Line Utilities Work
- Master Skills Necessary to Create a Program for ControlWave Controllers
- Learn the Bristol Library of Function Blocks for Measurement, Calculations, Process Control, Data Storage
- Understand OpenBSI Communications Software
- Master How to Establish Ethernet/IP Communications using ControlWave Designer
- Learn to Program Polling and Data Transfers in BSAP and an I/O Environment
- Understand How to Define a Hierarchical Network of ControlWave Controllers using NetView
- Understand the Configuration of Communication via other Protocols such as Modbus

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. Participants should have programming experience (this course is not recommended for beginner programmers).

Remote Automation Solutions - ControlWave - Designer Programming Short Course - RA440
CEUs - 1.8

Overview
A virtual course that will give you as much exposure to ControlWave programming as possible in the shortest amount of time. The ControlWave Designer short 2 ½ 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. The class project will help students generate and debug simple control strategy programs using Function Block, Ladder Logic, and Structured Text programming languages, including programming for Modbus communications

Topics
- Understand How IEC-61131-3, ControlWave Designer and On-Line Utilities Work
- Master Skills Necessary to Create a Program for ControlWave Controllers
- Learn the Bristol Library of Function Blocks for Measurement, Calculations, Process Control, Data Storage
- Understand OpenBSI Communications Software
- Master How to Establish Ethernet/IP Communications using ControlWave Designer
- Learn to Program Polling and Data Transfers in BSAP and an I/O Environment
- Understand How to Define a Hierarchical Network of ControlWave Controllers using NetView
- Understand the Configuration of Communication via other Protocols such as Modbus

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.
Remote Automation Solutions - CONTROLWAVE® - Designer Programming - Accelerated - RA443
CEUs - 3.2

Overview
Save time and money by attending this fast-paced, hands-on course for programming the ControlWave® product family using IEC-61131-3 standard software and Bristol®-supplied functions. This course provides you with the knowledge and skills required to define and control inputs and outputs of related real world applications, including communications and troubleshooting. Students will generate and debug control strategy programs using several programming languages while learning the basics of ControlWave network communications, historical data storage, alarming, and hardware configurations, including MODBUS communications.

Topics
- Flash Memory Communication Configuration via Local View
- Ladder Logic
- Function Block Diagram
- Debugging Techniques
- Programming for Audits/Archives/Alarms
- Establishing User Libraries

Audience
Personnel responsible for the establishing of communication interfaces to ControlWave Automation products

Prerequisites
- Participants must have a strong working knowledge of personal computers and Windows 2000/ XP or a later version
- Participants must have a strong working knowledge of their application/ process
- Participants should have some programming experience.
- Participants should have completed “Creating a Simple Project”.

Remote Automation Solutions - CONTROLWAVE® - Gas Measurement Products - RA445
CEUs - 1.8

Overview
The ControlWave Gas Measurement 2-1/2-day course provides participants with a thorough understanding of configuring the ControlWave® GFC, EFM, and XFC Flow Computers for single or multiple-run gas measurement. As a hands-on course, students will use TechView to collect historical logs, calibrate internal and external pressure sensors, and gain troubleshooting techniques for real world applications.

Topics
- Hardware Configuration
- TechView Software Overview
- Log Collection
- Troubleshooting
- Configuring 4-Run Gas Application

Audience
Personnel responsible for the installation, wiring, start-up, configuration and maintenance of ControlWave gas flow computers

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 possess a general knowledge of gas measurement and production.

Remote Automation Solutions - CONTROLWAVE® - Station Manager Configuration - RA447 – Continued

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

Audience
Personnel responsible for the installation, wiring, start-up, configuration and maintenance of ControlWave gas flow computers

Remote Automation Solutions - CONTROLWAVE® - Station Manager Configuration - Virtual - RA447V
CEUs - 1.8

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

Audience
Personnel responsible for the installation, wiring, start-up, configuration and maintenance of ControlWave gas flow computers
Remote Automation Solutions - ControlWave® Station Manager Configuration - Virtual - RA447V – Continued...

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 possess a general knowledge of gas measurement and production.

Remote Automation Solutions - ControlWave® Designer – RA442 CEUs - 3.2

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

Audience
Personnel responsible for the establishing of communication interfaces to ControlWave Automation products.

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.

Remote Automation Solutions - ControlWave® Designer Communication Programming - RA442V CEUs - 3.2

Overview
This 4-1/2-day virtual course is a continuation of ControlWave® Designer Fundamentals programming 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

Audience
Personnel responsible for the establishing of communication interfaces to ControlWave Automation products.

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.

Remote Automation Solutions - Creating Your Own Function Block Using ControlWave Designer – RA446V CEUs - 0.4

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 troubleshoot the final project. Each student will be provided remote access to a PC (ControlWave Designer installed).

Audience
This course is for engineers, technicians and others involved with programming ControlWave.

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.
Remote Automation Solutions - FloBoss™ - Configuration and Operations - RA1220

CEUs - 3.2

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

Audience
This Remote Automation Solutions course is for engineers, technicians, and others interested in understanding the configuration and operation of the ROC800 using the SmartProcess Oil and Gas Applications.

Prerequisites
Participants must be PC literate preferably have administrator privileges.

Remote Automation Solutions - FloBoss™ - Modbus Configuration for ROC800 and FloBoss™ - Virtual - RA1250V

CEUs - 0.35

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 Remote Automation Solutions RTU device.

Topics
- Configuration for Modbus Slave
- Configuration for Modbus Master
- Modbus Serial IP
- Basic Modbus Troubleshooting

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.

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).

Remote Automation Solutions - FloBoss™ - S600+ Operator - Fundamentals - RA900

CEUs - 1.8

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 cEditor
- Registering Tickets - Do's and Don'ts

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.

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.

Remote Automation Solutions - FloBoss™ - S600+(Config600 - Advanced - RA901

CEUs - 1.8

Overview
The 2-1/2-day advanced course provides an insight into the generation of application configurations for the FloBoss™ S600+

Topics
- 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.

Remote Automation Solutions - FloBoss™ - S600+ Operator - Fundamentals - RA900 – Continued

- Editing Configurations with Config600
- Using Config600 Transfer
Remote Automation Solutions - FloBoss™ S600+/Config600 - Advanced - Virtual - RA901V
CEUs - 1.8

Overview
The 2-1/2-day advanced virtual 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

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.

Prerequisites
Participants should be familiar with metering techniques and standards. Participants should bring their own personal computer to the course and should have administrative privileges. Participants must be PC literate. Participants must have attended the RA900.

Remote Automation Solutions - FloBoss™ S600+/Config600 - Fundamentals - Virtual - RA900V
CEUs - 1.8

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

Remote Automation Solutions - FloBoss™ S600+/Config600 - Fundamentals - Virtual - RA900V
CEUs - 3.2

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.

Remote Automation Solutions - FloBoss™ Configuration and Operations - Virtual - RA1220V
CEUs - 3.0

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 107/RTU, 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

Audience
This Remote Automation Solutions course is for engineers, technicians and others involved with the configuration and operation of the FloBoss™ 103 and FloBoss 107 products.

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).
Remote Automation Solutions - FloBoss™ S600+ Fundamentals and Advanced - RA902V
CEUs - 3.2

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 cEditor
• 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.

Remote Automation Solutions - OpenEnterprise - SCADA Systems Ver. 3.x - Intermediate - RA802 – Continued...

Audience
The course is intended for users who have experience with programming and configuration of Remote Automation Solutions RTUs.

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.

Remote Automation Solutions - OpenEnterprise - Enhancements for SCADA Systems - Ver. 3.x - Virtual - RA850V - Continued...

Participants must have completed course RA701 Basic and RA702 Intermediate Courses version 2.8x.

Remote Automation Solutions - OpenEnterprise - SCADA Systems - Basics Ver. 2.8x - RA701
CEUs - 3.2

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 2.8X). At the conclusion of the class, students will be able to install a very simple OpenEnterprise Server and Workstation; configure communications with ControlWaves RTU’s and then begin building HMI displays, trends, alarm windows, and develop a basic user interface using these products.

Topics
• Database Explorer and Structure
• Creating Display Objects
• Alarm Windows, Alarm & Event History
• Creating and Configuring Trends
• Data Export
• Creating Reports
• System Troubleshooting

Audience
The class is intended for users who have experience with programming and configuration of Remote Automation Solutions RTUs.

Remote Automation Solutions - OpenEnterprise - SCADA Systems Ver. 3.x - Intermediate - RA802
CEUs - 3.2

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

Remote Automation Solutions - OpenEnterprise - Enhancements for SCADA Systems - Ver. 3.x - Virtual - RA850V

Prerequisites
Participants must have a strong working knowledge of personal computers and Windows XP or later version. Participants must have a strong working knowledge of their applications/process. Participants should have a strong working knowledge of OpenBSI and ControlWave Designer.

Remote Automation Solutions - OpenEnterprise - SCADA Systems - Basics Ver. 2.8x - RA701
CEUs - 3.2

Overview
This 4-1/2 day course will provide a very brief introduction to the OpenEnterprise Server, and more detailed coverage of the OpenEnterprise Workstation and OpenEnterprise Reporting packages (version 2.8X). At the conclusion of the class, students will be able to install a very simple OpenEnterprise Server and Workstation; configure communications with ControlWaves RTU’s and then begin building HMI displays, trends, alarm windows, and develop a basic user interface using these products.

Topics
• Database Explorer and Structure
• Creating Display Objects
• Alarm Windows, Alarm & Event History
• Creating and Configuring Trends
• Data Export
• Creating Reports
• System Troubleshooting

Audience
The class is intended for users who have experience with programming and configuration of Remote Automation Solutions RTUs.

Remote Automation Solutions - OpenEnterprise - SCADA Systems Ver. 3.x - Intermediate - RA802
CEUs - 3.2

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

Remote Automation Solutions - OpenEnterprise - Enhancements for SCADA Systems - Ver. 3.x - Virtual - RA850V

Prerequisites
Participants must have a strong working knowledge of personal computers and Windows XP or later version. Participants must have a strong working knowledge of their applications/process. Participants should have a strong working knowledge of OpenBSI and ControlWave Designer.
Remote Automation Solutions - OpenEnterprise - SCADA Systems Ver. 3.2x - RA702
CEUs - 3.2

Overview
This 4-1/2-day course will equip you to be able to install an OpenEnterprise Server and Workstation; configure the communications, security, historical, alarming, messaging, and other major subsystems. Most of the tools within the OpenEnterprise toolbox will be covered during this class.

Topics
- Learn Advanced Configurations of the OpenEnterprise Systems
- Perform Alarming and Messaging Configurations
- Learn to Configure, Diagnose and Troubleshoot OpenEnterprise Systems
- Creating Calculations from RTU Data

Audience
This class is intended for engineers who will be designing and building complete OpenEnterprise systems.

Prerequisites
Participants should have formal RTU configuration training and a working knowledge of their application/process. Participants must have completed the Basic OpenEnterprise Class course RA701.

Remote Automation Solutions - OpenEnterprise - SCADA Systems Ver. 3.x - RA801 – Continued...

Remote Automation Solutions - OpenEnterprise - SCADA Systems Ver. 3.x - Virtual - Basics- RA801V
CEUs - 3.2

Overview
This 4-1/2-day virtual 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

Remote Automation Solutions - OpenEnterprise - SCADA Systems Ver. 3.x - Virtual - Intermediate - RA802V
CEUs - 3.2

Overview
This 1-1/2-day virtual 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

Audience
The course is intended for users who are responsible for installing and configuring the Open Enterprise system.

Prerequisites
Participants should have formal RTU configuration training and a working knowledge of their application/process. Participants must have completed course RA801 Basic OpenEnterprise Course version 3.x.
Remote Automation Solutions - ROC - Configuration - ROC800L - RA1244
CEUs - 2.1

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 Remote Automation 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

Audience
This Remote Automation Solutions course is for engineers, technicians and others involved with the operation and maintenance of the ROC800L.

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).

Remote Automation Solutions - ROC - Configuration - Virtual - ROC800L - RA1244V – Continued...

(ROCLINK preinstalled), a Remote Automation Solutions RTU (ROC800L), and a workbook for the duration of the class.

Topics
- Basic Concepts and Product features
- Install and configure a ROC800L RTU
- Convert ROC800 to RO800L
- Configuring an Application
- Updating Firmware and Software

Remote Automation Solutions - ROC - Configuration and Operations - ROC800 Series - RA1240 – Continued...

- 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

Audience
This Remote Automation Solutions course is for engineers, technicians, and others involved with the operation and maintenance of the ROC800 Series products.

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).

Remote Automation Solutions - ROC - Configuration and Operations - ROC800 Series - RA1240
CEUs - 3.2

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 Remote Automation 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
Remote Automation Solutions - ROC - Configuration and Operations - Virtual - ROC800 Series - RA1240V
CEUs - 2.5

Overview
This 3-1/2-day virtual 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 Remote Automation Solutions RTU, a communications cable and a workbook for the duration of the course.

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 Calculations
  - Configuring ROC History
  - Modbus Tables
  - PID Configuration
  - Building ROC Displays
  - FST Workshop

Audience
This Remote Automation Solutions course is for engineers, technicians, and others involved with configuring the ROC800 series products.

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.

Remote Automation Solutions - ROC - DS800 Programming - ROC800 Series - RA1241
CEUs - 1.8

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 Remote Automation 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 Overview
  - Ladder Logic of Ladder Diagram
  - Function Block Diagram
  - Structured Text
  - Instruction List
  - ROCLINK 800 Software

Audience
This Remote Automation Solutions Course is for engineers, technicians, and others involved with configuring the ROC800 Series products.

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.

Remote Automation Solutions - ROC - DS800 Programming - Virtual - ROC800 Series - RA1241V
CEUs - 1.8

Overview
This 2-1/2-day virtual 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 Remote Automation 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

Audience
This Remote Automation Solutions Course is for engineers, technicians, and others involved with configuring the ROC800 Series products.

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.
Remote Automation Solutions - ROC - Preset System Configuration - DL8000-RA1242
CEUs - 2.1

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 Remote Automation 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 and Troubleshooting
• DL8000 Configuring Dynamic, Real-Time Display of Flow Parameters
• Configuring for Additive Injection
  • Temperature Compensation
  • Data Logging
  • Communications
• Blending Methods and Flow Sequencing

Audience
This Remote Automation Solutions course is for engineers, technicians, and others involved with the operation and maintenance of the DL8000 Preset System Controller product.

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).

Remote Automation Solutions - SmartProcess Production Applications Foundation - RA3012V – Continued...

and Gas Applications. This class will focus two of applications, Surface Controls Manager and Local Display Manager, utilized in conjunction with the balance of the applications. Some of the configuration activities will include: control logic, maintenance bypassing, and use of accumulators, advanced calculations configuration, user lists, and display navigation.

Topics
• Surface Controls Applications
• Local Display Manager

Remote Automation Solutions - SmartProcess Production Applications Foundation Produced Fluids Management - RA3013V – Continued...

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.

Prerequisites
Participants should have a strong working knowledge of personal computers and Windows XP or a later version. Participants should have completed course Surface Controls Manager RA3012V.

Remote Automation Solutions - SmartProcess Production Applications Foundation Well Operations and Optimization - RA3014V
CEUs - 1.4

Overview
Production Manager (PM) Series: Well Optimization and Chemical Manager for ROC and FloBoss™ Overview This 2-day virtual training course will provide a combination of lecture and hands-on configuration activities related to production well operations, such as choke control, artificial lift techniques and chemical injection. Some configuration activities include: (1) modification & tuning of plunger and/or gas lift wells, and (2) application of advanced set point techniques and/or inhibit logic for optimized chemical injection. As time permits, an overview of Automated Choke controls will be covered.

Topics
• Well Optimization
• Configuration & Operations
• Gas Lifts
• PAGL
• Cycle Logs
• Chemical Manager
• Chemical Configuration
• Injection Point Configuration

Audience
Course is for engineers, technicians, and others interested in understanding the configuration and operation of the ROC800 using the SmartProcess Oil & Gas Applications.

Prerequisites
Participants should have a strong working knowledge of personal computers and Windows XP or a later version. Participants should have completed course Surface Controls Manager RA3012V.

Remote Automation Solutions - SmartProcess Production Applications Foundation - RA3012V
 CEUs - 0.5

Overview
Production Manager (PM) Series: Overview and Surface Controls Manager for ROC and FloBoss™ Overview. This 1-day virtual training class will provide an overview of the Production Manager Series, the cornerstone of Emerson's SmartProcess Oil & Gas Applications.
Overview
This 2-day course is a combination of labs and lectures combined with the theory and operation of the Rosemount Analytical OPM 3000/4000 Opacity Dust Density Monitors. Product application will be reviewed. Correct selection of equipment, installation, and start up are critical and will be covered in detail. Operational diagnostics and maintenance are explored with the goal of allowing the student to recognize and correct any issues promptly. EPA certification and quarterly audits will be discussed, but in-depth planning will be site specific.

Topics
- Overview of OPM 3000/4000 Opacity Dust Density Monitors
- Theory of Operation
- Installation and Start Up
- Troubleshooting and Maintenance
- Audit and Reporting Requirement

Note: Product is also part of course 2370.

Audience
This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 3051 Fieldbus Pressure Transmitter.

Prerequisites
Knowledge of basic pressure fundamentals and pressure instrumentation.
<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td><strong>Rosemount - 3051 Pressure Transmitter</strong> – 2305</td>
<td><strong>Overview</strong> 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 &amp; 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 <strong>Topics</strong> - 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 <strong>Audience</strong> This course is designed for those individuals responsible for the installation and maintenance of the Rosemount 3051 Pressure Transmitter. <strong>Prerequisites</strong> Knowledge of basic pressure fundamentals and pressure instrumentation.</td>
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<tr>
<td><strong>Rosemount - 3051C Pressure Transmitter &amp; 3144P Temperature Transmitter</strong> – 2398</td>
<td><strong>Overview</strong> 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 &amp; 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 3051C Pressure and 3144P Temperature transmitters <strong>Topics</strong> - Smart and Analog Transmitters - 3051C &amp; 3144P Overview and Principles of Operation - Test Equipment Selection - Sensor Selection and Wiring - Bench Testing the 3051C &amp; 3144P Smart Transmitter - Field Communicator Operation - Digital Trims/Calibration - Installation and Start-up - Troubleshooting and Maintenance <strong>Audience</strong> This course is designed for those individuals responsible for the installation and maintenance of the Rosemount 3051 Pressure Transmitter, and 3144P Temperature Transmitters. <strong>Prerequisites</strong> Knowledge of basic pressure and temperature fundamentals and instrumentation.</td>
</tr>
<tr>
<td><strong>Rosemount - 3051S Electronic Remote Sensors System</strong> – 2309</td>
<td><strong>Overview</strong> 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 &amp; 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 &amp; troubleshoot the 3051S ERS System <strong>Topics</strong> - 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 <strong>Audience</strong> 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. <strong>Prerequisites</strong> Knowledge of basic Pressure, and DP Level fundamentals and instrumentation.</td>
</tr>
</tbody>
</table>
**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® Multi Variable 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

Note: This product is also included in course 2327 and 2329.

**Audience**
This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 3051S Multi Variable (MV) Transmitter.

**Prerequisites**
Knowledge of basic Pressure, and DP Flow fundamentals and instrumentation.

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**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 Pressure and 5300 GWR Transmitters.

**Topics**
- Principles of Transmitter Operations
- Installation and Startup
- Configuration
- Calibration
- Validation of GWR
- Troubleshooting
- Field Communicator Operation
- Operation of Radar Software

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**Overview**
This 1-day course uses lecture and labs to install, configure, calibrate, troubleshoot, and maintain the Rosemount 3051S Pressure and 5300 GWR Transmitters. The student will also learn the operation of the Field Communicator or AMS Device Manager. 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
- configure the compensated flow parameters using Engineering Assistant software with the 3095MV & 3051SMV
- properly install/troubleshoot transmitters

**Topics**
- DP Flow Fundamentals
- Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the Smart Transmitters
- Operation of the Field Communicator and AMS Device Manager
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance
- Configure/Wire/Setup the HART® Tri-Loop
- Operation of Engineering Assistant Software

**Audience**
This course is designed for those individuals responsible for the installation and maintenance of the Rosemount 3095MV or 3051SMV Transmitter.

**Prerequisites**
Knowledge of basic pressure fundamentals and pressure instrumentation.
Overview
This 1-day course uses lecture and labs to teach the student how to install, configure, calibrate and maintain the Rosemount Model 3095MV Smart Transmitters. The student will also learn the operation of the Field Communicator. 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 and the 3095MV Engineering Assistant (EA) Snap-On software
- configure the compensated flow parameters using AMS Device Manager with the 3095MV Engineering Assistant (EA) Snap-On Software
- properly install/troubleshoot transmitters

Topics
- DP Flow Fundamentals
- Overview and Principles of Operation
- Test Equipment Selection
- Temperature Sensor Wiring
- Bench Testing the Smart Transmitters
- AMS Device Manager with the 3095MV EA Snap-On Software
- Operation of the Field Communicator and AMS Device Manager
- Digital Trims/Calibration
- Installation and Start-Up
- Troubleshooting and Maintenance
- Configure/Wire/Setup the HART® Tri-Loop

Note: This product is also included in course 2327.

Audience
This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3095 Multi Variable (MV) Transmitter.

Prerequisites
Knowledge of basic pressure and temperature fundamentals/instrumentation
Rosemount - 3300 & 5300 Guided Wave Radar Transmitters – 2395
CEUs - 0.7

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.

Rosemount - 3300 Guided Wave Radar Level Transmitter – 2332
CEUs - 07

Overview
This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, calibrate, troubleshoot and maintain the Rosemount 3300 GWR Level & Interface Transmitters. Students who complete this course will be able to:
- explain the principles of operation of the 3300 GWR
- identify 3300 parts and explain their functionality
- understand the available probe options and when each should be used
- properly install the 3300 GWR
- configure and test the 3300 GWR
- properly troubleshoot the 3300 GWR transmitter using RCT software

Topics
- 3300 Overview/Principles of Operation
- Installation of the 3300 GWR
- Configuration of the 3300 GWR
- Bench Testing the 3300 GWR
- Field Communicator Operation
- AMS Device Manager Operation

Rosemount - 4088 MultiVariable™ Transmitters – 2345
CEUs - 0.7

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 4088 MultiVariable™ (MV) Modbus Transmitters. The student will learn the operation and interface capabilities of the Rosemount 4088A MV Modbus Transmitters. The student will learn the operation and interface capabilities of the Rosemount Transmitter Interface Software (RTIS) and the Field Communicator. Students who complete this course will be able to:
- Explain the principles of operation of the transmitter
- Configure and test using the RTIS software and the Field Communicator
- Properly install, calibrate and troubleshoot the Transmitters
- Properly configure the transmitters Modbus parameters

Prerequisites
Knowledge of basic level fundamentals and instrumentation.

Rosemount - 370XA Gas Chromatograph – Introduction – E4070

Overview
Introduction to Rosemount’s 370XA gas chromatograph, including features, installation, calibration, the Maintainable Module™ and reading chromatograms.

Rosemount - 5300 & 5400 Radar Level Contacting & Non-Contacting Transmitters – 2396
CEUs - 0.7

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 5400 & 5300 Series HART® Radar Level Transmitters. Students who complete this course will be able to:
- explain the principles of operation of the 5300/5400 radar
- identify 5300/5400 parts and explain their functionality
- properly install and wire the 5300/5400 Radar
- configure and test the 5300/5400 Radar
- properly troubleshoot the 5300/5400 Radar transmitter and installation using Radar Master software

Topics
- 5300/5400 Overview and Principles of Operation
- Installation of the 5300/5400 Radar
- Configuration of the 5300/5400 Radar
- Bench Testing the 5300/5400 Radar
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Calibration, Verification and Adjustments
- Troubleshooting and Maintenance
- Tank & Application/Probe Troubleshooting and Echo Handling Using Radar Master Software

Audience
This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount 5400 & 5300 Series HART® Radar Level Transmitters.

Prerequisites
Knowledge of basic level fundamentals and instrumentation.
Rosemount - 5300 High Performance Guided Wave Radar HART® Level Transmitter – 2337

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 the principles of operation of the 5300 GWR
- identify 5300 GWR parts and explain their 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 and 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
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling Using Radar Master Software

Note: 5300 GWR HART® Level transmitter is also included in the 3-day Level course 2333.

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.

Prerequisites
Knowledge of basic level fundamentals and instrumentation.

Rosemount - 5400 Series HART® Radar Level Transmitter – 2336

CEUs - 0.7

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 5400 Radar Transmitters. Students who complete this course will be able to:

- explain the principles of operation of the 5400 Radar
- identify 5400 Radar parts and explain their functionality
- properly install and wire the 5400 Radar
- configure and test the 5400 Radar
- understand how to setup the 5400 Radar to work in different applications
- properly troubleshoot the 5400 Radar Transmitter and the installation using Radar Master software

Topics
- 5400 Overview and Principles of Operation
- Installation of the 5400 Radar
- Wiring the 5400 Radar
- Configuration of the 5400 Radar
- Bench Testing the 5400 Radar
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank and Application Troubleshooting and Echo Handling using Radar Master Software

Note: This product is also included in the 3-day Level course 2333.

Audience
This course is designed for those individuals responsible for the installation, configuration, calibration, and maintenance of the Rosemount 5400 HART® Radar Level Transmitter.

Prerequisites
Knowledge of basic level fundamentals and instrumentation.

Rosemount - 5600 Radar Level Transmitter – 2334

CEUs - 0.7

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 5600 Series HART® Radar Level Transmitters. Students who complete this course will be able to:

- explain the principles of operation of the 5600 Radar
- identify 5600 Radar parts and explain their functionality
- properly install and wire the 5600 Radar
- configure and test the 5600 Radar
- understand how to setup the 5600 Radar to work in different applications
- properly troubleshoot the 5600 Radar Transmitter using Radar Master software

Topics
- 5600 Overview and Principles of Operation
- Installation of the 5600 Radar
- Wiring the 5600 Radar
- Configuration of the 5600 Radar
- Bench Testing the 5600 Radar
- 2210 LOI / Display Operation
- Field Communicator Operation
- AMS Device Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank and Application Troubleshooting and Echo Handling using Radar Master Software

Note: This product is also included in the 3-day Level course 2333.

Audience
This course is designed for those individuals responsible for the installation, configuration, calibration, and maintenance of the Rosemount 5600 Series HART® Radar Level Transmitter.

Prerequisites
Knowledge of basic level fundamentals and instrumentation.
Rosemount - 5708 3D Solids Scanners – 2357
CEUs - 0.7

Overview
This 1-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, communicate to, calibrate/verify, and troubleshoot 5708 3D solids scanner products and applications. Students who complete this course will be able to:
- explain the principles of operation of the 5708 Scanner
- identify 5708 parts and explain their functionality
- Properly install and wire the 5708 Scanner and components
- configure and test the 5708 Scanner
- understand how to setup the 5708 Scanner to work in different applications
- properly troubleshoot the 5708 Scanner and Installation using 3D Vision software

Topics
- Product Overview
- Theory of Operation / Technology Overview
- Proper Location and Installation
- 3D Vision software and communication
- Multi Scanner Systems
- Communication Connections

Audience
This course is targeted for those individuals responsible for the installation, configuration, and calibration/verification of the 5708 3D Scanners.

Prerequisites
Knowledge of basic level fundamentals and instrumentation

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Rosemount - 848 Fieldbus Temperature Transmitters – 2328
CEUs - 0.7

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.

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Rosemount - 8700 Series Smart Magnetic Flowmeter Short Course - 2339SM
CEUs - 0.4

Overview
This 1/2-day field class is a condensed version of the 2340 course briefly reviewing 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 8700 Magnetic metering system 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 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
- Magnetic Flowmeter System
- Smart vs. Analog Transmitters
- Flow Tube Selection
- Configuring Using LOI and AMS Device Manager
- Local Operator Interface Functions
- Positive Zero Return
- Auxiliary Functions and Special Units
- Signal Conditioning
- System Troubleshooting and Maintenance
- Bench Testing/Digital Trims
- Process Noise and Grounding Diagnostics
- Meter Verification Diagnostics

Audience
This course is intended as a refresher course for anyone that is involved with properly configuring and troubleshooting a Rosemount 8700 Series Smart Magnetic Flowmeter. 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 sessions.

Prerequisites
Some prior experience working with Rosemount Magnetic Flowmeters meters is recommended. However students with no past experience can also benefit. For all attendees, it is assumed they have a basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing.
Rosemount - 8800 Series Smart Vortex Flowmeter Short Course – 2339
CEUs - 0.4

Overview
This 1/2-day field class is a condensed version of the 2341 course briefly reviewing 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 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 Flowmeters
- Explain the von Karman Effect and Principles of Operation of Vortex Flowmeters
- Identify Vortex Parts and Explain Functionality
- Configure and Test Transmitters using the AMS Device Manager
- Properly Install and Troubleshoot the Rosemount 8800 Series Vortex Flowmeter System

Audience
This class is intended as a refresher course for anyone that is involved with properly configuring and troubleshooting a Rosemount 8800 Series Smart Vortex Flowmeter. 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 sessions.

Prerequisites
Some prior experience working with Micro Rosemount Vortex Flowmeters 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.

Rosemount - 8800 Series Smart Vortex Flowmeter with HC475 - 2341
CEUs - 0.7

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 Smart Vortex flowmeter 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 Flowmeters
- Explain the von Karman Effect and the Principles of Operation of Vortex Flowmeters.
- 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 Flowmeter System

Audience
This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8800 Series Vortex Flowmeter. Typical job functions include; maintenance technicians, instrument technicians, and instrument engineers.

Prerequisites
None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.

Rosemount - 8800 Series Smart Vortex Flowmeters with AMS Device Manager - 2341A
CEUs - 0.7

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 flowmeter systems. The students will learn how to use AMS Device Manager 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 Flowmeters
- Explain the von Karman Effect and Principles of Operation of Vortex Flowmeters
- Identify Vortex Parts and Explain Functionality
- Configure and Test Transmitters using the AMS Device Manager
- Properly Install and Troubleshoot the Rosemount 8800 Series Vortex Flowmeter System

Audience
This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8800 Series Vortex Flowmeter. Typical job functions include; maintenance technicians, instrument technicians, and instrument engineers.

Prerequisites
None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed.
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 D analyzer 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

Classes typically start at 1pm CST on Monday and end at 12pm CST on Wednesday to accommodate travel.

Rosemount - Analytical 700XA & 1500XA Gas Chromatograph - Operation & Maintenance - R4170
CEUs - 1.7

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

Audience
This course is best suited for students working in a technical environment.

Prerequisites
Students that have at least 6 month 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 for Legacy GC’s (Model 500, 700, or 1000) or R4105 for XA Series GC’s. Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel.

Rosemount - Analytical 700XA & 1500XA Gas Chromatographs (GC) - Advanced Process - R4315/R4316
CEUs - 3.5

Overview
This 5-day course equips students with a full understanding of many advanced techniques used in process gas chromatography. An experienced instructor and focused material enable students to troubleshoot a variety of field issues for the Rosemount Analytical 700XA & 1500XAG.

Topics
- Setting Valve Timing
- Hardware Troubleshooting
- Mixture Adjustments for FID
- Mixture Adjustment for FPD
- Proper Setting Timed
- Overview of Model 1500XA
- Calibration and Accuracy Checks
- Recovery of GC After Analysis Interruption
- GC Start-up After Overhaul

Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel.

Rosemount - CCO 5500 CO Analyzer-Maintenance – 2168

Overview
This 2-day course covers the theory, application and operation of the Rosemount Analytical CCO5500 Combustion Flue Gas Analyzer. Infrared absorption spectroscopy is defined and explained as a measurement technique. Focusing on applications, the instrument is reviewed and the students are taught to install and maintain the analyzer. Students who complete this course will be able to:
- Understand the basic theory of operation
- Install, start up and calibrate the analyzer
- Use the software diagnostics to troubleshoot problems

Topics
- Overview of the CCO 5500 Carbon Monoxide (CO) Analyzer
- Theory of Operation, Appropriate Applications
- Installation, Configuration and Calibration
- Troubleshooting and Maintenance
Rosemount - Chemiluminescence Gas Analyzers - 951C – 2102

Overview
This 1-day course uses lectures and hands-on service training to instruct the student on how to install and maintain the Rosemount Analytical Model 951C Chemiluminescence Analyzer. Students who complete this course will be able to:
- Identify subassemblies and explain their functionality
- Explain the principles of operation
- Calibrate and test equipment
- Properly install and troubleshoot

Topics
- 951C Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the 951C
- Calibrating the 951C Chemiluminescence Analyzer
- Installation and Start-Up
- Troubleshooting and Maintenance

Rosemount - Continuous Emissions Monitoring Systems (CEMS) – 2157

Overview
This 3-day course covers basic fundamentals and the theory of operation, installation, calibration and maintenance of Continuous Emissions Monitoring Systems (CEMS).

Topics
- Environmental Requirement
- Process Applications
- Theory of Operation
- Sample System Instrument
  - Installation and Troubleshooting
  - Hardware and Maintenance

Audience
This course is for instrument technicians responsible for the maintenance of continuous emissions monitoring systems.

Rosemount - Dual Input Analyzer - 1056 - e2601
CEUs - 0.10

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.

Rosemount – Field Communicator Technical Training – e475

Overview
Upon completion of the 475 Field Communicator technical training, you will be able to: setup the 475 for HART® or Fieldbus applications, configure the initial setup items like Contrast, Touch Screen and Clock and use the 475 in HART® or Fieldbus applications.

Topics
- Topics
- Overview
- Initial setup
- Keyboard operation
- HART® device specific menu tree
- The Easy Upgrade Utility
- Using the device with the HART® and Fieldbus applications

Rosemount - Fieldbus Measurement Instruments – 2370
CEUs - 2.1

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 Fieldbus 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

Rosemount - Fieldbus Measurement Instruments – 2370
Rosemount - Fieldbus Measurement Instruments – 2370 – Continued

Note: Course may be conducted using other Fieldbus Hosts, such as AMS Device Manager.

Audience
This course is for individuals responsible for installing, configuring, calibrating, and troubleshooting FOUNDATION™ fieldbus measurement devices.

Prerequisites
Experience in instrument calibration, maintenance, installation, and operation would be helpful.

Rosemount - Four-Wire Liquid Analyzers - 56, 1056, & 1057 – 2204
CEUs - 0.2

Overview
This 2-hour class covers features, benefits and operation of Rosemount Analytical Models 56, 1056 or 1057. Each analyzer family can measure pH, ORP, contacting conductivity, toroidal conductivity, chlorine, oxygen, and ozone. The Model 1056 can also measure Turbidity in drinking water, flow from a pulse sensor and display any 4 to 20mA signal input. Each instrument has its own available features, and menu tree which will be covered in great detail.

Topics
- Installation and Application Problems
- Configuration of Outputs / Alarms (If Applicable)
- Programming of Automated Cleaning Systems (DO, pH)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration
- Troubleshooting
Overview
This fully customized 5-day course provides students with a strong understanding of gas analyzer best practices as they relate to the safe operation and maintenance of the specific models of Rosemount Analytical Gas Analyzers found in their plants, including the NGA2000, MLT, Binos, CLD, X-STREAM, and X-STREAM XE. The instructor focuses on the specific analyzers that are applicable to the students' specific needs. This course emphasizes safe operation and maintenance. Training becomes customized when students present application information. Given that data, the experience instructor will look closely at specific applications and offer participants insight.

Topics
- Analyzer Overview, Including Hardware and Construction
- Software Functionality
- Physical Principals of IR and UV Photometric Measurements and Oxygen Paramagnetic Measurements
- Overview of the Electronics
- Replacement of Physical Components
- Testing and Troubleshooting
- Spare Parts
- Mechanical Assembly/Disassembly
- Sample Handling System – Method, Theory, and Troubleshooting
- Site-specific Applications
- Theory of Operation
- Installation and Start Up
- Troubleshooting and Maintenance
- Audit and Reporting Requirements

Overview
This 3-day course gives students basic understanding of how Rosemount Analytical gas chromatographs 700XA & 1500XA (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 Hardware
- Setting Timed Events, Retention Times, and Response Factors
- Understanding Data Calculations
- Reading Chromatograms
- Calibrating a Gas Chromatograph

Classes typically start at 1pm CST on Monday and end at 12pm CST on Wednesday to accommodate travel.

Overview
This 3-day course gives students basic understanding of how Rosemount Analytical gas chromatographs 700XA & 1500XA (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

Classes typically start at 1pm CST on Monday and end at 12pm CST on Wednesday to accommodate travel.

Overview
This 5-day course is most valuable to those with three years of chromatography experience, or those who have completed the introductory ‘Operation and Maintenance of Gas Chromatographs’ course. Participants will develop an advanced understanding of gas chromatograph operation, troubleshooting, and maintenance. Training becomes customized when students present application information. Given that data, the experience instructor will look closely at specific applications and offer participants insight.

Topics
- Understanding Chromatograph Flow Configurations
- Overhauling Valves
- Reviewing Thermal Conductivity, Flame Ionization, and Flame Photometric Detectors
- Understanding Sample/Carrier/Calibration Gas Systems
- Working with and troubleshooting the Rosemount Analytical 2350A Controller
- Installing and Using MON Software for Integration and Calibration
- Setting Timed Events, Retention Times, and Response Factor Calculations
- Understanding Startup Procedures
- Setting Valve Timing and Flows with Different Flow Configurations
- Checking for Proper Separation and Analyzing Gas Chromatographs
- Verifying Proper Operation of the Gas Chromatograph
- Troubleshooting the Chromatograph and 2350A Controller
- Configuring Reporting Details and Control Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

Prerequisites
Introduction to Gas Chromatographs R4100 course or equivalent knowledge.

Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel.
### Rosemount - Hydrocarbon Gas Analyzers - 400A – 2103

**Overview**
This 1-day course uses lectures and hands-on service training to instruct the student on how to install and maintain the Rosemount Analytical Model 400A Hydrocarbon Analyzer. Students who complete this course will be able to:
- Identify subassemblies and explain their functionality
- Explain the principles of operation
- Calibrate and test equipment
- Properly install and troubleshoot

**Topics**
- 400A Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the 400A
- Calibrating the 400A Hydrocarbon Analyzer
- Installation and Start-up
- Troubleshooting and Maintenance

### Rosemount - Interactive Plant Environment Level Transmitters – 2896 CEUs - 1.4

**Overview**
This 2-day course combines lectures with bench-top labs and uses the interactive plant for scenario based training. Students shall apply classroom knowledge directly to the interactive plant scenario labs. Be ready to learn in a “real world” plant environment.

**Topics**
- Identify Transmitter Parts and Functionality
- Explain the Principles of Operation of the Transmitters
- Configure, Calibrate and Test Transmitters using the Field Communicator, AMS Device Manager, and Engineering Assistant Software
- Configure the Compensated Flow Parameters
- Properly Install and Troubleshoot Pressure, Temperatures and Multi-Variable Flow Transmitters
- Students shall ensure proper PPE and safety measures while working on the plant.

**Audience**
Target students are individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Pressure Transmitters. Students shall ensure proper PPE and safety measures while working on the plant.

### Rosemount - Interactive Plant Environment MultiVariable™ Flow Transmitter – 2812 CEUs - 1.1

**Overview**
This 1-1/2-day course combines lectures with bench-top labs and uses the interactive plant for scenario based training. Students shall apply classroom knowledge directly to the interactive plant scenario labs. Be ready to learn in a “real world” plant environment.

**Topics**
- Identify Transmitter Parts and Functionality
- Explain the Principles of Operation of the Transmitters
- Configure, Calibrate and Test Transmitters using the Field Communicator, AMS Device Manager, and Engineering Assistant Software
- Configure the Compensated Flow Parameters
- Properly Install and Troubleshoot Pressure, Temperatures and Multi-Variable Flow Transmitters
- Students shall ensure proper PPE and safety measures while working on the plant.

**Audience**
Target students are individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Pressure Transmitters. Students shall ensure proper PPE and safety measures while working on the plant.

### Rosemount - Interactive Plant Environment Pressure Transmitters – 2808 CEUs - 1.4

**Overview**
This 2-day course combines lectures with bench-top labs and uses the interactive plant for scenario based training. Target students are individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Pressure transmitters. Students shall apply classroom knowledge directly to the interactive plant scenario labs. Be ready to learn in a “real world” plant environment.

**Topics**
- Identify Transmitter Parts and Functionality
- Explain the Principles of Operation of Pressure Transmitters
- Configure, Calibrate and Test Pressure Transmitters using the Field Communicator
- Properly Install and Troubleshoot Pressure Transmitters
- Students shall ensure proper PPE and safety measures while working on the plant.

**Audience**
Target students are individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Pressure, Temperature, and Multi-Variable Flow transmitters.
Rosemount - Interactive Plant Environment Temperature Transmitters – 2898
CEUs - 2.1

Overview
This 3-day course combines lectures with bench-top labs and uses the interactive plant for scenario based training. Target students are individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Temperature Transmitters. Students shall apply classroom knowledge directly to the interactive plant scenario labs. Be ready to learn in a “real world” plant environment.

Topics
- Explain the Difference between HART® & Analog Transmitters
- Identify Transmitter Parts and Functionality
- Explain the Principles of Operation of Pressure and Temperature Transmitters
- Configure, Calibrate and Test Pressure and Temperature Transmitters using the Field Communicator
- Properly Install and Troubleshoot Pressure and Temperature Transmitters.
- Students shall ensure proper PPE and safety measures while working on the plant.

Audience
Target students are individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Temperature Transmitters.

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Rosemount - Liquid Analysis: Chlorine, Dissolved Oxygen & Ozone
Amperometric Measurement Theory – 2201
CEUs - 0.7

Overview
This 1-day course provides insight into the complicated amperometric measurements of chlorine, dissolved oxygen and ozone. Students will learn the concepts of how amperometric sensors work and how to calibrate each type of measurement. Students who complete this course will be able to:
- Understand the theory behind how amperometric sensors work and how to calibrate each type of measurement
- Differentiate the various species of chlorine
- Implement a proper maintenance program
- Use diagnostics to troubleshoot problems

Topics
- Amperometric Measurement Theory:
  - Chlorine/Dissolved Oxygen/Ozone
  - Calibration Procedures for Each Measurement
  - Maintenance & Troubleshooting Tips

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Rosemount - Liquid Analysis: pH, Conductivity & ORP Theory - Advanced
– 2200
CEUs - 0.7

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
- pH/Conductivity Sensor Overview
- pH/Conductivity/ORP Analyzer Overview

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Rosemount - Liquid Analysis: pH, Conductivity & ORP Analyzer
Overview

Rosemount - Interactive Plant Environment Temperature Transmitters
– 2821
CEUs - 0.7

Overview
This 1-day course combines lectures with bench-top labs and uses the interactive plant for scenario based training. Students shall apply classroom knowledge directly to the interactive plant scenario labs. Be ready to learn in a “real world” plant environment.

Topics
- Identify Transmitter Parts and Functionality
- Explain the Principles of Operation of Temperature Transmitters
- Configure, Calibrate and Test Temperature Transmitters using the Field Communicator
- Properly Install and Troubleshoot Temperature Transmitters.
- Students shall ensure proper PPE and safety measures while working on the plant.

Audience
Target students are individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Temperature Transmitters.

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Rosemount - Liquid Analysis: Measurement Theory (Customer Specific) – 2205
CEUs - 0.7

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. Select an analyzer (course 2204) or transmitter (course 2202) to accompany the measurement theories for a well-rounded class.

Topics
- Installation and Application Problems
- Configuration of Outputs / Alarms (If applicable)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration & Maintenance
- Troubleshooting
Rosemount - Magnetic 8700 Series & Vortex Flowmeters 8800 Series – 2394 CEUs - 0.7

Overview
This 1-day course is an abbreviated version of the 2340 and 2341 courses for Rosemount 8700 Series Magnetic and 8800 Series Vortex meters. Typically 2/3 of the course time is spent on Rosemount's 8800 Vortex flowmeter and 1/3 on Rosemount's 8700 Magnetic Flowmeter. The theory of operation, meter components and installation of each flowmeter are covered. The focus of the class is to provide a hands-on experience configuring and reviewing the most common troubleshooting issue and best practices for resolution.

Topics
• After attending the course the student will be able to do the following for both the Rosemount Magnetic and Vortex flowmeters:
• Briefly Explain the Fundamentals for How Each Flowmeter 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 and Process Issues

Audience
This combined class is intended anyone that is involved with properly configuring and troubleshooting a Rosemount 8700 Smart Magnetic & 8800 Smart Vortex Flowmeters. Typical job functions include; maintenance technicians, instrument technicians and instrumentation engineers.

Prerequisites
This being a 1-Day class covering two flowmeters, some prior experience working with Rosemount's Magnetic and Vortex flowmeters 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.

Rosemount - Magnetic Flowmeter Installation Best Practices - c6502

Overview
This curriculum is part of the Magnetic Flowmeter Online Instrument and Electrical (I&E) Technician Training. This course group covers sensor installation, grounding and wiring.

Topics
• Explain the piping requirements for magnetic flowmeters
• Demonstrate the proper sensor location and orientation for installations
• Describe the installation process for flanged, wafer and sanitary sensors
• Explain the importance of grounding when installing magnetic flowmeters
• Describe the two types of grounding - earth ground and process reference ground
• Discuss the four methods used to establish process reference ground
• Describe the conduit requirements for the transmitter
• Explain how to connect the sensor to the transmitter
• Identify and connect transmitter inputs and outputs

Rosemount - Magnetic Flowmeter Theory and Specification - c6501

Overview
This curriculum is part of the Magnetic Flowmeter Online Instrument and Electrical (I&E) Technician Training. This course group covers the theory of operation; sensor and transmitter components; the magmeter product offering; liner, electrode and flange materials; and sizing.

Topics
• Explain Faraday's Law of Induction
• Describe the components of magnetic flowmeters
• List the advantages and limitations of magnetic flowmeters
• Explain the product offering for sensors and transmitters
• Compare and contrast liner, electrode and flange materials
• Identify typical areas of application
• Explain sizing guidelines for magnetic flowmeters
• Use Instrument Toolkit to size magnetic flowmeters


Overview
This 3-day course explains the measurement technology for Pressure, Temperature, Flow and Level instruments. It will also emphasis 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 Technology Overview
• Guided Wave Radar Level Instruments
• Non-Contacting Radar Level Instruments
• Self-Organizing Wireless Networks

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.

Prerequisites
Students should have experience with process instrumentation and measurements.
Rosemount • Measurement Instrument Fundamentals (2 day) – 2322
CEUs - 1.4

Overview
This 2-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
- HART® Transmitters
- HART Communication Protocol
- Field Communicator
- DP Flow
- Guided Wave Radar Level Instruments
- Non-Contacting Radar Level Instruments

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.

Prerequisites
Students should have experience with process instrumentation and measurements.

Rosemount • MLT Process Gas Analyzers – 2110

Overview
This 3-day course uses lectures and hands-on service training on the relationship of Rosemount Analytical MLT analyzers, platforms and other menu structures. The course will instruct the student on how to install, maintain and troubleshoot the MLT series of analyzers. Application and selection will be briefly covered including the hazardous area requirements. Students who complete this course will be able to:
- Identify individual modules and their functionality
- Understand the basic theory of operation of each module
- Set up software variables for proper calibration and operation
- Use software diagnostics to troubleshoot problems

Topics
- Overview of MLT
- Theory of Operation
- Installation
- Configuration and Calibration
- Maintenance and Troubleshooting

Rosemount • Operation & Maintenance - Gas Chromatographs of Model 500 - R4210
CEUs - 3.5

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-Analyses 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
Introduction to Gas Chromatographs' course or equivalent knowledge.

Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel

Rosemount • Operation & Maintenance - Model 700 - Gas Chromatograph - R4212
CEUs - 3.5

Overview
This 5-day course is appropriate for those who have either worked with a Chromatograph for at least six months or completed the Introductory Gas Chromatograph course. It prepares participants to operate and repair a Rosemount Analytical 700 Gas Chromatograph. It prepares par-ticipants to operate and repair a Model 700 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-Analyses 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

Prerequisites
Introduction to Gas Chromatographs course or equivalent knowledge.

Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel

Rosemount • pH Theory - Level 1 - e2602
CEUs - 0.1

Overview
Entry level training in pH Theory, including explanation of pH measurement, industries utilizing measurement, types of pH measurement, science of determining pH, and examination of a pH detector and sensor.

Explain pH to learner to impart a solid, working knowledge of pH and how it is measured and why, in industry, and understanding of pH scale, and pH sensors.
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 Multivariable DP Flow Transmitter Installation, Configuration, Calibration and Troubleshooting

Note:
Students must attend both days. Reference course, 2305, 2321 and 2308MV for further details.

Prerequisites
Students should have experience with process instrumentation and measurements.

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 multivariable DP Flow Transmitters
- perform DP Flow troubleshooting

Topics
- Basic DP Flow Fundamentals
- DP Flow Sizing Calculations
- Multivariable 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

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.

Prerequisites
Some experience in instrument calibration/verification, maintenance, installation and operation would be helpful.

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

Audience
This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, verification, maintenance and troubleshooting of level measurement instrumentation.

Prerequisites
Experience in instrument calibration, maintenance, installation and operation would be helpful.
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

Audience
This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of measurement instrumentation.

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

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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 Flowmeter 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 Flowmeters
- Identify Transmitter and Sensor Parts and Explain Functionality
- Explain Faraday’s Law and the Principles of Operation of Magnetic Flowmeter System
- Configure and Test Transmitters Using the LOI, Field Communicator, or AMS Device Manager
- Properly Install/Troubleshoot the Rosemount Magnetic Flowmeter System

Audience
This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Magnetic flowmeter. Typical job functions include: maintenance technicians, instrument technicians and instrumentation engineers.

Prerequisites
Knowledge of basic flow fundamentals and instrumentation.

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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 Flowmeter 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 AMS Device Manager and how to use this tool 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 Flowmeters
- Identify Transmitter and Sensor Parts and Explain Functionality
- Explain Faraday’s Law and the Principles of Operation of Magnetic Flowmeter system
- Configure and Test Transmitters Using AMS Device Manager
- Properly Install/Troubleshoot the Rosemount Magnetic Flowmeter System

Audience
This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8700 Series Magnetic flowmeter. Typical job functions include: maintenance technicians, instrument technicians, and instrumentation engineers.

Prerequisites
None required. However, basic understanding of the fundamentals of flow measurement, electricity, analog and frequency signal processing are assumed.
### Rosemount - Tank Gauging Technical Product Training - RTG101
**CEUs** - 3.5

**Overview**
This 5-day Tank Gauging Technical Product Training focuses on the 5900S system, our Wireless Tank Gauging System, a little about Rex and Pro, as well as other field equipment relevant for 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:
- correctly perform installation and setup procedures
- properly configure Tank Gauging System
- plan a Wireless installation
- perform basic troubleshooting

**Topics**
- System Overview
- Perform basic troubleshooting
- 2410 TankHub
- 5900 Gauges
- Rosemount 2240S
- Rosemount 2230 Display
- 5300/5400 Gauges
- Field Communication
- Electrical and Mechanical Installation
- System Configuration
- LPG/LNG
- Wireless
- AMS Wireless Snap-On
- Gateway
- Emulation
- SIL
- Troubleshooting

**Audience**
This course is customized for service, project, and sales engineers. The course includes both practical and theoretical training

**Prerequisites**
This course is suitable for service, project, and sales engineers, and is a good start for new employees and customers.

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### Rosemount - TankMaster Training - RTG102
**CEUs** – 2.5

**Overview**
This 4-day TankMaster Training covers more detailed information about TankMaster functions. This course is suitable for anyone who works with TankMaster as well as for customers who use WinOpi as the operators’ interface. Among other useful functions in TankMaster, the training covers batch-handling, Custom Views, and Redundancy. Students who complete this course will:
- correctly perform System Configuration
- properly configure Host Communication
- properly use Redundancy
- perform basic troubleshooting

**Topics**
- System Configuration
- WinOpi Tools
- Host Communication and OPC
- TankMaster Batch
- Custom Views and Translation
- TankMaster to Enraf
- Network Basics
- Redundancy
- TankMaster.net
- Administrator Program, Backup & Restore
- Troubleshooting

**Audience**
This course is customized for service, project, and sales engineers. The course includes both practical and theoretical training.

**Prerequisites**
It is required that you have previously attended the Technical Product Training or have good knowledge of the Rosemount Tank Gauging System.

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### Rosemount - Two-Wire Liquid Transmitters - 1066 & 5081 – 2202
**CEUs** - 0.2

**Overview**
This 1-day course provides insight into the complicated amperometric measurements of chlorine, dissolved oxygen and ozone. Students will learn the concepts of how amperometric sensors work and how to calibrate each type of measurement. Students will:
- differentiate the various species of chlorine
- implement a proper maintenance program
- use diagnostics to troubleshoot problems

**Topics**
- Installation and Application Problems
- Configuration of Outputs (HART® Only)
- Use Diagnostic Features (If Applicable)
- Sensor Calibration
- Troubleshooting

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### Rosemount – Vortex Device Configuration & Using Configuration Tools - c6003

**Overview**
This curriculum is part of the Vortex Online Instrument and Electrical (I81E) Technician Training. It may be purchased individually or with the c6000 curriculum. Unlimited access for 3 months. Duration: 1 HR

**Topics**
- key parameters for a basic vortex configuration
- how to use AMS and the Field Communicator to configure an 8800D Vortex meter
- advanced configuration for special units of measure, base volume units - density ratio, pulse output, totalizer, display variables and saturated steam using the MTA option
### Rosemount - Vortex Installation Best Practices - c6002

**Overview**
This curriculum is part of the Vortex Online Instrument and Electrical (I&E) Technician Training. It may be purchased individually or with the c6000 curriculum. Unlimited access for 3 months. Duration: .5HR

**Topics**
- piping requirements
- mounting
- remote electronics
- wiring

### Rosemount - Vortex Troubleshooting - c6004

**Overview**
This curriculum is part of the Vortex Online Instrument and Electrical (I&E) Technician Training. It may be purchased individually or with the c6000 curriculum. Unlimited access for 3 months. Duration: 1HR

**Topics**
- troubleshooting scenarios
- electronics, sensor and process troubleshooting
- vibration, mass balancing and filtering troubleshooting

### Rosemount - Wireless Pressure Gauge - e2977

**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.

**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.

**Prerequisites**
Some experience in Wireless Networks and Host integration would be helpful. Completion of the Wireless classes on Plantweb University would be beneficial.

### Rosemount - Wireless Self Organizing Network (1 day) – 2376

**CEUs** - 0.3

**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
Rosemount - Wireless Self Organizing Network (2 day) – 2375
CEUs - 1.4

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

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.

Prerequisites
Some experience in Wireless Networks and Host integration would be helpful.

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Rosemount - X-Stream Process Gas Analyzers (PGA) – 2170

Overview
This 3-day course uses lectures and hands-on training to teach the student the non-dispersive infrared, electrochemical, or paramagnetic oxygen and thermal conductivity measurement techniques used in the analyzer. Applications will be reviewed including the various housings to meet the environmental needs. The student will:
- learn the theory of operation
- set up software variables for proper calibration and installation
- understand and use the troubleshooting tools including diagnostics

Topics
- Overview and Theory
- Application and Selection of Options
- Installation and Troubleshooting
- Maintenance and Calibration
### Roxar - Acoustic Sand Monitor - RX007

**CEUs** - 1.2

**Overview**
The Roxar Sand Monitor is a non-intrusive acoustic sand monitoring system that identifies in real-time sand production in any water, oil, gas or multiphase flow lines for onshore and offshore locations. This 1-day training course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision-making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using to operate the instrumentation.

**Topics**
- Introduction to Sand Metering
  - Causes of Sand Production
  - Why Do we Need Sand Detection System?
  - Roxar Sand and Pig Detection System
  - System Enclosure, History: Challenge, Integration with Other Products
- Measurement Technology
  - How Do We Measure - Sand Interface
  - Sand Rate Calculation - Sand Detector
  - Product Optimization
- Operations
  - Software and General Set-Up: - System Overview
  - Configure Sensor Parameters
  - Process Data Interface: Flow Rate Input, Velocity Input, Choke Input, Well Test Data Interface
  - Alarm Settings Interface, Data Logging
  - Basic Interpretation: Basic Noise Estimation, Sand Production Estimation
  - Adv. Interpretation: Velocity in Signal Interpretation
  - Flow Regime Consideration

**Roxar - Acoustic Sand Monitor - RX007 – Continued…**
- Maintenance
  - Detector Installation: Locations on Pipe, Temperature Considerations; - Wiring
  - Communication Digital Output, Analogue Output, Volt Free Contact, Lamp Output
  - Calibration: Factory Calibration, Background Noise Calibration, Automatic Background Noise Curve (ABA), Sand Noise Calibration
  - Sand Transport Capability Indicator
  - Sand Mass Correction (L)
  - Choke Calibration
  - Filtering Settings: Alpha and Beta Filtering of Raw Data, K-Factor
  - Preventative Maintenance: Visual Inspection and Routine Testing
  - Calibration Adjustment: Background Noise Calibration (Zero Calibration)
  - Sand Calibration, Hardware Maintenance: Checking Sensor Connections, Reinstalling or Replacing the Detector

### Roxar - CorrLog - Intrusive Corrosion Monitoring System - ROX008

**CEUs** - 1.2

**Overview**
Our intrusive corrosion monitor 1-day training course will provide your personnel with the knowledge of the Roxar intrusive corrosion monitoring system, providing understanding of the different system infrastructures, components and measurement principles. The course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision-making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

**Topics**
- Introduction to Corrosion Monitoring
- Overview of Corrosion Issues
- Why Corrosion Monitoring?
- Corrosion Control and Process Optimization
- Maintenance
  - Integrity Management and Safety
  - Basic Principles for Selecting Locations for Corrosion Monitoring
  - Overview of the Roxar Intrusive Corrosion Monitoring System
  - Weight Loss Coupons, Electrical Resistance Probes, Linear Polarization Probes, Galvanic Probes
- Mechanical Accessories
  - Instrumentation
  - System Software
  - Integrated Flow Assurance Monitoring Systems
- Measurement Principles
  - Weight Loss Coupons
  - Electrical Resistance Probes
  - Linear Polarization Probes
  - Galvanic Probes
- Software Operations
  - Verification of the Software
  - Configuration and Installation Architecture
  - Instrument Specific Parameters
  - Raw Data Verification
  - Engineer Values
- Data Handling and Presentation
- Data Interpretation
- Reporting
  - Exporting Data
  - Maintenance
  - Battery Replacement (Offline Systems Only)
- System Health Check
- Replacing Interface Cards
Roxar - FSM - ROX010
CEUs - 1.2

Overview
Corrosion is a major cost in the oil and gas as well as other industries, and frequently being the reason for accidents and unplanned interruptions in production plans. Corrosion monitoring is thus important for verification of the assets integrity. Roxar’s FSM (Field Signature Method) system is a non-intrusive system for monitoring internal corrosion in pipes, pipelines or vessels directly in the pipe wall. Our Non-Intrusive Corrosion Monitor 2-day training course will provide your personnel with the knowledge of the Roxar non-intrusive corrosion monitoring system, understanding of the different system infrastructures, components and measurement principles. The course focuses on teaching the participants what valid and non-valid data are; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision making. The course is available in two versions: MultiTrend and Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics
- Introduction
  - Overview of Corrosion Issues
  - Why Corrosion Monitoring?
- Corrosion Control and Process Optimization
- Integrity Management and Safety
  - Basic Principles for Selecting Locations for Corrosion Monitoring
  - Overview of the Roxar FSM System
- Mechanical Components
- Buried System
  - Instrumentation
  - System Software
  - System Infrastructure
  - Integrated Flow Assurance Monitoring Systems
- Measurement Principles
  - Field Signature Method
- Software Operations
  - Verification of the Software
  - Configuration and Installation Architecture
  - Instrument Specific Parameters
  - Raw Data Verification
  - Signature
  - Engineering Values
- Data Handling and Presentation
- Data Interpretation
- Reporting
- Exporting Data

Roxar - FSM - ROX010 – Continued...

- Maintenance
  - Battery Replacement (EX Version)
  - System Health Checks

Roxar - Hydraulic Retrieval & Access Fitting System - ROX011
CEUs - 1.8

Overview
The objective of this course is to give the participant an overview of the Hydraulic Retrieval & Access Fitting System. The focus of this 1-day course is to bring awareness of working safely and efficiently with the tool and safe work practices. It will explain the design and operations of the tool and the fitting, and is recommended for anyone who will work with retrieval operations using our hydraulic retrieval system. Physical demonstrations with retrievers, service valves, and retractors on non-pressurized stands may be arranged by special request.

Topics
- Introduction
  - The Hydraulic Access Fitting and its Components
  - The Hydraulic Tool Retrieval and its Components
  - Different Variations of the Tool (PED/Non-PED)
- Theoretical Operation
  - Videos
  - Theoretical Run through the Operation
- Understanding How the Tool Works
  - Safe Operation of the Tool
  - Troubleshooting and Maintenance
- Practical Operation
  - Practical Troubleshooting
  - Focus on Getting Comfortable using the Tool
  - Repeated Operations
  - Maintenance After Use
  - Practical Exam

Roxar - Multiphase Meter 1900VI ROX001
CEUs - 1.8

Overview
The Roxar topside Multiphase meter measures accurately the flow rates of oil, gas and water without separation, mixing or moving parts. Field experience shows long-term stability, high accuracy and very good repeatability. The objective of the 3-day Roxar MPFM 1900VI course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set-up and configuration; calibration data, reference fluid parameter set-up and operation of the meter. The course will cover interpretation and correlation of MPFM parameters versus influences of process conditions.

Topics
- Introduction to Multiphase
  - Metering of Oil & Gas Production
  - Purpose of the Roxar Multiphase Meter
  - Multiphase Flow and Terminology
  - Roxar Multiphase Sensors and Electronics
- Measurement Technology
  - Overview of the Measurement System
  - Measurement Principles used in Roxar MPFM 1900VI
  - Determination of Flow Rates
  - Velocity Measurements: Pressure, Temperature & Volume
  - Verification of the Measurements - which Factors have Vital
- Importance for Design and Process Calculation
- Operations
  - Overview of Roxar MPFM 1900VI
  - Operation System
  - Service Console Software Installation and Main Screen Presentations
  - Communication Set-Up
  - Calibration and Reference Fluid Parameter Set-Up
  - Purpose of the Service Console Program (SCP)
  - Interpretation of the SCP screen
    - Diagnostics
  - SCP Screen Alarm Indication, Configuration of the Multiphase Meter
  - Practical Information on How to Access and Save Parameter Files;
  - Practical Information on How to Log and Retrieve Data; Well Test Options
Roxar - Multiphase Meter 1900VI ROX001 – Continued...

- Maintenance
- Test Equipment and Recommended Spare Parts
- Main Checks and Intervals
- Radiological survey (Topside)
- Reference Fluid Density Parameter Set-Up
- Reference Permittivity and Conductivity
- Temperature, Pressure and Differential Pressure Function Check
- Capacitance Unit Function Check
- Inductive Unit Function Check
- Densitometer Unit Function Check

Roxar - Multiphase Meter 2600 - ROX002

Overview
The Roxar Zector technology provides accurate and real-time characterization of flow patterns. The voxel-based signal processing and electrode geometry provides information, including multiple flow velocity data and near wall measurements. The objective of the Roxar MPFM2600 2-day course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set up and configuration; calibration data, reference fluid parameter set up and operation of the meter. The course will cover interpretation and correlation of MPFM parameters versus influences of process conditions. Understanding the data is the key in order to make the right decisions for reservoir management.

Topics
- Introduction to Multiphase Metering
- Single Phase Metering/Multiphase Metering
- Flow Regimes
- Roxar’s Experience in Multiphase Metering
- Roxar MPFM2600
- Mechanical Design
- Mechanical Specifications
- Installation and Commissioning Instructions
- Measurement Technology
- Overview of the Measurement System

Roxar - Multiphase Meter 2600 - ROX002 – Continued...

- The Principle of Operation (Phase Fraction Measurement, the Gamma Densitometer, Velocity Measurement, PVT Tables, Phase Slip, Static Properties)
- Software Operations
- Overview of Roxar MPFM Operation System
- Installation and Start Up of the Service Console
- Software Operations: Practical Information on How to Access and Save Parameter Files, Logging and Retrieving data, Well Test Options
- Maintenance
- Overview of the Mechanical System Maintenance
- Gamma System
- Electrical System
- Calibration
- Replacement of Parts
- PVT
- What is PVTx
- Fluid Analysis: Sampling, Compositional Data
- Tempest PVTx
- Import Tables
- Parameter Save and Download; Diagnostics; Troubleshooting

Roxar - SandLog Intrusive Sand Monitoring System - ROX009

Overview
Our intrusive sand monitor 1-day training course will provide your personnel with the knowledge of the Roxar Sand Monitoring System, providing understanding of the different system infrastructures components and measurement principles. The course focuses on teaching the participants what valid and non-valid data is; provides knowledge on how to create reports from data received by the instrument in order to provide input to integrity managers to enable better decision making. The course is available in two versions: MultiTrend & Fieldwatch, depending on the system software that your installation is using for operations of the instrumentation.

Topics
- Introduction to Intrusive Sand Metering
- Overview of Sand/Erosion Issues
- Basic Principles for Selection Locations for Sand/ Erosion Monitoring
- Erosion Control Integrity & Safety
- Optimizing Flow Rates & Production
- Overview of the Roxar Intrusive Sand/Erosion Monitoring System
- Mechanical Accessories
- Sand Erosion Probes
- Combined Sand Erosion & Corrosion Probe
- Electrical Resistance Probes
- Instrumentation
- System Software
- Integrated Flow Assurance Monitoring Systems
- Measurement Principles
- Electrical Resistance Probes
- Sand Erosion Measurements
- Correlations with Sand Production
- Combined Sand Erosion and Corrosion Probe
- Software Operations
- Verification of the Software
- Configuration & Installation Architecture
- Instrument Specific Parameters
- Raw Data Verification
- Engineer Values
- Data Handling and Presentation
- Data Interpretation
- Reporting
- Exporting Data
- Maintenance
- Battery Replacement (Offline Systems Only)
- System Health Check
- Replacing Interface Cards
Roxar - Subsea Multiphase Meter - ROX003
CEUs - 1.8

**Overview**
The Roxar subsea Multiphase meter provides flow rates for oil, gas and water; vital information for managing reservoirs and processes. The objective of the Roxar SMPFM 2-day course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The objective of the Roxar Subsea Multiphase Meter course is to provide the participant with an understanding of the multiphase flow, components and measurement principles of the instrument. The course focuses on providing the participants with detailed understanding of the set up and configuration; calibration data, reference fluid parameter set up and operation of the meter. The course will cover interpretation and correlation of SMPFM parameters versus influences of process conditions. Understanding the data is the key in order to make the right decisions for reservoir management.

**Topics**
- Introduction to Multiphase Metering
  - Single Phase Metering/Multiphase Metering
  - Flow Regimes
  - Roxar’s Experience in Multiphase Metering
  - Roxar SMPFM
  - Well Testing, Monitoring and Allocation
- Mechanical Specifications
  - Roxar SMPFM Components
  - Versions of the Meter
- Measurement Technology
  - Overview of the Measurement System
  - The Principle of Operation (Phase Fraction Measurement, the Gamma Densitometer, Velocity Measurement, PVT Tables, Phase Slip, Static Properties)
- Software Operations
  - Overview of Roxar SMPFM operation system
  - Installation and Start-Up of the Service Console
  - Software Operations: Practical Information on How to Access and Save Parameter Files, Logging and Retrieving Data, Well Test Options
  - Well Test
  - Creating Diagnostic Files
  - Setting Up Fluid Parameters

Roxar - Subsea Multiphase Meter - ROX003 – Continued...

**Topics**
- Maintenance
  - Gamma System
  - Electrical System
  - Calibration
  - Software Updates
  - Sensor Geometry
- PVT
  - What is PVTx
  - Fluid Analysis: Sampling, Compositional Data
  - Tempest PVTx
  - Import Tables

Roxar - Subsea Watercut Meter - ROX006
CEUs - 1.2

**Overview**
The Roxar Watercut meter measures water in oil (0% to 100%) and is used in process control on test separators, fiscal metering, on- and offloading, export metering, desalting in refineries, two phase flow metering. The Roxar Watercut meter uses a unique and patented microwave resonance technology to measure the permittivity of an oil/water mixture with an extremely high level of accuracy and sensitivity. The aim of this 1-day course is to enable participants to take full advantage of the meter in real applications. Upon completion of the course participants should be able to efficiently run the instrument on their own, including delivering on-site quality reliable data, doing normal routine maintenance, fault finding and troubleshooting.

**Topics**
- Introduction to Water Cut Metering and Technology
  - Why Measure Water Cut?
  - Water Cut Metering Challenges
  - Water Cut Metering Requirements
  - Technology for Water Cut Measurement
- Measurement Technology
  - How Do We Measure Water Cut
  - Installation
  - Microwave Signal Path
  - Entrapment of Microwaves in a Pipe
  - Microwave Resonance
  - Permittivity of Oil and Water
  - Water Continuous and Oil Continuous Phase
  - The Tables of Water Cut Made from the First Meter

Roxar - Subsea Watercut Meter - ROX006 – Continued...

**Topics**
- The Production of the Meters to Fit the Model of the First Meter
- The Production Sequence in a Meter
- Measurement Uncertainty and Initial Explanation
- Operations
  - Connecting to the Meter
  - Software Operations: Entering the Meter, Configuration
  - Measurement
  - Inline Calibration of the Meter
  - Measurement Uncertainty
  - Practical Exercises on Meter Electronics
- Maintenance
  - Overview of Recommended Maintenance
  - Turning Diagnostics andLogging of Hyper Terminal
  - Taking a 50dB Plot of Microwave Electronics
  - Common Error Messages
  - Sending Diagnostic Data to Roxar for Analysis and Filing
  - Download New Code for a Meter
  - Erasing Battery Backed RAM in a Meter
  - Troubleshooting the Temperature Transmitter
  - Practical Exercises
Overview
The Roxar Subsea Wetgas meter is a unique instrument allowing accurate measurement of hydrocarbon flow rates and water production with a very compact mechanical solution. The aim of this 1-day training is to provide the participants with in-depth knowledge of instrument operations which enable participants to take full advantage of the meter in real applications. Course participants will be taught the intricacies of the meter and measurement technology, understanding of the data and the measurement principles will allow better decision making when it comes to reservoir management and optimizing the production process.

Topics
- Introduction to Wetgas
  - Introduction
  - Wet Gas
  - Why Measure Water?
  - Multiphase Flow
  - Flow Conditions
  - Ranges and Specifications
  - Installation Examples
- Mechanical Specifications
  - Material Overview
  - Design Standards
  - SWGM Components
  - Cathodic Protection and HISC
  - Insulation and Coating
  - Testing
- Measurement Technology
  - Overview of the Measurement System
  - The Principle of Operation
  - Direct Measurement and Required Inputs
  - Fraction Calculations
  - Formation Water Detection
  - Calculation Modes
  - Redundancy
- Operations and Maintenance
  - Pre-commissioning Phases
  - Commissioning and Start Up
  - Communication
  - Roxar SWGM Console
  - Meter Operation
  - Alarms and Warnings
  - Calibration (Describe All Alternatives)
  - Maintenance

Overview
The Roxar Wetgas Meter is a unique instrument allowing accurate measurement of hydrocarbon flow rates and water production, with a very compact mechanical solution. The aim of this 1-day training is to provide the participants with in-depth knowledge of instrument operation, which enables participants to take full advantage of the meter in real applications. Course participants will be taught the intricacies of the meter and measurement technology, understanding of the data and the measurement principles will allow better decision making when it comes to reservoir management and optimizing the production process.

Topics
- Introduction to Wetgas
  - Introduction
  - Wet Gas
  - Why Measure Water?
  - Multiphase Flow
  - Flow Conditions
  - Ranges and Specifications
  - Installation Examples
- Mechanical Specifications
  - Material Overview
  - Design Standards
  - WGM Components
  - Cathodic Protection and HISC
  - Insulation and Coating
  - Testing
- Measurement Technology
  - Overview of the Measurement System
  - The Principle of Operation
  - Direct Measurement and Required Inputs
  - Fraction Calculations
  - Formation Water Detection
  - Calculation Modes
  - Redundancy
- Operations and Maintenance
  - Pre-Commissioning Phases
  - Commissioning and Start Up
  - Communication
  - Roxar WGM Console
  - Meter Operation
  - Alarms and Warnings
  - Calibration (Describe All Alternatives)
  - Maintenance
RS3 - Configuration - Advanced – 3500 CEUs - 2.1

Overview
Advanced Control Block configuration training for those whose needs go beyond cascade or ratio control and straightforward Interlock logic.

Topics
- 3500-1 Introduction and Overview
- 3500-2 Configuring Control Blocks for High Level Orchestration
- 3500-3 Optimizing Complex Logic Functions
- 3500-4 Optimizing Block Data Transfer

Prerequisite
Curriculum 3100 Introduction to RS3

RS3 - Hardware & Maintenance – 3200 CEUs - 3.5

Overview
Students entering this curriculum should have a general electronics background, and should know how to use electronics test equipment such as a multimeter & current source.

Topics
- 3200-10 RS3 Hardware Overview
- 3200-20 Power Supplies/Power Distribution
- 3200-70 The PeerWay
- 3200-30 Console Electronics
- 3200-31 CRT Displays
- 3200-32 Multitube Command Consoles
- 3200-40 Control Files -Coordinator Processor IV
- 3200-53 Overview of the I/O Subsystem
- 3200-50 Analog I/O Hardware
- 3200-51 Discrete I/O Hardware
- 3200-52 Contact I/O Hardware
- 3200-54 Low-Level Input Multiplexer
- 3200-56 PLC Interface
- 3200-57 Multipoint Analog Input/Output

Audience
The 3200 curriculum is designed for technicians and engineers who are responsible for installing, starting up, or maintaining a RS3 installation.

Prerequisites
3100: modules 1, 2, 3 & 4

RS3 - Introduction – 3100 CEUs - 3.5

Overview
This curriculum provides a starting point for all engineers, technicians and other personnel who will configure, install, or maintain any part of a RS3 Distributed Control System. It may meet all the needs of those configuring control systems for continuous processes requiring nothing more complex than cascade or ratio control, simple interlocks or motor controls. For others, 3100 modules serve as prerequisites for modules in the 3200, 3500 or 3600 curricula. This curriculum can provide a basic understanding of RS3 for managers and others whose success depends on the system but who will not work with it directly.

Topics
- 3100-1 Developing Basic Operating Skills Using the RS3 MTCC Console
- 3100-2 System Hardware and Architecture
- 3100-3 Configuring Basic Control Loops
- 3100-4 Configuring Trends, Reports, Alarms/ Console Configuration- RS3 MTCC Console
- 3100-5 Configuring Logic Functions/Displays
- 3100-6 Configuring Process Graphic Displays Using the RS3 MTCC Console
- 3100-7 Configuring Cascade/Ratio Loops

Audience
This curriculum provides a starting point for all engineers, technicians and other personnel who will configure, install, or maintain any part of a RS3 Distributed Control System.

Prerequisites
With the retirement of the RS3 product line in 2013, these courses can only be assured to customers with a Sustain Support Agreement. A Sustain Support Agreement can be customized to meet your needs for future support-taking into consideration your onsite resources and schedule for modernization. Please contact your local office to learn more about Sustain Support.

RS3 - Process Operation – 3400 – Continued...

Overview
Training can be tailored to either a continuous or a batch process. The 3400 modules help the student learn how to analyze process conditions and make process adjustments, with confidence and without hesitation. Training activities help the student develop keyboard dexterity through repetition of routine procedures under increasingly challenging conditions. Qualification exercises require each student to demonstrate an adequate skill level before proceeding to the next training activity or module.

Topics
For MTCC Consoles:
- 3400-1 Basic Operating Displays and Adjustments Using the MTCC Console
- 3400-2 Operating Cascade and Ratio Loops Using the MTCC Console
- 3400-4 Operating Batch Processes Using ABC Batch Software through the MTCC Console (Batch Only!)

For ROS Consoles:
- 3400-11 Basic Operating Displays and Adjustments Using the RS3 Operator Station
- 3400-12 Operating Cascade and Ratio Loops Using the RS3 Operator Station
- 3400-14 Operating Batch Processes Using ABC Batch Software Through the RS3 Operator Station (Batch Only!)

Time Required
Standard Operator Training (non-batch) - 12 hours. Including batch - 20 hours.

Audience
The 3400 curriculum is designed for plant operators and supervisors who are responsible for day-to-day process operation.

RS3 - Process Operation Configuring
RS3 Control for Batch Processes – 3600 CEUs - 3.5

Topics
- 3600-10 Introduction to ABC Batch Recipe
- 3600-11 Intro. to RBL Language/Scripts
- 3600-12 Configuring Batch Tasks
- 3600-2 Displays, Alarms, & Reports
- 3600-3 Exception Management in a Task Environment
- 3600-4 Batch Data Transfer
- 3600-5 Advanced Task Organization

Time Required - 1 Week

Audience
The 3600 modules are designed for engineers who must configure/support a batch process control system using RS3 ABC Batch software.

Prerequisite
Curriculum 3100, Introduction to RS3
Service Training TEC2000 Maintenance and Operation - Level I - VA111
CEUs - 2.8

Overview
This 4-day course presents a fundamental overview of the construction, assembly, hardware, software and configuration of EIM™ actuators. Students attending this program will demonstrate an ability to identify actuator 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
- MCP:
  - Set Limit Switch and Torque Stop
  - Mechanical Disassembly (Basic)
  - Change Torque Springs
  - Identify Components in Package and in Wiring Diagram
- M2CP:
  - Set Limit Switch and Torque Stop
  - Mechanical Disassembly (Basic)
  - Change Torque Springs
  - Identify Components in Package and in Wiring Diagram
- Tec2/Model500:
  - Set Limit Switch and Torque Stop
  - Mechanical Disassembly (Basic)
  - Change Torque Springs
  - Identify Components in Package and in Wiring Diagram
  - Set Configuration Files
- TecLink DCMLink:
  - Troubleshoot Settings via the Software
- Identify the Basic Components and Assemblies of EIM™ Actuators
- Disassemble and Reassemble of EIM Actuators
- Application
- Troubleshoot Start-up Problems Associated with Installation, Configuration and Operation of Various Control and Actuator Combinations

Prerequisites
Students planning on attending this program should have a minimum of 1 year field service experience and have a working knowledge of MS Windows. Each student should have a strong background in the mechanical operation and electrical operation of EIM™ products.

Service Training TEC2000 Maintenance and Operation - Level II - VA112
CEUs - 2.8

Overview
This 3-day course presents a fundamental overview of the construction, assembly, hardware, software and configuration of a Tec2/Model500 actuator. Students attending this program will demonstrate an ability to identify actuator hardware, components and assemblies. Students will interconnect various control configurations for the Tec2/Model500 units and prove actuator operation. All students will demonstrate the ability to setup, configure, check and verify operation of various actuator configurations using appropriate hardware or software.

Topics
- Identify the Basic Components and Assemblies of a Tec2/Model500 Non-Intrusive Actuator by Function, Configuration and Operation
- Disassemble and Reassemble a Tec2/Model500 Actuator
- Customize the Configuration of a Tec2/Model500 Actuator
- Wiring Options
- Application
- Troubleshoot Start-up Problems Associated with Installation, Configuration and Operation of Various Control and Actuator Combinations
- Demonstrate How to Upgrade the Service Pack for a Tec2/Model500 Actuator

Prerequisites
Students planning on attending this program should have a minimum of 3 years field service experience and have previously attended the Service Training Program — Level I and have a working knowledge of MS Windows. Each student MUST have a strong background in the mechanical operation and electrical operation of EIM™ products. Other attendees with a solid background in electrical controls [including microprocessor basics] are encouraged to attend.

Shafer Products - VA109
CEUs - 2.8

Overview
This 4-day course uses classroom style lectures and hands-on experience with working models to teach students on the following topics:
- assemble, install, operate and maintain a Shafer, rotary vane gas-over-oil actuator
- use troubleshooting techniques and tests to identify problems in gas-over-oil systems, and perform routine maintenance and emergency repairs on each component
- install any Shafer control component on the corresponding actuator, connect calibration equipment and carry out set-up and calibration procedures
- adapt and install control upgrade or modification kits including all tubing connections and final adjustments
- identify graphic fluid schematic symbols, match to actual control device and integrate the symbols into a functioning relationship

Topics
- Gas-over-oil Actuators
- Gas-over-oil Control Systems
- Gas-over-oil Control System Accessories
- Control Applications
- Control Component Calibration

Prerequisite
Students should be involved with the application, service or maintenance of Shafer, rotary vane gas-over-oil actuator systems.
Topics
- DCA Overview
- DCA User Interface
- Repository Creation, Configuration and Use
- Document Types
- Configured Properties
- Creating Document Properties
- Adding Documents — Manual/Autowloader
- Document Life Cycle
- Document Change Control
- Change Request User Interface
- Change Request Life Cycle
- Change Request Types
- Change Request Workflows
- Creating Change Requests
- Review and Approval Processes
- Document Packages Overview
- Packages User Interface
- Package Classes

Overview
This 3-day class provides the user with the necessary skills to set up, configure and maintain the DCA module in Syncade. Students will be taught repository setup and administration settings, how to add documents to a user configured repository structure using manual or automated techniques, manually move documents through the promotion model as well as editing existing documents and making them available to the production cycle. Users will configure and use the Change Request feature within DCA to move documents through the promotion model. Change request types and workflows will be created and users assigned to the roles in the steps to automate the document promotion process. Document packages will also be taught in this class. Users will create package classes that will be used to create a print package for a production run.

Topics
- DCA Overview
- DCA User Interface
- Repository Creation, Configuration and Use
- Document Types
- Configured Properties
- Creating Document Properties
- Adding Documents — Manual/Autowloader
- Document Life Cycle
- Document Change Control
- Change Request User Interface
- Change Request Life Cycle
- Change Request Types
- Change Request Workflows
- Creating Change Requests
- Review and Approval Processes
- Document Packages Overview
- Packages User Interface
- Package Classes

Overview
This 2-day class provides an overview of the Syncade applications and their use within a Manufacturing Execution System (MES) environment. The Syncade applications handle tasks that fit between the process control system environment, such as DeltaV™, and corporate Enterprise Resource Planning (ERP) systems, such as SAP. Each module in Syncade will be covered briefly to provide the user with a basic understanding of the module, its functionality and how it fits into the overall MES functional layer. Integration methods and implementation techniques are not part of this class.

Topics
- Manufacturing Execution Systems (MES)
- Document Control and Authoring
- Security Basics
- Portal
- Training and Development
- Equipment Tracking
- Materials Management
- Inventory Management
- Recipe Authoring
- Order Management
- Weigh and Dispense

Overview
This 2-day class provides an overview of the Syncade applications and their use within a Manufacturing Execution System (MES) environment. The Syncade applications handle tasks that fit between the process control system environment, such as DeltaV™, and corporate Enterprise Resource Planning (ERP) systems, such as SAP. Each module in Syncade will be covered briefly to provide the user with a basic understanding of the module, its functionality and how it fits into the overall MES functional layer. Integration methods and implementation techniques are not part of this class.

Topics
- Manufacturing Execution Systems (MES)
- Document Control and Authoring
- Security Basics
- Portal
- Training and Development
- Equipment Tracking
- Materials Management
- Inventory Management
- Recipe Authoring
- Order Management
- Weigh and Dispense
### Syncade™ - Equipment Tracking - Virtual - 7083V
**CEUs - 1.4**

**Overview**
This 2-day class 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.

**Topics**
- ET Overview
- Create Equipment Classes
- Define Calibration Targets
- Add Custom Properties
- Create Events and Event State Matrix
- Create Rules and Groups
- Material and Labor with Events
- Event Scheduling
- Create Equipment
- Integrating Documents and Skills
- Performing Events
- Work Orders

### Syncade™ - Materials, Inventory and Order Management – 7084 – Continued...
**Overview**
This 3-day 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.

**Topics**
- Sampling
- Purchasing and Receiving
- Lot and Container Actions
- Physical Inventory
- Genealogy
- Inventory Adjustments

### Syncade™ - Materials, Inventory and Order Management - Virtual - 7084V
**CEUs - 2.1**

**Overview**
This 3-day 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.

**Topics**
- Material/Inventory Management Overview
- OM Overview
- Material Masters
- Material Properties
- Quality Statuses
- Order Creation and Execution
- Material Allocations
- Weigh and Dispense
- Trusted Dispensing
- Sampling
- Purchasing and Receiving
- Lot and Container Actions
- Physical Inventory
- Genealogy
- Inventory Adjustments

### Syncade™ - Overview - 7080B – Continued....
and implementation techniques are not part of this class. This course is online, on-demand and includes:

Recorded lectures, workshop demonstrations, and instructions available for 6 months after course enrollment. Access to a dedicated student Syncade Workstation in the cloud to perform hands-on workshops available from 6 months or 15 hours of workstation run time (whichever occurs first). Requires a high speed internet (DSL minimum and HTML 5 compliant browser (prefer Chrome) Student Workbook sent to students.

**Topics**
- Manufacturing Execution Systems (MES)
- Document Control and Authoring
- Security Basics
- Portal
- Training and Development
- Equipment Tracking
- Materials Management
- Inventory Management
- Recipe Authoring
- Order Management

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**Syncade™ - Overview - 7080B**

**Overview**
This 2-day class provides an overview of the Syncade applications and their use within a Manufacturing Execution System (MES) environment. The Syncade applications handle tasks that fit between the process control system environment, such as DeltaV™, and corporate Enterprise Resource Planning (ERP) systems, such as SAP. Each module in Syncade will be covered briefly to provide the user with a basic understanding of the module, its functionality and how it fits into the overall MES functional layer. Integration methods...
Syncade™ - Recipe Authoring - 7095B
CEUs - 2.1

Overview
This 3-day class will provide the user with the necessary skills to configure version 4.3 recipes. Users will learn to configure and execute manual, automation, and integrated recipes using Syncade and DeltaV. Recipes will be taken from the configuration stage, through execution, and into the order completed state. This process will teach users how a complete batch record is made.

This course is online, on-demand and includes: Recorded lectures, workshop demonstrations, and instructions available for 6 months after course enrollment. Access to a dedicated student Syncade Workstation in the cloud to perform hands-on workshops available from 6 months or 15 hours of workstation run time (whichever occurs first). Requires a high speed internet (DSL minimum and HTML 5 compliant browser (prefer Chrome)) Student Workbook sent to students

Topics:
- Recipe Authoring (RA) Overview
- RA Application
- Manual and Automation Recipe Hierarchy
- Work Instructions and Parameter Types
- Operations, Unit Procedures and Procedure Creation
- RA Simulator
- Process Segments
- Master Recipes
- Order Execution
- Parameter Referral and Deferral
- Reference Groups
- Formula Creation/Selection
- Behaviors
- DeltaV Recipes
- Integrated Type 2 and 3 Recipes

Note: Detailed application classes available to customers that have purchased Syncade.

Syncade™ - Recipe Authoring - Virtual - 7095V
CEUs - 2.1

Overview
This 3-day class will provide the user with the necessary skills to configure version 4 recipes for Syncade execution. Users will learn to configure manual recipes, DeltaV recipes and recipes that integrate the Syncade and DeltaV into a complete cohesive batch record.

Topics
- Recipe Authoring (RA) Overview
- RA Application
- Manual and Automation Recipe Hierarchy
- Work Instructions and Parameter Types
- Operations, Unit Procedures and Procedure Creation
- RA Simulator
- Process Segments
- Master Recipes
- Order Execution
- Parameter Referral and Deferral
- Reference Groups
- Formula Creation/Selection
- Behaviors
- DeltaV Recipes
- Integrated Type 2 and 3 Recipes

Note: Detailed application classes available to customers that have purchased Syncade.

Syncade™ - Training and Development – 7082
CEUs - 0.7

Overview
This 1-day class will provide the user with the necessary skills to configure the Training and Development module to successfully ensure the workforce is up to date with job related skill sets. Users will configure the tasks and skill sets necessary for an individual to complete a job function as well as maintain those skills over time. Users will configure an organizational structure that will be used to define departments and positions and assign skills to those positions that will set the requirements for a person holding that position. Courses will be created that will teach the tasks required to fill a position in the organization.

Users will also schedule classes and learn how to enroll themselves and others using the training and requirement planners in the TD module.

Users will also be taught how to set up the notification processes within the Syncade administration menus.

Topics
- TD Overview
- Defining the Organizational Structure
- Creating Tasks
- Creating Skills and Assigning Tasks
- Certification Methods
- Setting Up Training Classes
- Creating Job Requirements
- Integrating TD with Other Syncade Modules
- Maintaining Necessary Job Related Skills Administration Notification Processes
IACET Authorized Provider

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Qualifications for Enrollment

Educational Services agrees to accept for training, individuals who are not competitors of Emerson Process Management in the field to which the training pertains. Educational 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 Scheduling, Locations & Pricing

Course schedule and locations including length, dates of each session and price are listed on the Educational Services price sheet that came with your catalog. All prices are in U.S. dollars. For the most up to date information call or visit our website at: www.emersonprocess.com/education

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.

Cancellations & Transfers

If your plans or budgets change, you may cancel/transfer your reservations up to 14 calendar days prior to the 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 cancelling. Substitutions are accepted until the first day of class.

Arrival & Departure Time

Students should plan to arrive the day prior to the course starting day, 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.

Course Materials

All materials presented are copyrighted. Audio and video recording is prohibited and no material or portion of any school may be reproduced in any manner without prior written approval. All necessary documentation, catalogs, and literature are included in the course tuition.

Continuing Education Units

Continuing Education Units (CEUs) are awarded for the successful completion of most Emerson Process Management schools, based on 80% minimum attendance and satisfactory class and lab participation as determined by the course instructor.

On-Site and Local Training

Educational 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 Process Management service provider or call 1-800-338-8158 or 641-754-3771.

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For pricing and schedules, please contact the respective site in your area of interest.

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### Latin/South America, Education Contacts

<table>
<thead>
<tr>
<th>Country</th>
<th>Address</th>
<th>Contact</th>
<th>Phone</th>
<th>Fax</th>
<th>Email</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mexico, Mexico City</td>
<td>Emerson Process Management, S.A. de C.V.</td>
<td>Cinthia Solis</td>
<td>+52 55 5809 5367</td>
<td>+52 55 5397-4880</td>
<td><a href="mailto:capacitacion.mexico@emerson.com">capacitacion.mexico@emerson.com</a></td>
<td><a href="http://www.emersonprocess.com/mx">www.emersonprocess.com/mx</a></td>
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### Middle East/Africa, Education Contacts

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<th>Country</th>
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<th>Phone</th>
<th>Fax</th>
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<tbody>
<tr>
<td>Al-Khobar</td>
<td>Emerson Arabia Inc.</td>
<td></td>
<td>+9663 8147560</td>
<td>+96638147570</td>
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<td>+974 44315448</td>
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<tr>
<td>South Africa, Johannesburg</td>
<td>Emerson Process Management/ Alpret Control Specialists</td>
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<td><a href="http://www.emersonprocess.com">www.emersonprocess.com</a></td>
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<td>+971 2 697 2129 / +971 2 697 2018</td>
<td></td>
<td><a href="mailto:mea.education@emerson.com">mea.education@emerson.com</a></td>
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### North America, Canada Education Contacts

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<th>Country</th>
<th>Address</th>
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<th>Website</th>
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<tbody>
<tr>
<td>Edmonton, Calgary, Saskatoon, Fort McMurray &amp; Burnaby</td>
<td>8403 - 51 Avenue</td>
<td><a href="mailto:Education-Services@SpartanControls.com">Education-Services@SpartanControls.com</a></td>
<td>+1 780-468-5463</td>
<td>+1 780-440-8361</td>
<td></td>
<td><a href="http://www.emersonprocess.com">www.emersonprocess.com</a></td>
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</table>
# Course Offerings Contact Information

<table>
<thead>
<tr>
<th>Brand/Company, Education Contacts</th>
<th>Contact Information</th>
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</thead>
<tbody>
<tr>
<td>AMS™ Suite / DeltaV™/ FOUNDATION™ fieldbus / Process Control /PROVOX/ RS3/ SyncadeSmart Operation Management / Wireless:</td>
<td>800-338-8158 or 641-754-3771 e-mail: <a href="mailto:Education@Emerson.com">Education@Emerson.com</a> Emerson Process Management, Educational Services PO Box 190/205 South Center Street</td>
</tr>
<tr>
<td><strong>Control Valves:</strong></td>
<td><strong>Daniel:</strong></td>
</tr>
<tr>
<td>800-338-8158 or 641-754-3771 e-mail: <a href="mailto:Education@Emerson.com">Education@Emerson.com</a> Emerson Process Management, Educational Services PO Box 190/205 South Center Street</td>
<td>713-827-6314 e-mail: <a href="mailto:Tech.Service@Emerson.com">Tech.Service@Emerson.com</a> Emerson Process Management Daniel Measurement &amp; Control, Inc. 11100 Brittmoore Park Drive</td>
</tr>
<tr>
<td><strong>Machinery Health™:</strong></td>
<td><strong>Micro Motion/Rosemount:</strong></td>
</tr>
<tr>
<td>800-675-4726 e-mail: <a href="mailto:MHM.Training@emerson.com">MHM.Training@emerson.com</a> Emerson Process Management 835 Innovation Dr.</td>
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<tr>
<td><strong>Ovation™ &amp; WDPF:</strong></td>
<td><strong>Plant Safety:</strong></td>
</tr>
<tr>
<td>800-445-9723 e-mail: <a href="mailto:Dawn.Smith@Emerson.com">Dawn.Smith@Emerson.com</a> Emerson Process Management Power &amp; Water Solutions 200 Beta Drive</td>
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<tr>
<td><strong>Reliability Consulting:</strong></td>
<td><strong>Remote Automation Solutions, ROC/FloBoss &amp; ControlWave:</strong></td>
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<tr>
<td>203-264-0500 e-mail: <a href="mailto:HP.Slater@emerson.com">HP.Slater@emerson.com</a> Emerson Reliability Consulting 27 Glen Road, 3rd Floor</td>
<td>800-395-5497 e-mail: <a href="mailto:RAS_Training@emerson.com">RAS_Training@emerson.com</a> Emerson Process Management, Educational Services 1100 Buckingham Street</td>
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<tr>
<td><strong>Rosemount: Gas Analyzers, Gas Chromatographs &amp; Liquid Instruments</strong></td>
<td><strong>Rosemount Tank Gauging:</strong></td>
</tr>
<tr>
<td>713-396-8870 email: <a href="mailto:Ana.Morgan@Emerson.com">Ana.Morgan@Emerson.com</a> Emerson Process Management, Educational Services 10241 W. Little York, Suite 200</td>
<td>281-988-4000 e-mail: <a href="mailto:Training.RTG.Hou@Emerson.com">Training.RTG.Hou@Emerson.com</a> Emerson Process Management, Educational Services Rosemount Tank Gauging North America, Inc. 6005 Rogerdale Road</td>
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<tr>
<td><strong>Valve Automation:</strong></td>
<td><strong>Roxar Flow Measurement:</strong></td>
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<tr>
<td>281-477-4513 19200 Northwest Freeway</td>
<td>281-879-2600 e-mail: <a href="mailto:Meter.Training@emerson.com">Meter.Training@emerson.com</a> Roxar Flow Measurement 6005 Rogerdale Road</td>
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### Additional Information
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- **Remote Automation Solutions, ROC/FloBoss & ControlWave:** 800-395-5497 e-mail: RAS_Training@emerson.com
- **Rosemount Tank Gauging:** 281-988-4000 e-mail: Training.RTG.Hou@Emerson.com
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Educational Services Learning Paths

Education@emerson.com
Or more training options see us at:
www.emersonprocess.com/education
**DeltaV - PlantWeb - Introduction – 7101**

**Overview**
Students will perform basic workstation operations including accessing displays, accessing faceplates, accessing modules to make process changes, responding to alarms and observing/changing tunable configuration parameters. Students who complete this 3-day course will be able to:

- use and apply PlantWeb terminology and acronyms
- identify DeltaV Explorer components
- define the different types of downloads
- commission and download a controller
- identify DeltaV Operate functionality
- operate a process using faceplates, detail displays, and primary control displays using DeltaV Operate
- define the Foundation™ Fieldbus technology terminology
- view device alerts using AMS
- define the PlantWeb/DeltaV Suite: Intelligent Device Manager
- define the DeltaV SIS architecture

**Topics**
- DeltaV System Description
- DeltaV Hardware
- Engineering Application
- Operation & Maintenance
- Alarm Management
- Security
- Bus Architecture
- Safety Life Cycle
- DeltaV SIS Overview
- Data Integration
- Batch

**Audience**
This course is for plant managers, process and process control engineers, and maintenance personnel needing an introduction to how the PlantWeb technology is utilized in basic process control systems and safety systems.

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**DeltaV- Implementation I – 7009 / V**

**CEUs – 3.2**

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

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

**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, Course 7101, or DeltaV Hardware & Troubleshooting, Course 7018.

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**DeltaV - Systems Batch Implementation - 7016 / V**

**CEUs – 3.2**

**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

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

**Prerequisites**
Course 7009, DeltaV Implementation I
### DeltaV - Implementation II – 7017 / V

**CEUs – 3.2**

#### 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, and 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.

#### Topics
- Function Block Structures & Status Values
- Analog Control Palette Blocks PID Bias/Gain, Dead time, 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
- Configuration of Equipment Modules for Supervisory Control
- Custom Faceplates and Dynamos

#### Audience

This course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface.

#### Prerequisites

Course 7009, DeltaV Implementation I

### DeltaV - Graphics - Advanced – 7025 / V

**CEUs – 3.2**

#### Overview

This 4-1/2-day course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface. This course expands on graphic topics covered in both the DeltaV Implementation course 7009 and DeltaV Implementation II course 7017.

#### Topics
- Visual Basic Primer
- Forms
- Modules
- Schedules
- User Preferences
- Picture Sizing
- Environment Customization
- Custom Faceplates
- Function Block Faceplates
- FRS Functions
- Pop Up Menus
- Color Threshold Tables
- Custom Dynamos
- Tag Groups
- Key Macro Editor
- Theme Dynamos

#### Audience

This course is for process control engineers responsible for configuring advanced functionality in the DeltaV user interface.

#### Prerequisites

Course 7009, DeltaV Implementation I

### DeltaV - Analyze Features Training - e7045

**CEUs – .20**

#### Overview

This course is for personnel who will be using DeltaV Analyze in their alarm management program. This on-line course includes audio presentations, quizzes, and up to a four hour access to DeltaV Analyze. To obtain hands on experience, e7045 students will have four hour access to DeltaV Analyze over a two week time-frame.

#### Topics
- DeltaV Analyze Overview
- DeltaV Analyze Administration Features
- How to Create a Bookmark
- How to Create an Alarm Statistics Report

Course access is 12 months

### DeltaV - PMO Configuration Standard (PCSD) – 7076 / V

**CEUs – 3.2**

#### Overview

This 4-1/2 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:
- Support a production system by ensuring it is performing optimally
- 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

#### Audience:

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

#### Prerequisites:

Course 7009, DeltaV Implementation I and familiarity with process control
DeltaV - Advanced Control – 7201 / V
CEUs – 3.2

Overview
This 4-1/2 day course introduces students to the advanced control tools available within 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
  o Traditional Tools e.g. Override, Cascade, Ratio
  o Improvements Provided by Advanced Control
- DeltaV Inspect with InSight
  o Detection of Abnormal Conditions
  o Performance Indices
  o Performance Reports
- DeltaV Tune with InSight
  o Tuning Response
  o Process Learning
  o Adaptive Tuning
  o Adaptive Control
- DeltaV Fuzzy
  o Principles of Logic Control
  o FLC Function Block, Tuning
- DeltaV Predict
  o MPC for Multi-Variable Control
  o Model Identification, Data Screening
  o Simulation of Response, Tuning
- DeltaV Neural
  o Creation of Virtual Sensor
  o Data Screening, Training
- DeltaV Simulate Suite
  o Process Simulation
  o Simulate Pro

Prerequisites:
Courses 7101, PlantWeb/DeltaV Implementation I or equivalent field experience.

DeltaV - Model Predictive Control – 7202 / V
CEUs – 2.4

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
- Insuring Disturbance Inputs are Independent of Other Process Inputs
- 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
  o Optimizing the Control Using the MPC-Pro or MPC-Plus Blocks

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

Prerequisites
7201 DeltaV Advanced Control

DeltaV - Batch Analytics Model Builder - e7046
CEUs - .80

Overview
This 8-hour (average duration) on-line course provides an orientation of Batch Analytics Model Builder. The course includes audio presentations, demonstrations, hands-on practices, hands-on workshops, and quizzes. Course access is 12 months. Upon completion of this course, the student will be able to:

- Define basic principles of Batch Data Analytics and their use in fault detection and quality parameter prediction
- Use the Batch Data Analytics Model Builder application to build and deploy a project for fault detection and quality parameter prediction
- Users will be able to recognize and navigate the screens needed to build a model in Batch Analytics
- Users need to define batch logic, stage logic, and initial condition logic needed for model development
- Users will be able to interpret analytic data of the Model Builder application using a saline example
- Users will be able to build a Batch Data Analytics model

Topics
- Batch Analytics Overview
- Batch Analytics Model Builder Overview
- Batch Analytics Viewer Overview
- Batch Saline Simulation
- Benefits of Using Batch Analytics
- Batch Analytics Manager Administration
- Batch Logic, Stage Logic, and Initial Logic Required to Build a Model
- Batch Analytics Model Builder – Equipment
- Batch Analytics Model Builder – Product
- Batch Analytics Model Builder – Model

Audience
This course is designed for Chemometricians, Process Engineers, Quality Engineers, and Process Control Engineers.
DeltaV Advanced Control – Custom – 7203CV
CEUs – 3.2

Overview
This 4 ½ day course is designed for system engineers who will be using DeltaV Advanced Control features. This is a condensed course with selected content from Courses 7201 and 7202. The principal technology that is utilized in each product will be discussed. The course lectures and discussions will use Emerson’s virtual classroom and 50 percent of the course will be hands-on workshops. Students will log into DeltaV systems to apply the advanced control features to simulated process applications.

Topics
- The Control Foundation in DeltaV
- Traditional Tools e.g. Override, Cascade, Ratio
- DeltaV Tune with InSight
- DeltaV Inspect with InSight
- Performance Indices
- Performance Reports
- Model Predictive Control
- Model Predictive Control – Model Analysis
- Model Predictive Control – Control Generation
- MPCPro – Applying MPCPro on Large Applications
- MPCPro – Applying MPCPro with Objective Functions

Prerequisites
Course 7009 – DeltaV Implementation I, or 7101 PlantWeb/DeltaV Introduction.
DeltaV - SIS Implementation – 7305 / V
CEUs – 3.2

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

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

Prerequisites
Course 7009 is a requirement. Recommend IEC 61511 knowledge.

DeltaV - Administration - Windows7/Server 2008 -7027 / V
CEUs – 3.2

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 running on the Windows 7 operating system and Windows Server 2008.

Topics
- Overview/Review of System Components and Topologies
- DeltaV Licenses
- Database Administration
- User Administration
- Network Node Diagnostics
- Auto Update Service
- Cybersecurity Tools — Smart Firewall, Controller Firewall, Smart Switches
- Installation of the DeltaV Software and AMS Device Manager Components
- DeltaV Control Networks and Remote Access
- DeltaV Domains and Workgroups
- Network Security
- Backup and Restore Procedures
- Importing/Exporting
- DeltaV Zones

Audience
This course is designed for control system administrators, process control engineers and IT specialist responsible for managing, installing, and commissioning a DeltaV system running on the Windows 7 operating system and Windows Server 2008.

Prerequisites
Course 7009, DeltaV Implementation I, or Course 7018, DeltaV Hardware and Troubleshooting.

DeltaV - Virtualization – 7029
CEUs 3.2

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 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

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

Prerequisites
Course 7027, DeltaV Systems Administration for Windows 7 and Server 2008
AMS - Device Manager with DeltaV – 7039
CEUs - 3.2

Overview
This 4-1/2-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. The hands-on workshops with AMS Device Manager along with DeltaV will address areas relating to the instrument technician's daily tasks.

Topics
- DeltaV and PlantWeb Overview
- AMS Device Manager Overview
- FOUNDATION™ fieldbus Overview
- ValveLink™ SNAP-ON Introduction
- ValveLink DVC Setup
- HART® Overview
- PROCONEX QuickCheck SNAP-ON
- PROFIBUS Overview
- Wireless SNAP-ON Introduction
- PlantWeb Alerts
- AMS Device Manager User Interface
- AMS Device Manager Help
- AMS Device Manager Plant Location Hierarchy
- AMS Device Manager Browser
- Monitoring System Alerts with AMS Device Manager
- PROCONEX AlertTrack SNAP-ON
- Device Replacement for HART, Fieldbus, and PROFIBUS Devices
- AMS Device Manager Audit Trail
- ValveLink SNAP-ON Tests & Diagnostics
- AMS Device Manager Calibration Assistant

Audience
Targeted 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 on instrumentation in plant turnovers, startups, and for project work
- improves process availability & reduces operations and maintenance costs

Prerequisites
Microsoft windows experience. Prospective attendees should first complete eLearning e7020 AMS Device Manager Suite Primer. The purchase of this course includes access to the e7020 course at no extra charge. Upon confirmed enrollment, the student will receive access to the e7020 online course (via email) to take as a prerequisite prior to attending the instructor led course.

DeltaV - Power and Grounding for Electronic Systems – 5590
CEUs – 1.4

Overview
This course focuses on specific power and grounding requirements of a control system. You will learn:
- how to conduct site verifications
- how to audit using “hands-on” testing labs
- to detect power and grounding problems on existing sites

Topics
- Review of Power Basics
- Power System Measurements
- Low Voltage Power Systems
- Power System Grounding
- Earthing vs. Grounding
- Connection to Earth
- Equipment Grounding
- Code Requirements
- Building Power Distribution
- Feeders and Branch Circuits
- Separately Derived Systems
- Power & Grounding for the DeltaV System
- Single Point Grounding
- Isolated Ground Installations
- Dedicated Circuits
- DC Grounding
- Verifying New Installations
- Power Quality Problems
- Applying Power Conditioning
- SIS Power and Grounding Installation
- Intrinsic Safety Devices

Audience
This 2-day course is designed for personnel involved with the planning, installation and maintenance of DeltaV digital automation system and provides essential knowledge regarding the power and grounding system for DeltaV equipment.

Prerequisites
A working knowledge of electronics and AC power basics is required.
### DeltaV - Hardware & Troubleshooting – 7018

**CEUs – 2.8**

**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 prerequisite 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
- DeltaV and AMS Suite Intelligent Device Manager
- Redundant I/O

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

**Prerequisites**
Windows Experience

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### DeltaV - Fieldbus Devices – 7030

**CEUs – 2.8**

**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 PlantWeb Alerts at DeltaV Workstations
- Segment Checkout Procedures
- Replace Wizard

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

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

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### DeltaV - Fieldbus Systems & Devices – 7032

**CEUs – 2.8**

**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**
- FOUNDATION™ fieldbus Overview
- Macro Cycle Execution
- Fieldbus Function Blocks
- Control Anywhere
- Fieldbus Wiring and Installation
- Segment Checkout Procedures
- Commissioning and Configuring Devices
- Control Strategy Configuration
- PlantWeb Alerts
- Configuring an Operator Display

**Audience**
This course is for individuals responsible for designing and configuring FOUNDATION™ fieldbus segments; as well as analyzing the fieldbus macro cycle, troubleshooting fieldbus segments/devices and modifying FOUNDATION™ fieldbus parameters.

**Prerequisites**
7009 DeltaV Implementation I or 7018 DeltaV Hardware Installation and Troubleshooting.
## DeltaV Communication Bus Interfaces with the DeltaV System – 7037

**CEUs – 2.5**

**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, Profinet DP, DeviceNet Serial, EtherNet IP, and Wireless HART® devices, including proper wiring practices. The AMS Intelligent Device Manager will be used to interrogate PROFINET 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 turnaround, 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
- PROFINET DP Overview
- PROFINET Wiring and Installation
- Configuring a PROFINET 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 v13.3.1 along with AMS Device Manager 13.5 will address areas relating to the instrument technician’s daily tasks.

**Prerequisites**
- 7009 DeltaV Implementation I or 7018 DeltaV Hardware Installation and Troubleshooting.

## DeltaV Safety Instrumented System with SLS 1508 Maintenance – 7003

**CEUs – 2.1**

**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

**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.

**Prerequisites**
- Course 7018, DeltaV Hardware and Troubleshooting, is a requirement.

## DeltaV - SIS with Electronic Marshalling Maintenance – 7004

**CEUs – 2.1**

**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 be able to configure Partial Stroke Test using DeltaV SIS with Electronic Marshalling. 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
- Partial Stroke Test using DeltaV SIS with Electronic Marshalling
- Local Safety Network Bridges

**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.

**Prerequisites**
- Course 7018 DeltaV Hardware and Troubleshooting is a requirement.
### DeltaV - Operator Training for Continuous Operation – 7012 / V

**CEUs – 1.4**

**Overview**
This 2-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. Students who complete this course will:
- access operator displays
- manipulate various control module operating parameters to operate the process
- respond to process alarms
- monitor process performance
- view real-time and historical trend data

**Topics**
- System Overview
- Accessing DeltaV Operate Window, Menus Displays and Directories
- Discrete and Analog Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Motor Control Module Operation
- Regulatory/Cascade Control Module Operation
- Accessing Real-time/Historical Trend Data
- Unit Alarms
- Sequential Function Chart Operation
- Phase Logic Modules

**Audience**
This course is for operators, supervisors and managers responsible for the operation of continuous processes using DeltaV system.

### DeltaV - Operator (v11) for Continuous Operations - e7012

**CEUs – 1.2**

**Overview**
This interactive on-line course includes audio presentations, demonstrations, practice sessions, workshops, quizzes, and a final examination. The average time to complete the course is 12 hours.

Note: Course access is 12 months.

**Topics**
- System Overview; Accessing DeltaV Operate
- Navigating in DeltaV Operate
- Discrete, Analog, Regulatory, and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing: Alarm Displays; Real-Time/Historical Trend Data; Process History View
- Using DeltaV Operate Themes

**Audience**
Operators, supervisors and managers responsible for the operation of continuous processes with a DeltaV System. Ideal students for this course are new to the DeltaV System but already have process control/plant experience.

### DeltaV - Operator Interface for Batch - 7014V

**CEUs – 1.8**

**Overview**
This 2-1/2-day course uses lectures and hands-on workshops to provide an in-depth overview on operating the DeltaV System. It includes all content in course 7012 plus students will:
- understand basic batch terminology
- manipulate Unit Module parameters
- access the Batch Operator Interface
- run procedures
- review batch history data

**Topics**
- System Overview
- Accessing DeltaV Operate Window, Menus Displays and Directories
- Discrete, Analog, Regulatory and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing Alarm Displays/Alarm Handling
- Accessing Real-time/Historical Trend Data
- Accessing Process History View
- Sequential Function Chart Operation
- Phase and Recipe Controls
- Batch Operator Interface
- Batch Historian
- Campaign Manager

**Audience**
This course is for operators, supervisors, and managers responsible for the operation of batch processes using DeltaV system.
DeltaV - Operator (v11/v12) Interface for Batch - e7014
CEUs – 1.6

Overview
This is an interactive 16-hour on-line course with DeltaV screens including audio presentations, demonstrations, practice sessions, workshops, quizzes and a final examination. Note: Course access is 12 months.

Topics
- System Overview
- Accessing DeltaV Operate
- Navigation in DeltaV Operate
- Discrete, Analog, Regulatory, and Cascade Control Module Operation
- Motor Control Module Operation
- Accessing Alarm Displays
- Accessing Real-Time/Historical Trend Data
- Accessing Process History View
- Phase and Recipe Controls
- Batch Operator Interface
- How to Add/Run Batches

Audience
Operators, supervisors, and managers responsible for the operation of a batch process using the DeltaV system.

DeltaV - Batch Analytics Operator - e7044
CEUs - .6

Overview
This 6-hour (average duration) on-line course provides an orientation of Batch Analytics and how it is used in a production environment. The course includes audio presentations, demonstrations, hands-on practices, hands-on workshops, and quizzes. Upon completion of this course, the student will be able to:
- Define basic principles of Batch Analytics
- Identify how Batch Analytics is used in fault detection and quality parameter prediction
- Identify the Batch List, Quality Prediction, and Fault Detection screens
- Monitor a fault
- Interpret analytic data of a saline example
- Identify the root cause of a detected fault

Topics
- Batch Analytics Overview
- Batch Analytics Model Builder Overview
- Batch Analytics Viewer Overview
- Batch Saline Simulation
- Benefits of Using Batch Analytics
- Batch Analytics Viewer – Batch List Tab
- Batch Analytics Viewer – Fault Detection Tab
- Batch Analytics Viewer – Quality Prediction

Audience
This course is designed for operators, process engineers, and management.

Prerequisites
DeltaV Batch experience and Microsoft Windows experience is required.

Delta™ Essential Operator Training Solution

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

For more information, contact your local Emerson sales office or visit: www.emersonprocess.com/education
**Rosemount - Fieldbus Measurement Instruments – 2370**
**CEUs - 2.1**

**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 Fieldbus 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

Note: Course may be conducted using other Fieldbus Hosts, such as AMS Device Manager.

**Audience**
This course is for individuals responsible for installing, configuring, calibrating, and troubleshooting FOUNDATION™ fieldbus measurement devices.

**Prerequisites**
Experience in instrument calibration, maintenance, installation, and operation would be helpful.

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**DeltaV - Fieldbus Devices – 7030**
**CEUs – 2.8**

**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 Scalable 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 PlantWeb Alerts at DeltaV Workstations
- Segment Checkout Procedures
- Replace Wizard

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

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

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**DeltaV - Fieldbus Systems & Devices – 7032**
**CEUs – 2.8**

**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**
- FOUNDATION™ fieldbus Overview
- Macro Cycle Execution
- Fieldbus Function Blocks
- Control Anywhere
- Fieldbus Wiring and Installation
- Segment Checkout Procedures
- Commissioning and Configuring Devices
- Control Strategy Configuration
- PlantWeb Alerts
- Configuring an Operator Display

**Audience**
This course is for individuals responsible for designing and configuring FOUNDATION™ fieldbus segments; as well as analyzing the fieldbus macro cycle, troubleshooting fieldbus segments/devices and modifying FOUNDATION™ fieldbus parameters.

**Prerequisites**
7009 DeltaV Implementation I or 7018 DeltaV Hardware Installation and Troubleshooting.
Fisher™ - FOUNDATION™ fieldbus
FIELDVUE™ Digital Valve Controller – 7036
CEUs – 2.1

Overview
This 3-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. During commissioning, students will learn the basics of the FOUNDATION fieldbus protocol, the role of function blocks, addressing, modes and status. Students will configure, calibrate, and commission devices using the 475 Field Communicator and ValveLink™ software. Hands-on exercises also teach students how to perform detailed setup routines and how to run and collect data for various ValveLink software diagnostics.

Topics
- Positioner Basics
- FOUNDATION™ fieldbus overview
- FIELDVUE™ digital valve controller installation and mounting
- Modes and status
- Configuration and calibration with the 475 Field Communicator
- ValveLink™ software guided Setup /Detailed Setup
- Tuning
- Tag management
- Pressure control
- ValveLink software diagnostics
- FIELDVUE instrument troubleshooting

Audience
This course teaches technicians and engineers the basics of FOUNDATION™ fieldbus digital valve controller installation, configuration, calibration, and troubleshooting using the 475 Field Communicator, and ValveLink™ software.

Prerequisites
Completion of 1450 recommended but not required.
## Learning Paths

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Control System Engineer Curriculum Path

Self-Guided Primers
- e9025, Control Loop Foundation

Core Competencies
- 7009, DeltaV Implementation I
- 7016, DeltaV Batch Implementation

Additional Competencies
- 7076, DeltaV PMO Configuration Standard
- 7201, DeltaV Advanced
- 7202, DeltaV Model Predictive Control
- 7017, DeltaV Implementations II
- 7025, DeltaV Advanced Graphics
- 7018, DeltaV Hardware & Troubleshooting
- 7037, Communication Interfaces with the DeltaV System
- 7027, DeltaV Systems Administration Window 7/Server 2008
- 7305, DeltaV SIS Implementation
- 7020, AMS Device manager or 7039, AMS Device Manager with DeltaV
- 7032, FieldBus System and Devices

Job Competencies
- Support DeltaV Automation Control
- System performance
- Maintain, troubleshoot, and enhance configuration, application and operation of Basic Process Control System and Safety Instrumented System (SIS)
- Identify, plan, and implement process control improvement projects
- Productivity of Operations Personnel
- Alarm Rationalization and Management
- Construct and support external communication links
- Overall Risk Management of DeltaV
- Automation Control System

Your control system engineers’ process and technical knowledge and skills can directly impact your facility’s bottom line. Emerson Educational Services can dramatically boost your personnel skills and performance and reinforce job competencies.

Emerson Process Control System Engineers’ Curriculum Path provides focused, in-depth, objective-based training on product-specific procedures for proper configuration and maintenance of your DeltaV distributed control system. Your control systems engineers’ get practical application skills through dedicated classroom facilities and hardware.

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Continuous Control Operators Curriculum Path

Self-Guided Primers
- e9025, Control Loop Foundation
- e7012, DeltaV Operator Interface for Continuous Control

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 effective respond to unusual process issues
- Troubleshoot difficult production issues
- Suggest Production improvements
- Alarm Management
- Tune loops

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.

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I&E Maintenance Technical Curriculum Path

Self-Guided Primers
- e9025, Control Loop Foundation
- e7020, AM Suite: Intelligent Device Manager Primer

Core Competencies
- 7018, DeltaV Hardware & Troubleshooting
- 7020, AMS Device Manager or 7039, AMS Device Manager with DeltaV

Additional Competencies
- 7009, DeltaV Implementation I
- 7016 DeltaV Batch Implementation
- 7030 Fieldbus Devices
- 5590, Power Quality and Grounding
- 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 and commission devices, instruments and valves
- Proactively monitor devices for alerts, troubleshoot device problems & faulty assets

Effectiveness of Maintenance Reliability Program

Your maintenance technicians’ process knowledge and skills can affect your facility’s performance, up-time, and maintenance cost-and ultimately your bottom line.

Emerson Educational 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.

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Batch Operators Curriculum Path

Self-Guided Primers
- e9025, Control Loop Foundation
- e7014, DeltaV Operator Interface for Batch

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.

Your batch operators’ process knowledge and skills levels affect how your process is run, which can directly impact your facility’s bottom line.

Emerson Educational 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.

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**Final Control**

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<th>Plant Management &amp; Engineering Learning Paths</th>
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P – Primer | C – Core Competency | A – Additional Competency

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## Final Control

### Plant Maintenance & IT Learning Paths

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<th>Rotating Equipment Mechanic</th>
<th>Reliability Data Collector</th>
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P = Primer | C = Core Competency | A = Additional Competency

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# Flow Metering

## Plant Maintenance Learning Paths

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- 0 = Course Duration in days | X = Core Competency | O = Optional Additional Competency

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Fundamentals of Instrumentation and Flow Measurement
Flow Measurement Systems Related Courses
Product Courses for End Users and EPC’s Application Courses
Product Courses for Service and Maintenance Providers

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## Flow Metering

### Plant Engineering Learning Paths

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<th>Electrical &amp; Instrument Engineer</th>
<th>Process Engineer</th>
<th>Control System Engineer</th>
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## Flow Metering
### Project Management Team Paths

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0 – Course Duration in days | X – Core Competency | O – Optional Additional Competency

**Fundamentals of Instrumentation and Flow Measurement**

**Product Courses for End Users and EPC’s**

**Flow Measurement Systems Related Courses**

**Product Courses for Service and Maintenance**

**Application Courses**

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