EMERSON

EDUCATIONAL SERVICES

2024 Middle East & Africa Training Offerings

EMPOWER YOUR WORKFORCE

TABLE OF CONTENTS

Empower Your People with the Skills They Need to Succeed

Companies are investing in new products and technologies to improve performance and create value. With these advancements comes the added challenge of retaining and training the people needed to unlock the full potential of those investments.

Ensuring your workforce has the skills needed to meet your business goals is critical to any successful operation. By giving employees the knowledge and skills they need to succeed, you can help to keep them engaged while improving your organization's ability to meet performance targets.

You want to develop and retain the kind of capable, experienced workers you need to maximize performance, now and in the future. Here's how Emerson's Training Services can help.

IMPROVING SKILLS OPTIMIZES PERFORMANCE

Across four key technology functions, **only 1 in 10 organizations** was found to have the skills needed to be successful.[1]

71% of CEOs identified human capital as a key source of sustained economic value.[2]

84% of employees in top-performing organizations are receiving the training they need.[3]

1 The 2012 IBM Tech Trends Report, Fast Track to the Future.

2 According to our Industry

3 IBM Smarter Workforce Survey, 2013.

Keep Pace with Evolving Technologies

Advancements in technology happen quickly, with a high degree of complexity. Companies that fail to continually enhance their process technology skills—and effectively adapt work processes to keep pace with new technologies—risk lagging behind. Our experts equip technicians and engineers across industries with the practical knowledge they need to do their jobs well.

Develop and Retain a Capable Workforce

To ensure your employees are qualified to help your organization reach its full potential, Emerson provides higher education training opportunities all over the world to develop your workforce through advanced automation courses.

Customizable, Scalable Training Solutions

Learn from industry leaders in a format that works for you

- **Online** at your own pace
- **On-site** at an Emerson office or at your facility
- **Customized** to address your specific needs
- **Virtual** led by a live instructor online

1 Deloitte U.S. Manufacturing Industry Outlook, 2022 (https://www2.deloitte.com/content/dam/Deloitte/us/Documents/energy-resources/us-2022-manufacturing-industry-outlook.pdf)

Emerson Training Solution

STANDARD
Out-of-the-box training courses that covers configuration, implementation, IT-related and hardware resources

ROLE-BASED TRAINING
Learning paths available for various job roles

CUSTOMIZED COURSES
Customers can choose topics that suit their requirements

TRAINING CAN ALSO BE DELIVERED IN DIFFERENT MODALITIES
Face-to-face, Virtual, eCourses, etc.

COMPETENCY DEVELOPMENT PROGRAM
Partner with customer to assess the skills gap and plan a learning path

CUSTOMIZE CURRICULUM TO MEET YOUR SPECIFIC NEEDS

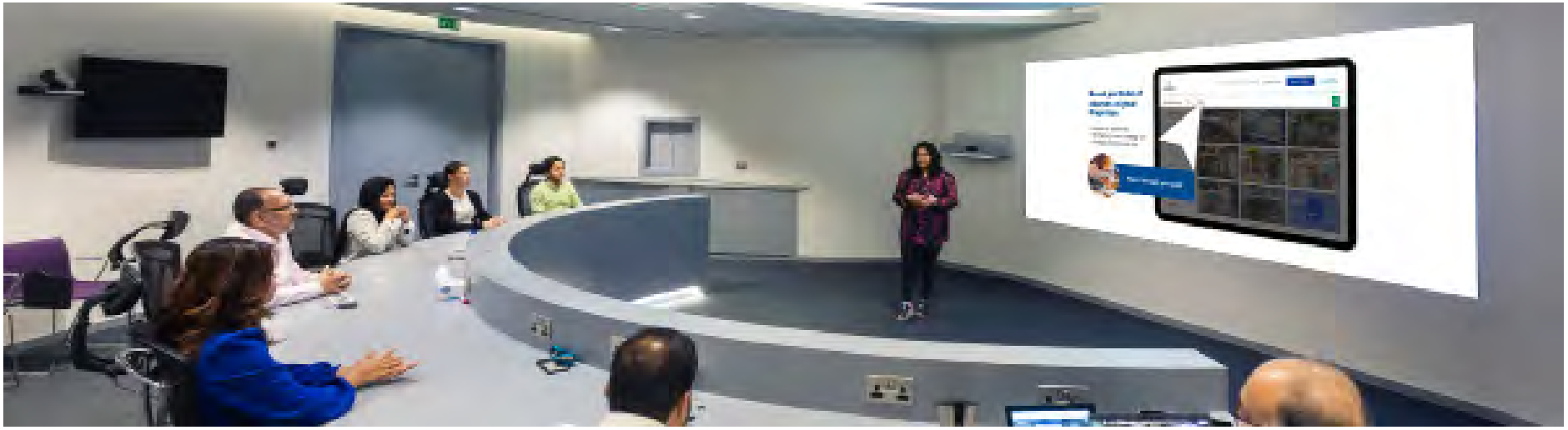
Find the right combination of training solutions to best suit operational needs

Ensure learning retention through adaptive and student-centered learning paths

Evaluate and develop competencies in alignment with specific business needs

Receive comprehensive training on Emerson's portfolio of technology

SOLUTIONS	DESCRIPTION	BENEFITS
ON-SITE		
Emerson Training Center	• Ask questions, meet in person, and get direct access to our experts • Traditional classroom-based learning	• Offices strategically located around the world
On-site, Local Training	• Learn through hands-on experiences, addressing both practical and theoretical scenarios at your location	• Training delivered to you. • Interact with our products and experts on site
ONLINE		
eCourses	• Online self-led courses, which allows you to learn at your own pace and schedule	• Self-paced • Reasonable costs • Access to library of offerings
Digital Classroom	• Virtual training that delivers real time value • Get a live classroom experience with the convenience of remote accessibility	• Convenient training schedule • Train in an environment that works best for your team
Blended Learning	• Contemporary approach to training that “blends” different teaching methods and deploys them via digital and online media	• Convenient & Flexible to create customized competency development programs • Leverages web technologies • Lowers overall training costs



Digital Classroom

We understand that getting your employees trained can often be a challenge due to budgets, scheduling conflicts, or upcoming project deadlines.

Working alongside Emerson™ certified trainers, provide your team full access to software systems and training solutions without having to leave the office. Using a modern high tech approach, students can absorb content and engage with peers in a location and time that works best for their schedule.

KEY FEATURES

- State-of-the-art technology with IT Infrastructure
- Live Demo sessions with Theoretical training
- Easy Connectivity with Customer sites through VOiP

COURSE OFFERINGS AVAILABLE:

- IACET compliant Emerson Standard Courses
- Basic Instrumentation and Control Courses
- Competency Development Courses for Automation
- Webinars for Digital Solution and IIOT

OPPORTUNITIES:

- Save time and effort by scheduling at your convenience.
- Meet the range of diverse learning styles in the workplace.
- Delivering a new modern approach to teaching that enhances participation and engagement.

Competency Development Programs

As your education partner, Emerson will work with you to assess the skills gap and plan a learning path for your employees. We help develop training programs based on job roles and specific core job tasks by personas and competencies. Our Experts :

- Assess the competency levels or use the existing skills gap
- Plan the training programs deliverables and milestone
- Implement the training program as per plan
- Review the progress and future roadmap

Emerson will help you identify the proper training and guide your employees to the appropriate delivery means to perfectly match your needs.

After completion of training, students can stay in touch with their instructors regarding the real life problems they face being on site.

TRADITIONAL TRAINING VS COMPETENCY DEVELOPMENT

Ahmed S.

PLANT MANAGER

Traditional Training

- Train when new technologies are added
- Send people for training when schedule allows
- Availability of training takes preference over need
- Lengthy process to onboard new employees

Meera N.

PLANT MANAGER

Competency Development

- Developed a long-term training plan based on courses for a specific job
- Access to courses that are relevant to installation
- Track effectiveness with pre/post assessments
- Advanced onboarding process

What Customers say about our Trainings

"It was a very pleasant experience, and the classroom facilities were excellent. The instructors helped deliver the topics in a very clear and simplified manner."

TEAM LEADER IN THE OIL AND GAS INDUSTRY

"The training exceeded my expectations. I wanted information on sizing control valves and I got that plus, much other useful information."

OPERATIONS/PRODUCTION WORKER IN THE REFINING INDUSTRY

"The material was good. I needed the review of the PID, the instructor explained it in a way that really helped me to understand it much better that I previously did."

MAINTENANCE ENGINEER IN THE PETROCHEMICAL INDUSTRY

"Emerson was easily customizing our requirements without complicating things. What I liked about Emerson was how they welcomed our employees with their hospitality, which made the employees feel comfortable."

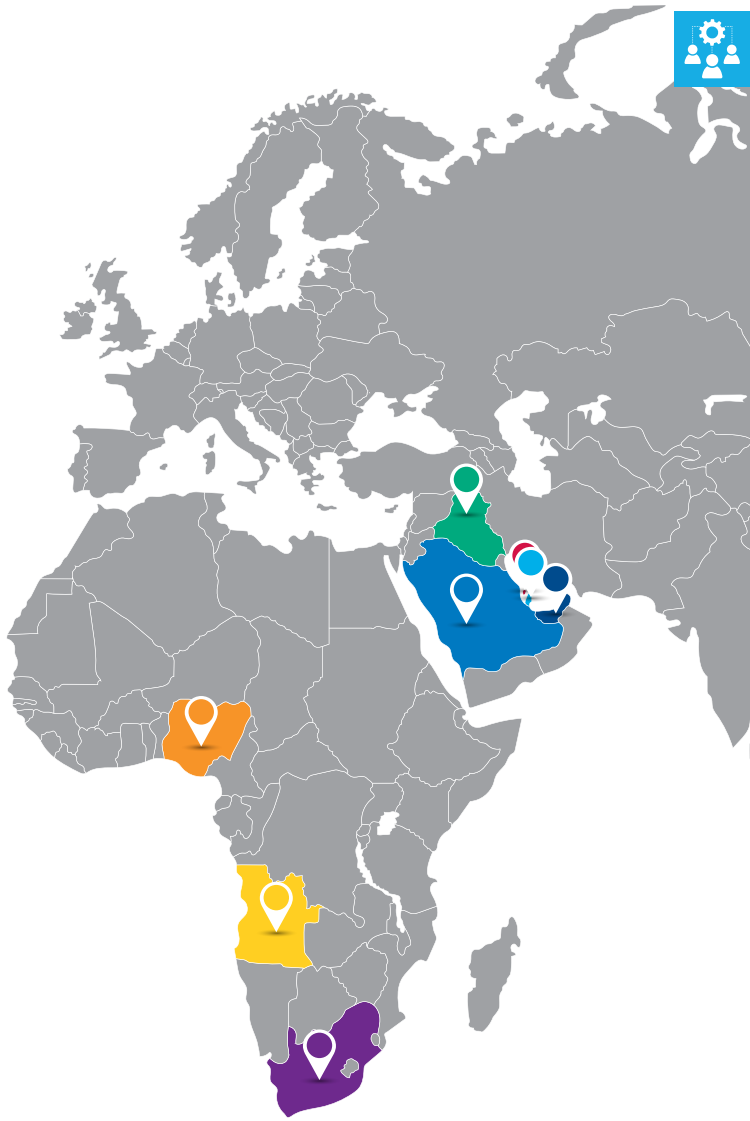
INSTRUMENT MAINTENANCE ENGINEER IN THE OIL AND GAS INDUSTRY

"We did a virtual-hybrid training which was a very good experience. The functional safety training was a third-party training, but we chose to go with Emerson because of their delivery tools."

LEAD INSTRUMENT AND PROTECTIVE SYSTEMS ENGINEER IN THE OIL AND GAS INDUSTRY

Middle East & Africa Training Locations

- Angola
- Bahrain
- Iraq
- Kuwait
- Nigeria
- Saudi Arabia
- South Africa
- Qatar
- U.A.E.



We hope you will invite Emerson to instill confidence in your personnel and develop the capabilities of your workforce. We will guide them to be interested in potential solutions — ready to move your facility to greater efficiency and profitability.

Whether for a new project or for ongoing operations and maintenance, Emerson provides consulting services, skills assessments and the right training solutions at the right time.

- Project consultants identify targeted business results where training solution can improve plant operations. A skills assessment identifies skills gaps that can be addressed with training and prescribes the proper training solution.
- Your staff will be prepared when your project comes on line and throughout continuing operations and maintenance.

Across the world over several decades, Emerson has developed and dedicated substantial resources to training operators, engineers, technicians and maintenance personnel. We are ready for you anywhere and anytime.

CONTROL AND SAFETY SYSTEMS

Systems and Software Education Center

Systems and Software Education Center is a multipurpose classroom that offers face to-face and Virtual Training for students that enroll in courses to support job functions of Control Systems Engineer, I&E Maintenance, Batch Operator, Continuous Control Operator and more.

KEY FEATURES

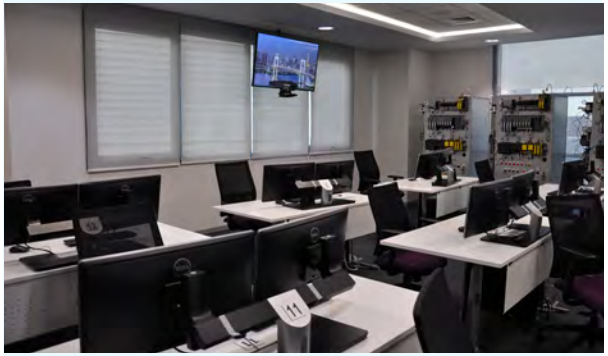
- Can accommodate up to 10 students and 10 live demos
- Equipped with state-of-the-art technology to provide best classroom and Virtual training experience
- Customizable hands-on training
- Objective-based learning with Workshops
- Delivered in Local Languages
- Covers complete Systems and Software course offerings and product portfolio

COURSE OFFERINGS AVAILABLE:

- IACET compliant Emerson Standard Courses
- DeltaV, Ovation, Reliability and Remote Automation Solutions Courses that fall under DCS & SCADA
- Competency Development Programs

OPPORTUNITIES:

- Tailor Made courses to meet your requirements
- Hands-on experiences with supporting workshops
- Provides practical application skills with dedicated hardware at the Education Center



DeltaV Learning Path

This architecture is designed to take full advantage of the communications capabilities of the FOUNDATION™ fieldbus technology and its capacity for the open, continuous communication of large volumes of digital information generated by intelligent field devices. This information is accessed by the AMS Device Manager software and used for a variety of time and money-saving functions. The DeltaV™ Digital Automation System serves as an ideal automation system host in this environment.

CONTROL SYSTEM ENGINEER

- e9025 Control Loop Foundation
- 7009 DeltaV™ Implementation I
- 7016 DeltaV™ Batch Implementation
- 7076 DeltaV™ PMO Configuration Standard
- 7201 DeltaV™ Advanced
- 7076 DeltaV™ Model Predictive Control
- 7017 DeltaV™ Implementations II
- 7025 DeltaV™ Advanced Graphics
- 7018 DeltaV™ Hardware & Troubleshooting
- 7018 Communication Interfaces with the DeltaV™ System
- 7027 DeltaV Systems Administration Window 7/Server 2008
- 7305 DeltaV™ SIS Implementation II
- 7020 AMS Device Manager
- 7039 AMS Device Manager with DeltaV
- 7032 FieldBus System and Devices

I&E MAINTENANCE

- e9025 Control Loop Foundation
- e7020 AM Suite : Intelligent Device Manager Primer
- 7018 DeltaV™ Hardware & Troubleshooting
- 7020 AMS Device Manager
- 7039 AMS Device Manager with DeltaV
- 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

LEGEND :

- Self-Guided Primers
- Core Competencies
- Additional Competencies

BATCH OPERATOR

- e9025 Control Loop Foundation
- e7014 DeltaV™ Operator Interface for Batch
- e7014 DeltaV™ Operator Interface for Batch
- DeltaV™ Essential Operator Training Solution
- 7009 DeltaV™ Implementation I
- 7016 DeltaV™ Batch Implementation

CONTINUOUS CONTROL OPERATOR

- e9025 Control Loop Foundation
- e7012 DeltaV Operator Interface for Continuous Control
- e7012 DeltaV Operator Interface for Continuous Control
- DeltaV™ Essential Operator Training Solution
- 7009 DeltaV™ Implementation I

COURSE 7039 **CEUs : 2.8**

AMS Device Manager with DeltaV

Overview
This 4-days course is for instrumentation technicians and engineers 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 and DeltaV will address areas relating to the instrument technician's daily tasks, device troubleshooting/ commissioning/replacement, alert configuration, and many other best practices relating to AMS Device Manager and the interactions with the DeltaV DCS.

Prerequisite
Microsoft windows experience. Course 7018 or 7009 or 7409.

Topics
- DeltaV and PlantWeb Overview
- HART Overview
- AMS Device Manager Overview
- AMS Device Manager User Interface
- Location Hierarchy & Adding Devices
- AMS Device Manager Browser Functions
- Monitoring System Alarms
- DeltaV Device Alarms
- Device Replacements
- Reviewing Audit Trail
- AMS Device Manager User Permissions
- QuickCheck SNAP-ON
- ValveLink SNAP-ON
- ValveLink Status Window
- ValveLink DVC Setup
- Device Calibration
- Smart Commissioning

Audience
- 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

COURSE 7020 CEUs : 2.1

AMS Intelligent Device Manager Overview

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

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

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. AMS Device manager modules may also be purchased for self-study which comes in three separate paper/bound modules. POA.

COURSE E7020 CEUs : 0.2

AMS Intelligent Device Manager Overview

Overview
This course is for maintenance personnel and managers responsible for understanding the benefits of using the AMS Suite Intelligent Device Manager. This is a 2-hour (average online course with AMS Device Manager screens including interactive practice sessions, workshops, demonstrations, audio presentations
and quizzes.

Topics
Be able to identify areas that AMS Device Manager could be used to:
- Speed-Up Start-Ups and Commissioning
- Improve Quality and uptime
- Reduce Costs- Both Fixed and Operating
- Simply Safety System Use and Compliance
- Including Start-Ups
- Identify and Navigate the AMS Device Manager's Screens

COURSE 7021 CEUs : 2.1

AMS Device Manager with Rosemount HART Instruments

Overview
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 SMART transmitters
- Properly calibrate transmitters
- Perform basic troubleshooting-transmitters

Topics
- Configuring and Using AMS Device Manager
- HART Communication
- SMART Transmitters (3051C, 3144P)
- Test Equipment Selection
- Transmitter Installation
- Transmitter Configuration
- Transmitter Calibration
- AMS Calibration Manager
- Intelligent Calibrators
- Transmitter Troubleshooting

COURSE 2370 CEUs : 2.1

Fieldbus Measurement Instruments

Overview
This 3-days course covers a complete DeltaV™ system implementation. This course is for users that use DeltaV™ Operate Graphics. Upon completion of this course the student will be able to define system capabilities, define nodes, configure continuous and sequential control strategies, operate the system and define users and security.

Prerequisites
Windows experience. It is recommended that prospective attendees new to process control systems attend Course 7101 or 7018.

Topics
- System Overview
- Explorer
- Control Modules
- Control Studio
- Motor Control
- Regulatory Control
- Workspace
- System Operation
- Alarms & Process History View
- Sequential Function Charts Phase Logic
- Security

Combustion Control & Safety Workshop

Overview
This 1-day course covers optimizing combustion efficiency, safety and reliability within industrial and process plants. It brings significant savings in fuel consumption, increased process unit reliability and stability, increased steam generation and overall energy efficiency. This training course focuses on proven best practices, techniques and methodologies that have delivered positive results across many combustion & safety projects.

The course is designed to help engineers accelerate their knowledge and the application of this knowledge to improve their combustion fired equipment.

Topics
The course agenda comprises
- Common problems found in combustion equipment
- International standards compliance
- How to identify improvement opportunities
- Implementation of a unit based improvement methodology
- Critical instrumentation for combustion equipment performance
- Fuel and performance optimization
- Enhanced Burner Management Systems
- Combustion and Safety Practical demo
- Advanced automation technologies for performance improvement
- Getting started Improvement opportunity assessment

This course is delivered by an experienced combustion and safety expert providing real world experience and expertise. The attendees will be shown how best practice is implemented with practical demonstration of combustion control and safety using a simulated application.

COURSE 7032 CEUs : 2.8

Fieldbus Systems & Devices

Overview
This 4-day lecture/lab provides maximum hands-on experience working with the integration of FOUNDATION™ Fieldbus devices and the DeltaV™ scalable system. The student will be able to install Fieldbus instruments and segment checkout for the correct operation of the physical layer. The student will be able to use the DeltaV™ system to perform AMS Device Manager methods such as calibration, setup wizards, zero trim and diagnostics. The student will be able to implement a pressure loop using FOUNDATION™ Fieldbus function blocks with the DeltaV™ Control Studio application. The student will configure PlantWeb Alerts and device alarm parameters.

Prerequisites
Course 7009 or 7018. 7009 DeltaV Implementation I or 7018 DeltaV Hardware Installation and Troubleshooting or 7409, Using DeltaV Live Operator Interface Implementation

Topics
- FOUNDATION™ Fieldbus Overview
- Macro Cycle Execution
- Fieldbus Function Blocks
- Control Strategy Configuration
- Control Anywhere
- FieldVue Theory of Operation
- Transmitter Theory of Operation
- AMS Device Manager Methods
- Fieldbus Wiring Practices
- System Troubleshooting
- Configuring Fieldbus Device
- Alarms and PlantWeb Alerts
- Configuring a Fieldbus Operator Display
- Segment Checkout Procedures

COURSE 7037 **CEUs: 2.5**

Communication Bus Interface with DeltaV™ System

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

Prerequisites
7009 DeltaV Implementation I or 7018 DeltaV Hardware and Troubleshooting or 7049 DeltaV Live Operator Interface Implementation I

Topics
- 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

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

Today's plant is a myriad of process control hardware and software. Everything from valves to compressors, from level measurement devices to real-time data servers, and from boilers to condensers, just operating this collection of technologies is challenging. Making them all work together at their best to produce the best product at a profit is a daunting task. It takes more than just monitoring the process to be successful. It takes optimizing the devices and the process together in the right environment with people who have a clear understanding of both.

Working in a plant for long periods of time can create "legacy thinking", where even when it is in the best interest to change, nobody can bring themselves to do so because "that's the way we've always done it." Emerson's Educational Services offerings can show how to optimize existing equipment with new methods and technology.

DeltaV™ Operator Training Simulation (OTS)

Overview
DeltaV Operator Training Simulation (OTS) is an engineered, hands-on, process-specific learning environment designed to up-skill our customers' operations workforce. DeltaV OTS exposes operators to what they will experience in their actual control room. This enables operations personnel to gain experience in an off line, non-intrusive environment. Operators will learn DeltaV operating concepts while learning their actual process in preparation to effectively handle incidents or process upsets. The ability to practice how to handle potential incidents in a simulation environment is invaluable. The OTS training solution is not only key to preparing operations personnel prior to the start-up of new automation projects. It is an ongoing tool to train future operators, a great refresher tool and a platform for more advanced training for current operators.

DeltaV™ OTS includes the following key deliverables:

- Self-Guided Custom Curriculum Based on the Customer's Configuration and actual displays
- DeltaV Training Simulators that include both hardware and software that operate the customer configuration in a simulated environment
- Student Testing that includes realistic failure scenarios that record actual operator responses

Key tangible savings and benefits include:

- Quicker, Smoother Start-Ups
- Reduced Operator Error
- Product Loss Reduction/Elimination
- Improved Product Quality
- Regulatory Violation Reduction/Elimination
- Reduce Incident Reporting
- Operator Acceptance and Endorsement to Change Management
- To discuss OTS and simulation contact us at OTS@EmersonProcess.com

COURSE 7009 **CEUs : 3.2**

DeltaV™ Implementation I

Overview
This 4½-day course covers a complete DeltaV system implementation. Upon completion of this course the student will be able to define system capabilities, define nodes, configure continuous and sequential control strategies, operate the system and define users and security.

Prerequisites
Windows experience. It is recommended that prospective attendees new to process control systems attend Course 7101 or 7018.

Topics

- System Overview
- Explorer
- Control Modules
- Control Studio
- Motor Control
- Regulatory Control
- Work Space
- System Operation
- Alarms & Process History View
- Sequential Function Charts
- Phase Logic
- Security

COURSE 7012 **CEUs : 1.4**

DeltaV™ Operator Interface for Continuous Control

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

COURSE E7012 **CEUs : 1.2**

eLearning: DeltaV™ Operator Interface for Continuous Control

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. 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.

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

COURSE 7014 **CEUs : 2.1**

DeltaV™ Operator Interface for Batch

Overview
This course is for operators, supervisors and managers responsible for the operation of batch processes using DeltaV system. This 3-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

COURSE 7016 **CEUs : 3.2**

DeltaV™ Systems Batch Implementation

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

Overview
This 4½-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.

Prerequisites
Course 7009, DeltaV Implementation I

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

COURSE 7017 CEUs : 3.2

DeltaV™ Implementation II

Overview
This sequential course is for users that have completed course 7009. This 4½-day course is for process control engineers responsible for configuring the DeltaV system. Advanced topics will be covered including displays, function blocks and configuration tips.

Prerequisites
Course 7009, DeltaV Implementation I

Topics
- Function Block Structure
- HART Inputs and Outputs
- Analog Control Blocks
- DeltaV Tune with InSight
- Device Control Options
- Class Based Control Modules
- Expressions
- Unit Alarms
- Multi-Dimensional (Array Parameter)
- Equipment Modules
- Display Environment
- Custom Faceplates
- Custom Dynamos

COURSE E7014 CEUs : 1.6

eLearning: DeltaV™ Operator Interface for Batch Control

Audience
Operators, supervisors and managers responsible for the operation of a batch process using the DeltaV system. This is an interactive 16-hour on-line course with DeltaV screens including audio presentations, demonstrations, practice sessions, workshops, quizzes and a final examination.

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

Note:
Course access is 3 months

COURSE 7024 CEUs : 2.8

DeltaV™ Systems Administration XP/Server 2003

Overview
This course is designed for system administrators that will be installing, commissioning and implementing a DeltaV™ system running on the XP operating system and Windows Server 2003.
The course is 4-days in length.

Prerequisites
Course 7009, DeltaV Implementation l, or Course 7018, DeltaV™ Hardware and Troubleshooting

Topics
- Overview/Review of System Components and Topologies
- Installation Checklist of the XP Operating System
- Installation of the DeltaV Software Components
- DeltaV™ Control Networks
- DeltaV™ Domains and Work groups
- Users and Securities
- Upgrading Hardware and Software
- Backup and Restore Procedures
- Importing/Exporting
- Process Historian Administration
- DeltaV™ Zones

COURSE 7018 CEUs : 2.8

DeltaV™ Hardware & Troubleshooting

This course is recommended for instrumentation, maintenance technicians, their managers, and for configuration engineers prior to taking configuration classes. It provides an overview of the DeltaV Control Network, hardware and software applications. Upon completion, you will be able to describe the hardware and perform troubleshooting techniques for the DeltaV Control Network, Controllers,1/0 subsystem and workstation.

Overview
This 4-day course focuses on the hardware components that make up the DeltaV system. Using a combination of lectures and workshops, you will assemble the system and power up the Controller, 1/0 subsystem, and workstation. You will learn how to use the diagnostic tools available to verify and locate hardware-related fault conditions, and you will be introduced to configuration tools and the operator interface. If your systems include bus technologies, we recommend courses 7030, 7032or 7037. The 7018 course satisfies the prerequisite requirement for these bus courses.

Prerequisites
Windows experience.

Topics
- DeltaV™ Overview
- Controllers
- 1/0 Cards
- Carriers
- Field Power
- System Power Supplies
- Control Network
- Workstation
- Diagnostics
- Troubleshooting
- DeltaV™ Operate Overview
- Interpreting the Event Journal, Trend Charts & Alarm List
- Introduction to HART Devices and AMS
- Intelligent Device Manager

COURSE 7027 CEUs : 3.2

DeltaV™ Systems Administration for Windows 7 and Server 2008

Overview
This 4½-day course is designed for system engineers and administrators responsible for installing, commissioning, and managing 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

Topics
- Overview/Review of System Components and Topologies
- Installation Checklist of the Windows 7 and Windows Server 2008 Operating Systems
- Installation of the DeltaV Software Components
- DeltaV Control Networks and Remote Access
- DeltaV Domains and Work groups
- User Administration and Network Security
- Upgrading Hardware and Software
- Backup and Restore Procedures
- Importing/Exporting

COURSE 7026 CEUs : 3.2

DeltaV™ CyberSecurity Virtual

Overview
The 4½-day DeltaV Cyber security course focuses on the DeltaV Security Manual and the practical implementation of the guidance provided within. Students will engage in activities to properly apply Emerson's Defense-in-Depth strategies so that students can have the skills to apply these same strategies on their DeltaV systems. Students are encouraged to read the DeltaV Security Manual before attending class.

Prerequisites
Course 7027

Topics

DeltaV™ Deployment Guidelines and Physical Security
- Define the expected DeltaV installation environment
- Define physical access rules (cabinets, switches, consoles, etc.)

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

Communications Security and Remote Access to DeltaV
- Define communication and security requirements for remote access
- Use Emerson Smart Firewall
- Deploy Remote Desktop Gateway server
- Configure DeltaV remote desktop server Active Directory Design and User Account Management
- Define Active Directory implementation guidelines
- Create customized DeltaV users and groups Audit user privileges
- Configure password policies through Group Policy Objects

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

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

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

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

COURSE 7023

DeltaV Information Technology for Automation Personnel

Overview
This 3-day course will provide students a set of essential information technology (I.T.) skills. The course touches different technologies like Physical and Virtualization environments, Networks, Domains and Security. By learning these new technologies using a combination of lecture and hands-on workshops. The student will learn to successfully setup, maintain, and troubleshoot a DeltaV distributed control system, integrate and exchange information with Business Systems and create CyberSecurity awareness. The course will distill the core learnings and techniques required from the Information Technology skill set, providing a targeted launch point for the student to adopt and successfully use these technologies. After attending, students will be prepared to dive deeply into these technologies by attending other higher-level courses like 7027 DeltaV System Administration, 7028 DeltaV Virtualization Administration and 7226 DeltaV CyberSecurity Administration.

Prerequisites
None

Topics
- Overview
- Networking
- Virtualization
- Domain
- Servers
- DeltaV
- Security
- Troubleshooting
- Custom Faceplates
- Function Block Faceplates
- FRS Functions
- Pop Up Menus
- Color Threshold Tables
- Custom Dynamos
- Tag Groups
- Key Macro Editor

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

COURSE 7029 CEUs : 3.2

DeltaV™ Virtualization

Overview
This 4½-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.

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

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 Professional Plus Node
- Configuring a WYSE Thin Client and Redundant
- Thin Client Networks
- Create a Highly Available Fail-over 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.

COURSE 7025 CEUs : 3.2

DeltaV™ Advanced Graphics

Overview
This 4½-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.

Prerequisites
Course 7009, DeltaV Implementation I

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

COURSE 7035 CEUs : 1.4

Practical Implementation of FOUNDATION™ fieldbus

Overview
This course is for individuals responsible for evaluating FOUNDATION™ fieldbus technology for process automation projects. This 2-day course covers the practical implementation issues with FOUNDATION™ fieldbus faced by design and project engineers familiar with 4-20mA DCS installations. Upon completion of the course the student will understand the basics of fieldbus technology and be aware of areas that will change during project execution. The student will be able to design H1 fieldbus segments, specify equipment, comply with hazardous area requirements, modify current engineering practices, troubleshoot installations and estimate installed benefits for a project using FOUNDATION™ fieldbus. The course content is not vendor specific though DeltaV™ and Emerson Automation Solutions field devices are used for examples and demonstration purposes.

Prerequisites
Background in instrumentation & electrical engineering, control systems engineering or project engineering.

Topics
- Introduction to FOUNDATION™ fieldbus Technology
- Design of H1 Field bus Segments
- Hazardous Area Applications
- Project Engineering Practices Using FOUNDATION™ fieldbus
- Economic Benefits Compared to Traditional 4-20mA DCS Technology

COURSE E7045 CEUs : 0.2

eLearning: Features Training on DeltaV Analyze 2.0

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

Note:
Course access is 3 months

COURSE 7303 CEUs : 2.1

DeltaV™ Safety Instrumented System (SIS) Maintenance

Overview
This course is for individuals responsible for maintaining a DeltaV™ SIS. 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.

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

Topics
- Safety Life cycle
- DeltaV SIS Overview
- DeltaV SIS Hardware
- Safety Instrumented Functions
- Rosemount SIS Instruments
- AMS Device Manager

Fisher SIS Digital Valve Controller SISNet Repeaters course offerings and are not part of this course.

COURSE 7999 CEUs : 1.4

DeltaV New Features

Overview
This 2-day course covers the new features and enhancements made to the DeltaV Distributed Control System in v13 and v14 using a combination of lectures, demos and hands-on workshop exercises. Students who complete the course will:
- Understand the new features and enhancements introduced in DeltaV v13 and v14
- Understand the benefits of the new features
- Understand how to apply the new features
- Perform workshop exercises implementing the new features

Prerequisites
Course # 7009, 7409 or 7018

Topics
The course includes 40 core topics and 32 optional topics categorized under the following functional areas:
- Alarm Management
- Batch
- Hardware
- Logic Configuration

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

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

COURSE 7201 CEUs : 3.2

DeltaV™ Advanced Control

Overview
This 4½-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.

Prerequisites
Courses 7101, PlantWeb™ DeltaV™ Intro or 7009, DeltaV Implementation I or equivalent field experience.

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 FIC 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

COURSE 7303 CEUs : 2.1

DeltaV™ Safety Instrumented System (SIS) Maintenance

Overview
This course is for individuals responsible for maintaining a DeltaV™ SIS. 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.

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

Topics
- Safety Life cycle
- DeltaV SIS Overview
- DeltaV SIS Hardware
- Safety Instrumented Functions
- Rosemount SIS Instruments
- AMS Device Manager
- Fisher SIS Digital Valve Controller
- SISNet Repeaters course offerings and are not part of this course.

COURSE 7999 **CEUs : 1.4**

DeltaV™ New Features

Overview
This 2-day course covers the new features and enhancements made to the DeltaV Distributed Control System in v13 and v14 using a combination of lectures, demos and hands-on workshop exercises.

Students who complete the course will:
- Understand the new features and enhancements introduced in DeltaV v13 and v14
- Understand the benefits of the new features
- Understand how to apply the new features
- Perform workshop exercises implementing the new features

Prerequisites
- Course # 7009, 7409 or 7018

Topics
The course includes 40 core topics and 32 optional topics categorized under the following functional areas:
- Administration
- Alarm Management
- Batch
- Hardware
- Logic Configuration
- Miscellaneous
- Operator Interface
- Security
- SIS

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

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

COURSE 7304 CEUs : 2.1

DeltaV™ Safety Instrumented System with Electronic Marshalling Maintenance

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

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

Topics
- Safety Life cycle
- DeltaV™ SIS Overview
- DeltaV™ SIS with Electronic Marshalling Hardware Architecture Including Power Requirements
- Commissioning & 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™

COURSE 7305 CEUs : 3.2

DeltaV™ SIS Implementation

Overview
This course is for personnel who design, implement, commission and service DeltaV™ SIS. This 4½-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.

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

Topics
- DeltaV™ SIS Overview
- DeltaV™ SIS Hardware
- Configuring SIFs in DeltaV™
- Rosemount™ SIS Instruments
- AMS Device Manager
- Fisher™ SIS Digital Valve Controller
- SISNet Repeaters
- DeltaV™ SIS Security
- DeltaV™ Version Control

COURSE 7409 CEUs : 3.2

DeltaV Using DeltaV™ Live Operator Interface Implementation I

Overview
During the 4½-day course, the student will be able to define system capabilities, define nodes, configure continuous and sequential control strategies, create process alarms, operate the system, troubleshoot the system and modify operator displays using the DeltaV Live Operator Interface introduced with DeltaV™ Version 14.3.

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

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.

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

COURSE 7425 CEUs : 3.2

DeltaV Advanced Graphics Using DeltaV Live Operator Interface

Overview
This 4½-day course is for process control engineers responsible for configuring graphics in the DeltaV Live operator interface.

This course teaches basic options through advanced configuration topics. This course is designed for process and process control engineers responsible for obtaining key production data, maintaining, configuring and troubleshooting a DeltaV system with the DeltaV Live user interface.

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

COURSE 7309 **CEUs : 2.8**

AMS Device Manager with DeltaV™

Overview
This 4-day course is for instrumentation technicians responsible for all areas of managing and ensuring the reliability of instrumentation in the plant process including startup and commissioning, normal operations, maintenance, and troubleshooting. The target audience usually does following:

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

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

Topics

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

COURSE E7044 **CEUs : 0.6**

DeltaV™ Batch Analytics Operator

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.

This course is designed for operators, process engineers, and management. 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 cause of a detected fault

Prerequisites
DeltaV Batch experience and Microsoft Windows experience is required.

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 ListTab
- Batch Analytics Viewer FaultDetection Tab
- Batch Analytics Viewer QualityPrediction

COURSE E7046 CEUs : 0.8

DeltaV Batch Analytics Model Builder

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.

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

COURSE 7201CV CEUs : 0.7

DeltaV InSight Virtual

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

Prerequisites
7009, DeltaV Implementation I or equivalent field experience.

Topics

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

COURSE 7027V CEUs : 3.2

DeltaV Administration Virtual Course

Overview
This 4½-day course is designed for control system administrators, process control engineers and IT specialist responsible for managing, installing, and commissioning a DeltaV™ system. This course includes access to a virtual DeltaV system to practice and review course workshops complete with brief recorded demonstrations available after course completion. This course is designed for control system administrators, process control engineers and IT specialist responsible for managing, installing, and commissioning a DeltaV system.

Topics

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

COURSE 7202 CEUs : 2.5

DeltaV™ Model Predictive Control

Overview
This 3-1/2-day course is designed for process and control engineers who are applying DeltaV™ Predict and Predict Pro. It provides practical examples of how to determine the benefits of MPC application and how this control may be used to meet specific application requirements. Students will gain hands on experience through lab exercises based on realistic dynamic process simulations.

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

Prerequisites
7201 DeltaV™ Advanced Control 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 throughout\when plant production is restricted by input limits or measurable constraint
- Meeting application requirements
- Meeting control requirements when the response times are very different
- Understanding the design and testing of an integrating process
- Tailoring control performance
- Placing more emphasis on selected control or constraint parameters
- Improving control performance when the process is dead time dominant
- Compensating for large changes in process gain or dynamics
- Minimizing the impact of process noise on control performance
- MPC application
- Selecting and applying MPC, MPC-Pro and MPC-Plus blocks
- Optimizing control
- Optimizing the control

COURSE 7203CV CEUs : 3.2

DeltaV Control Advanced Custom Virtual

Overview
This 4½-day course is designed for process and control engineers who are applying DeltaV™ Predict and Predict Pro. This is a condensed course with selected content from Courses 7201 and 7202. 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.

This course is designed for process and control engineers who are applying DeltaV™ Model Predictive Control.

Prerequisites
7201 DeltaV™ Advanced Control Topics

How to Implement an MPC Solution
- DeltaV™ MPC Function Blocks and Predict / PredictPro
- MPC for Multi-Variable Control
- Model Identification, Data Screening
- Simulation of Response, Tuning 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
- Ensuring 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

COURSE 7028 **CEUs : 2.1**

DeltaV Virtualization Administration

Overview
This course is designed for system administration personnel that will be maintaining DeltaV workstations on a virtual platform after installation. This 3-day DeltaV Virtualization course focuses on the various software that is used in the management of a DeltaV Virtualization environment. Students will engage in workshops that will reinforce the material discussed to successfully run and maintain a Virtualized DeltaV™ system.

Prerequisites
7027 DeltaV System Administration

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

ASSET RELIABILITY

ASSET RELIABILITY

Paths to Success

Emerson training gives you the confidence and experience in industrial maintenance technologies. Our alumni can tell you about the recognition and job promotions they've received from plant management. With Emerson, you walk down a path that leads to full mastery of knowledge and skills necessary in a Machinery Health program. These "Paths to Success" are outlined here. They include both theory/ application courses for certification as well as product-specific courses. Offered at Emerson's training centers, these classes can also be held at your chosen facility. For a calendar schedule of courses and registration information, visit **https://mytraining.emerson.com/lmt/clmsbrowseV2.prmain?in_sessionid=2J845A531298544**

Category I Vibration Analyst Path to Success

- Fundamentals of Vibration Analysis
- Fundamentals of CSI 2130 Machinery Health Analyzer
- Basic Vibration Analysis
- Introduction to AMS Machinery Manager
- Category I Vibration Analyst Certification Exam

Category II Vibration Analyst Path to Success

- Intermediate Vibration Analysis
- Intermediate AMS Machinery Manager
- SI 2140 Advanced Function with PeakVue™
- Category II Vibration Analyst Certification Exam

Category III Vibration Analyst Path to Success

- Advanced Vibration Analysis
- Advanced AMS Machinery Manager
- PeakVue™ Mystery and Autocorrelation
- Category III Vibration Analyst Certification Exam

Online Monitoring Path to Success

- Online Prediction (CSI 4500/6500/XP32)
- Operation and Maintenance
- Online Protection (CSI 6000/6500)
- Operation and Maintenance
- Turbo Machinery Diagnostic

Lubrication Analyst Path to Success

- Lubrication Level 1 & 2 with Certification exam
- Wear Debris Analysis Workshop
- OilView® for AMS Machinery Manager
- Reliability Management Path to Success
- Maintenance Best Practice
- Root Cause Failure Analysis Adding other Technologies to your Credentials
- Laser Alignment
- Balancing Theory & Application
- Basic Ultrasonic Theory & Technology & Level 1 Certification Exam
- Electric Motor Diagnostics & Basic Motor View
- IR Thermography & Level 1 Certification Exam

Companies today rely on fewer people to do more work. That's why the need of training is more critical than ever to achieve and maintain cost-effective maintenance programs.

COURSE 2069 **CEUs : 1.4**

Vibration Analysis Fundamentals

This course is for individuals responsible for interfacing with Device Net, AS-i, Profibus DP HART and serial communication buses to a DeltaV™ scalable system.

Overview
This 2-day vibration training course is for those with no prior experience in vibration analysis. The 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.

Prerequisites
None

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

COURSE 2031 **CEUs : 2.8**

Basic Vibration Analysis / Category I Compliant

Overview
This course is for individuals needing an introduction to the technology and concepts used in the new generation of process control systems. This 4-day course complies with Category I Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. This course is intended to enable students to operate single channel machinery analyzers, dump and load routes, recognize the difference between good and bad data, and compare vibration measurements against pre-established alert settings. 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 Management supported software to analyze basic vibration defects.

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

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 Bearing Defects Gear Problems
  - » Resonance Introduction to Electrical Defects
  - » Introduction to Electrical Defects

Participants will receive a complimentary copy of the Pocket Vibration Analysis Trouble-Shooter Guide.

Emerson helps maximize the return on your investment in technology and people.

COURSE E2069 CEUs : 0.2

Fundamentals of Vibration eLearning

Overview
This 2 hour e-course provides instruction to individuals with no prior experience in vibration analysis. The course introduces the technology of vibration analysis by explaining what vibration analysis is and how it plays a critical role in any predictive maintenance program. Students are led through a self-paced discussion on how vibration analysis works with many examples of the types of faults that can be detected. Students will also gain an understanding of where and how vibration is measured with an emphasis on good data collection techniques. Students will learn important terminology that will be critical to their success as they progress to the next level of training in vibration analysis; Emerson's Basic Vibration Analysis course.

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

Note:
Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

Our instructors share their own **real-world experiences** and guide classes through **hands-on exercises** that reinforce the lesson. Reliability Solutions strategy includes training courses designed to help you start-up and maintain your mechanical equipment. Our goal is to provide you with the knowledge to keep your plant running smoothly.

COURSE 2032 CEUs : 2.8

Intermediate Vibration Analysis/Category II Compliant

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 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.

Prerequisites
Basic Vibration Analysis course and accumulative 18 months of field experience are recommended.

Topics
- Equipment Testing and Diagnostics
- Reference Standards
- Reporting and Documentation
- Fault Severity Determination
- Analyzer Averaging Techniques
- Slow Speed Applications using Slow Speed Technology (SST®)
- 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

COURSE 2068

AMS Machinery Manager Introduction

Overview
In this 4-day class students learn methods of database creation and vital features of route creation such as collecting reference data, analyzer/computer communication, and the basic concepts of Analysis Parameter Sets, Alarm Limit Sets, and Fault Frequency Sets. A machinery analyzer is used to demo the process of loading routes for data collection. This course will also include a basic overview of the vibration plotting application and reporting functions. This course is based on the current mass release of the AMS Machinery Manager software. Students can call to verify if the course is appropriate to the version they are using. Wireless technology, Infrared Analysis, Motorview, Online Monitoring 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.

Topics:
- RBM wizard
- Database Setup
- Route Management
- Reports
- Vibration Analysis Module

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

COURSE 2076

Machinery Health AMS 2140 Introduction

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

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

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

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

Note:
You may take with Fundamentals of Vibration as a 4-day course.

COURSE 2082

Machinery Health Lubrication Introduction & Intermediate

Overview
Guidelines and instruction for starting an oil analysis program will be provided in this 4-day course. The course focuses on the basic properties of lubricants and lubricant specifications including additive packages.

An overview of laboratory testing methods and interpretation of test data is taught.
In addition, instruction is provided on proper storage and handling of new, unused lubricants, as well as sample point identification and best practices for collecting samples from machinery.
Basic contamination control and wear debris analysis and identification is covered.

The focus of the level two portion of the course is the use of oil analysis with other predictive technologies to enhance a machinery health program. Machine life extension and reduction of unscheduled downtime will be covered in depth. Training includes introductions to lubricant engineering, failure concepts, and failure prevention. Information will be provided on greases and synthetic lubricants, including advantages and applications.

The importance of Wear Debris Analysis and contamination control and their impact on reliability will be stressed. Guidelines and step-by-step procedures will be offered for consolidating lubricants, setting alarm limits, as well as managing and enhancing existing lubrication programs.
Optional Level I & Level II Lubrication Certification exams will be administered at the end of the course for no charge.

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

COURSE 2076 CEUs : 1.4

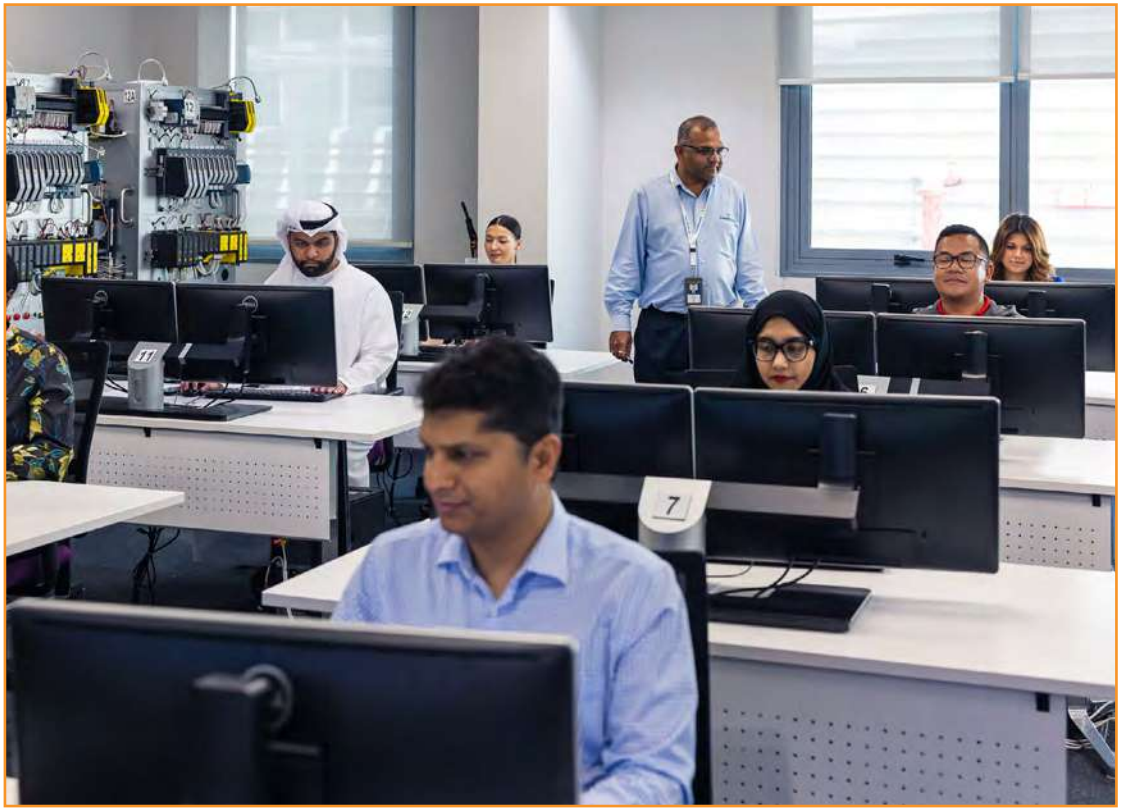
Fundamentals of CSI 2140 Machinery Health Analyzer

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

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

Note:
You may take with Fundamentals of Vibration as a 4-day course.



COURSE 2021EX

Vibration Analyst Exam Category I

Overview
Category I exam, available at the end of course 2031.
Test Format: Written exam,
Duration: 2 hours,
Passing Grade: 75%

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

COURSE 2022EX

Vibration Analyst Exam Category I

Overview
Category II exam, available at the end of course 2032.
Test Format: Written exam,
Duration: 3 hours,
Passing Grade: 75%

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

COURSE 2035/2075 CEUs : 2.1

Mystery PeakVue™and Autocorrelation

Overview
This 3-day course provides insight into advanced functionality of Emerson's patented 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

Prerequisites
Students should be familiar with vibration data collection and analysis techniques and the use of AMS Machinery Manager Software.

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.

COURSE 2068 CEUs : 2.8

Introduction to AMS Machinery Manager

Overview
This 4-day course was designed for the new users of AMS Machinery Manager. 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 CSI 2140 Analyzer will be used to load routes and collect data on lab machinery for basic vibration analysis using Export and Diagnostic Plotting.

Prerequisites
Computer experience with the Windows operating system and Basic Vibration are recommended.

Topics
- Navigation
- Database Creation
- Data Collection
- Basic Analysis and Reporting
- Link to RBMview®
- Data locker Management (lite)

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 On-Line Machinery Health Monitor and Oilview modules are covered in other course offerings and are not part of this course.

COURSE 2074 CEUs : 2.1

Intermediate AMS Machinery Manager

Overview
This 3-day course was designed for students who have a basic understanding of AMS Machinery Manager. Students expand their knowledge of machinery analysis techniques, focusing on analysis and reporting using Plot- Data, Diagnostic Analysis, Export, PeakVue™ and the full version of RBMview®. Prerequisites Introduction to AMS Machinery Health Manager Course

Topics
- Vibration Analysis Module
- Export
- PeakVue™ Technology
- RBMview®
- PlotData

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 On-line Machinery Health Monitor and Oilview modules are covered in other course offerings and are not part of this course.

COURSE 2076 CEUs : 1.4

Fundamentals of CSI 2140

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. 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

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

Note:
You may take with Fundamentals of Vibration as a 4-day course.

COURSE 2088A CEUs : 2.8

Online Prediction: Operation and Maintenance

Overview
This 4-day course explores the operation, use and application of online monitoring and transient capture technologies using CSI's 4500, 6500, XP-32 and 2600 online products and AMS Suite: Machinery Health Monitoring Software.

This course is intended for:
- Anyone interested in online monitoring and transient capture
- Reliability managers
- Vibration analysts and technicians
- Responsible for reliability services

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

Topics
- On-line Monitoring Database Configuration including Gross Scan and Spectral Scan
- Database Construction of Sleeve Bearing
- Configuration including Shaft Centerline
- Plots and Orbits
- Sensor Configurations for Various Sensor
- Types including: Accelerometer, Velocity,
- Proximity Probe, Microphone, Pressure,
- Laser Displacement, Temperature and other Sensors
- Practical Application of Input and Output Relays
- Troubleshooting Tools (Putty or Tel net)
- Constructing Analysis Parameter Sets for Normal Vibration, High Frequency Vibration, PeakVue™ and Process Signals
- Time and Predicate Based Data Collection Sets
- On-line Watch Program Operation
- Transient Capture Database Configurations
- Transient Auto Archive Creation

- Transient Data Extraction
- Online and Transient Capture Case Histories
- Analyzing On-line and Transient Data using the Vibration Analysis Program

COURSE 2094 CEUs : 1.4

Advance CSI 2130 with PeakVue

Overview
This 2-day course is intended for students with single-channel vibration analysis experience and little or no multi-channel experience. This 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.

Prerequisites
Single channel vibration analysis experience is required.

Topics
- PeakVue™
- Resonance Detection
- Dual Channel 1 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 DLP
- Zoom Analysis, Cascade and Overall Transient Wave Form Capture and Analysis
- CSI 2130 Analysis Experts

COURSE 2033 CEUs : 3.2

Advanced Vibration Analysis/ Category III Compliant

Overview
This 4½-day course complies with Category III Vibration Analyst per ISO standard 18436-2: Vibration condition monitoring and diagnostics. This course expands on the subjects covered in the Intermediate Vibration course (Category II), especially in the areas of fault analysis and corrective actions. The class details advanced analysis techniques. The dual channel machinery health analyzer features are introduced including the use of AMS™ Suite: Machinery Health Manager Software to set up the advanced analyzer features and the powerful downloadable 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.

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

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
- Establish specifications for vibration levels and acceptance criteria for new machinery
- Measure and analyze basic operational deflection shapes (ODS)
- Measure and analyze PeakVue™ technology measurements
- Slow Speed Technology (SST®)
- Zoom Analysis
- Transient Techniques
- Dual Channel Machinery Analyzer Features
- Triggered Data Capture
- Resonance Detection

COURSE 2016 CEUs : 1.4

Balancing Theory & Application for CSI 2140

Overview
This 2-day class 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.

Prerequisites
Understanding of vibration analysis is recommended.

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

COURSE 2051 **CEUs : 2.1**

Time Waveform Analysis

Overview
This 3-day course is designed to upgrade and enhance waveform analysis skills for vibration technician and reliability engineers. There are several reasons that vibration analysts want to understand and use waveform analysis, since some significant defects are better analyzed in the time domain. The time domain provides visual confirmation of amplitude enhancement and reduction. Time waveform analysis can present, in a static picture, amplitude variations and changes in frequencies that the FFT cannot display without using multiple (dynamic) graphics. Further, a waveform graphically presents accurate peak vibration amplitudes representing defect severity.

Prerequisites
Intermediate vibration analysis or eighteen-month vibration related field experience is recommended.

Topics
- Waveform Data Acquisition: Analog to Digital Conversion (A/D)
- Waveform Parameters for Trending: Peak to Peak, Crest Factor, and Analog Overall
- Waveform Tools: Revolution Markers, Difference Frequency markers, Phase, Peak, RMS, Crest Factor
- Waveform Patterns: Sinusoidal, Impacting, Truncated, Asymmetric, Transient/Random, Modulated and Discontinuity or Bad/Compromised Data.
- FFT vs. Waveform: Benefits and limitations of each Applications of Waveform Analysis: Synchronous Time Averaging (STA) for rolls in nip; Peak Hold averaging for maximum carrier/sideband frequency amplitudes for rolling element bearings; Time Difference cursors for identifying beat frequencies and repeating impacts (gear teeth cracks or defects); Transient Analysis of motor inrush current; Distinguishing Misalignment from Looseness using waveform analysis as a confirmation to the FFT data; and Gearbox Analysis using STA waveforms and standard waveform discontinuity analysis.

Audience
Vibration technicians and reliability engineers

COURSE 2070 OR 2070V CEUs : 2.8

Advanced AMS Suite: Machinery Health Manager

Overview
This 4-day course is the third in our series of AMS Machinery Manager courses. Its focus is on 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 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 is recommended. Experience with the Windows operating system is recommended.

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
- Nspectr®
- Data Locker Management
  Wizard Reporting Techniques and Modification/ Addition of Setup Information
- Austostat Database Utility
- Database Zip Utility
- Network Administration

COURSE E2074V CEUs : 1.4

eLearning: Vibration Analysis Module AMS Machinery Manager (V5.2 or Higher)

Overview
This 2-day e-course provides thorough introduction on the Vibration Analysis module in the V5.2 or higher AMS Machinery Manager software. The interface of the Vibration Analysis module is much more user intuitive. With the V5.2N5.3 version of the Vibration Analysis module, powerful tools for the analysis and comparison of multiple types of data are right at your fingertips.

Prerequisites
Familiar with the AMS Machinery Manager Software I

Topics
- Introduction of the New Vibration Analysis Module (V5.2N5.3)
- Learn to Display Spectra,
- Waveform and Trends
- Use the Toolbar for Data Manipulation
- Custom Faceplates
- Custom Dynamos

Note:
Typical duration of course access is 3 months. Contact education@emerson.com to request an extension.

COURSE 2080 CEUs : 1.4

Online Protection Operation and Maintenance

Overview
This 2-day course is a hands-on training for anyone involved with operating and maintaining a CSI Online Protection System. 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 online prediction system
- System troubleshooting and maintenance.

COURSE E2140 **CEUs : 0.6**

eLearning: Fundamentals of CSI 2140 Machinery Health Analyzer

Emerson's Machinery Health Management 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 6 hour e-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

COURSE 2070CV **CEUs : 1.4**

AutoStat for AMS Suite : Machinery Health Manager

AutoStat is included in the standard curriculum of the 4-day Advanced AMS Machinery Manager, course 2.070. This 2-day session only covers AutoStat in the AMS Machinery Manager software. Alarms are an important part of any analysis program. Properly setting alarms allows the user to quickly identify an abnormal machine condition and reduces time spent analyzing machines that are running in acceptable or "normal" condition. AMS Machinery Health Manager provides the user the ability to create up to 12 parameter bands with alarms in addition to the Overall value. Calculating ideal alarm values for these parameters can be very complicated. Autostat uses statistical analysis to provide limit value, for the individual parameter bands by analyzing the data associated with similar pieces of equipment.

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. 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.

Topics

- Analysis Parameter Alarm vs Narrow band
- Alarms -What's the Difference?
- Database Setup Requirements and Reports
- Creating and Editing Analysis Groups
- Modifying and Creating New Parameter Alarms
- Creating and Editing Statistical Envelopes
- Using these Alarms within the Vibration Analysis Plotting Application

PROCESS CONTROL

Learning Path

All these courses deal with optimizing process performance and reliability by reducing process variability through better control. Loop tuning by-feel is replaced by a systematic, scientifically sound approach, which is the subject of several courses for process control engineers and technicians. These courses provide an excellent platform for further economic optimization via advanced process control.

To enroll in Process Control courses or for more information, please call: 800-338-8158 or 641-754-3771

9032
Applied Modern Loop Tuning

9034
Applied Advanced Regulatory Controls

9035
EnTech Applied Modern Loop Tuning and Advanced Regulatory Controls

9030
Process Dynamics and Tuning Fundamentals (PCE I)

9031
Process Analysis and Minimizing Variability (PCE II)

1430
EnTech Toolkit Training

COURSE 9000 **CEUs : 3.2**

Introduction to Process Control

Overview
This 4 ½-day course provides those new to the field with the basic, overall fluid process controls knowledge they need to better understand the function of automated control loops. Aspects of process control (measurement devices, controllers, final control elements, and fundamental control methods) are covered by classroom presentations and laboratory exercises that are intended to familiarize students with the function and application of the wide variety of equipment commonly found in process plants.

Prerequisites
None. This is an introductory course.

Topics
- Process Control Terminology and Symbols
- Process Loop Introduction
- Measurement Instrumentation for:
  - » Flow
  - » Level
  - » Temp
  - » Pressure
- Instrument Calibration Concepts
- Final Control Elements
- Control Valves; -Actuators;
- Control Valve Instrumentation
- Introduction to Loop Dynamics, Tuning and Control

Persons completing these courses receive a good grounding in **process control principles and strategies, controller tuning and loop dynamics** as they relate to Fisher control valves. Engineers and technicians with little or no experience begin to build the fundamental knowledge they need to move forward in this field.

COURSE 9006 **CEUs : 1.4**

Loop Tuning Short Course

Overview
This 2-days Fisher course is designed for those who have the job responsibility of tuning or monitoring industrial process control loops. Students will learn to tune controllers to meet the needs of each loop. Students will practice tuning on process simulation software using tuning methods that do not require calculations. The baseline method requires knowledge of the type of process, and the trial and error method requires making small set point bumps and changing controller gain and reset to meet the desired loop performance. Students will also learn open loop response testing and Lambda tuning to obtain greater loop accuracy, stability and predictability.

Prerequisites
None

Topics
- Load Upsets
- Process Noise
- Self Regulating Process
- Integrating Process (Level)
- Valve Deadband and Stick/Slip
- Limit Cycling
- Baseline Controller Tuning
- Trial and Error Tuning
- Lambda Tuning
- Process Time Constant, Deadtime and Gain
- Positioner Application Guidelines

COURSE 9025 **CEUs : 3.2**

Control Loop Foundation

Overview
This 4½-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 the learn in the class. 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.

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, Wireless HART
- 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 Feed forward, 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

Completing these courses receive a **good grounding in process control principles and strategies, controller tuning, and loop dynamics** as they relate to Fisher control valves.

COURSE E9025 **CEUs : 1.8**

eLearning: Control loop Foundation

Overview
This course is designed for process engineers, process control engineers, managers, technicians and operators new to the process control industry. This 18-hour (average duration) on-line course includes audio presentations, demonstrations, hands-on workshops and quizzes. Upon completion of this course, the student will be able to read control strategy documentation and will be able to effectively work with and commission single/multi-loop control strategies.

Prerequisites
Microsoft Windows experience.

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, Wireless HART
- 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- Feed forward, 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

COURSE 9032 **CEUs : 1.8**

Applied Modern Loop Tuning

Overview
This course is for engineers and technicians responsible for maintaining process control performance using instrumentation and control loop tuning. Applied Modern Loop Tuning (9032) is a 3-days registration or on-site course that introduces participants to effective methods for determining optimal tuning parameters for regulation of processes. The non-oscillatory En Tech 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 computer-based process simulators. 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 deadband (backlash) and resolution (section), set point tracking and regulatory control, integrating processes and level control are reviewed and demonstrated using case study examples.

Prerequisites
Some experience with process instrumentation and control is helpful.

Topics
- Process Dynamics -Perform Bump Tests to Identify Process Model (Gain, Deadtime, Time Constant and Valve Dynamics) to Determine PID Tuning
- Self Regulating Loops -Apply Lambda
- Tuning to First-Order and Second-Order Process Loops (Flow, Pressure, Temperature, pH, etc)
- Integrating Loops -Tune Levels and Header Pressures for Load Recovery and Set point Response
- Process Interactions Lambda Tune Loops to Minimize Interactions and Increase Production

COURSE 9034 CEUs : 2.1

Applied Advanced Regulatory Controls

Overview
This course is for engineers and technicians responsible for process control design, implementation and control performance. This is a 3-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.

Prerequisites
Participants should possess basic process control knowledge and experience with DCS control strategy configuration.

Topics
- Process and Disturbance Dynamics
- PID Algorithms- PID, PI, PI-D, 1-PD, PD, P-D, ID, 1-D, 2 degrees of Freedom Control
- Cascade Control, Dynamic Feed forward
- Ratio Control, Override (selector) Control
- Split Range and Midrange Control Interactive Control Loops- Decoupling
- Control (2X2) and Lambda Tuning
- Deadtime Compensation (Smith Predictor)
- Adaptive Control (Gain Scheduling, Auto Tuning)
- Introduction to Model Predictive Control
- (Multiple Inputs Single Output)

COURSE 9035 CEUs : 2.8

DeltaV Control Advanced Custom Virtual

Overview
This course is for engineers and technicians responsible for process control design, implementation and control performance. 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.

Prerequisites
Participants should possess basic process control knowledge and experience with DCS control strategy configuration.

Topics
- Lambda Tuning for Self Regulating and Integrating Processes
- Process and Disturbance Dynamics
- PID Algorithms- PID, PI, PI-D, 1-PD, PD, P-D, ID, 1-D, 2 degrees of freedom control
- Cascade Control, Dynamic Feed forward
- Ratio Control, Override (selector) Control
- Split Range and Midrange Control
  Interactive Control Loops Decoupling
- Control (2X2) and Lambda Tuning
- Deadtime Compensation (Smith Predictor)
- Adaptive Control (Gain Scheduling, Auto Tuning)
- Introduction to Model Predictive Control
- (Multiple Inputs Single Output)

COURSE 9031

Process Analysis and Minimizing Variability (PCE II)

Overview
This course is for engineers and technicians responsible for process control design, implementation and control performance. This is a 3-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.

Prerequisites
Participants should possess basic process control knowledge and experience with DCS control strategy configuration.

Topics
- Process and Disturbance Dynamics
- PID Algorithms PID, PI, PI-D, 1-PD, PD, P-D, ID, 1-D, 2 degrees of Freedom Control
- Cascade Control, Dynamic Feed forward
- Ratio Control, Override (selector) Control
- Split Range and Midrange Control Interactive Control Loops- Decoupling Control (2X2) and Lambda Tuning
- Deadtime Compensation (Smith Predictor)
- Adaptive Control (Gain Scheduling, Auto Tuning)
- Introduction to Model Predictive Control (Multiple Inputs Single Output)

COURSE 9030 CEUs : 2.8

Process Dynamics & Tuning Fundamentals (PCE I)

Overview
This course is for engineers, or persons with equivalent math and theoretical background, who have responsibility for process control design and implementation, process optimization or process design and troubleshooting. Process Dynamics, Control and Tuning Fundamentals (Process Control for Engineers I) is a 4-day course that provides the fundamental theory governing process dynamic behavior, control system operation and controller tuning. Course material is based on experience gained in process variability optimization work and is based on modern control engineering concepts coupled with practical process application knowledge. This course presents a systematic approach to optimizing the control of a process unit operation in order to manufacture uniform product more efficiently. The course uses formal lectures with hands-on lab exercises. High fidelity process simulators are used as the basis for the labs and simulation analysis.

Prerequisites
Had functionality in the mathematics required to understand the concepts listed in “topics”.

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

COURSE 1430 **CEUs : 2.8**

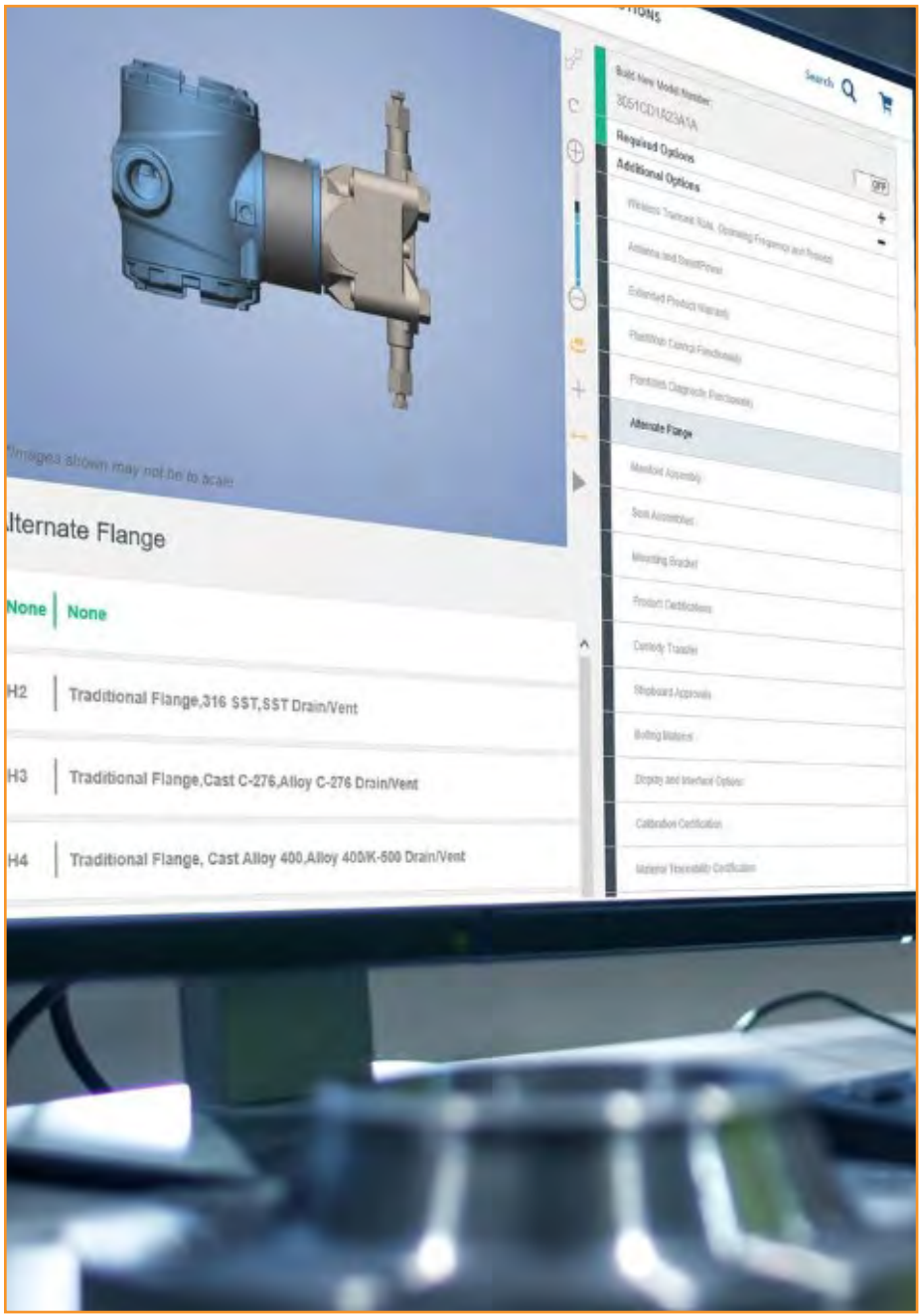
En Tech Toolkit Training

Overview
This course is for engineers and technicians responsible for process control design, implementation and control performance. 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.

Prerequisites
Participants should possess basic process control knowledge and experience with DCS control strategy configuration.

Topics
- Lambda Tuning for Self Regulating and Integrating processes
- Process and Disturbance Dynamics
- PID Algorithms- PID, PI, PI-D, 1-PD, PD, P-D, ID, 1-D, 2 degrees of freedom control
- Cascade Control, Dynamic Feed forward
- Ratio Control, Override (selector) Control
- Split Range and Midrange Control
- Interactive Control Loops Decoupling Control (2X2) and Lambda Tuning
- Deadtime Compensation (Smith Predictor)
- Adaptive Control (Gain Scheduling, Auto Tuning)
- Introduction to Model Predictive Control
- (Multiple Inputs Single Output)

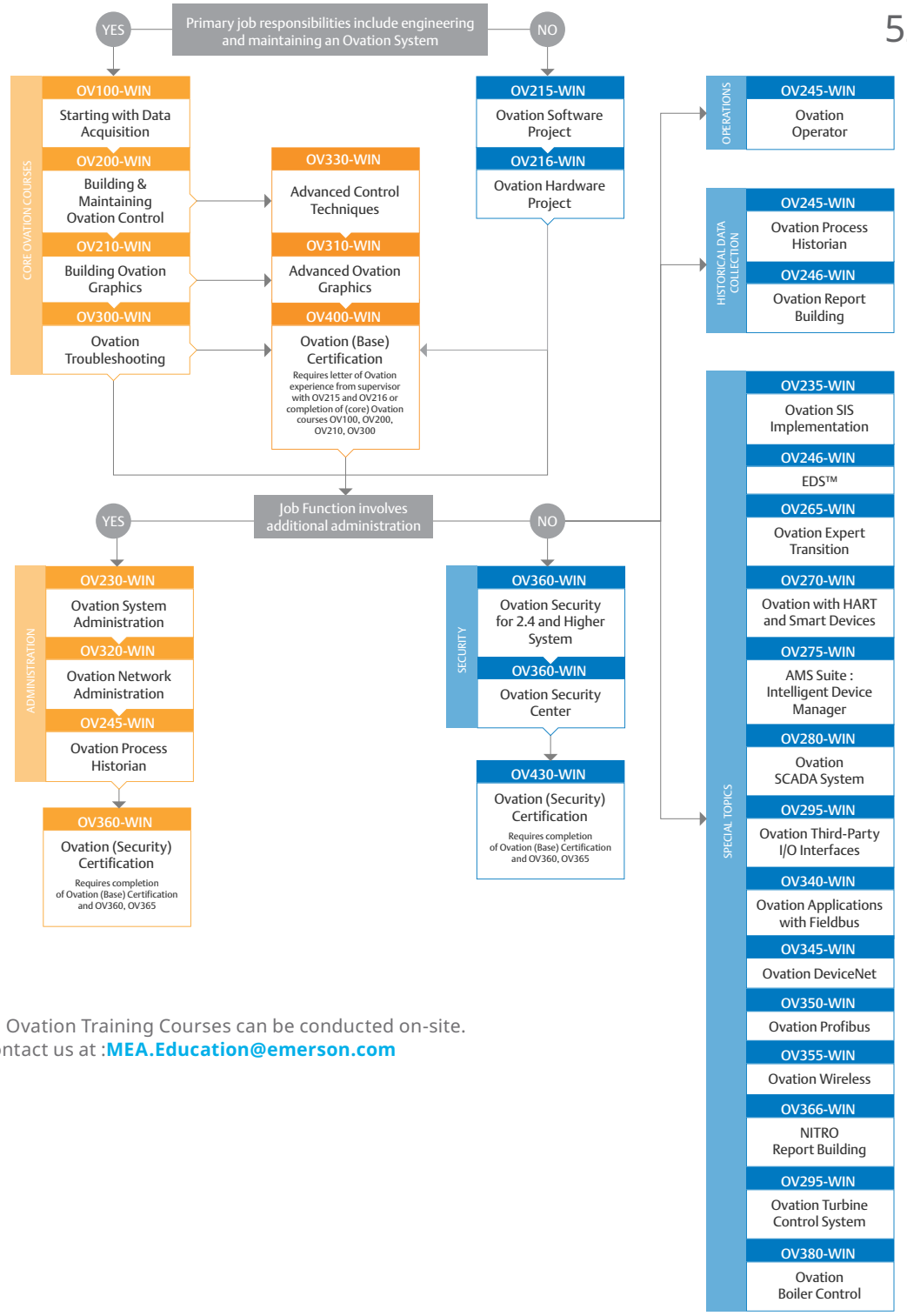


OVATION

Course Map

The Ovation Course Map is designed to help students determine their course path for Ovation training. Emerson offers the industry's broadest array of process automation products and services; a total solution for your plant automation needs. We are committed to providing our customers with an exceptional level of education that spans every aspect of our product portfolio. We work hard to ensure that our academic deliverables are as applicable to your everyday job functions and responsibilities as possible.

Our course map is an instrumental tool for charting your path to success.



All Ovation Training Courses can be conducted on-site.
Contact us at :**MEA.Education@emerson.com**

COURSE OV100-WIN

Starting with Data Acquisition

Overview
This 5-day course provides experience using an Ovation Data Acquisition System (DAS). Ovation terminology and proper use of Ovation documentation are discussed. Students are introduced to the major components of the system and practice using Ovation tools that are designed to make data acquisition easy. Exercises include modifying and building database point records for analog and digital points. The students physically connect various field devices to the I/O and test the signals. Basic techniques for troubleshooting data acquisition hardware and software are also included in the course. These courses are intended for anyone who will need to work with the DAS of the Ovation system in a Windows environment.

Prerequisites
There are no prerequisites for this course.

Topics
- Recognize Ovation terminology and identify the types of drops used for data acquisition in an Ovation system.
- Demonstrate the ability to effectively use Ovation documentation
- Describe the functions of the Ovation network and its components
- Describe the general architecture of an Ovation system
- Describe the database point record movement between various drops as points are monitored, modified and built
- Monitor plant processes using data acquisition tools
- Recognize, modify and build the various types of database point records in an Ovation system
- Select and configure I/O modules for typical field devices
- Wire and test complete signal paths between various field devices and appropriate / database point records
- Analyze problem situations and implement appropriate corrective solutions

COURSE OV200-WIN

Building and Maintaining Ovation Control

Overview
This 5-day 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. These courses are intended for people who work with Ovation Controllers to tune and build the analog and digital control schemes.

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. It is recommended that students attend an OV100-WIN course prior to attending this course.

Topics
- Interpret and apply a control functional to the Windows-based system.
- Interpret and tune implemented control using the available tools.
- Edit existing control schemes.
- Demonstrate proficiency in building digital & 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.

COURSE OV210-WIN CEUs : 3.5

Building Ovation Graphics

Overview
This 5-day course will teach the user to build Ovation system graphic diagrams. Students will learn how to use the Ovation Graphics Builder in various applications. Course topics include the layout and implementation of static and dynamic objects, linking to control and creating perspective-type diagrams. Methods for standardizing information entities and control interfaces and troubleshooting problems within the graphics code are also covered. These courses are intended for anyone who will build process diagram displays to the Ovation system.

Prerequisites
Students must understand Ovation point record fields and Ovation control algorithm structures. It is recommended that students attend OV100-WIN prior to attending these courses. If the student will be heavily involved in creating control interfaces or OV200-WIN is also recommended.

Topics
- Describe the different coding areas within the graphic source code
- Build graphics to display live plant data
- Use various drawing techniques to create 3D graphics
- Interface graphics to the control system by using poke fields
- Design and implement macros to be used within graphics.
- Use conditional statements to create dynamic indications in graphics.
- Employ various techniques to make graphics code execute more efficiently
- Use various application programs within a graphic to perform specific actions
- Assess and correct problems in graphics using available tools

COURSE OV010-WIN CEUs : 1.7

Ovation Operator

Overview
This 2½-day course is designed to provide students with the ability to efficiently perform routine plant operations using the Ovation control system. Key topics include data acquisition, process analysis and control interfaces. Students will be able to use the tools provided to monitor processes controlled by the Ovation system and will learn to take appropriate actions to control these processes. These courses are intended for all operations personnel using the Ovation system in Windows environment.

Prerequisites
There are no prerequisites for this course.

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

COURSE OV248-WIN **CEUs : 2.1**

EDS™

Overview
This 3-day course is designed to give students a detailed understanding of 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.

Prerequisites
There are no prerequisites for this course.

Topics
- Illustrate the functions of the EDS system and architecture
- Explain how an EDS server is loaded and configured
- Configure an 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
- Build custom graphics using the EDS Graphics Builder

COURSE OV246-WIN **CEUs : 2.1**

Global Ovation OPH Report Building

Overview
This 3-day course will teach students to configure and retrieve historical data using the Ovation Process Historian (OPH) and Crystal Reports. Students will learn how to use the OPH Report Manager to define: Alarm, Soe, Point and Operator Event Reports. Students will also learn how to configure demanded reports, triggered reports and timed reports in the OPH Report Manager. Students will also use Crystal Reports to create new report formats for use in the OPH Report Manager.

Prerequisites
There are no prerequisites for this course.

Topics
- Describe the functions of the Ovation
- Process Historian and related components
- Recognize the Ovation Process
- Historian Database Schema and understand the concept of a Relational Database Management System (RDBMS)
- Schedule, automate and manipulate reports
- Distribute reports using printers and various output files
- Create custom reports and ad-hoc queries using various 3rd party applications such as Crystal Reports and MS Excel

The Ovation expert control system, a key component of the proven PlantWeb™ digital architecture, **delivers higher levels of plant availability, reliability, and environmental compliance.**

COURSE OV275-WIN CEUs : 1.4

AMS Suite: Intelligent Device Manager

Overview
This 2-day course will provide the student with the skills to fully utilize the special features of I/O related to HART and smart field devices attached to the Ovation™ system. Students will learn the basic components of an Ovation system. Items discussed will include physical attachment of field devices to the Ovation I/O modules, building of HART/smart data points in the system, analysis of the data available from the field device, and diagnosis of problems that may occur. This course is intended for technicians and administrators using an Ovation system that includes HART and smart field devices.

Prerequisites
Students should complete OV100-WIN prior to taking this course. OV270-WIN and either OV200-WIN-3.0.X or OV200-WIN-3.1.X are also recommended.

Topics
- Identify the configuration of components in an Ovation system using Hart/smart devices
- Attach HART/smart field devices to the Ovation I/O cards
- Build database points for the field devices
- Use AMS™ Suite to obtain data from the devices
- Diagnose common problems and configuration errors

COURSE OV280-WIN CEUs : 2.1

Ovation SCADA System

Overview
This 3-day course will provide the student with the skills to take full advantage of their Ovation SCADA system. Students will learn the basic components of an Ovation SCADA system. Items discussed will include SCADA Servers, remote terminal units, scan blocks, lines, ports, configuration tool, protocol analyzers and more. Students will establish communications using available Allen-Bradley, MODBUS or DNP 3.0 protocols. This course is intended for technicians and administrators using the Ovation SCADA system.

Prerequisites
Students should complete OV100-WIN and OV270-WIN prior to taking this class. OV200- WIN is also recommended, but not required.

Topics
- 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 RTUs
- Interpret scan block data
- Create Ovation graphics to interface to the Ovation SCADA system

Extensive training opportunities are available for project managers, engineers, operators, technicians and system administrators.

COURSE OV330-WIN **CEUs : 3.5**

Ovation™ Advanced Control

Overview
This 5-day course is intended for students 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. This course is a continuation of the control topics discussed in OV200-WIN. The course will emphasize the proper selection, configuration and application of algorithms in the Ovation™ control system.

Prerequisites
Prior completion of OV200-WIN is strongly recommended. A working knowledge of control systems and control theory is suggested.

Topics
- 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 input/output hardware.
- Use algorithms for timing, counting, accumulation and system-time applications.

COURSE OV230-WIN **CEUs : 3.5**

Ovation System Administration

Overview
This 5-day course will provide students with an understanding of Ovation™ system licensing, security, configuration, backup and recovery. Students will learn how to navigate the Ovation™ file system as well as basic administration skills. Students will also explore Ovation workstation hardware. This course is intended for Ovation™ system administrators and those wishing to complete the Ovation Certification Program.

Prerequisites
Students must have a good understanding of Ovation system architecture. Experience working in a Windows environment is helpful but not necessary. Prior completion of the OV100-WIN, OV200-WIN and OV210-WIN, courses, is highly recommended but not required.

Topics
- Navigate and understand the Ovation™ engineering tools Developer Studio for Windows)
- Understand licensing of the Ovation™ system
- Implement process control and user security in the Ovation™ system (2.3 and lower)
- Apply system configuration changes to the Ovation™ system
- Add new and modify existing drops to the Ovation™ system
- Navigate and understand the 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.

COURSE OV245-WIN **CEUs : 3.5**

Ovation Process Historian

Overview
This 5-day course will teach students to configure and retrieve historical data using the Ovation Process Historian. The course covers data collection, data storage and data retrieval. Students will learn how to configure Ovation points and the Ovation system for collection. This course is intended for people who will configure, access and maintain the Ovation Process Historian and the Report Scanner/ Report Generator drops of the Ovation system.

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. It is recommended that students attend an OV100- WIN course prior to attending this course.

Topics
- Describe the functions of the Ovation
- Process Historian and related components
- Configure scanners and points for collection
- Recognize the Ovation Process
- Historian database scheme and understand the concept of a relational database management system (RDBMS)
- Understand the Ovation Process Historian architecture and hardware
- Install and configure the Ovation Process Historian report manager
- Schedule, automate and manipulate reports
- Distribute reports using various techniques such as email, web publishing, printers and various output files
- Create custom reports and ad-hoc queries using various 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, SOE, op-Event, ASCII and common reviews
- Analyze the Ovation Process Historian with the diagnostic tools available

COURSE OV270-WIN **CEUs : 1.4**

Ovation with HART and Smart Devices

Overview
This 2-day course will provide the student with the skills to fully utilize the special features of I/O related to HART and smart field devices attached to their Ovation system. Students will learn the basic components of an Ovation system. Items discussed will include physical attachment of field devices to the Ovation I/O modules, building of HART/smart data points in the system, analysis of the data available from the field device and diagnosis of problems that may occur. This course is intended for technicians and administrators using an Ovation system that includes HART and smart field devices.

Prerequisites
Students should complete OV100-WIN prior to taking this course.
OV200-WIN and OV210- WIN are also recommended.

Topics
- Identify the configuration of components in an Ovation™ system using HART/smart devices
- Attach HART/smart field devices to the Ovation I/O cards
- Build Database points for the field devices.
- Use AMS™ Suite to obtain data from the devices
- Diagnose common problems and configuration errors.

COURSE OV300-WIN

Ovation Troubleshooting

Overview
This 5-day course provide students 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 anywhere in the signal path from the field terminations to the I/O modules, through the controller, across the network and into the graphic display. Students will evaluate single- and multiple-problem scenarios. These courses are intended for anyone who may be called to troubleshoot any part of the data acquisition, control or display areas of the Ovation system.

Prerequisites
Students must have a basic understanding of the Ovation system architecture, database point records, system controls, and process diagrams. It is strongly recommended that students attend the OV100- WIN and OV200- WIN courses prior to attending this course. The OV210-WIN and OV230-WIN courses also provide useful skills that support this course.

Topics
- 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.

COURSE OV310-WIN CEUs : 2.8

Advanced Ovation Graphics

Overview
This 4-day course will give students the ability to use application programs and advanced programming techniques, including the use of memory segments combined with pointer manipulation to enhance advanced graphic programming skills. These courses are intended for anyone who will build specialized process diagram displays for the Ovation™ system.

Prerequisites
Students must have a good understanding of the Ovation™ system architecture, database point records and how basic graphics are built and maintained in the Ovation™ system. It is strongly recommended that students attend the OV100 WIN and OV210-WIN courses prior to attending this course. It would also be helpful to have taken the OV200-WIN course if the student wants to improve skills pertaining to graphic interfaces with plant controls.

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

COURSE OV270-WIN CEUs : 3.5

Ovation with HART and Smart Devices

Overview
This 5-day introductory networking course will provide students with an understanding of general 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 router configuration for use in Ovation™ systems. This course is intended for Ovation™ network administrators, Ovation™ system administrators and those wishing to Complete the Ovation™ Certification Program.

Prerequisites
Prior completion of the OV230-WIN course is recommended but not required.

Topics
- 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, Cisco3550 series switches and Cisco 2950 switches series for use in an Ovation network (where applicable)
- Configure and implement SNMP for Ovation
- Troubleshoot inter-networked systems with network tools and software
- Configure and apply third-party networking software

COURSE OV360-WIN CEUs : 3.5

Ovation Security for 2.4 Systems or Later

Overview
This 5-day course will guide students in the proper planning and installation of security for Ovation™ 2.4 and higher level systems. Students will discuss and come to understand Ovation external and internal security concerns, and learn to apply appropriate safeguards. Students will install and configure Ovation compatible Windows Server 2003 Domain Controllers, Windows XP service packs and Windows security patches. The student will configure Ovation security using the Ovation Security Manager and have a basic understanding of Windows group policy objects.

Prerequisites
This course is designed for students who will administer Ovation™ 2.4-level or higher systems.
It is recommended that students attend OV230-WIN and have a basic understanding of Ovation™ system configuration and security concepts prior to attending this course. No prior knowledge of Windows-based security is required.

Topics
- Identify and explain Ovation-specific internal and external security threats
- Plan and implement Ovation 2.4 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

COURSE OV400-WIN **CEUs : 3.5**

Ovation Certification Program

Overview
This is a 5-day blend of (core) course subjects. The course comes complete with a vigorous examination designed to test and measure the student's proficiency in areas related to database building, control implementation, graphic linkage of process points and control algorithms and troubleshooting on a system wide basis. Earning Ovation Certification acknowledges the competency of the individual while working within the Ovation product lines and enhances their abilities in addressing, assessing and repairing problematic situations within the Ovation system. During the 5-day course of (core) subject's instruction, attending students may elect to complete the examination during mid-week subject reviews. The attending students have two chances of achieving certification during this 5-day offering. Failure to achieve the desired results will result in the student having to retest via web-access at a later period-of-time. A 100-point online exam is administered in which students are required to achieve a score of 80% or greater to successfully gain certification. Ovation certification is valid for three years and is applicable to the current software revision only.

Prerequisites
Students must have a strong background and understanding of the Ovation system and demonstrated proficiency in programming, configuring and troubleshooting said system. Before enrolling in the Ovation Certification program, students are required to have attended and completed the full course-length offerings of the following courses: OV100, OV200, OV210, OV300.

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

COURSE OV215-WIN CEUs : 7.0

Ovation™ Software Project

Overview
This 10-day course is designed for those who have a need or desire for a good, general, overall understanding of Ovation® system software and software utilities. This course contains and connects software topic segments from five different Ovation one week courses: OV100-WIN, OV200-WIN-3.0.X, OV210-WIN, OV230-WIN and OV300-WIN. The topics covered include Ovation application functions; the Developer Studio architecture; point building; creating and modifying control sheets; creating and modifying graphics; backing-up MMIs including a domain controller; and adding points for collection to an Ovation Process Historian. This course is not intended to replace the five one-week courses directed toward personnel who have a singular need for the detailed knowledge provided in the one-week courses. The course does not involve implementing any I/O modules. A sequel course, OV216-WIN, specifically focuses on I/O applications and is scheduled to follow OV215-WIN.

Prerequisites
There are no prerequisites for this course.

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

COURSE OV235 CEUs : 3.5

Ovation™ SIS Implementation

Overview
This 5-day course is designed to provide an overall understanding of the Ovation Safety System. This course is intended for people who work with the Ovation SIS systems.

Prerequisites
Students must be knowledgeable in Ovation™ point record field content and Ovation™ control algorithm structures. It is suggested that students attend the OV100-WIN course prior to taking this course. If the student is going to be heavily involved in creating control interfaces, it is also suggested that the OV200- WIN course be taken.

Topics
- Recognize the terminology used with an Ovation™ SIS
- Describe the functions of the Ovation™ SIS network and its components
- Describe the general architecture of an Ovation™ SIS
- Monitor Ovation™ SIS using the data acquisition tools
- Configure an Ovation™ SIS network and SIS Controller

COURSE OV295-WIN CEUs : 2.1

Ovation Third-Party I/O Interfaces

Overview
This 3-day teaches the students how to create specialized I/O links to non-Ovation™ field devices using both serial link modules and the Ovation™ Ethernet highway. The course covers configuring and loading link controller modules, creating third party points, memory mapping, adding third party drivers to controllers and the Ovation™ addressing requirements.

Prerequisites
There are no prerequisites for this course.

Topics
- Understand the Architecture and the functionality of the Ovation™ Fast Switched
- Ethernet Highway, and the need to protect it from external sources
- Define MAC and IP addressing, and Ethernet protocols
- Understand how Ethernet switches work
- Understand the Ovation™ IP addressing requirements
- 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
- Be Aware of the difference in Modbus Drivers based on Ovation™ Releases
- Be Able to install Ovation™ Modbus drivers
- Be Able to build Ovation™ Point records for communication to Modbus
- Verify successful communications between Ovation™ and a PC Modbus simulation
- Interpret Ovation™ Controller Modbus error codes
- Recognize Fundamental AB Data Files
- Be Able to install Ovation™ Allen-Bradley Drivers
- Be Able to build Ovation™ Point records to communicate to an AB SLC500
- Verify successful communications between Ovation and the AB SLC500

COURSE OV355-WIN CEUs : 1.4

Ovation Wireless with Wireless HART

Overview
This 2-day course reviews the major components in an Ovation wireless system (wireless transmitters, gateways and the components of the SmartPack™). The student is taught how to utilize the available configuration tools to set up an Ovation wireless interface and add transmitters to an existing network.

Prerequisites
There are no prerequisites for this course.

Topics
- Understand Wireless HART® communications and Terminology
- Identify the Wireless HART® configuration components
- Attach Wireless HART® field devices and Gateway to the Ovation DCS
- Build Database points for the field devices
- Identify Wireless HART® Applications
- Commission a Wireless HART® Device

COURSE OV365-WIN CEUs : 3.5

Ovation Security Center

Overview
This 5-day course consists of a suite of security packages and services that has the ability to enhance and manage the cyber security of Ovation expert control systems without disrupting the controlled process. The OSC is a key component in achieving NERC CIP compliance by offering services such as: Patch Management, Event Management, and Malware Prevention. The course will examine how to configure and maintain the components of an OSC system on Ovation levels 2.4 and newer on Window's OS and Ovation levels 1.7 and newer on Solaris OS.

Prerequisites
There are no prerequisites for this course.

COURSE OV216-WIN CEUs : 3.5

Ovation Hardware Project

Overview
This 5-day course was developed for personnel whose primary interest and/ or assignment is maintaining Ovation® hardware. Selected topics from the OV100-WIN, OV200-WIN, OV300-WIN and OV320-WIN courses are incorporated and expanded to cover hardware features of the controllers, the power supplies, the most commonly applied I/O modules, the Cisco switches and the Dell MMIs. Hardware information contained within node and module records are explained, and the criteria for adding and changing modules assigned to a branch and slot positions are defined. Hands-on exercises include building control sheets and linking inputs and outputs to selected modules. Also, included will be the application and activation of remote I/O, relay modules, serial link modules and third-party I/O as well as an exercise requiring a complete reload of a software server in order to understand how to recover from a hard drive failure.

Prerequisites
Students must have attended either OV215-WIN or both OV100-WIN and either OV200-WIN-3.0.X or OV200-WIN-3.1.X prior to attending this course.

Topics
- Utilize documentation to analyze faults
- Interpret Ovation system error messages
- Demonstrate remote I/O
- Understand recovery of hard drive failures on MMI(s)
  Configure Cisco switches and routers
- Monitor various LEDs of the system
- Build various RM records
- Recognize system administration tool problems and apply a solution
- Implement closed loop control
- Evaluate and determine operation of power supplies
- Implement given control requirements using the Developer Studio
- Evaluate and determine the proper operation of a control scheme using the tools and methods provided

COURSE OV370-WIN CEUs : 3.5

Ovation Turbine Control System

Overview
This 5-day course provides expert knowledge of the Ovation turbine control system (TCS). Turbine simulators will be used to demonstrate turbine operation, graphics and control logic. Turbine over speed protection and trip functions will be closely examined. The course includes calibration and troubleshooting exercises on the speed detector and valve positioner modules. Students will also learn how to tune the turbine control feedback loops and turbine valve curves using methods developed by Emerson.

Prerequisites
Students must have a good understanding of the Ovation system architecture. It is recommended that students attend the OV100-WIN, OV200- WIN and OV210-WIN courses prior to attending this course

Topics
- Understand major Ovation operator functions as they apply to turbine control, including the process graphic, alarm, trend and point information systems
- Identify basic functions of turbine control logic drawings
- Recognize how the turbine control logic connects to the turbine control graphics
- Identify the fail-safe design components: (1) power, (2) controller, (3) relay module
- Understand the turbine first out trip logic and sequence of event (SOE) alarm reporting
- Configure and test a speed detector module
- Configure and calibrate a valve positioner or servo driver module. Identify logic sheets that require field tuning. Discuss field proven tuning examples
- Retrieve historical trend data for valve curve tuning
- Import data into an Excel spreadsheet, calculate and plot new valve curves

COURSE OV380-WIN CEUs : 3.5

Ovation™ Boiler Control

Overview
This 5-day course is designed for customers who maintain or troubleshoot control strategies within the Ovation™ DCS system related to boiler control. This course is intended for students 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 design pertinent to boiler controls in an Ovation™ environment. This course is a continuation of the control topics discussed in more basic control classes. The course will emphasize the proper selection, configuration and application of algorithms in a typical Ovation™ boiler control system.

Prerequisites
Prior completion of OV200-WIN and OV330- WIN is strongly recommended.
A working knowledge of control systems and control theory is required.

Topics
- Recognize the terminology used with an Ovation SIS
- Describe the functions of the Ovation SIS network and its components
- Describe the general architecture of an Ovation SIS
- Monitor Ovation SIS using the data acquisition tools
- Configure an Ovation SIS network and SIS Controller

COURSE OV420-WIN CEUs : 3.5

Ovation™ (Admin) Certification

Overview
This 5-day course is offered as a stand-alone web-based exam or implemented with a pre-testing review at the Training Center, the OV420-WIN measures the student's proficiency in areas that address the overall Ovation system configuration while maintaining the integrity of the system software. It assesses the students understanding of networking concepts and that of switch and router configurations. Achieving Admin Certification acknowledges the competency of the individual in maintaining the integrity of the Ovation system concerning user access and capabilities. A multi-point examination is administered and participants are required to achieve a grade score of 80% or greater to successfully gain certification.

Prerequisites
Students should have achieved Ovation (Base) Certification through the OV400WIN program. Students are required to attend the OV230-WIN, OV320-WIN and OV245-WIN courses.

Topics
Upon successful completion of this course, the student will receive Ovation (Admin) Certification. This accreditation affirms that the student is competent in all areas of the Ovation System and possesses the abilities and understanding to engineer and supervise the system integrity, communications and user capabilities.

COURSE RA331C CEUs : 1.4

Control Wave Troubleshooting Configuration

Overview
This 3-day hands-on course, held at Emerson's Interactive Plant Environment, covers the installation, wiring of external devices, troubleshooting, 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
- Intro to ControlWave product family
- Hardware options
- LocalView for local communications
- Wiring external devices
- Local serial communications
- Downloading ControlWave project loads
- Viewing live data using Dataview
- Collecting archive and audit logs
- Creating and saving configurations
- Flashing firmware
- Diagnostics program for hardware
- Understanding communication statistics
- Establishing an Ethernet/IP communication link
- Hands-on troubleshooting

COURSE RA441 CEUs : 2.5

Control Wave Designer Fundamentals

Overview
This 2½-day hands-on course covers programming the ControlWave product family using the ControlWave Designer IEC61131-3 software and the Designer function block library. This course will provide the participant the necessary knowledge and skills required to define and control inputs and outputs of related real world applications. Participants will generate and debug simple control strategy programs using Function Block, Ladder Logic, Structured Text, and Sequential Function Chart programming. They will also learn the basics of ControlWave communications, historical data storage, alarming, hardware configurations and much more.

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

COURSE RA442 CEUs : 1.1

Control Wave Designer Communications Programming

Overview
This 1-1/2-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

COURSE RA1220 CEUs : 3.2

FloBoss Configuration and Operation

Overview
This 4½-day course will provide an overall working knowledge of the FloBoss 103, FloBoss 107 and the FloBoss 107E. Participants are presented with a comprehensive view of the FloBoss 103/107/107E hardware and software to obtain the necessary knowledge needed to effectively install, configure and maintain the FloBoss 103/107/107E products. Each student will be provided with a PC (ROCLINK preinstalled), a Remote Automation Solutions RTU, a communications cable, and a workbook for the duration of the class.

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).

Topics
- FloBoss 103/107/107E Hardware Overview
- Flow Measurement Review
- Overview on MVS Product
- Set Up Multi-Dropping on MVS
- FloBoss Configuration
- Elements of a Basic Configuration
- Setting and Checking ROC System Flags
- Set and Check ROC Information
- Configuring I/O Points
- Calibrating AI and AO points
- Communication Basics
- Configuring AGA Flow Calculations
- Configuring FloBoss History
- Building FloBoss Displays
- FST Workshop

COURSE RA900 CEUs : 1.4

Flo Boss S600+ Operator Fundamentals

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

COURSE RA901 CEUs : 1.7

Flo Boss S600+ Advanced

Overview
The 2½-day advanced course provides an insight into the generation of application configurations for the FloBoss S600+.

Topics
- Loading Config600 Pro Software License
- Firmware Versions
- Using System Editor Object Types
- Logical Editor
- Registering Tickets Do's and Don'ts

COURSE RA902 CEUs : 3.2

Flo Boss S600+ Combined

Overview
The 4½-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

COURSE RA801 CEUs : 3.2

Open Enterprise SCADA Systems Basics

Overview
This 4 ½-day course provides a very brief introduction to the OpenEnterprise Server, and more detailed coverage of the Open Enterprise 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 Obj.
  - Alarm Windows, Alarm & Event History
  - Creating & Configuring Trends
- Data Export
- Creating Reports
- Calculation Server
- Communications Manager
- Data Collection
- Plant Area Grouping

COURSE RA802 CEUs : 3.2

Open Enterprise SCADA Systems Intermediate

Overview
This 4 ½-day course will equip the participant to be able to; configure the communications, security, historical, alarming, asset modeling and other major subsystems of an OpenEnterprise and Workstation (version 3.x). Most of the tools within the OpenEnterprise Administrative Tools will be covered during this class.

Topics
- Configure Security
- Historical Collections
- Alarming
- Asset Modeling
- Work Flows
- Local Signals & Alarms
- Administrative Tools

COURSE RA802 CEUs : 3.2

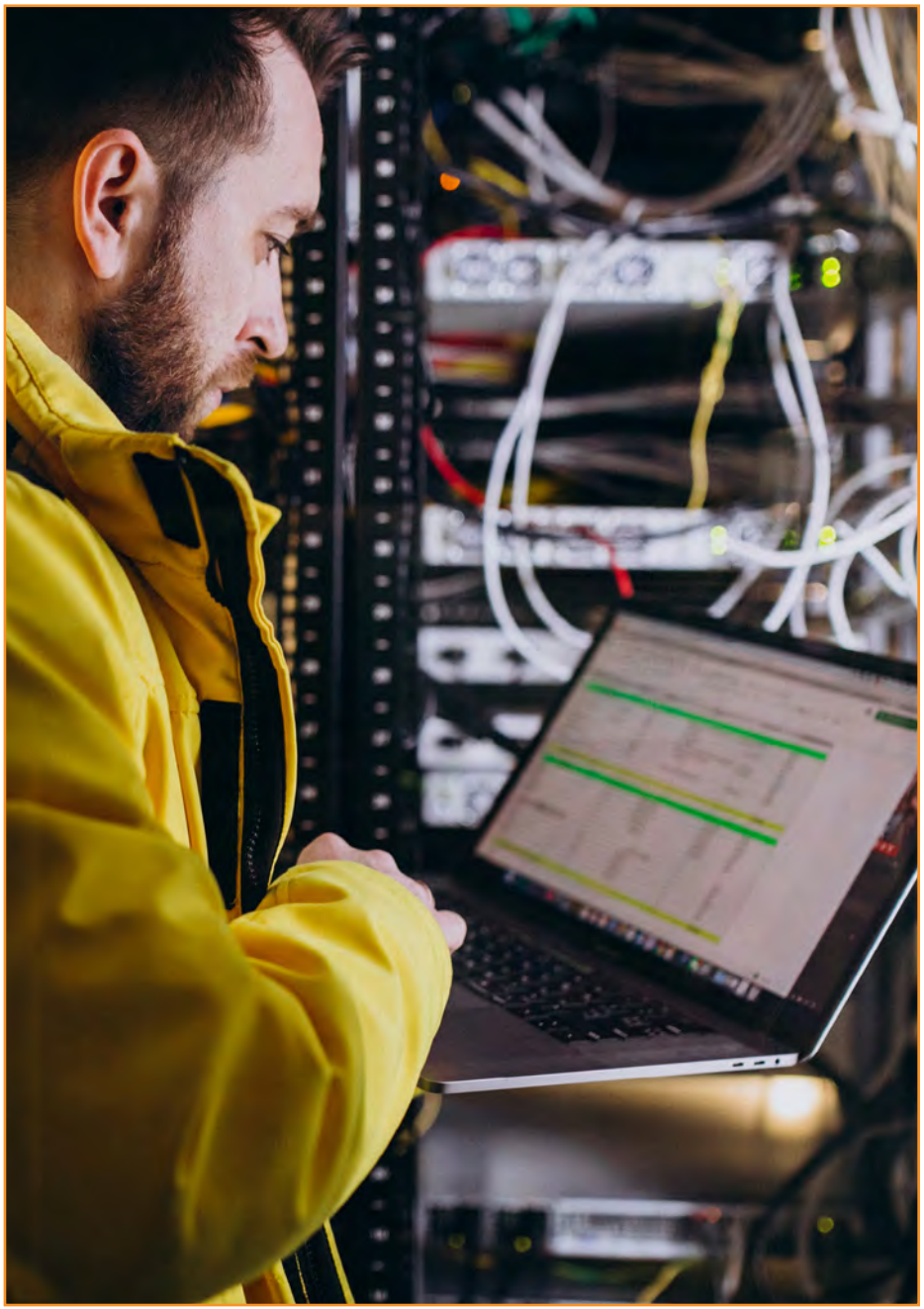
Energy and Transportation Solutions FloBoss Configuration & Operations

Overview
This 4-1/2 day course will provide an overall working knowledge of the FloBoss 103, FloBoss 107. Participants are presented with a comprehensive view of the FloBoss 103/107 hardware and ROCLINK800 software to obtain the necessary knowledge needed to effectively install, configure and maintain the FloBoss 103/107 products. Each student will be provided with a PC (ROCLINK800 preinstalled), a FloBoss 107RTU, a communications cable and a workbook for the duration of the class. However, participants are encouraged to bring their laptop to class.

Prerequisites
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).

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 & operation of the FloBoss 103 & 107 products.



COURSE RA802 **CEUs : 2.8**

Open Enterprise SCADA Systems Intermediate

Overview

Learn programming for PACSystems, 90/70, 90/30, and VersaMax controllers in this Machine Edition class featuring the PACSystems RX3i Controller. This 4-days class covers programming techniques and the advanced features of the PACSystems Controller using Logic Developer PLC Machine Edition software. Starting with the controller software architecture, students are taught how to effectively develop control applications using building block concepts. This course builds upon Object-Oriented concepts with PACSystems User-Defined Function Blocks (UDFBs), as well as the development and troubleshooting of control systems using Proficy Logic Developer PLC and PAC Systems Controllers.

Prerequisites

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

Topics

Upon completion of this course, the student will be able to:

- Describe Control System Architectures& Operational Fundamentals
- Operate Proficy Machine Edition
- Establish and Utilize Communications to the Controller
- Configure a Controller and its associated hardware modules
- Effectively use and create Controller Variables
- Create Projects in Ladder Diagram (LD), Function Block Diagram (FBD), and Structured Text (ST)
- Understand and program Arithmetic, Timer, Counter, and Move operations
- Utilize programming guidelines for developing robust control applications
- Use User Defined Function Blocks (UDFBs) to build structured applications
- Effectively use the Machine Edition Tool chest as a repository for Application Building Blocks
- Create, Monitor, and Modify running Controller applications

VALVES, ACTUATORS AND REGULATORS

Final Control Training Facility

The FCTL education center is a fully equipped training laboratory built to serve students hands on and virtual experience that support job functions in vast areas such as Senior technicians, Valve or Mechanic technicians, Valve Engineers and more.

KEY FEATURES

- A state-of-the-art dedicated training room able to accommodate 12 students in comfort
- Audio visual: 165 inch LED screen and 70 inch interactive touch screen TV with higher resolution and brightness.
- Radio mic with ambient sound for the instructor
- Workstations: 6 live workstations for Control & Isolation valves, PRV, & Electric Actuators. HART & Foundation Fieldbus suited with own PC's and double monitors, connected through Wi-Fi

COURSES OFFERINGS AVAILABLE:

- IACET compliant Emerson Standard Courses
- Courses on Fundamentals of Digital Valve Controllers, Control Valve Engineering, Pressure Relief Valves and more.
- Competency Development Programs

OPPORTUNITIES:

- Train new hires and improve your current workforce's skills
- Utilize Virtual classroom or a blended learning approach
- Certified instructors will share their knowledge and experience of valves, regulators and actuators through lecture and hands on workshops.

FINAL CONTROL ELEMENTS

Learning Path

At the foundation of any process are the field devices that measure and control the flow of air, steam, water, gas or hundreds of other materials. Without proper basic setup, calibration and configuration of these devices, advanced control techniques cannot provide the levels of efficiency the technology is capable of. Knowledge of process control devices within a plant is often passed down from generation to generation. At the same time, if advances in process technology and methodology usually brought about by training aren't brought into the plant, in-house standards for device setup and maintenance can become based on outdated theory. The result is that while a valve or instrument may be working, it may not be working up to its capabilities and is not delivering on its promised performance. Educational Services has made a global commitment to helping our customers find and keep that promise of performance.

Factory Training

At our Dubai & Jubail training facilities, we host factory training courses in which the student will attend class in our fully equipped training laboratory. Our courses include small group hands-on sessions, one-on-one time with instructors and a facility tour in the factory. Our workshops are simply the best investment you can make today in your employees and your business.

Regional Training Center

Our regional training center at RLIC Qatar is strategically located to support your training needs when and where you need it. Our fully equipped training laboratory allows us to host the same training courses as in Dubai & Jubail.

On-site, Local Training

We offer on-site training subject to availability of dedicated classroom facilities and suitable workshop locations so that we can maintain the same high standards of education at site.

eLearning Courses

Are a convenient and flexible way to manage your time and costs. Browse an online catalog of the latest eLearning courses on a variety of technical topics.

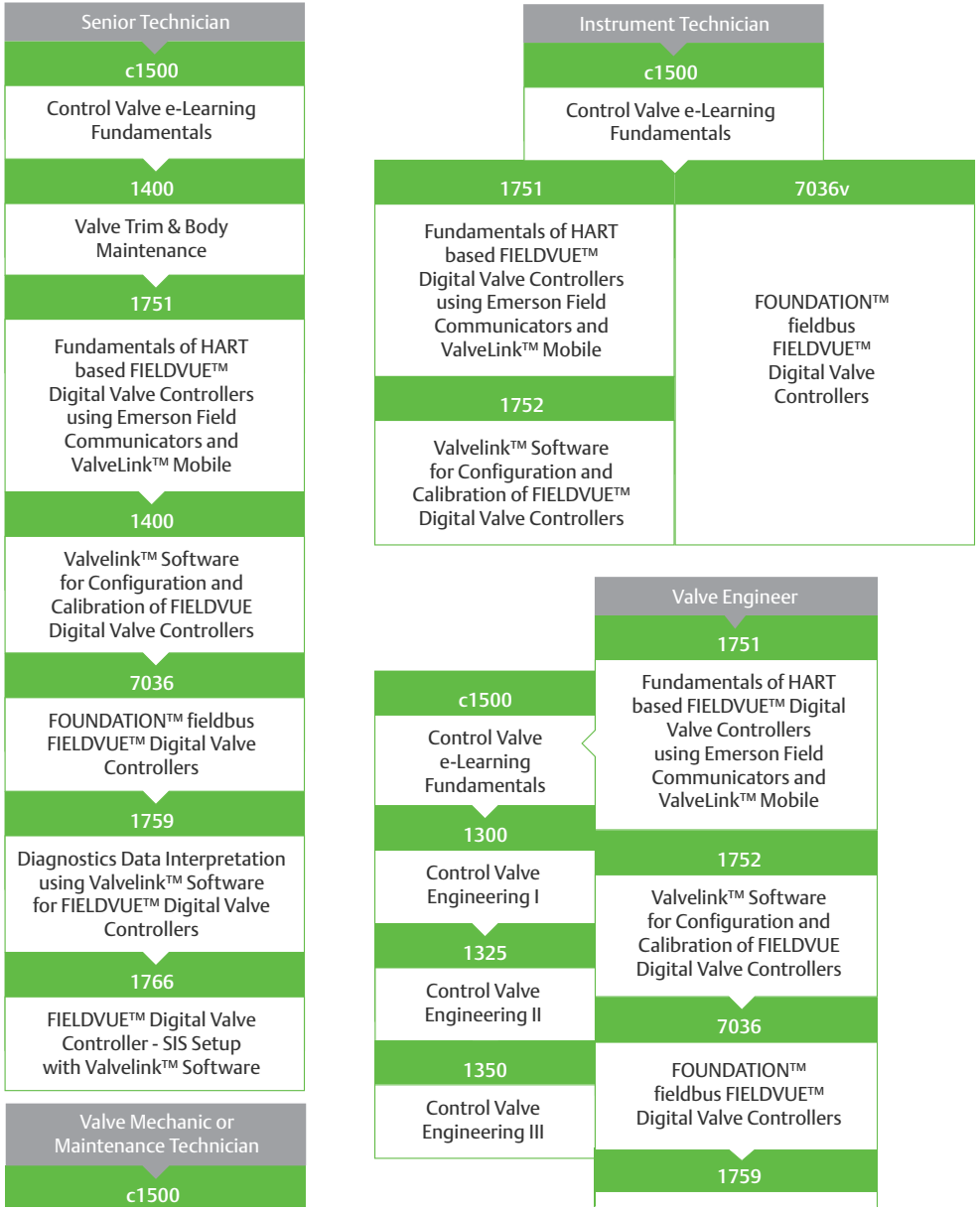
You can purchase directly from eStore with a credit card or provide a PO to **mea.education@emerson.com**

FINAL CONTROL ELEMENTS

Learning Path

Training Facilities

- A state-of-the-art **dedicated training room** able to accommodate 12 students in comfort
- Audio visual: **165 inch LED screen** and **70 inch interactive touch screen TV** with higher resolution and brightness.
- **Radio mic with ambient sound** for the instructor
- Work stations: 6 **live work stations** capable of both Hart and Fieldbus communications with their **own PC's and double monitors**, connected through **Wi-Fi** to the main AV stations allowing any 4 students on the main screen simultaneously
- Broadcast: **self tracking video cameras** for broadcasts and recording of sessions, plus independent **live video conferencing**



COURSE 1300 CEUs : 2.1

Control Valve Engineering I

Overview
This course is for engineers, technicians and others responsible for the selection, sizing and application of control valves, actuators and control valve instrumentation. This 3-days 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 problems using Fisher Specification Manager 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 of control valves and actuators
- Properly apply positioners and instruments

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

Topics
- Control Valve Selection
- Rotary/ Sliding Stem
- Actuator Selection and Sizing
- Corrosion Resistant Valves
- Liquid Valve Sizing
- Gas Valve Sizing
- Positioners and Transducers
- Valve Application Guidelines
- Valve Characteristics
- Valve Packing Considerations

COURSE 1325 CEUs : 0.7

Control Valve Engineering II

Overview
This course is designed for engineers, technicians, and others responsible for the selection, sizing, and application of control valve assemblies. This 1-day course event consists of two parts, 4 hours for each part. It reviews design and operating principles of control valves in various applications. It describes the sizing and selection methods utilized in selecting appropriate control valve assemblies, as they relate to severe service applications such as noise and cavitation. Students will solve several advanced sizing and selection problems using Fisher Specification Manager software and published materials. Students will also have the opportunity to ask Emerson certified instructors for Fisher engineering courses to clarify questions and assist in better understanding of these advanced fluid mechanic ideas. Students who successfully complete this course will:
- Size control valves and trim for cavitating application
- Size control valves and trim for a noisy application
- Choose suitable styles of control valves for an application
- Size control valves for an erosive and/or corrosive application
- Properly apply knowledge learned from 1300

Prerequisites
Successful completion of 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

COURSE 1350 CEUs : 2.1

Control Valve Engineering III

Overview
This 3-day 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.

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 have equivalent experience (minimum of two years specifying control valves and instrumentation). Familiarity with Fisher Specification Manager is required.

Topics
- Review of Control Valve Selection Guidelines
- Liquid Sizing
- Gas Vapor Sizing
- Actuator Sizing Guidelines
- Stroking Speed
- Negative Fluid Force Gradients
- Two Phase Sizing
- Sizing Hydrocarbon Mixtures
- Advanced Cavitation
- Advanced Aerodynamic Noise

The twin forces of advancing technology, exemplified by the rapid acceptance of **FIELDVUE digital valve controllers**, and the merging of the **valve and instrument technician crafts** in many plants are making control valve education more important today than ever before. These interrelated trends necessitate higher levels of education on the part of those responsible for valve maintenance and operation.

COURSE 1400 **CEUs : 2.1**

Valve Trim & Body Maintenance

Overview
This 3-days 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 digital valve controllers. Those who complete this course will be able to:

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

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

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.

COURSE 1751 **CEUs : 2.1**

Fundamentals of HART based FIELDVUE™ Digital Valve Controllers using Emerson Field Communicators and ValveLink™ Mobile

Overview
This course is for technicians, engineers and others responsible for installing, calibrating and basic troubleshooting FIELDVUE™ instruments using the AMS Trex Field Communicator. This 3-days course provides the necessary skills to:

- Install and mount a FIELDVUE™ digital valve controller onto Sliding Stem Actuator/Valve and Rotary Actuator/Valve Assemblies.
- Configure and calibrate FIELDVUE™
- Instruments with the Field Communicator.

Prerequisites
Control valve experience and/or course 1400, 1300, 1710 or 1451

Topics

- Control Valve Terminology
- Globe Valves/Packing
- Actuators
- Bench Set
- Ball Valves / Butterfly Valves / Eccentric Disc Valves
- Valve Characteristics
- Control Valve Noise and Cavitation
- FIELDVUE™ Digital Valve Controller Theory of Operation
- HART Communication Signal
- FIELDVUE™ Instrument Installation
- AMS Trex Field Communicator
- Instrument Configuration and Calibration
- Instrument Troubleshooting
- ValveLink™ Mobile Overview

COURSE 1752 **CEUs : 2.1**

ValveLink™Software for Configuration and Calibration of FIELDVUE™ Digital Valve Controllers

Overview
This course is for technicians, engineers and others responsible for installation, calibration and diagnostics for FIELDVUE™ digital valve controllers and ValveLink™ software. The primary focus of this course is to provide a comprehensive experience in managing Digital Valve Controllers using the ValveLink™ software. This 3-days lecture/lab style course provides hands-on experience working with FIELDVUE™ digital valve controller and ValveLink™ Software. Students will be able to execute ValveLink™ calibration and diagnostic routines, and create an instrument database.

Prerequisites
Control valve experience and course 1451 / 1751

Topics

- Introduction to ValveLink™ Software
- ValveLink™ Tag and Database Management
- Configuration with ValveLink™
- Calibration with ValveLink™
- ValveLink™ Advanced and Performance
- Tier Diagnostics
- Troubleshooting
- Introduction to Diagnostic
- Data Interpretation

Courses for valve and instrument technicians explain what's required to **maintain modern control valves and demonstrate the skills necessary to do that job effectively**. These classes are very structured, but students have plenty of opportunities to practice newly learned skills and receive feedback from experts in the field. The goal is to **reduce the number of poorly operating control valves throughout industry in order to enhance processing and reduce downtime.**

COURSE 7036 **CEUs : 2.1**

FOUNDATION™ Fieldbus FIELDVUE ™ Digital Valve Controllers

Overview
This course teaches technicians and engineers the basics of FOUNDATION™ fieldbus digital valve controller installation, configuration, calibration and troubleshooting using AMS Trex Field Communicator and ValveLink™ Software. The 3-days course is designed for the reviews of the role and function of control valve positioners, followed by a series of hands-on exercises to disassemble, inspect, assemble, install and commission a 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 AMS Trex 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™ diagnostics.

Prerequisites
Basic familiarity with positioners and control valve basics is required. Course 1400 / 1451 is recommended.

Topics
- Positioner Basics
- FOUNDATION™ Fieldbus Overview
- FIELDVUE™ digital valve controller Installation and Mounting
- Modes and Status
- Configuration and Calibration with new 475 Field Communicator
- ValveLink™ Setup Wizard / Detailed Setup
- Tuning
- Tag Management
- Pressure Control
- Valvelink™ Diagnostics
- FIELDVUE™ Instrument
- Troubleshooting

COURSE 1759 **CEUs : 2.1**

Diagnostic Data Interpretation Using ValveLink™ Software for FIELDVUE™ Digital Valve Controllers

Overview
This 3-days course uses practical exercises and discussions to teach the student to interpret and analyze diagnostic data obtained using FIELDVUE™ Digital Valve Controllers and ValveLink software. Students will perform diagnostic tests on a variety of valve/actuator combinations and use the data to determine bench set, dynamic error band, seat load, spring rate and other pertinent parameters.

Students will also perform comparison tests on valves/ actuators containing assembly or operating flaws and use the data for troubleshooting purposes. This course is for technicians, engineers and others responsible to collect and interpret valve diagnostic tests performed using Valvelink™ software.

Prerequisites
Students must have completed one of the following: 1751, 1752, 7036, or 1760V Series (1760V, 1761V, 1762V, 1763V). Completion of 1400, 1700, and 1450 are recommended if additional experience with valve maintenance and basic troubleshooting is needed

Topics
- Review of ValveLink software
- Diagnostic Tests
- Data Interpretation
- Troubleshooting Techniques
- Comparison Testing Techniques
- Performance Diagnostics

COURSE 1766

FIELDVUE DVC 6200 SIS Setup with ValveLink Software

Overview
This 3-day course are to provide the background and exercises that will allow the student to:
- · Configure and Calibrate a FIELDVUE DVC 6000 SIS Digital Valve Controller.
- · Run and interpret a Partial Stroke Test
- · Define and edit key SIS parameters
- · Understand and manage SIS alerts

Prerequisites
Familiarity with Fisher Controls' Digital Valve Controller (FIELDVUETM DVC) will be very helpful.

Audience
Participants in this course are engineers, technicians, mechanics, and other personnel who are required to specify, install, configure, calibrate, and/or maintain the SIS Tier Fisher Controls Digital Valve Controller (FIELDVUE DVC)

COURSE PRM-MEA-101

Pressure Relief Valve Overview

Overview
This 1-day course explains how pressure relief valves function and how they are installed and tested. At the end of the course the attendees will be familiar with various Pressure Relieving Devices, their design, operation, maintenance, calibration, testing and installation. The course also covers the causes of improper valve performance. Those who complete this course will be able to:

- Understand the reasons for & history of pressure relieving devices.
- Gain knowledge on design considerations.
- Understand the basic terminologies used

Prerequisites
Some experience in valve maintenance, design concepts, installation, and operation would be helpful.

Topics

- Pressure relief valve types
- An overview of Codes & standards
- Basic Valve Operation
- Initial troubleshooting

Audience
This introductory course is for valve mechanics, mechanical inspectors, piping engineers, mechanical maintenance personnel, instrument technicians, and others who deal with pressure relieving device management and maintenance.

COURSE PRM-MEA-102 CEUs : 3.5

Direct Spring Operated Pressure Relief Valve Maintenance ASME VIII

Overview
This 5-day course caters for maintenance personnel dealing with pressure relief valves. Upon completion of the course, the candidates will be able to overhaul, fault find, calibrate and test Pressure Relief Valves utilizing the relevant maintenance instructions.

Prerequisites
Some experience in valve maintenance, design concepts, installation, and operation would be helpful.

Topics

- Terminology
- Valve Types & Operation
- Codes and Standards
- Temperature/Back Pressure Compensation
- Causes of Improper Performance
- Type Numbering
- Machining of Valve Components
- Practical Valve Engineering
- Troubleshooting

Audience
This is a workshop style course that includes "hands on" overhaul and test procedures, along with practical and written assessment. It is intended for workshop supervisors, valve mechanics, mechanical maintenance personnel, instrument technicians, and others who deal with pressure relieving device management and maintenance.

COURSE PRM-MEA-103

High Pressure Pilot Operated Pressure Relief Valve Maintenance

Overview
This 18-hour course caters for maintenance personnel dealing with High Pressure Pilot Operated pressure relief valves. Upon completion of the course, the candidates will be able to overhaul, fault find, calibrate and test ASME Sec VIII HP Pilot Operated Pressure Relief Valves utilizing the relevant maintenance instructions. It is recommended to attend a follow-up training session PRM-MEA-103W which is a 1-day practical hands-on event. Assessment Certification, achieved by written and practical examination, is valid for three years.

Topics

- Terminology
- Valve Types & Operation
- Codes and Standards
- Causes of Improper Performance
- Pop action vs modulating action pilots
- Type Numbering
- Practical Valve Engineering
- Troubleshooting

Audience
This is a virtual workshop style course that includes "demonstration hands on" of overhaul and test procedures, along with written assessment. It is intended for workshop supervisors, valve mechanics, mechanical maintenance personnel, instrument technicians, and others who deal with high pressure pilot operated pressure relieving device management and maintenance.

Prerequisites
Some experience in valve maintenance, design concepts, installation, and operation would be helpful.

As the world-wide leading provider of precision pressure relief devices & industrial regulators with such brands as Fisher, Anderson Greenwood, Crosby, and Varec, we are committed to provide the technical assistance needed to help designers and engineers **meet pressure vessel code requirements and attain optimum pressure relief valve performance.**

COURSE PRM-MEA-104

Recertification for Direct Spring OR High-Pressure Pilot Operated Valves ASME VIII

Overview
This 2-day course is intended for Mechanical, Instrument, Process Supervisors & Technicians who have undertaken the "5 Day Pressure Relief Valve Maintenance Course or 5 Day Pilot Valve Maintenance Course" within the last 3 years and have documented evidence of PRV Maintenance during the certification period. A minimum of 4 cases of evidence per year is requested.

Method
A certificate is awarded on successful completion of the assessment, which is valid for 3 years. If there is insufficient or no documented evidence then a 3-day refresher course will be required to be completed for recertification.

COURSE PRM-MEA-105

Pressure / Vacuum Valve Familiarization Overview

Overview
This 3-day course caters for maintenance personnel dealing with pressure/vacuum valves. Upon completion of the course, the candidates will be able to understand working principle of these mechanical devices, fault find, calibrate and test Pressure/Vacuum Valves utilizing the relevant maintenance instructions & testing equipment.

Prerequisites
Some experience in valve maintenance, design concepts, installation, and operation would be helpful.

Topics
- Terminologies
- Basic Tank operating principles
- Pressure/Vacuum valve operating principles
- Valve Types & Operation
- Codes and Standards
- Type Numbering

Audience
This is a classroom & workshop style course that includes "hands on" overhaul and test procedures, along with practical and written assessment. It is intended for workshop supervisors, valve mechanics, mechanical maintenance personnel, and others who deal with pressure/vacuum relieving device management and maintenance.

COURSE PRM-MEA-106

Low Pressure Pilot Operated Valves Maintenance

Overview
This 3-day course caters for maintenance personnel dealing with low pressure pilot operated valves. Upon completion of the course, the candidates will be able to understand working principle of different styles of low-pressure pilot operated valves, fault find, calibrate and test utilizing the relevant maintenance instructions & testing equipment.

Prerequisites
Some experience in valve maintenance, design concepts, installation, and operation would be helpful.

Topics
- Terminologies
- Low Pressure Pilot valve operating principles
- Codes and Standards
- Type Numbering

Audience
This is a classroom & workshop style course that includes "hands on" dis-assembly/re-assembly and test procedures, along with practical and written assessment. It is intended for workshop supervisors, valve mechanics, mechanical maintenance personnel, and others who deal with low pressure pilot operated valves management and maintenance.

COURSE 1100

Regulators & Relief Valves Gas Regulators

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 conference will be able to:
- Perform maintenance on regulators and relief valves
- Troubleshoot field problems

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

Topics
- Self-Operated Regulators
- 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.

COURSE ACT-MEA-101 **CEUs : 0.7**

Emerson Electric Actuators Overview

Overview
This 1-day course discusses on Emerson's next generation portfolio of compact electric actuators for quarter-turn and multi-turn applications. Brands like Bettis, Biffi, & EIM along with different models and application will be discussed to give the audience a general overview of these versatile valve actuation packages. This course is for technicians, engineers and others who wish to understand the basic concepts for electric actuator functionality, principles of operation, selection criteria & best practices for maintenance.

Topics
- Bettis electric product portfolio
- Biffi Electric product portfolio
- Basic concepts
- Principle of operation
- Selection of electric actuators
- Maintenance practice

COURSE VA-MEA-201 **CEUs : 2.1**

Bettis and Biffi Scotch-Yoke Products, and Biffi, El-O-Matic & FieldQ Rack & Pinion Products Servicing

Overview
This 3-day class provides comprehensive information concerning the installation, operation and maintenance of all Bettis Scotch-Yoke Products, EL-O-Matic & FieldQ Rack & Pinion Products.

Prerequisites
Involved with the purchase / application / marketing or sales of products

Topics
- Instruction / Maintenance
- Instruction Manuals
- Product Serial Numbers Review
- Service Procedure Index Review
- General Operating / Maintenance Instructions
- General Servicing information on G, CBA300, CBB-Series, ALGA, ALGAS, RPD, RPS-Series; F, E, P-Series and FieldQ-Series
- Conversion of Fail Action in G-Series Actuators
- 2-days of practical exercises involving the disassembly /reassembling of Products

Actuation Technologies combines the strengths of seven world-recognized brands; **Bettis, Biffi, Dantorque, El-O-Matic, Hytork, FieldQ, and Shafer** into a single unit. We capitalized on more than 100 years of combines experience dedicated to only one thing controlling and automating valve operation.

COURSE ACT-MEA-102 **CEUs : 3.5**

Biffi Electric Actuators Service Training

Overview
This 5-day course provides information on the ICON 2000 & 3000 portfolio ranging from multi-turn to ¼ turn, the principles of operation, mechanical and electrical components, followed by a hands-on demonstration and practical troubleshooting.

Prerequisites
Personnel involved with the design, commissioning, operations & maintenance of electric actuators & systems.

Topics
- Product overview
- Actuator operation
- Operation by Handwheel
- Local /Remote Control
- Configuration
- Local Operator Interface
- Set-up Menu and Routines
- View Menu and Routines
- A Manager programs
- Maintenance
- Troubleshooting
- Diagnostics Messages
- Differences between ICON 2000 & 3000

COURSE ACT-MEA-103 **CEUs : 2.8**

EIM Electric Actuators Service Training

Overview
This 3-days Fundamental overview of the construction, assembly, hardware, software and configuration of Emerson's Bettis Tec2000 and Tec2 actuators. Students attending this program will demonstrate an ability to identify actuators, hardware, components and assemblies. All students will demonstrate the ability to setup, configure, check and verify operation of various actuator configurations using appropriate hardware or software. This course is for field service technicians, sales engineers, quotation managers, instrumentation and control technicians.

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

Topics
- Identify main mechanical components and understand the function of Emerson's Bettis Tec2 actuators
- Identify main components and understand function of the non-intrusive Tec2 control package.
- Setup and Commissioning
- Identify function and main components of bevel gears and worm gears
- Upgradation of TEC2000 to TEC2 actuator

COURSE ISV-MEA-101 CEUs : 1.4

Gate, Globe, & Check Valve Overview and Maintenance

Overview
This 2-days course discusses on Emerson's extensive manual valve portfolio comprised of gate, globe, check, & knife gate valves. A practical session with hands-on is included in a workshop type environment. This course is for mechanics, engineers and others who wish to understand the basic concepts for GGC valves functionality, principles of operation, selection criteria & best practices for maintenance.

Topics
- Types of valves & application
- Design standards & testing standards
  Packing designs
- Repair & Maintenance

COURSE ISV-MEA-102 CEUs : 1.4

Ball & Butterfly Valve Overview & Maintenance

Overview
This 2-days course discusses on Emerson's extensive ball & butterfly valve lines comprised of floating & trunnion mounted ball valves, swing type & triple-offset butterfly valves. Brands like Vanessa, Fisher, KTM, and Virgo will be discussed along with different types and models manufactured. A practical session with hands-on is included in a workshop type environment.

Prerequisites
Personnel involved with the design, commissioning, operations & maintenance of these mechanical isolation equipment.

Topics
- Product overview
- Principle of operation
- Servicing, repair & Maintenance

COURSE ISV-MEA-103 CEUs : 1.4

Fundamentals of Vanessa TOV Valves Product & Maintenance

Overview
This course is for technicians, engineers, and others responsible for installing, calibrating and basic troubleshooting Vanessa TOV valves. This 2-days course provides the necessary skills to:
- Install and maintenance of Vanessa TOV valves
- Product details of Vanessa and details of TOV
- Maintenance details with spare parts details

Topics
- Vanessa TOV Terminology
- Triple offset details
- Vanessa Model 30000
- Product features
- Key features
- Value proposition
- Valve maintenance
- Vanessa testing procedure

COURSE ISV-MEA-104 CEUs : 1.4

Fundamentals of AEV Valves Product and Maintenance

Overview
This course is for technicians, engineers, and others responsible for installing, calibrating and basic troubleshooting AEV valves. This 2-days course provides the necessary skills to:
- Install and maintenance of AEV valves.
- Product details of AEV Valves and details of TOV.
- Maintenance details with spare parts details.

Topics
- AEV Valve Terminology
- Value proposition
- Overview
- Capabilities
- Design
- Simplicity
- Double eccentric
- General assemble information
- Valve maintenance
- AEV testing procedure

COURSE VA-MEA-203 **CEUs : 1.0**

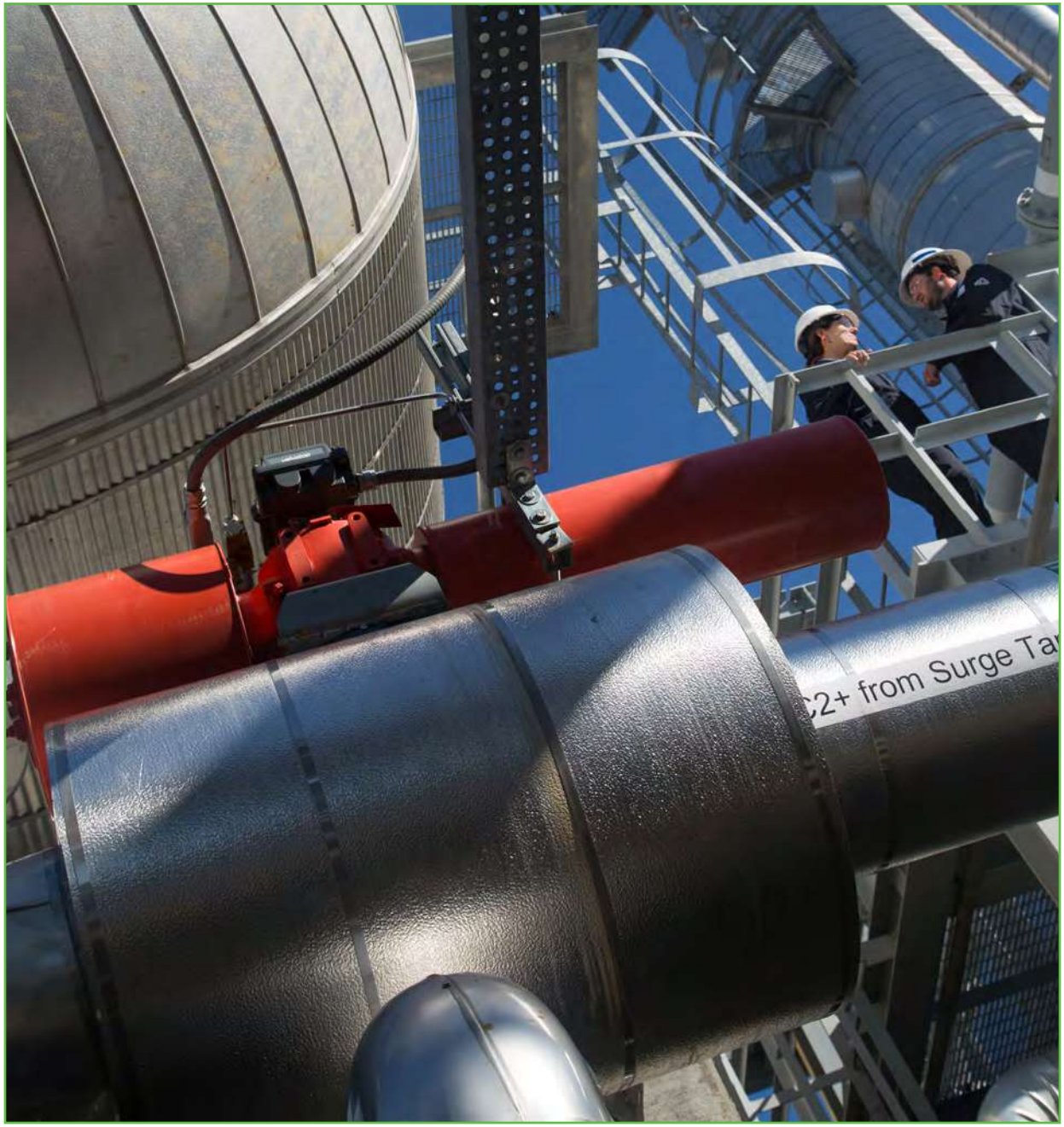
Bettis™ Multiport Flow Selector (MPFS) Servicing

Overview
This 1½-day course provides information on the Bettis MPFS, principles of operation and hands-on experience concerning the installation, operation and maintenance of the product.

Prerequisites
Involved with the purchase / application / marketing or sales / service of products.

Topics

- MPFS Design Philosophy
- MPFS assembly overview
- Plug seal components overview
- MPFS Disassembly
- MPFS Re-assembly
  - » Bonnet seal change
  - » Plug seal change
- Actuator local mode operation
- Actuator remote mode operation
- Actuator communication with DCS
- Port alignment/calibration
- Home port calibration



MEASUREMENT INSTRUMENTATION

Measurement Solutions Classroom

In these challenging times when the priority for training your staff can be lost compared to other critical requirements on-site we have a flexible solution to fit all your different needs, calendars and budgets. From virtual trainings that allow your engineers to access from site or home to sending them to attend the customized training courses in our state-of-the-art training facility be assured that we have you covered.

KEY FEATURES

- State-of-the-art audio/visual technology with fixed mobile cameras & microphones for all virtual training requirements
- Demos to cover all training needs across our entire product portfolio
- Analyzer training center with live gases for both face-to-face and virtual trainings
- Mobile Training skid with full Control System, Flow Loops, Instrumentation and Tank Controls

COURSES OFFERINGS AVAILABLE

- IACET compliant Emerson Standard Courses
- Courses that fall under Fundamentals of Instrumentation, Analytical Instrumentation, Pressure, Temperature, Level Measurement, Flow Measurement, Density Measurement & Rosemount Measurement
- Competency Development Programs

OPPORTUNITIES:

- Flexible to your needs, timescale and budgets
- Globally certified expert instructors available to conduct trainings
- Customize training by job function

Roxar's objectives are to help oil and gas operators **increase oil and gas recovery from their reservoirs, reduce uncertainty and make improved field management decisions**. The need for training is more critical than ever to achieve and maintain cost-effective operations. Roxar supports all the delivered instrumentation with a range of highly practical training programs.

COURSE ROX007 **CEUs : 0.7**

Roxar Acoustic Sand Monitor

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: SAM Server 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

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, Re-installing or Replacing the Detector

COURSE ROX008 **CEUs : 0.7**

Roxar CorrLog Intrusive Corrosion Monitoring System

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 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

COURSE RX009 **CEUs : 0.7**

Roxar SandLog Intrusive Sand Monitoring System

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

COURSE ROX010 CEUs : 1.4

Roxar FSM

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

Maintenance
- Battery Replacement (EX Version)
- System Health Checks

COURSE ROX011 CEUs : 0.7

Roxar Hydraulic Retrieval & Access Fitting System

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

COURSE ROX001 **CEUs : 2.1**

Roxar Multiphase Meter 1900VI

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-days Roxar MPFM 1900VI course is to provide the participant with an understanding of the multi phase 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

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

COURSE ROX016

Roxar Multiphase Meter 2600

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-days 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
- 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

COURSE ROX003 **CEUs : 1.4**

Roxar Subsea Multiphase Meter

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-days 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 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

Maintenance

- Gamma System
- Electrical System
- Calibration
- Software Updates
- Sensor Geometry

PVT

- What is PVTx
- Fluid Analysis: Sampling, Compositional Data
- Tempest PVTx
- Import Tables

COURSE ROX006 **CEUs : 0.7**

Roxar Subsea Watercut Meter

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, do 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

Operations

- Connecting to the Meter
- Software Operations: Entering the Meter, Configuration Measurement
- In-line Calibration of the Meter
- Measurement Uncertainty
- Practical Exercises on Meter Electronics

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
- The Production of the Meters to Fit the Model of the First Meter
- The Production Sequence in a Meter Measurement Uncertainty and Initial Explanation

Maintenance

- Overview of Recommended Maintenance
- Turning Diagnostics and Logging 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

COURSE ROX004 CEUs : 0.7

Roxar Wetgas Meter

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

COURSE ROX005 CEUs : 0.7

Roxar Subsea Wetgas Meter

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

COURSE D4520 **CEUs: 2.1**

Hydrocarbon Liquid Flow Measurement Systems Operation and Maintenance

Overview
This 3-days course provides students with a detailed understanding of the principles of measurement for Hydrocarbon Liquids. Consideration of the correct Primary measuring device, its installation, operation, and secondary instrumentation requirements will be explained. The instructor will reference applicable standards, used for design, and to optimize system performance. This includes system calibrations, meter-proving practices and maintenance. Full supporting literature will be made available to students.

Prerequisites
A basic knowledge of flow measurement is required.

Topics
- Background to Liquid Flow Measurement
- Commercial and Legal Requirements
- Principles of Current Liquid Flow
- Measurement Techniques
- Secondary instrumentation, including Liquid Samplers
- Meter Operation, Calibration and Meter
- Proving Operations
- Maintenance Procedures
- Reporting and Book Keeping

COURSE D4510 **CEUs: 1.4**

Hydrocarbon Gas Flow Measurement Systems Operation and Maintenance

Overview
This 2-days course provides students with a detailed understanding of the principles of measurement for Hydrocarbon Gases. Consideration of the correct Primary measuring device, its installation, operation and secondary instrumentation requirements will be explained. The instructor will reference applicable standards, used to design the system to optimize performance. This includes system calibrations and device maintenance. Full supporting literature will be made available to students.

Prerequisites
A basic knowledge of flow measurement is required.

Topics
- Background to Gas Flow Measurement
- Commercial and Legal Requirements
- Principles of Current Gas Flow Measurement Techniques
- Secondary Instrumentation, including Gas Quality Analyzers System Design Standards Used
- Meter Operation, Calibration and Master Metering Operations
- Maintenance Procedures
- Reporting and Book Keeping

COURSE D4230/D4280 CEUs: 1.4

Operation and Maintenance of Gas/Liquid Ultrasonic Meters

Overview
This 2-days course prepares students to install, operate and maintain multipath ultrasonic flow meters. In addition to classroom instruction, the training course includes hands-on experience using the flow meter, 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

COURSE D4100 CEUs: 2.1

Introduction to Model 500 and 700 Gas Chromatographs

Overview
This 3-days course provides students with a basic understanding of how a gas chromatograph works, emphasizing chromatograph fundamentals and basic theory. The only prerequisites are basic computer skills and DMS provides an experienced on-site instructor as well as all necessary equipment and handouts for the course.

Topics
- Basic Chromatography Principles and
- Their Application to Gas Measurement
- Basic Chemistry, Flow Configuration and Carrier and Calibration Gas Systems
- Basic Sample Systems
- Basic Chromatograph Hardware
- Times Events, Retention Times, Response Factors
- Calculations & Control Parameter
- Using Chromatograms to Identify Problems
- Identifying Gas Components
- Calibrating a Gas Chromatograph
- Operation of MON Software

COURSE D4270 CEUs: 1.4

Operation & Maintenance of the Rosemount Compact Prover

Overview
This 2-days course covers the operation, installation and maintenance of the Compact Prover.

Prerequisites
Basic knowledge of flow measurement.

Topics
- Theory of Operation: Double Chronometry and Specifications
- Overview of the Parts Which Make up the Compact Prover such as Actuator Assembly, Pneumatic Spring Chamber, Piston and Poppet, Optical Switches, Hydraulic Motor and Pump, and Solenoid Valve
- Installation: Prover and Meter Location, Nitrogen Spring Plenum Setting, and Power requirements
- Troubleshooting and Repair of: safety Barriers, Seal and O-ring Replacement, Detector Switches, Interface Board, Hydraulic and Nitrogen System, and Spare Parts
- Overview of Calibration: Seal Leak Test, Upstream and Downstream calibration and Waterdraw Data Sheet
- Overview of Prover Electronics:
- Programming, Input and data Modes Using Software/Local Display, Circuit Module Description and Diagnostics
- Proving Operations: Direct Proving and Master Meter Proving
- Prover Maintenance

COURSE D4260/D4262 **CEUs: 1.4**

Operation and Maintenance of S600/S600+ Flow Computers

Overview
This 2-days course provides students with an appreciation of the operation, design, capabilities and configuration of the S600/ 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 made available to all students.

Prerequisites
Basic knowledge of flow measurement.

Topics
- Introduction to the S600/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

COURSE D4530 **CEUs: 1.4**

Understanding Metering Systems: Applications, Operations and Maintenance

Overview
This 2-days course is an introduction to high accuracy fluid flow measurement systems. The instructor will explain the practical application of gas and liquid flow meters and secondary instrumentation as well as the liquid sampling and gas analysis techniques for measuring product quality. Good practice for System operation and maintenance will also be discussed. Supporting literature will be supplied to students.

Prerequisites
A background in process control or process instrumentation is required.
Topics
- Background to High Accuracy Fluid Flow Measurement
- Custody Transfer, Fiscal and Allocation Metering
- Commercial Agreements and Legal Requirements
- Flow Measurement Methods
- Qualitative Measurement
- Reference Standards Employed
- Flow and Energy calculations
- System Maintenance
- Good Metering Practices

COURSE D4540 **CEUs: 1.4**

DanPac Measurement and Control System Introduction to Operation and Maintenance

Overview
This 2-days generic course provides students with an operational introduction to the Danpac Measurement & Control System. The instructor will explain the metering system architecture, its function and administration. As well as showing how to navigate the operator interface, the course covers basic troubleshooting. The instructor will also explain the features and benefits of the control options available within DanPac. Students will receive supporting literature.

Prerequisites
A background in flow measurement is required.
Topics
- Introduction to the DanPac System Architecture
- Operator Interface Graphics and Controls
- Access and Security
- Communication and Interface to System Field Components Reporting and Alarm Functions
- Simple Diagnostics and Troubleshooting

*More detailed training for a specific project application is also available and will be quoted on request.

COURSE 2380 **CEUs: 1.4**

Micro Motion Coriolis Comprehensive Training Class

Overview
This 2-days class is modeled after the 2352 factory course. It consists of a blend of lectures and extensive hands-on exercises that cover the installation, configuration and calibration of the Micro Motion metering system. Students will learn the Series 1000/2000 transmitters using either ProLink® III, AMS Device Manager, HC475 or L.O.I. Students will perform a master reset, configure the Series 1000/2000, perform a flow calibration and solve troubleshooting problems. Based on student need, we will cover one or all of the following topics: RFT9739, 9739MVD transmitter, T-Series, R-Series, or Series 3000 platform. On-site classes can be customized to cover the customer's installed base, preferred configuration tools and application questions. This course also includes an introduction to Micro Motion's new 5700 transmitter.

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

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 flow and density meter. Typical job functions include, maintenance technicians, instrument technicians and instrumentation engineers.

COURSE 2358 **CEUs: 0.7**

Micro Motion Coriolis Product Intermediate

Overview
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. This 1-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 (e2353) for a year. This online training cost $400/license per year if purchased separately.

Prerequisites
A basic understanding of the fundamentals of flow measurement, electricity, analog & frequency signal processing are assumed

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

COURSE 2340 **CEUs: 0.7**

Rosemount 8700 Series Magnetic Flowmeter

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.

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.

Prerequisites
Knowledge of basic flow fundamentals and instrumentation.

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 or PROLINK III
- Properly Install/Troubleshoot the Rosemount Magnetic Flowmeter System

Customized Training at a customer's plant is a **convenient, cost-effective means of training four to ten technicians**. Also, offering special technical training tools and materials for self-study.

COURSE 5716 **CEUs: 0.7**

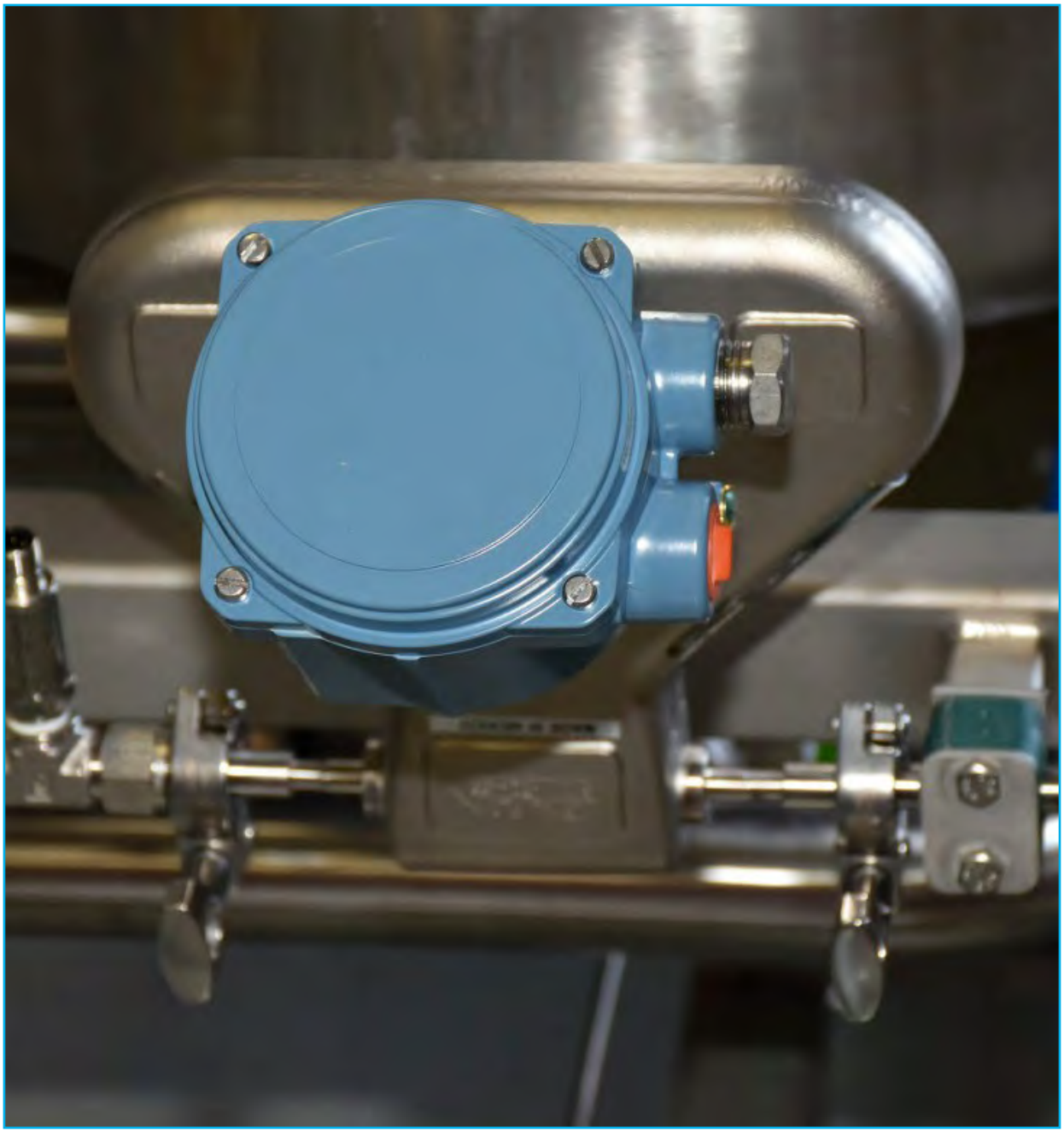
Rosemount 8800 Series Smart Vortex Flowmeter

Overview
This one-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. Students will learn the operation and Local Operator Interface as well as how to use these tools to perform configuration. Common issues encountered and troubleshooting techniques will also be covered. This course includes hands-on exercises within the Inter Active Plant Environment training facility. Customer exclusive classes can be customized to address specific transmitter and configuration tools specific to that customer

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

Objectives
After attending this course the student will be able to do the following:
- Explain the differences and capabilities of the Rosemount 8800 Series Vortex flowmeters
- Explain the von Karman Effect and the principles of operation for vortex flowmeters
- Identify vortex parts and explain functionality
- Configure and test transmitters
- Properly install and troubleshoot the Rosemount 8800 Series Vortex flowmeter system
- Apply a step by step process to perform basic troubleshooting of the most common process issues
- Experience hands on simulated plant environment with operating Vortex flowmeter system

Audience
This one-day course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Rosemount 8800 Series Smart Vortex flowmeter. Typical job functions include: maintenance technicians, instrument technicians and instrumentation engineers.



COURSE 2381 **CEUs: 0.7**

Micro Motion ModBus Digital Communication

Overview
This course is appropriate for personnel who have any of the following responsibilities: Installing a Micro Motion transmitter on an RS-485 network, configuring, calibrating, operating or troubleshooting a Micro Motion transmitter using ModBus protocol, setting up a Modbus host or PLC to communicate with a Micro Motion transmitter or writing programs that use ModBus protocol to communicate with Micro Motion transmitters. This 1-day class consist of a blend of lectures and hands-on exercises. Students will learn the Modbus communication 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.

Prerequisites
Students should have completed Micro Motion Comprehensive Product Training, Course 2352 or have equivalent knowledge or experience.

Topics
- Explain the Fundamentals for the Modbus Protocol model
- Configure, Commission, Read Process
- Data, View and Analyze Key Diagnostic Registers and Loop Test a Batch Application using a Micro Motion Meter
- Set up a Host System or PLC to Communicate with a Micro Motion Transmitter via Modbus Diagnostics
- Meter Verification Diagnostics

COURSE 2386 **CEUs: 0.7**

Micro Motion Specific Gravity Meter Intermediate

Overview
This course is intended for anyone that is involved with properly installing, wiring, configuring and troubleshooting a Micro Motion 3098 Gas Specific Gravity meter. Typical job functions include; maintenance technicians and instrumentation engineers. 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 start-up. Troubleshooting of commonly seen issues is also covered. This course includes hands-on demonstrations.

Prerequisites
None required. However, basic understanding of the fundamentals of the behavior/ properties of gases and gas density measurement are helpful. Basic electricity, analog and frequency signal processing knowledge are also assumed.

Topics
- Explain the Principle of Operation for how a Micro Motion 3098
- Gas Specific Gravity works and the Function of the Key components
- Learn the installation Best Practices for orienting, mounting, piping and wiring the 3098
- Configure the 3098 and perform the required field calibration
- Learn a step by step process to perform basic troubleshooting of the most common issues Customers encountered

COURSE 2333 **CEUs: 2.1**

Process Measurement Products III (Level)

Overview
This course is intended for technicians, engineers and other plant personnel who need to know installation, calibration, maintenance and troubleshooting of measurement instrumentation. This 3-days course explains how level instruments function and how they are installed and calibrated. 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 Guided Wave Radar Transmitters
- Correctly install Non-contacting Radar Transmitters
- Properly calibrate Level instruments
- Perform basic troubleshooting

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

Topics

- DP Level Fundamentals
- Radar Applications
- Radar Instruments
- Radar PC Software
- Field Communicator
- Test Equipment Selection
- Installation
- Configuration
- Calibration / Verification
- Troubleshooting

COURSE 2305 **CEUs: 0.7**

3051 Smart Pressure Transmitter

Overview
This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3051 Smart Pressure Transmitter. This 1-day course lecture and labs to teach the student how to install, configure, calibrate, and maintain the Rosemount Model 3051 Smart Pressure Transmitter. The Student will also learn the operation of the Model Field Communicator, Students will:

- Explain the differences between Smart & Analog Transmitters
- Identify 3051 parts and functionality
- Explain the principles of operation of the 3051
- Configure, calibrate and test 3051 Smart Pressure Transmitters using the Field Communicator or AMS
- Properly install/troubleshoot the 3051 Smart Transmitter

Prerequisites
Knowledge of basic pressure fundamentals and pressure instrumentation

Topics

- Smart and Analog Transmitters
- 3051 Overview and Principles of Operation
- Test Equipment Selection
- Bench Testing the 3051 Smart Transmitter Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

COURSE 2307 **CEUs: 0.7**

3051 Fieldbus Pressure Transmitter

Overview
This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3051 Fieldbus Pressure Transmitters. This 1-day course uses lectures and labs to maximize the hands-on experience and teach the student how to install and maintain the Rosemount Model 3051 Fieldbus Pressure Transmitter. The Student will also learn the operation of the Field Communicator. Students who complete this course will able to :
Identify 3051 parts and functionality

- Explain the principles of operation of the 3051
- Design and build a Fieldbus segment
- Configure test, and calibrate the 3051
- Fieldbus Pressure Transmitter using the field Communicator
- Properly install and troubleshoot the 3051 Fieldbus Transmitter

Prerequisites
Knowledge of basic pressure fundamentals and pressure instrumentation.

Topics

- 3051 Overview and Principles of Operation
- FOUNDATION™ Fieldbus Overview
- Fieldbus Wiring/Segment
- Design/Function Blocks
- Test Equipment Selection
- Bench Testing 3051 Fieldbus Transmitter
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

COURSE 2308 **CEUs: 0.7**

3051S Smart Pressure Transmitter

Overview
This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting and maintenance of the Rosemount Model 3051S Smart Pressure Transmitter. This 1-day course uses lectures and labs to maximize the hands-on experience and teach the student how to install, configure, calibrate, troubleshoot and maintain the Rosemount Model 3051S Smart Pressure Transmitter. The student will also learn the operation if the Model Field Communicator. Students who complete this course will be able to:

- Identify 30501S parts and functionality explain the principle of operation of the 3051S
- Configure and test the 3051S Smart
- Pressure Transmitters using the Field
- Communicator or AMS
- Properly install, configure and test the 3051S Smart Transmitter

Prerequisites
Knowledge of basic pressure fundamentals and pressure instrumentation

Topics

- 3051S Overview/Principles of Operation
- 3051S Installation & Options
- Test Equipment Selection
- Configure & Test the 3051S Advance Features:
  - » Alarm & Saturation Levels,
  - » Alarm Direction, Write Protection,
  - » Process Alerts, Scaled Variable
- Digital Trims/Calibration
- Troubleshooting and Maintenance

COURSE 2309 **CEUs: 0.7**

Rosemount DP Level & Electronic Remote Sensor (ERS) System

Description
This 1-day course uses lecture and labs to maximize he hands on experience and teach the student how to install, configure, calibrate, maintain, and troubleshoot DP Level Transmitters and the Rosemount 3051S ERS System.

Prerequisites:
Knowledge of basic Pressure, and DP Level fundamentals & instrumentation.

Topics
- How remote seals work
- Understanding Remote Seals components
- Diaphragm Seals Most Common
- Understanding Capillary Connections
- Understanding the different fill fluids
- Understanding Remote Seal performance
- Remote Seal Performance Calculation using Instrument Toolkit
- Installing/Mounting DP Level Transmitters
- Ranging/Scaling DP Level Transmitters
- 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

Objectives
Students who complete this course will:
- Know the common DP Level Applications
- Understand Remote Seal Components
- Understanding Remote Seal performance
- Know How to perform DP Level Installation and Ranging
- Identify ERS transmitter parts and explain their functionality
- Identify 3051S ERS Hi & Lo Sensors
- Explain the principles of operation of the ERS System
- Configure and test the ERS system use AMS Device Manager & the Field Communicator
- Perform Zero Trims and Calibrate the ERS Sensors
- Properly install & troubleshoot the 3051S ERS System

Audience
This course is designed for those individuals responsible for the installation, configuration, calibration, troubleshooting and maintenance of DP Level Transmitters and the Rosemount 3051S Electronic Remote Sensors (ERS) System.

COURSE 2310 **CEUs: 0.7**

Rosemount 3051S Multi Variable Mass Flow Transmitter

Description
This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, calibrate and maintain the Rosemount Model 3051SMV HART Mass Flow Transmitter.

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

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

Objectives
Students who complete this course will:
- Identify transmitter parts & 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

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

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

COURSE 2321 **CEUs: 0.7**

3144P Temperature Transmitters

Overview
This course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3144P Smart Temperature Transmitters. This 1-day course uses lecture and labs to teach the students how to install, configure, calibrate and maintain the Rosemount Model 3144P Smart Temperature Transmitters. The Student will also learn the operation of the field Communicator. Students who complete this course will:

- Identify 3144P parts and explain their functionality
- Explain the principles of operation of the 3144P
- Configure, calibrate and test 3144P Smart Temperature Transmitter using the Field Communicator or AMS
- Properly install and troubleshoot the 3144P Smart Transmitter

Prerequisites
Knowledge of basic temperature fundamentals and temperature instrumentation

Topics

- 3144P Overview and Principles of Operation
- Test Equipment Selection Sensor
- Selection and Wiring
- Bench Testing the 3144P Smart Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- 3144P Dual Sensor Setup and Configuration
- Installation and Start-up
- Troubleshooting and Maintenance

COURSE 2324 **CEUs: 0.7**

3144P Fieldbus Temperature Transmitters

Overview
This 1-day course is designed for those individuals responsible for the installation and maintenance of the Rosemount Model 3144P Fieldbus Temperature Transmitters. The student will also learn the operation of the Field Communicator. Students who complete this course will be able to:

- Identify 3144P parts and explain their functionality
- Explain principles of operation of the 3144P
- Design and build a Fieldbus segment
- Configure, calibrate and test 3144P Fieldbus Temperature transmitter using Field Communicator
- Properly install and troubleshoot the 3144P Fieldbus Transmitters

Prerequisites
Knowledge of basic temperature fundamentals and temperature instrumentation

Topics

- 3144P Overview and Principles of Operation
- FOUNDATION™ FieldBus Overview
- Fieldbus Wiring
- Fieldbus Segment Design
- Fieldbus Function Blocks
- Test Equipment Selection
- Sensor Selection and Wiring
- Bench Testing 3144P FieldBus Transmitters
- Field Communicator Operation
- Digital Trims/Calibration
- Installation and Start-up
- Troubleshooting and Maintenance

COURSE 2336 **CEUs: 0.7**

5400 Series HART Radar Level Transmitter

Overview
This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5400 HART Radar Level Transmitter. 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 Model 5400 Radar Transmitters. Students who complete this course will be able to:

- Explain the principle 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 to work in different applications
- Properly troubleshoot the 5400 Radar
- Transmitter and the installation using Radar Master Software

Prerequisites
Knowledge of basic level fundamentals and instrumentation

Topics

- 5400 Overview and Principles Operation
- Installation of the 5400 Radar
- Wiring 5400 Radar
- Configuration of 5400 Radar
- Bench testing the 5400 Radar
- Field Communicator Operation
- AMS Devise Manager Operation
- Radar Master Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling Using Radar Master Software

Note:
5400 HART Radar Level transmitter is also included in the 3-days Level course # 2333

COURSE 2337 **CEUs: 0.7**

5300 High Performance Guided Wave Radar HART Level Transmitter

Overview
This course is designed for those individuals responsible for the installation, configuration, calibration and maintenance of the Rosemount Model 5300 High Performance Guided Wave Radar (GWR) Series HART Radar Level Transmitter. 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 Model 5300 High Performance GWR Transmitter. 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 option and when each should be used
- Properly install and wire the 5300 GWR
- Understand how to setup the 5300 GWR in work in application
- Properly troubleshoot the 5300 GWR
- Transmitter and installation using Radar Master Software

Prerequisites
Knowledge of basic level fundamentals and instrumentation

Topics

- 5300 Overview and Principles of Operation
- Installation of the 5300 GWR
- Wiring the 5300 GWR
- Field Communicator Operation
- AMS Software Operation
- Troubleshooting and Maintenance
- Tank & Application Troubleshooting and Echo Handling Using Radar Master Software

COURSE 2326 **CEUs: 2.8**

Process Measurement Products I (Pressure & Temp.)

Overview
This course is designed for technicians, engineers and plant personnel who need to know installation, calibration, maintenance, and troubleshooting of measurement instrumentation. This 4-day course explains how pressure and temperature instruments function and how they are installed and calibrated. It emphasizes installation, proper setup and calibration of Analog and Smart Pressure and Transmitters. The course uses lectures and labs to teach the students. Those who complete this course will be able to:

- Correctly perform installation and setup procedures
- Properly Configure Pressure and Temperature Transmitters.
- Properly Calibrate Pressure and Temperature Transmitters.
- Perform basic troubleshooting

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

Topics

- Basic 4-20 mA Loop Setup
- Pressure sensors
- Temperature Sensors
- Analogue Transmitters
- Smart Transmitters
- AMS Device Manager
  Hart and Field Communicator
- Test Equipment Selection
- Installation and Configuration
- Calibration / Verification
- Troubleshooting

COURSE 2327 **CEUs: 1.4**

Process Measurement Products II (DP Flow)

Overview
This course is designed for technicians, engineers and plant personnel who need to know installation, calibration, maintenance and troubleshooting of DP Flow measurement instrumentation. This 2-day course explains how DP Flow functions and how they are installed and calibrated. It emphasizes installation, proper setup and calibration of DP Flow Instruments. The course uses lectures and labs to teach the students. Those who complete this course will be able to:

- Correctly install, configure and calibrate the DP Flow instruments.
- Perform DP Flow troubleshooting

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

Topics

- Basic DP Flow Fundamentals
- DP Flow sizing Calculations
- Multi-variable Flow Transmitters
- AMS Device Manager with Engineering Snap-on Assistant
- Field Communicator
- Test Equipment Selection
- Installation and Configuration
- Calibration / Verification
- Troubleshooting

The vast amounts of information generated by these devices **make possible lower automation costs, improved plant performance, faster troubleshooting, fewer unscheduled lower maintenance costs**.

COURSE 2370 CEUs: 2.1

Fieldbus Measurement Instruments

Overview
This course is intended for technicians, engineers responsible, calibrating and troubleshooting FOUNDATION Fieldbus measurement instruments. This 3-days course covers the integration of Foundation Fieldbus compliant measurement devices using the communicator, FF Modem and AMD device manager and other hosts. Those who complete this course will be able to:

- Install, Configure and Calibrate & Troubleshooting Rosemount Fieldbus Devices, including pressure Transmitter, Temperature Transmitter and Radar level transmitters.

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

Topics

- Foundation Fieldbus Overview
- Fieldbus Wiring / Segment design function Blocks
- Field Communicator Operation
- AMD Device Manager Operation
- Theory of operation, Installation, Configuration and Troubleshooting of the following:
  - » 3051 C & 3051S Pressure Transmitters
  - » 3144 & 644 Temperature Transmitters
  - » GWR level Transmitters

COURSE 2328 CEUs: 0.7

848 Fieldbus Temperature Transmitter

Overview
This 1-day course use lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount Model 848T Fieldbus Temperature Transmitters. The Student will also learn the operation of the Field Communication. 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

Prerequisites
Knowledge of basic temperature fundamentals and temperature instrumentation

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

COURSE 2329 CEUs: 1.4

Rosemount Pressure, Temperature & Multi-Variable Flow Transmitters

Overview
This 2-day course uses lectures and labs to maximize the hands on experiences and teach the student how to install, configure, calibrate, troubleshoot, and maintain the Rosemount 3051, 3144P, and 3051SMV Transmitters.

Prerequisites
Students should have experience with process instrumentation and measurements.

Topics

- Field Communicator Operation
- 3051 Pressure Transmitter Installation, Configuration, Calibration and Troubleshooting
- 3144P Temperature Transmitter Installation, Configuration, Calibration and Troubleshooting
- 3051SMV Multi-Variable DP Flow Transmitter Installation, Configuration, Calibration and Troubleshooting

Note:
Students must attend both days. Reference course, 2305, 2321 and 2308MV for further details.

COURSE 2332 **CEUs: 1.4**

3300 Guided Wave Radar Level Transmitter

Overview
This course is for those individuals responsible for the installation/maintenance of the Rosemount Model 3300 Series Guided Wave Radar (GWR) Level & interface transmitters. This 2-days 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 Model 3300 GWR Level & Interface Transmitters. Students who complete this course will be able to:

- Explain the principle of operation of the 3300 GWR
- Identity 3300 parts and explain their functionality
- Understand the available probe option 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

Prerequisites
Knowledge of basic level and interface fundamentals and instrumentation.

Topics

- 3300 Overview/principles of Operation
- Installation of the 3300 GWR
- Configuration of the 3300 GWR
- Bench Testing the 3300 GWR
- Field communicator Operation
- Calibration, Verification and adjustments
- Troubleshooting and maintenance
- Troubleshooting and Reading Tank
- Graphs using RCT Software

COURSE 2375 **CEUs: 1.4**

Wireless Self Organizing Network

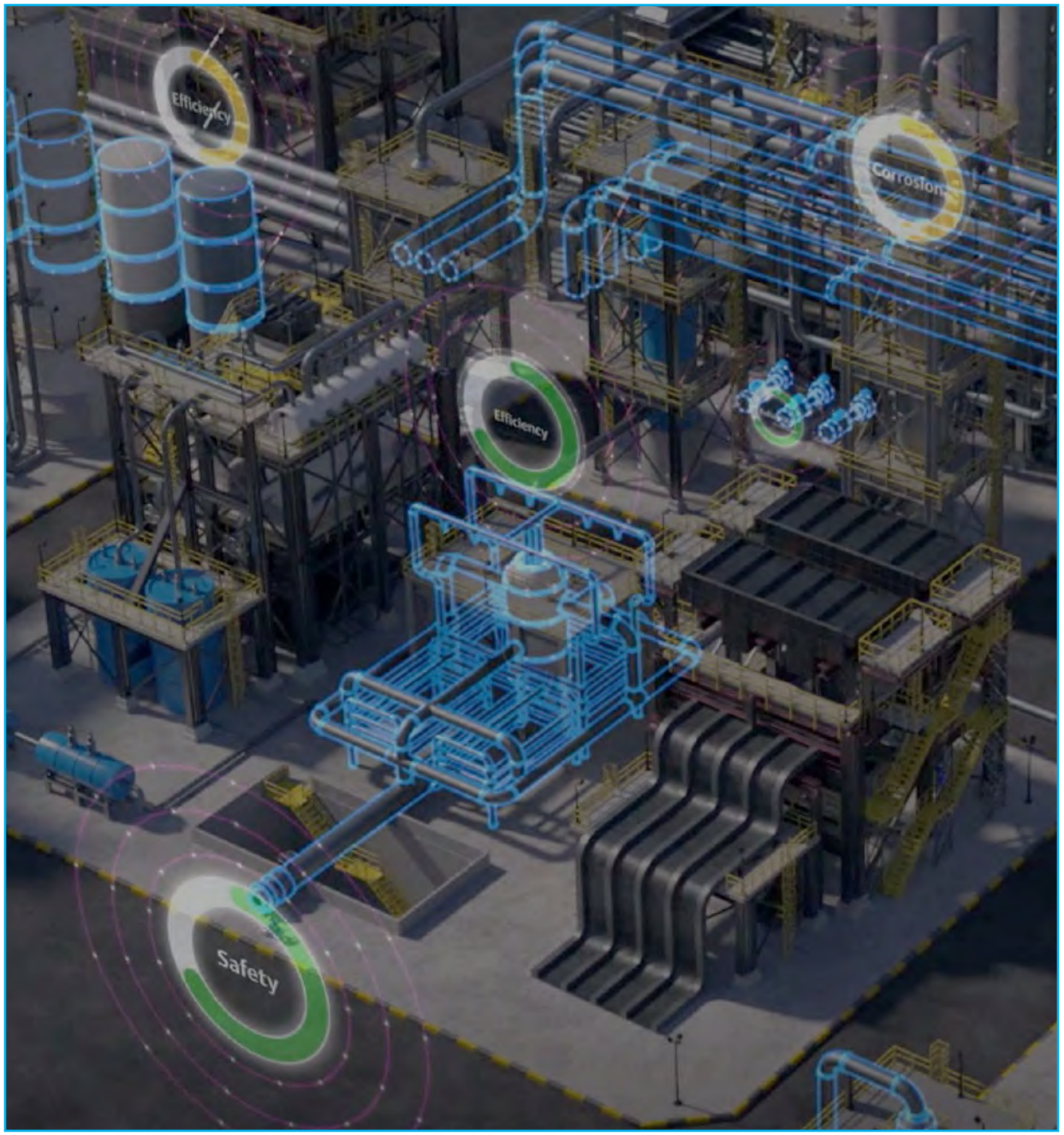
Overview
This course is intended for technicians, engineers and other plant personnel who need to know how to design, install, setup, configure, maintain and troubleshoot Wireless Self Organizing Networks and their Components. This 2-days course explains how Self Organizing Wireless Networks function 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 Wireless Gateway
- Properly install and configure Wireless Transmitters
- Properly integrate Host interfaces to the Wireless Gateway

Prerequisites
Some experience in network and Host integration would be helpful

Topics

- How Self organizing networks function
- Self Organizing networks best practices
- Network components
- Installation and setup
- Network parameters
- Wireless transmitters installation configuration, maintenance and calibration THUM installation wiring and configuring
- Using AMS Device manager with the wireless gateway
- Configuring wireless devices with AMS device manager
- Modbus serial integration
- Modbus TCP integration
- OPC integration
- Advance features



COURSE 2395 **CEUs: 0.7**

Rosemount 3300 & 5300 Guided Wave Radar Level Transmitters

Overview
This 1-day course uses lecture and labs to maximize the hands on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount 3300 & 5300 Series HART Radar Level Transmitters.

Prerequisites
Knowledge of basic level and interface fundamentals and instrumentation.

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

COURSE 2396 **CEUs: 0.7**

Rosemount Guided Wave & Non-Contacting Radar Level Transmitters

Overview
This course is designed for those individuals responsible for the installation, configuration, calibration/verification and maintenance of the Rosemount 5408 Non-Contacting & 5300 Guided Wave Radar (GWR) HART Level Transmitter. This 1-day course uses lecture and labs to maximize the hands-on experience and teach the student how to install, configure, troubleshoot and maintain the Rosemount 5408 & 5300 Series HART Radar Level Transmitters

Prerequisites
Knowledge of basic level and interface fundamentals and instrumentation.

Topics

- 5408 & 5300 Overview and Principles of Operation
- Installation of the 5408 & 5300 Radar
- Configuration of the 5408 & 5300 Radar
- Radar Master Software Operation
- Instrument Inspector Software Operation
- Calibration, Verification and Adjustments
- Troubleshooting and Maintenance
- Tank & Application/Probe Troubleshooting and Echo Handling Using Radar Master Software

Objectives
Students who complete this course will be able to:

- Explain the principles of operation of the 5408 & 5300 radar
- Identify 5408 & 5300 parts and explain their functionality
- Properly install and wire the 5408 & 5300 Radar
- Configure and test the 5408 & 5300 Radar
- Properly troubleshoot the 5408 & 5300 Radar transmitter and installation using Radar Master software

COURSE 2200 **CEUs: 0.7**

General pH, Conductivity, and ORP Theory

Overview
This 1-day course provides a solid theoretical background in pH, conductivity and ORP measurements. Students will:

- Understand how much measurement is made
- Recognize installation/ application problems
- Learn configuration/ calibrate procedures
- How to implement a maintenance program Troubleshooting problems using diagnostics

Topics

- What is pH/Conductivity/ORP
- How pH/Conductivity /ORP Measurements are Made
- Physical Process Properties and How
- They Affect On-Line Measurements
- Proper Calibration Techniques
- Cleaning and Maintenance of a Sensor
- How to Decipher Diagnostics Readouts
- pH/Conductivity Sensor Overview
- pH/Conductivity/ORP Analyzer

COURSE 2201 **CEUs: 0.7**

Amperometric Measurement Theory: Chlorine, Dissolved Oxygen & Ozone

Overview
This 1-day course provides insight into the complicated amperemetric measurements of Chlorine, Dissolved Oxygen and Ozone. Students will learn the concepts of how amperometric sensor work and how to calibrate each type of measurement.

Student will:

- 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 Produces for Each Meas.
- Maintenance & Troubleshooting Tips

COURSE 2202/2202V **CEUs: 0.2**

Rosemount Analytical 2-Wire Instrumentation Models Xmt & 5081 Transmitters

Overview
This 2-hour class cover features, benefits and operation if any Rosemount Analytical's Model 5081 or Model Xmt two wire transmitters. Each Transmitters family can measure pH, ORP, Contacting, Dissolved Oxygen and Ozone. Both Transmitters have advanced diagnostics capabilities and can communicate via HART or Foundation Fieldbus communication protocols. This class is free when performed in conjunction with either course 2200 "General pH, Conductivity, ORP theory", Course 2201 "Amperometric Measurement Theory".

Topics

- Installation and Application Problems
- Configuration of Outputs (HART only)
- Use Diagnostic Features (if Applicable)
- Sensor Calibration
- Troubleshooting

COURSE 2204/2204V **CEUs: 0.2**

Rosemount Analytical Four-Wire Instrumentation Models 54e, 1055, 1056 or 1057

Overview
This 2-hour class covers features, benefits and operation of any Rosemount Analytical Model 54e, 1055, 1056 or 1057. Each analyzer family can measure pH, ORP, contacting conductivity, toroidal conductivity, chlorine, dissolved oxygen and ozone. The Model 1056 can also measure turbidity in drinking water and flow from a pulse sensor, and display any 4-20mA 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

Available on Request or at Customer Site

COURSE 2205/2205V **CEUs: 0.2**

Customer Specific Measurement Theory

Overview
This 2-hour class covers features, benefits and operation of any Rosemount Analytical Model 54e, 1055, 1056 or 1057. Each analyzer family can measure pH, ORP, contacting conductivity, toroidal conductivity, chlorine, dissolved oxygen and ozone. The Model 1056 can also measure turbidity in drinking water and flow from a pulse sensor, and display any 4-20mA 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

Available on Request at Customer Site

COURSE 2800 **CEUs: 1.4**

Rosemount Liquid Analysis General pH, Conductivity, and ORP Theory

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 Rosemount Analytical pH, Conductivity, and ORP sensors and analyzers. Students shall apply classroom knowledge directly to the interactive plant scenario labs. Be ready to learn in a “real world” plant environment.

Topics
- Identify Sensor Parts and Functionality
- Explain the Principles of Operation of pH, Conductivity, and ORP sensors
- Configure, Calibrate and Test Analyzers
- Properly Install and Troubleshoot pH, Conductivity, and ORP Sensors Along with Analyzers
- Students shall ensure proper PPE and safety measures while working on the plant

COURSE 2153 **CEUs: 0.7**

Rosemount Oxygen Flue Gas & 6888A Analyzers

Overview
This 1-day course covers combustion measurement principles and the theory of operation of oxygen analyzers. The class will discuss the installation, operation, calibration and maintenance of the Rosemount 6888A Oxygen Analyzers.

Topics
- Combustion Requirements
- Methods of Oxygen Analysis
- Combustion Efficiency
- Zirconia (ZrO2) Oxygen Analysis
- Theory of Operation
- Oxygen Analyzer
  - » Installation
  - » Hardware
  - » Maintenance
  - » Troubleshooting
  - » HART Communication

COURSE 2154 **CEUs: 0.7**

Rosemount OCX8800 Oxygen & Combustibles Transmitter

Overview
This 1-day course covers combustion measurement principles and the theory of operation for oxygen analyzers in general and the installation, operation, calibration and maintenance of the Rosemount OCX8800 Analyzers.

Objectives
Theory of operation, combustion requirements, methods of oxygen analysis, typical uses of oxygen analysis, combustion efficiency, zirconia (ZrO2) oxygen analysis, COe analyzer: installation, hardware overview, maintenance, and troubleshooting.

Topics
- Combustion Requirements
- Methods of Oxygen Analysis
- Combustion Efficiency
- Zirconia (Zr)2) Oxygen Analysis
- Theory of Operation
- Oxygen Analyzer
- COe Analyzer
- Hart Communications

COURSE 2110 **CEUs: 2.1**

Rosemount MLT Process Gas Analyzers

Overview
This 3-day course is a classroom training where students learn principles and practical operation of MLT analyzers. Through hands-on training, the student will learn on how to install, maintain, and troubleshoot the MLT analyzer. Using MLT Analyzer demo units students will:

- Understand the Photometric measurement principles such as the theory of Infrared and Ultraviolet Spectrometry, Paramagnetic and Thermal Conductivity
- Learn the signal processing of the electronic boards.
- Learn the test procedure for troubleshooting and diagnostics

Prerequisites
Basic Knowledge of PGA Analyzers would be helpful

Topics

- Introduction to the function of Physical parts
- Function of Electronic boards
- Test points and procedure
- Mechanical Assembly / Disassembly
- Programming of software parameters
- Calibration setup manual (Auto calibration when available)Analog outputs, and Digital Inputs / Outputs
- Save / Load configuration functionality
- Spare parts

COURSE 2170 **CEUs: 2.1**

Rosemount X-Stream Process Gas Analyzers

Overview
This 3-day course is a classroom training where students learn principles and practical operation of XE analyzers. Through hands-on training, the student will learn on how to install, maintain, and troubleshoot the XE analyzer. Using XE Analyzer demo units students will:

- Understand the Photometric measurement principles such as the theory of Infrared and Ultraviolet Spectrometry, Paramagnetic and Thermal Conductivity
- Learn the signal processing of the electronic boards.
- Learn the test procedure for troubleshooting and diagnostics

Prerequisites
Basic Knowledge of PGA Analyzers would be helpful

Topics

- Introduction to the function of Physical parts
- Function of Electronic boards
- Test points and procedure
- Mechanical Assembly / Disassembly
- Programming of software parameters
- Calibration setup manual (Auto calibration when available) Analog outputs, and Digital Inputs / Outputs and Modbus setup
- Save / Load configuration functionality
- Spare parts
- Troubleshooting Procedure

COURSE R4100 CEUs: 2.1

Introduction to Model 500 and 700 Gas Chromatographs

Overview
This 3-day course provides students with a basic understanding of how a gas chromatograph works, 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

With a wide selection of sensors, analyzers, gas chromatographs and other measurement and analysis technologies, Rosemount Analytical helps customers streamline process performance with innovative improvements that **increase throughput, minimize energy usage, maximize asset life** and take advantage of continuous online diagnostics for amazing results.

COURSE R4105 CEUs: 2.1

Rosemount 700XA & 1500XA Gas Chromatographs Introduction

Description
This 3-day course gives students a basic understanding of how the Rosemount 700XA and 1500XA gas chromatographs 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

Note:
Classes typically start at 8AM CST on Tuesday and end at 5PM CST on Thursday to accommodate travel

COURSE R4170 CEUs: 2.1

Rosemount 370XA Gas Chromatograph Intermediate

Overview
This 3-day training is a level 1 course and includes theory, Operations & Maintenance practices for the Rosemount 370XA Gas Chromatograph. Module overview, hardware and software overview as well as basic troubleshooting skills.

Prerequisites
E4070 Introduction to the Model 370XA. Classes typically start at 8AM CST on Tuesday and end at 5PM CST on Thursday to accommodate travel.

Topics
- Chromatographic Theory
- Detector Theory
- Understanding Chromatograms
- Startup Procedures
- Natural Gas Sample Handling
- Using 370XA Software Assistants
- Cal-Saver™ Running Auto Valve Timing
- Module Initializations
- Calibrations, Validation & Routine Maintenance (Valve Rebuilding)
- Troubleshooting the module
- 370XA Hardware
- MON2020 Software

COURSE R4210 **CEUs: 2.8**

Operation and Maintenance of Model 500 Gas Chromatographs

Overview
This 4-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a Model 500 gas chromatograph.

Prerequisites
'Introduction to Gas Chromatographs' course or equivalent knowledge

Topics
- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration
- Techniques and Post-Analysis Calculations
- Using the Chromatograph to identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation -Gas Chromatograph
- Troubleshooting the 2350A Controller
- Configuring the 2350A Controller User Directory Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

COURSE R4212 **CEUs: 2.8**

Operation and Maintenance of Model 700 Gas Chromatographs

Overview
This 4-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a Model 500 gas chromatograph.

Prerequisites
'Introduction to Gas Chromatographs' course or equivalent knowledge

Topics
- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration
- Techniques and Post-Analysis Calculations
- Using the Chromatograph to identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation -Gas Chromatograph
- Troubleshooting the 2350A Controller
- Configuring the 2350A Controller User Directory Outputs
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

COURSE R4213 **CEUs: 2.8**

Operation and Maintenance of 700XA Gas Chromatographs

Overview
This 4-day course is appropriate for those who have either worked with a chromatograph for at least six months or completed the 'Introduction to Gas Chromatographs' course. It prepares participants to operate and repair a 700XA gas chromatograph.

Prerequisites
'Introduction to Gas Chromatographs' course or equivalent knowledge

Topics
- Understanding Gas Chromatography and a Gas Chromatograph
- Using the Basic Chromatograph System in Process Gas Analysis
- Understanding Carrier and Calibration Gas Systems
- Installing and Operating MON Software
- Applying Chromatograph Integration
- Techniques and Post-Analysis Calculations
- Using the Chromatograph to Identify Problems
- Setting Timed Events, Retention Times, and Response Factors
- Starting Up a Gas Chromatograph
- Understanding Sample Handling Systems
- Verifying Proper Operation Gas Chromatograph
- Conducting Preventative Maintenance
- Communicating to Other Devices
- Reviewing Spare Parts Recommendations

COURSE R4311 CEUs: 3.5

Rosemount 500 Process Gas Chromatograph Advanced

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 experienced instructor will look closely at specific applications and offer participants insight.

Prerequisites
Students attending this course must have completed either of these Operations & Maintenance courses: R4210, R4212, or have 3 years of advanced chromatography experience. Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel

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

COURSE R4315 CEUs: 3.5

Rosemount 700XA & 1500XA Process Gas Chromatographs Advanced

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 700XA & 1500XA GC. Classes typically start at 1pm CST on Monday and end at 12pm CST on Friday to accommodate travel

Prerequisites
Students attending this course must have completed either of Operations & Maintenance course R4213/R4214 or have 3 years of advanced chromatography experience.

Topics
- Setting Valve Timing
- Hardware Troubleshooting
- Mixture Adjustments for FID
- Mixture Adjustment for FPD
- Verifying proper operation of the Gas Chromatograph
- Overview of Model 1500XA
- Liquid Sample Injection
- Review of Sample System Techniques
- Calibration and Accuracy Checks
- Recovery of GC After Analysis Interruption
- GC Start-up After Overhaul
- Communicating to other devices
- Understanding flow settings for various flow configurations
- Understanding when to overhaul valves

COURSE FG 2100 **CEUs: 1.4**

Basic Course for Flame & Gas Detectors

Overview
This is a 2-day basic course about Flame and Gas Detectors.

Topics

Flame Detection
- Introduction to Flame detection principals
- Types of flame detection and its applications
- Ultra Violet (UV), Infra Red (IR) and UV/IR
- Installing Where to locate and aim the detector
- Causes of false alarms from Flame Detection & ideas to minimize the alarms
- Preventive Maintenance

Gas Detection Flammable and Toxic Gas
- Introduction to Gas detection principals
- Gas Detector Transmitters Millennium Transmitters M2B and 21
- Types of Gas detectors available in the market and its Operating principals: Cat Bead, Electro chemical and Metal Oxide Semiconductor
- Installing Where to site and locate the gas detectors
- Causes of false alarms and how to minimize it
- Preventive Maintenance

Smoke/Oil Mist Detector (EExd model)
- Introduction to Airborne Particle Monitor (APM)
- Applications using APM
- Installing the APM Where to site and locate the detector
- Causes of false alarms and how to minimize it
- Preventive Maintenance

Ultrasonic Gas Leak Detector
- Introduction to Ultrasonic Gas Leak Detector (UGLD)
- Applications using UGLD
- Site Mapping of Background Noise
- Installing the UGLD Where to site and locate the detector
- Causes of false alarms and how to minimize it
- Preventive Maintenance

Note:
- Course duration is 2-days
- Minimum 5 students per class
- Maximum 10 students per class
- Additional students will be charged extra

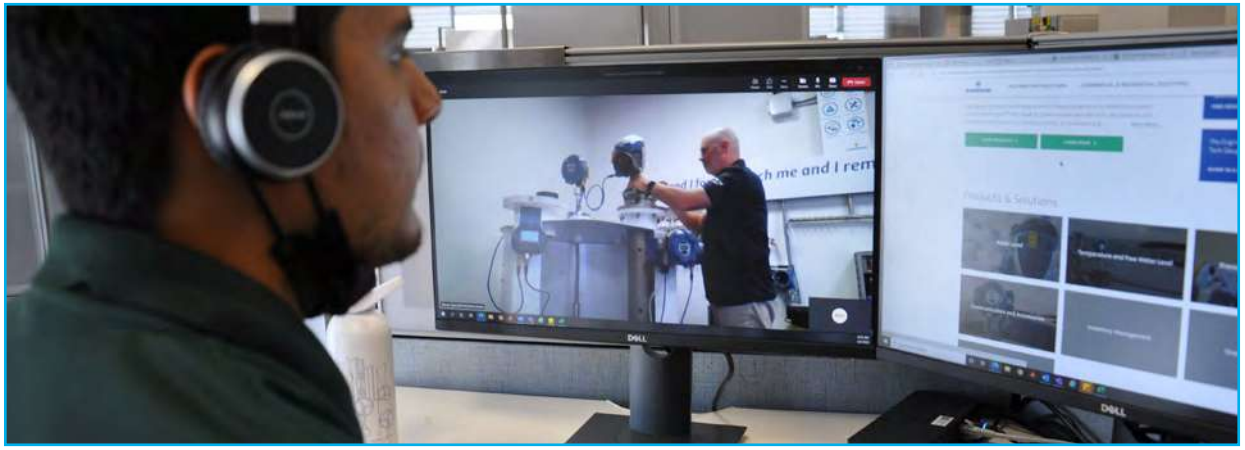
COURSE RTG 101 **CEUs: 3.5**

Tank Gauging Technical Product Training

Overview
This provides good coverage for Tank Gauging products supplied by Rosemount. It gives a general understanding on how to install, startup, commission and maintain a tank gauging system. It also helps the trainee to understands how he can optimize and maximize the benefits of using Rosemount Tank Gauging systems. This 5-day course covers the products range supplied by Rosemount tank Gauging. This course is suitable for project and maintenance engineers, and persons that are responsible for maintaining the tank gauging system at site. Training courses are based on classroom instructions backed up with laboratory work to deliver the trainees with a well-balanced knowledge in an integrated manner.

Prerequisites
- Instrumentation background and basic understanding of level measurement techniques in tanks
- Radar Technology Basics
- Installation of 3900 series/ 5900 Series
- REX/ Raptor hardware and software
- FCU/ FBM functionality
- MTT/ GFD functionality (Raptor)
- Tanks Master WINOpi & Winsetup
- Redundancy
- Lab works (installation, configuration, operation and troubleshooting)

Note:
Customer to specify whether they want REX Tank gauging training or RAPTOR tank Gauging training.



COURSE RTG 102 **CEUs: 2.1**

Tank Master Training

Overview
The course goal is to provide comprehensive knowledge about tank Master Software and its capabilities. It starts by demonstrating the different tools in Tank master and how it can be utilized, and then it continues to demonstrate that advanced capabilities of Tank Master when it comes to connecting to devices and host systems. The course also demonstrates troubleshooting and problem solving techniques in Tank Master. Training courses are based on classroom instructions backed up with laboratory work to deliver the trainees with a well-balanced knowledge in an integrated manner Tank Master is a 3-days course covering the Maintenance and inventory management software that communicates to the tank Gauging system. Tank Master is certified by OIML for inventory calculation as per API standards. This course helps the user to fully understand the Tank Master software and all its functionalities. It is suitable for individuals that are responsible for administrating and maintaining the tank Master software.

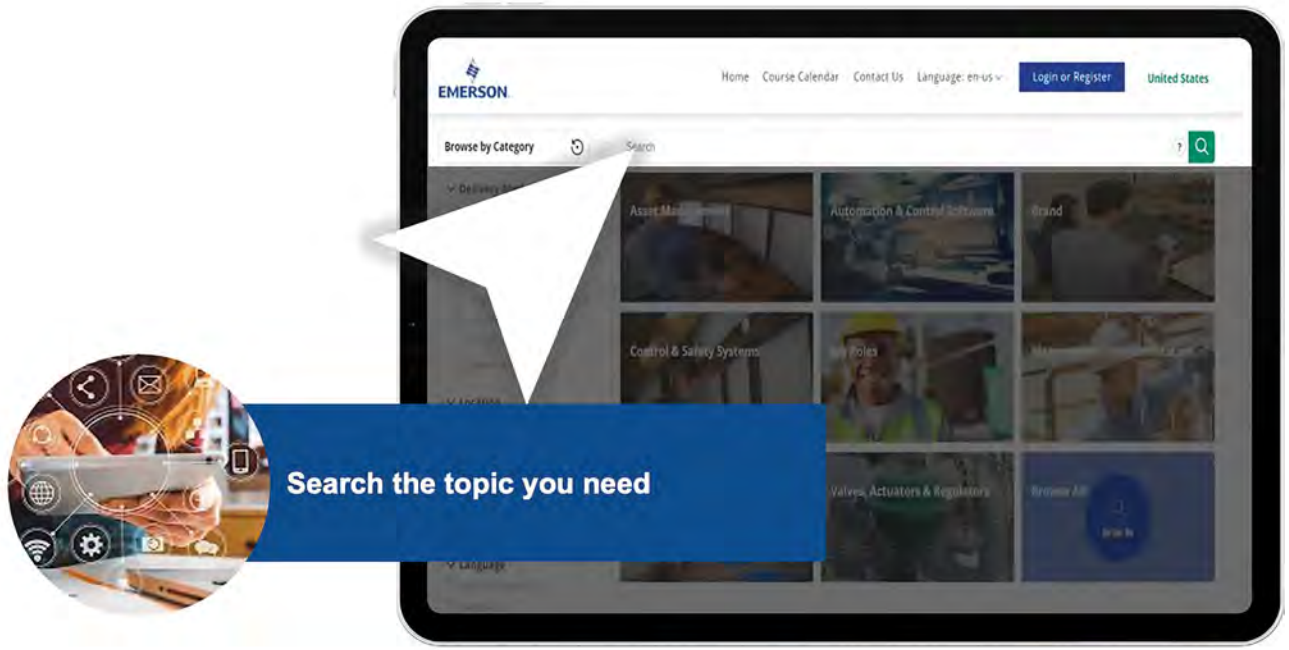
Prerequisites
Product training, or fair knowledge in Tank Gauging systems supplied by Rosemount.

Topics
- Inventory Calculation
- WinOpi tools
- Host Communication
- Driver and Communication
- Custom Views
- Redundancy
- Tankmaster.net
- Hybrid/ HTG
- Trouble Shooting

MyTraining

MyTraining Site

Visit for Registration
mytraining.emerson.com



Search for Courses

Browse for Upcoming Classes

Choose your Learning Style

Track your Learning History

Request for Quote, Order and more

IACET AUTHORIZED PROVIDER

Educational Services is an Authorized Provider of International Association for Continuing Education and Training (IACET) Continuing Education Units (CEU). IACET Authorized Provider Status Means our Organization:

- Demonstrates compliance with proven, research- based standards created in cooperation with the U.S. Department of Education
- Is dedicated to high standards for quality in continuing education and training
- Awards the IACET EDU, the hallmark for quality in continuing education and training

Educational Services is proud to have received Authorized Provider status. We look forward to the opportunity to share our training with you.

QUALIFICATIONS FOR ENROLLMENT

Educational Services agrees to accept for training, individuals who are not competitors of Emerson Automation Solutions 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 MyTraining website. All prices are in U.S. Dollars. For the most up to date information call or visit our website at: **www.emerson.com/mytraining**

CANCELLATIONS & TRANSFERS

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

ARRIVAL & DEPARTURE TIME

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

COURSE MATERIALS

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

2024 TRAINING CALENDAR BY COUNTRY

TRAINING CALENDAR - DUBAI, UAE

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
RELIABILITY SOLUTIONS													
Basic Vibration Analysis Category I	2031	8-11											
Advanced Vibration Analysis Category Ill	2033	15-19											
PROCESS SYSTEMS & SOLUTIONS													
DeltaV Hardware& Troubleshooting	7018	8-11										11-14	
DeltaV Implementation I for Continuous Process	7009	15-19										18-22	
DeltaV Systems Administration for Wins 7 & Server 2008	7027		5-9										
DeltaV CyberSecurity	7026		12-16										
AMS Device Manager with DeltaV	7039			4-7									
DeltaV Control Loop Foundation	9025		19-23										
POWER & WATER SOLUTIONS													
Starting with Data Acquisition	OV100			4-8									
Building and Maintaining Ovation Control	OV200			11-15									
REMOTE AUTOMATION SOLUTIONS													
RA902 Flo Boss S600+ Combined	RA902				22-26								
RA331 Control Wave Troubleshooting Configuration	RA331					13-15							
ROXAR													
Roxar Multiphase meter 2600	ROX016	16-17											
FLOW													
Micro Motion Coriolis Comprehensive Training Class	2380			5-6									
ROSEMOUNT MEASUREMENT													
Process Measurement Level Product Training Course	2333						25-27						
Wireless Self Organizing Network Training Course	2375				23-24								
Rosemount 3051 Pressure Transmitter	2305		19										9
Rosemount 3144P Temperature Transmitter	2321		20										10
Rosemount 5408 Non-Contacting Radar Level Transmitter	2336		21										11
Rosemount 5300 Guided Wave Radar Level Transmitter	2337		22										12

TRAINING CALENDAR - DUBAI, UAE

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ROSEMOUNT ANALYTICAL													
Rosemount Liquid Analysis General pH, Conductivity, and ORP Theory	2800											12-13	
Operation & Maintenance of 700XA Gas Chromatographs	R4213									23-26			
TANK GAUGING													
Tank Gauging Technical Product Training	RTG101					20-24							
Tank Master Training	RTG102										8-10		
CONTROL VALVES													
Control Valve Engineering I	1300				22-24					2-4			
Control Valve Engineering III	1350				29-1					9-11			
Valve Trim & Body Maintenance	1400					6-8				16-18			
Fundamentals of HART Based FIELDVUE™ Digital Valve Controller using Trex Field Communicator	1751					13-15				23-25			
ValveLink™ Software for FIELDVUE ™ Digital Configuration and Calibration of Valve Controllers	1752					20-22				30 - 2			
Diagnostic Data Interpretation Using ValveLink Software for Fieldvue Digital Valve Controllers	1759					27-29							
PRESSURE MANAGEMENT													
Pressure Relief Valve Overview	PRM-MEA-101										17		
Direct Spring - Operated Pressure Relief Valve Maintenance – ASME VIII	PRM-MEA-102	16-18											
High Pressure Pilot Operated Pressure Relief Valve Maintenance	PRM-MEA-103		13-15										
Vacuum Valve Familiarization Overview	PRM-MEA-105				16-17								
Low Pressure Pilot Operated Valves Maintenance	PRM-MEA-106					21-22							
Regulators & Relief Valves Gas Regulators	1100						18-20						

TRAINING CALENDAR - DUBAI, UAE

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ACTUATION TECHNOLOGIES													
Emerson Electric Actuators Overview	ACT-MEA-101						25						
Biffi Electric Actuators Service Training	ACT-MEA-102							1-5					
EIM Electric Actuators Service Training	ACT-MEA-103						26-28						
Bettis™, EL-O-Matic & FieldQ Scotch-Yoke and Rack & Pinion Product Servicing	VA201						19-21						
ISOLATION VALVES													
Gate, Globe, & Check Valve Overview and Maintenance	ISV-MEA-101			4-5									
Ball & Butterfly Valve Overview & Maintenance	ISV-MEA-102			6-7									
Bettis™ Multiport Flow Selector (MPFS) Servicing	VA203						17-18						
Vanessa TOV Training	ISV-MEA-103										17-18		
AEV Valve Training	ISV-MEA-104			18-19									

TRAINING CALENDAR - DHARAN TECHNO VALLEY, SAUDI ARABIA

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
RELIABILITY SOLUTIONS													
Basic Vibration Analysis Category I	2031										14-17		
Intermediate Vibration Analysis Category II	2032							22-25					
Advanced Vibration Analysis Category Ill	2033										20-24		
AMS Machinery Manager - Introduction	2068					13-16							
PROCESS SYSTEMS & SOLUTIONS													
DeltaV Hardware& Troubleshooting	7018				15-18								
DeltaV Implementation I for Continuous Process	7009				21-25								
DeltaV CyberSecurity	7026					26-30							
DeltaV Systems Administration for Windows 7 & Server 2008	7027												9-13
POWER & WATER SOLUTIONS													
Ovation Troubleshooting	OV300				22-26								
TANK GAUGING													
Tank Gauging Technical Product Training	RTG101								11-15				

TRAINING CALENDAR - JUBAIL, SAUDI ARABIA

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CONTROL VALVES													
Control Valve Engineering I	1300	30-1									29-31		
Control Valve Engineering III	1350		5-7									4-6	
Fundamentals of HART Based FIELDVUE™ Digital Valve Controller using Trex Field Communicator	1751		12-14									11-13	
ValveLink™ Software for FIELDVUE ™ Digital Configuration and Calibration of Valve Controllers	1752		19-21									18-20	
ISOLATION VALVES													
Gate, Globe, & Check Valve Overview and Maintenance	ISV-MEA-101											20-21	
Ball & Butterfly Valve Overview & Maintenance	ISV-MEA-102											22-23	
Vanessa TOV Training	ISV-MEA-003	15-16											

TRAINING CALENDAR - DOHA, QATAR

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
CONTROL VALVES													
Fundamentals of HART Based FIELDVUE™ Digital Valve Controller using Trex Field Communicator	1751						3-5						
ValveLink™ Software for FIELDVUE ™ Digital Configuration and Calibration of Valve Controllers	1752						10-12						

TRAINING CALENDAR - LAGOS, NIGERIA

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
ROSEMOUNT MEASUREMENT SOLUTIONS													
Rosemount 3051 Pressure Transmitter	2305			18									
Rosemount 3144P Temperature Transmitter	2321			19									
Rosemount 5408 Non-Contacting Radar Level Transmitter	2336			20									
Rosemount 5300 Guided Wave Radar Level Transmitter	2337			21									

TRAINING CALENDAR - VIRTUAL

COURSE DETAILS	COURSE #	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
RELIABILITY SOLUTIONS													
Basic Vibration Analysis Category I	2031V						3-6						
Advanced Vibration Analysis/Category III Compliant	2033V						24-28						
AMS Machinery Manager - Introduction	2068V									9-12			
PROCESS SYSTEMS & SOLUTIONS													
DeltaV Implementation I for Continuous Process	7009V						3-7						
DeltaV Hardware& Troubleshooting	7018V						10-13						
DeltaV CyberSecurity	7026V							22-26		23-27			
DeltaV Systems Administration	7027V							15-19					
AMS Device Manager with DeltaV	7039V								5-8				
ENERGY TRANSPORTATION SOLUTION													
Flo Boss S600+ Combined	RA902V								5-9				
ControlWave Designer Fundamentals	RA441V									9-11			
Control Wave Troubleshooting Configuration	RA331V									16-18			

2024 TRAINING CALENDAR BY SUBJECT

TRAINING CALENDAR - DELTAV

PROCESS SYSTEMS & SOLUTIONS				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
7039 AMS Device Manager with DeltaV	Dubai, UAE	Mar 4-7	4 Days	$4,200
7039V AMS Device Manager with DeltaV	Virtual	Aug 5-8	4 Days	$4,200
7009 DeltaV Implementation I	Dubai, UAE	Jan 15-19, Nov 18-22	4 1/2 Days	$4,600
	DTV, Saudi Arabia	Apr 21-25	4 1/2 Days	$4,600
7009V DeltaV Implementation I	Virtual	June 3-7	4 1/2 Days	$4,600
7018 DeltaV Hardware& Troubleshooting	Dubai, UAE	Jan 8-11, Nov 11-14	4 Days	$4,400
	DTV, Saudi Arabia	Apr 15-18	4 Days	$4,400
7018V DeltaV Hardware& Troubleshooting	Virtual	Jun 10-13	4 Days	$4,400
7027 DeltaV Systems Administration for Windows 7 and Server 2008	Dubai, UAE	Feb 5-9	4 1/2 Days	$4,700
	DTV, Saudi Arabia	Dec 9-13	4 1/2 Days	$4,700
7027V DeltaV Systems Administration	Virtual	Jul 15-19	4 1/2 Days	$4,700
7026 DeltaV CyberSecurity	Dubai, UAE	Feb 12-16	4 1/2 Days	$5,000
	DTV, Saudi Arabia	May 26-30	4 1/2 Days	$5,000
7026V DeltaV CyberSecurity	Virtual	Jul 22-26, Sep 23-27	4 1/2 Days	$5,000

PROCESS SYSTEMS & SOLUTIONS - ON DEMAND			
COURSE DETAILS	LOCATION	DURATION	COST PER STUDENT, US$
7039V AMS Device Manager with DeltaV	Call for Schedule	4 Days	$4,200
7020 AMS Device Manager		3 Days	$3,300
7021 AMS Device Manager with Rosemount HART Instruments		3 Days	$2,987
7032 Fieldbus Systems & Devices		4 Days	$4,400
7037 Communication Bus Interface with DeltaV System		3 1/2 Days	$3,500
7009V DeltaV Implementation I		4 1/2 Days	$4,600
7012 DeltaV Operator Interface for Continuous Control		2 Days	$1,600
7014 DeltaV Operator Interface for Batch		3 Days	$2,000
7016 DeltaV Systems Batch Implementation		4 1/2 Days	$4,800
7017 DeltaV Implementation II		4 1/2 Days	$4,700
7023 DeltaV Information Technology for Automation Personnel		3 Days	$3,300
7029 DeltaV Virtualization		4 1/2 Days	$4,800
7025 DeltaV Advanced Graphics		4 1/2 Days	$4,223
7303 DeltaV Safety Instrumented System (SIS) Maintenance		3 Days	$3,300
7226 DeltaV Cybersecurity Administration		3 Days	$3,500
7201 DeltaV Advanced Control		4 1/2 Days	$4,700
7999 DeltaV New Features		2 Days	$1,200
7304 DeltaV SIS with Electronic Marshalling Maintenance		3 Days	$3,300
7305 DeltaV SIS Implementation		4 1/2 Days	$4,700
7409 DeltaV - Using DeltaV Live Operator Interface - Implementation I		4 1/2 Days	$4,600
7425 DeltaV - Advanced Graphics – Using DeltaV Live Operator Interface		4 1/2 Days	$4,700
7201CV DeltaV InSight – Virtual		1 Day	$1,030
7202 DeltaV - Model Predictive Control		3 1/2 Days	$3,400
7028 DeltaV - Virtualization Administration		3 Days	$3,500
5590 Power Quality and Grounding for Electronic Systems		2 Days	$1,422

TRAINING CALENDAR - ASSET RELIABILITY

ASSET RELIABILITY				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
2031 Basic Vibration Analysis / Category I Compliant	Dubai, UAE	Jan 8-11	4 Days	$2,900
	DTV, Saudi Arabia	Oct 14-17	4 Days	$2,900
2031V Basic Vibration Analysis / Category I Compliant Virtual	Virtual	Jun 3-6	4 Days	$2,900
2032 Intermediate Vibration Analysis/Category II Compliant	DTV, Saudi Arabia	Jul 22-25	4 Days	$3,000
2068 AMS Machinery Manager - Introduction	DTV, Saudi Arabia	May 13-16	4 Days	$3,400
2068V AMS Machinery Manager - Introduction	Virtual	Sep 9-12	4 Days	$3,400
2033 Advanced Vibration Analysis/Category III Compliant	Dubai, UAE	Jan15-19	5 Days	$3,100
	DTV, Saudi Arabia	Oct 20-24	4 1/2 Days	$3,100
2033V Advanced Vibration Analysis/Category III Compliant	Virtual	Jun 24-28	4 1/2 Days	$3,100

TRAINING CALENDAR - ASSET RELIABILITY

ASSET RELIABILITY - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
2069 Vibration Analysis- Fundamentals	Call for Schedule		2 Days	$1,900
E2069 Fundamentals of Vibration eLearning			2 Hours	$400
2076 Fundamentals of CSI 2140Machinery Health Analyzer			2 Days	$1,900
2021EX Vibration Analyst Exam - Category I			2 Hours	$400
2022EX Machinery Health Vibration Analyst Exam Category II			3 Hours	$500
2035/2075 Mystery PeakVue™and Autocorrelation			3 Days	$2,800
2068 Introduction to AMS Machinery Manager			4 Days	$3,400
2074 Intermediate AMS Machinery Manager			3 Days	$3,400
2076 Fundamentals of CSI 2140			2 Days	$1,900
2088A Online Prediction: Operation and Maintenance			4 Days	$3,200
2094 Advance CSI 2130 with PeakVue			2 Days	$2,800
2016 Balancing Theory & Application for CSI 2140			2 Days	$3,200
2051 Time Waveform Analysis			3 Days	$2,800
2080 Online Protection Operation and Maintenance			2 Days	$1,800
2070 or 2070V Advanced AMS Suite: Machinery Health Manager			4 Days	$3,200
2082A + 2082B Level I & Level 2 Lubrication With Certification			3 Days	$2,200
2082A + 2082B V Level I & Level 2 Lubrication With Certification-Virtual			3 Days	$2,200
E2140 eLearning: Fundamentals of CSI 2140 Machinery Health Analyzer			6 Hours	$700
2070CV AutoStat for AMS Suite : Machinery Health Manager			2 Days	$1,800
REL003 Intro to Developing Reliability-Based Maintenance Strategies			2 Days	$1,800
REL004 Introduction to Planning and Scheduling Principles			2 Days	$1,800
REL006 Materials Management Strategies			2 Days	$1,800
REL007 Reliability Centered Maintenance (RCM) Principles			2 Days	$1,800
REL009 Foundational Awareness for Maintenance & Reliability Pros.			4 Days	$2,500

TRAINING CALENDAR - PROCESS CONTROL

PROCESS CONTROL				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
9025 DeltaV Control Loop Foundation	Dubai, UAE	Feb 19-23	4 1/2 Days	$3,500

PROCESS CONTROL - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
9006 Loop Tuning Short Course	Call for Schedule		2 Days	$1,440
9025 Control Loop Foundation			4 1/2 Days	$3,500
E9025 eLearning: Control loop Foundation			18 Hours	$1,000
9032 Applied Modern Loop Tuning			3 Days	$2,987
9034 Applied Advanced Regulatory Controls			3 Days	$2,987
9035 DeltaV – Control – Advanced – Custom - Virtual			4 Days	$4,120
9030 Process Dynamics and Tuning Fundamentals (PCE I)			4 Days	$4,120
9031 Process Analysis and Minimizing Variability (PCE II)			3 Days	$2,987
1430 En Tech Toolkit Training			4 Days	$4,120

TRAINING CALENDAR - OVATION

OVATION				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
OV100 Starting with Data Acquisition	Dubai, UAE	Mar 4-8	5 Days	$4,020
OV200 Building and Maintaining Ovation Control	Dubai, UAE	Mar 11-15	5 Days	$4,020
OV300 Ovation Troubleshooting	DTV, Saudi Arabia	Apr 22-26	5 Days	$4,020

TRAINING CALENDAR - OVATION

OVATION - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
OV100V Starting with Data Acquisition-Virtual	Call for Schedule		5 Days	$3,605
OV200V Building and Maintaining Ovation Control-Virtual			5 Days	$3,605
OV210 Building Ovation Graphics			5 Days	$3,605
OV210V Building Ovation Graphics- Virtual			5 Days	$3,605
OV010 Ovation Operator			3 Days	$2,163
OV150V Ovation Maintenance -Virtual			5 Days	$3,605
OV246 Global Ovation OPH Report Building			3 Days	$2,163
OV248 EDS™			3 Days	$2,163
OV275 AMS Suite: Intelligent Device Manager			2 Days	$1,800
OV280 Ovation SCADA System			3 Days	$2,163
OV330 Ovation Advanced Control			5 Days	$3,605
OV230 Ovation System Administration			5 Days	$3,605
OV245 Ovation Process Historian			5 Days	$3,605
OV270 Ovation with HART and Smart Devices			2 Days	$1,800
OV300 Ovation Troubleshooting			5 Days	$3,605
OV310 Advanced Ovation Graphics			4 Days	$3,000
OV270 Ovation with HART and Smart Devices			5 Days	$3,605
OV360 Ovation Security for 2.4 Systems or Later			5 Days	$3,605
OV400 Ovation Certification Program			5 Days	$3,605
OV215 Ovation Software Project			10 Days	$7,210
OV235 Ovation SIS Implementation			5 Days	$3,605
OV295 Ovation Third-Party I/O Interfaces			3 Days	$2,163
OV355 Ovation Wireless with Wireless HART			2 Days	$1,800
OV365 Ovation Security Center			5 Days	$3,605
OV216 Ovation Hardware Project			5 Days	$3,605
OV370 Ovation Turbine Control System			5 Days	$3,605
OV380 Ovation Boiler Control			5 Days	$3,605
OV420 Ovation (Admin) Certification			5 Days	$3,605

TRAINING CALENDAR - ENERGY TRANSPORTATION SOLUTION

ENERGY TRANSPORTATION SOLUTIONS				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
RA331 Control Wave Troubleshooting Configuration	Dubai, UAE	May 13-15	3 Days	$1,900
RA331V Control Wave Troubleshooting Configuration	Virtual	Sep 16-18	3 Days	$1,900
RA441V Control Wave Designer Fundamentals	Virtual	Sep 9-11	2 1/2 Days	$2,900
RA902 Flo Boss S600+ Combined	Dubai, UAE	Apr 22-26	4 1/2 Days	$5,300
RA902V Flo Boss S600+ Combined	Virtual	Aug 5-9	4 1/2 Days	$5,300

ENERGY TRANSPORTATION SOLUTIONS - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
RA441 Control Wave Designer Fundamentals	Call for Schedule		2 1/2 Days	$2,900
RA442 Control Wave Designer Communications Programming			1 1/2 Days	$1,700
RA1220 FloBoss Configuration and Operation			4 1/2 Days	$5,150
RA1220V FloBoss Configuration and Operation-Virtual			4 1/2 Days	$5,150
RA900 Flo Boss S600+ Operator Fundamentals			2 Days	$2,652
RA901 Flo Boss S600+ Advanced			2 1/2 Days	$4,800
RA801 Open Enterprise SCADA Systems Basics			4 1/2 Days	$3,700
RA802 Open Enterprise SCADA Systems Intermediate			4 1/2 Days	$3,700

TRAINING CALENDAR - CORROSION & EROSION MONITORING

CORROSION & EROSION MONITORING - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
ROX007 Roxar - Acoustic Sand Monitor	Dubai, UAE	Call for Schedule	1 Day	$690
ROX008 Roxar - CorrLog - Intrusive Corrosion Monitoring System	Dubai, UAE		1 Day	$690
RX009 Roxar - SandLog Intrusive Sand Monitoring System	Dubai, UAE		1 Day	$690
ROX010 Roxar - FSM	Dubai, UAE		2 Days	$1,380
ROX011 Roxar - Hydraulic Retrieval & Access Fitting System	Dubai, UAE		1 Day	$690

TRAINING CALENDAR - ROXAR

ROXAR				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
ROX016 Roxar Multiphase meter 2600	Dubai, UAE	Jan 16-17	2 Days	$1,380

ROXAR - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
ROX001 Roxar Multiphase meter 1900VI	Dubai, UAE	Call for Schedule	3 Days	$2,070
ROX003 Roxar Subsea Multiphase meter	Dubai, UAE		2 Days	$1,380
ROX004 Roxar Wetgas Meter	Dubai, UAE		1 Day	$690
ROX005 Subsea Roxar Wetgas Meter	Dubai, UAE		1 Day	$690

TRAINING CALENDAR - FLOW

FLOW				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
2380 Micro Motion Coriolis Comprehensive Training Class	Dubai, UAE	Mar 5-6	2 Days	$1,400

FLOW - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
D4510 Hydrocarbon Gas Flow Measurement Systems Ops. & Maint.	Dubai, UAE	Call for Schedule	2 Days	$1,380
D4520 Hydrocarbon Liquid Flow Measurement Systems Ops. & Maint.	Dubai, UAE		3 Days	$2,070
D4230/D4280 Operation and Maintenance of Gas Ultrasonic Flowmeters	Dubai, UAE		2 Days	$1,380
D4260/D4262 Operation & Maintenance of the S600 Flow Computers	Dubai, UAE		2 Days	$1,380
D4530 Understanding Metering Systems: Applications, Ops. & Maint.	Dubai, UAE		2 Days	$1,380
2358 Micro Motion Coriolis Product – Intermediate	Dubai, UAE		1 Day	$690
2340 Rosemount 8700 Series Magnetic Flowmeter	Dubai, UAE		1 Day	$690
2386 Micro Motion Specific Gravity Meter - Intermediate	Dubai, UAE		1 Day	$690
2358 Micro Motion Coriolis Product – Intermediate	Dubai, UAE		1 Day	$690
2340 Rosemount 8700 Series Magnetic Flowmeter	Dubai, UAE		1 Day	$690
2386 Micro Motion Specific Gravity Meter - Intermediate	Dubai, UAE		1 Day	$690

TRAINING CALENDAR - ROSEMOUNT

ROSEMOUNT MEASUREMENT SOLUTIONS				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
2333 Process Measurement Level Product Training Course	Dubai, UAE	Jun 25-27	3 Days	$2,070
2375 Wireless Self Organizing Network Training Course	Dubai, UAE	April 23-24	2 Days	$1,600
2305 Rosemount 3051 Pressure Transmitter	Dubai, UAE	Feb 19, Dec 9	1 Day	$800
	Lagos, Nigeria	Mar 18		
2321 Rosemount 3144P Temperature Transmitters	Dubai, UAE	Feb 20, Dec 10	1 Day	$800
	Lagos, Nigeria	Mar 19		
2336 Rosemount 5408 Non-Contacting Radar Level Transmitter	Dubai, UAE	Feb 21, Dec 11	1 Day	$800
	Lagos, Nigeria	Mar 20		
2337 Rosemount 5300 Guided Wave Radar Level Transmitter	Dubai, UAE	Feb 22, Dec 12	1 Day	$800
	Lagos, Nigeria	Mar 21		

ROSEMOUNT MEASUREMENT SOLUTIONS - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
2305 3051 Smart Pressure Transmitter	Dubai, UAE	Call for Schedule	1 Day	$690
2308 3051S Smart Pressure Transmitter	Dubai, UAE		1 Day	$690
2309 Rosemount DP Level & Electronic Remote Sensor (ERS) System	Dubai, UAE		1 Day	$690
2310 Rosemount 3051S Multi-Variable Mass Flow Transmitter	Dubai, UAE		1 Day	$690
2321 3144P Temperature Transmitters	Dubai, UAE		1 Day	$690
2336H 5400 Series HART Radar Level Transmitter	Dubai, UAE		2 Days	$1,380
2337H 5300 High Performance Guided Wave Radar Transmitters	Dubai, UAE		2 Days	$1,380
2326H Process Measurement Product Pressure and Temperature III	Dubai, UAE		4 Days	$2,760
2327H Process Measurement Product DP Flow Training Course	Dubai, UAE		2 Days	$1,380
2370 Fieldbus Measurement instruments Training Course	Dubai, UAE		3 Days	$2,070
2329 Rosemount Pressure, Temperature & Multi-Variable Flow Transmitters	Dubai, UAE		2 Days	$1,380
2395 Rosemount 3300 & 5300 Guided Wave Radar Level Transmitters	Dubai, UAE		1 Day	$690

TRAINING CALENDAR - ROSEMOUNT ANALYTICAL

ROSEMOUNT ANALYTICAL				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
2800 Rosemount Liquid Analysis General pH, Conductivity & ORP Theory	Dubai, UAE	Nov 12-13	2 Days	$1,600
R4213 Operation and Maintenance of 700XA Gas Chromatographs	Dubai, UAE	Sep 23-26	4 Days	$3,200

ROSEMOUNT ANALYTICAL - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
2200 Rosemount Liquid Analysis pH, Conductivity, and ORP Theory	Call for Schedule		1 Day	$690
2201 Rosemount Liquid Analysis Chlorine, Dissolved Oxygen & Ozone Amperometric Measurement Theory			1 Day	$690
2170 Rosemount X-Stream Process Gas Analyzers			3 Days	$2,070
2110 Rosemount MLT Process Gas Analyzers			3 Days	$2,070
FG2100 Basic Course for Flame & Gas Detectors			2 Days	$1,380
R4105 Rosemount 700XA & 1500XA Gas Chromatographs - Introduction			3 Days	$2,070
2154 Rosemount OCX8800 Oxygen & Combustibles Transmitter			1 Day	$690
R4100 Introduction to Model 500 and 700 Gas Chromatographs			3 Days	$2,070
2153 Rosemount Oxygen Flue Gas & 6888A Analyzers			1 Day	$690
2205/2205V Customer Specific Measurement Theory			2 Hours	$500
R4210 Operation and Maintenance of Model 500 Gas Chromatographs			4 Days	$2,760
R4212 Operation and Maintenance of Model 700 Gas Chromatographs			4 Days	$2,760
R4311 Rosemount 500 Process Gas Chromatograph - Advanced			5 Days	$3,450
R4315 Rosemount 700XA & 1500XA Process Gas Chromatographs - Adv.			5 Days	$3,450
R4170 Rosemount 370XA Gas Chromatograph - Intermediate			3 Days	$2,070

TRAINING CALENDAR - TANK GAUGING

TANK GAUGING				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
RTG 101 Tank Gauging Technical Product Training	Dubai, UAE	May 20-24	5 Days	$3,450
	DTV, Saudi Arabia	Aug 11-15		$3,450
RTG 102 Tank Master Training	Dubai, UAE	Oct 8-10	3 Days	$2,800

TANK GAUGING - ON DEMAND				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
Wireless Tank Gauging Training	Dubai, UAE	Call for Schedule	3 Days	$2,070

TRAINING CALENDAR - CONTROL VALVES

CONTROL VALVES				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
1300 Control Valve Engineering I	Dubai, UAE	April 22-24, Sep 2-4	3 Days	$3,150
	Jubail, Saudi Arabia	Jan 30-Feb 1, Oct 29-31		$3,150
1350 Control Valve Engineering III	Jubail, Saudi Arabia	Feb 5-7, Nov 4-6	3 Day	$3,150
	Dubai, UAE	Apr 29-May 1, Sep 9-11		$3,150
1400 Valve Trim & Body Maintenance	Dubai, UAE	May 6-8, Sep 16-18	3 Days	$3,150
1751 Fundamentals of HART Based FIELDVUE™ Digital Valve Controller using Trex Field Communicator	Dubai, UAE	May 13-15, Sep 23-25	3 Days	$3,150
	Doha, Qatar	Jun 3-5		$3,150
	Jubail, Saudi Arabia	Feb 12-14, Nov 11-13		$3,150
1752 ValveLink™ Software for FIELDVUE ™ Digital Configuration and Calibration of Valve Controllers	Dubai, UAE	May 20-22, Sep 30-Oct 2	3 Days	$3,150
	Doha, Qatar	Jun 10-12		$3,150
	Jubail, Saudi Arabia	Feb 19-21, Nov 18-20		$3,150
1759 Diagnostic Data Interpretation Using ValveLink Software for Fieldvue Digital Valve Controllers	Dubai, UAE	May 27-29	3 Days	$3,150

CONTROL VALVES - ON DEMAND				
7036 FOUNDATION™ fieldbus FIELDVUE™ Digital Valve Controllers	Dubai, UAE	Call for Schedule	3 Days	$3,150

TRAINING CALENDAR - PRESSURE MANAGEMENT

PRESSURE MANAGEMENT				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
PRM-MEA-101 Pressure Relief Valve Overview	Dubai, UAE	Oct 17	1 Day	Call for Price
PRM-MEA-102 Direct Spring Operated Pressure Relief Valve Maintenance ASME VIII	Dubai, UAE	Jan 16-18	3 Days	Call for Price
PRM-MEA-103 High Pressure Pilot Operated Pressure Relief Valve Maintenance	Dubai, UAE	Feb13-15	3 Days	Call for Price
PRM-MEA-105 Pressure / Vacuum Valve Familiarization Overview	Dubai, UAE	Apr 16-17	2 Days	Call for Price
PRM-MEA-106 Low Pressure Pilot Operated Valves Maintenance	Dubai, UAE	May 21-22	2 Days	Call for Price
1100 Regulators & Relief Valves Gas Regulators	Dubai, UAE	Jun 18-20	3 Days	$3,100

PRESSURE MANAGEMENT - ON DEMAND				
PRM-MEA-101 Pressure Relief Valve Overview	Jubail, Saudi Arabia	Call for Schedule	1 Day	Call for Price
PRM-MEA-102 Direct Spring Operated Pressure Relief Valve Maintenance ASME VIII	Jubail, Saudi Arabia		3 Days	Call for Price
PRM-MEA-103 High Pressure Pilot Operated Pressure Relief Valve Maintenance	Jubail, Saudi Arabia		3 Days	Call for Price
PRM-MEA-104 Recertification for Direct Spring OR High-Pressure Pilot Operated Valves – ASME VIII	Dubai, UAE		2 Days	Call for Price
	Jubail, Saudi Arabia			Call for Price
PRM-MEA-105 Pressure / Vacuum Valve Familiarization Overview	Jubail, Saudi Arabia		2 Days	Call for Price
PRM-MEA-106 Low Pressure Pilot Operated Valves Maintenance	Jubail, Saudi Arabia		2 Days	Call for Price
1100 Regulators & Relief Valves Gas Regulators	Jubail, Saudi Arabia		3 Days	Call for Price

TRAINING CALENDAR - ACTUATION TECHNOLOGIES

ACTUATION TECHNOLOGIES				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
ACT-MEA-101 Emerson Electric Actuators Overview	Dubai, UAE	Jun 25	1 Day	Call for Price
ACT-MEA-102 Biffi Electric Actuators Service Training	Dubai, UAE	Jul 1-5	5 Days	Call for Price
ACT-MEA-103 EIM Electric Actuators Service Training	Dubai, UAE	Jun 26-28	3 Days	Call for Price
VA201 Bettis™, EL-O-Matic & FieldQ Scotch-Yoke and Rack & Pinion Product Servicing	Dubai, UAE	Jun 19-21	3 Days	Call for Price

TRAINING CALENDAR - ISOLATION VALVES

ISOLATION VALVES				
COURSE DETAILS	LOCATION	DATES	DURATION	COST PER STUDENT, US$
ISV-MEA-101 Gate, Globe, & Check Valve Overview and Maintenance	Jubail, Saudi Arabia	Nov 20-21	2 Days	Call for Price
	Dubai, UAE	Mar 4-5		Call for Price
ISV-MEA-102 Ball & Butterfly Valve Overview & Maintenance	Dubai, UAE	Mar 6-7	2 Days	Call for Price
	Jubail, Saudi Arabia	Nov 22-23		Call for Price
VA203 Bettis™ Multiport Flow Selector (MPFS) Servicing	Dubai, UAE	Jun 17-18	1 1/2 Days	Call for Price
ISV-MEA-003 Vanessa TOV Training	Jubail, Saudi Arabia	Jan 15-16	2 Days	Call for Price
	Dubai, UAE	Oct 17-18		Call for Price
ISV-MEA-004 AEV Valve Training	Dubai, UAE	Mar 18-19	2 Days	Call for Price

AUTHORIZED IACET PROVIDER

Go Boldly™
Go Boldly™
Go Boldly™
Go Boldly™

Middle East and Africa World Area Headquarters
Emerson FZE
P.O. Box 17033
Jebel Ali Free Zone South
Dubai, UAE
T +971 4 811 8100
F +971 4 886 5465
E-mail: mea.education@emerson.com
www.Emerson.com/MEA

EMERSON™