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Hands-On, Unbiased, Technical Training

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Setting the Standard for Automation™

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When your organization needs to train more than one employee or requires more than one training course, you can choose from multiple options using the Master Education Card from ISA, European Office. At a fixed low rate per day, you can choose training from any of our Open Enrollment courses. Your fixed rate card is valid for one year.

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Education & Training

ISA is recognized worldwide as a leader in non-biased, vendor-neutral education and training programs for automation professionals. Industry professionals—whether an experienced engineer, practicing technician, or newcomer to the industry—can hone their skills at ISA's regional training centers, through onsite training programs at their company, or via distance education.

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KEY:

- This course covers the ANSI/ISA88 Standards
- This course covers the ANSI/ISA84 Standards
- This course covers the ANSI/ISA95 Standards
- This course covers the ANSI/ISA99 Standards
- This course covers the ANSI/ISA100 Standards
- This course covers Project Management

Introduction to Industrial Automation and Control

(Combines lecture and hands-on labs)

Most Popular!

This popular course combines lecture and hands-on labs to provide an overview of industrial measurement and control. Technicians, engineers, and managers are provided with a foundation for communication with other control system professionals. This course serves as a solid fundamental course for introduction to other ISA courses.

You Will Cover:

- **Concepts of Process Control:** Typical Industries • Definitions • Continuous vs. Batch • Feedback Loop
- **Documentation:** Instrument Line Symbols • Function Symbols • Identification Letters • Piping and Instrumentation Diagram (P&ID) • Loop Diagram
- **Industrial Measurement Systems:** Process Measurement • Standard Signals • Instrument Performance Terminology • Repeatability and Accuracy • Zero, Span, and Linearity Errors • Calibration Chart

> "Having the physical instruments present in the classroom was an outstanding asset...it is an important diffferentiation between ISA's and other classes. Hands-on wins the day!"
>
> —Bill Laumeister, FAE

- **Pressure Measurement:** Concepts • Instruments • Differential Pressure (D/P) Measurement • Pascal's Law • Absolute and Atmospheric Pressure • Relationship between Pressure and Column of Liquid • Hydrostatic Head Pressure • U-Tube and Well Manometers • Bourdon Pressure Gage • Spiral and Helical Elements • Bellows and Diaphragm Elements
- **Level Measurement:** Dip Stick Level Measurement • Basic Sight Glasses • Float and Cable Arrangements • Ultrasonic • Capacitance Probe • Radiation Point • Rotating Paddle • Radar Level System • Interface Measurement • Hydrostatic Pressure • Open Tank Level • Zero Suppression/Elevation • Air Bubbler System
- **Flow Measurement:** Types of Flow • Reynolds Number • Differential Pressure Flowmeters • Concentric and Eccentric Orifices • Flow Nozzle • Venturi and Pitot Tubes • Target Flowmeter • Rotameter or Variable Area Meter • Magnetic, Vortex, Turbine, and Ultrasonic Flowmeters • Doppler Effect • Flow Tube Vibration and Twist • Coriolis and Thermal Mass Flowmeters • Positive Displacement Flowmeters • Rotary Vane, Oval Gear, and Nutating Disc Designs • Open Channel Flow Measurement • Weirs • Parshall Flume • Flowmeter Selection
- **Temperature Measurement:** Temperature Scales • Liquid-in-Glass, Filled Bulb, and Bimetallic Thermometers • Resistance Temperature Detectors (RTDs) • Reference Junction Compensation • Thermocouples • Immersion and Insertion Lengths • Thermowells • Thermistors
- **Control Valves:** Types • Valve Characteristics • Inherent Flow Characteristics • Actuators • Air to Extend/Retract • Positioners • I/P Transducer
- **Feedback Control Strategies:** Control Hierarchy • Process Dynamics • Lags • Dead Time • Strategies • Direct/Reverse Acting • On-Off Control • Controller Modes • Proportional Control/Action • Level Control Offset • Integral and Derivative Action • Tuning
- **Advanced Control Strategies:** Control Hierarchy • Cascade Control • Applications: With and Without Cascade • Ratio Control • Feedforward Control
- **Control System Hardware:** Pneumatic Controller • Electronic Controller • Single Loop Controller • Distributed Control System (DCS) • Programmable Logic Controller (PLC) • Personal Computers for Control
- **Smart Field Devices:** Current Practice • Typical Smart D/P Transmitter • Smart Temperature Transmitter System • Benefits • Innovative Applications • Fieldbus Foundation—H1 and H2 • How is Fieldbus Different? • Fieldbus Control System (FCS)

Classroom/Laboratory Exercises:

- Calibrate process measurement devices for level, temperature, pressure, and flow using a variety of state-of-the-art calibration equipment
- Interpret simple P&IDs
- Configure smart transmitters
- Operate digital controllers
- Tune control loops using software
- Build and tune an actual feedback control loop
- Review flow measurements and pressure scales

Includes ISA Text:

Measurement and Control Basics, Fourth Edition,
by Thomas A. Hughes

Course Details:

Course No.: FG07
Length: 4.5 Days
CEUs: 3.2

Distributed Processor Systems for Control

Not merely distributed control systems (DCS), this continually updated course covers the many aspects of control systems along with the impact of the newly emerging technologies. The perspectives provided are necessary for anyone responsible for legacy control systems, anticipating the purchase of upgrading their existing system, or contemplating the purchase of a new system. This course has been extremely helpful for individuals prior to their going to a supplier's course on a specific system, as well as for control systems sales personnel. More...

You Will Be Able To:

- Examine the latest advances in distributed processor technology using several commercial systems to illustrate the concepts
- Compare roles and need for DCS, enterprise control systems (ECS), programmable logic controllers (PLCs), programmable automation controllers (PACs), personal computing (PC) networks, and traditional supervisory control and data acquisition (SCADA) architectures
- Evaluate and justify potential benefits of distributed processor technology for improved productivity
- Explore issues involved in linking control processor technology to enterprise resource planning (ERP) systems
- Define the differences among the several fieldbuses and the issues of Control-in-the-Field (CIF)
- And more

You Will Cover:

- Controller Structures
- Operator Interface
- Communication Networks
- Control Strategy and Configuration
- Implementation
- And more

Classroom/Laboratory Exercises:

- Examine structures of various vendor systems for their different approaches
- Develop how the distributed nature of a control system is needed for a specific process application

Course Details:

Course No.: IC35
Length: 3 Days
CEUs: 2.1

Includes ISA Text:

Understanding Distributed Processor Systems for Control
by Samuel M. Herb, P.E.

System Checkout, Testing, and Startup

This course provides the information necessary in the check-out, system test, and startup of process control systems. The learning experience is enhanced through exercises for each of the necessary stages from risk analysis through Site Acceptance Testing.

You Will Be Able To:

- Determine the adequacy of a documentation package when given a specified start-up scenario
- Select the hardware approach that would meet the given criteria including cost effectiveness, efficacy, and reliability
- Select the best risk containment policy/procedure for given conditions
- Identify selected loop components and connections
- Determine the correct calibration requirements for selected instruments
- And more

You Will Cover:

- Instrument Commissioning
- Loop Testing
- Software Testing
- Alarm/Interlock Testing
- Live Test
- And more

Classroom/Laboratory Exercises:

- Risk Analysis
- Installation Verification
- Software Testing
- Alarm/Interlock Exercise
- And more

Course Details:

Course No.: EA10
Length: 3 days
CEU Credits: 2.1

Introduction to Applying the Batch Control Standard ANSI/ISA-88.01-1995

This course will provide essential information for professionals working in batch process, especially in the pharmaceutical, pulp and paper, food processing, chemical processing, and air and gas industries. You will leave with an explanation of the goals of the ANSI/ISA-88.01-1995 standard, how to apply it, where to use it, and the issues and problems it addresses. The course also covers the recipe and equipment structures used for batch control.

You Will Be Able To:

- Identify where batch manufacturing concepts for flexible manufacturing apply
- Define the prerequisites and co-requisites for implementing the standard for various architectures—programmable logic controller (PLC), distributed control system (DCS), PC-based control system
- Discuss various interfaces of a batch control system and other systems in an enterprise
- Explain the elements of recipe procedural control
- Explain the elements and structure of equipment control

You Will Cover:

- ANSI/ISA-88.01-1995 Standard
- Physical Model
- Recipe Types
- Procedural Control Model
- Control Activity Model

Course Details:

Course No.: IC40C
Length: 1 day
CEU Credits: 0.7

Includes ISA Standards:

- ANSI/ISA-88.01-1995 (R2006), *Batch Control Part 1: Models and Terminology*
- ANSI/ISA-88.00.02-2001, *Batch Control Part 2: Data Structures and Guidelines for Languages*
- ANSI/ISA-88.00.03-2003, *Batch Control Part 3: General and Site Recipe Models and Representation*

This course covers the ANSI/ISA88 Standards!

Batch Control Using the ANSI/ISA88 Standards

This course presents an approach to developing functional requirements/specifications using the models and terminology defined in the ANSI/ISA88 batch control standards. A review of the characteristics of batch manufacturing systems is included. You will explore the ANSI/ISA88 concept that separates the recipe from the equipment. This course includes a methodology that defines an object approach based on ANSI/ISA88 that promotes the reuse of these objects from one project to the next.

You Will Be Able To:

- Specify the requirements for a batch control system
- Describe modes and states and how they are applied at the equipment level
- Develop phase logic that executes in equipment and that can deal with both normal and abnormal operations
- Identify the alternative architectures for programmable logic controllers (PLCs), distributed control systems (DCSs), and PC-based control systems
- Describe the interfaces that are needed between batch control and other systems within an enterprise
- And more

You Will Cover:

- ANSI/ISA88 Standards
- Physical Model
- Recipe
  - Types
  - Information Categories
- Procedural Control Model
- Batch Tracking
- And more

Classroom/Laboratory Exercises:

- Develop procedural elements using the ANSI/ISA88 procedural control model and test those procedural elements against the equipment entities
- Develop recipes using the ANSI/ISA88 recipe model and the ANSI/ISA88 recipe representation
- Develop phase logic that runs in the equipment entities and links to the procedural elements
- Apply the modes and various states defined in ANSI/ISA88

Course Details:

Course No.: IC40
Length: 3 days
CEU Credits: 2.1

Includes ISA Standards:

- ANSI/ISA-88.01-1995 (R2006), *Batch Control Part 1: Models and Terminology*
- ANSI/ISA-88.00.02-2001, *Batch Control Part 2: Data Structures and Guidelines for Languages*
- ANSI/ISA-88.00.03-2003, *Batch Control Part 3: General and Site Recipe Models and Representation*

This course covers the ANSI/ISA88 Standards!

Overview of FOUNDATION™ Fieldbus Technology

This course briefly covers the development of the ANSI/ISA50 standard, which is the driving force behind the FOUNDATION™ Fieldbus technology. Both FOUNDATION Fieldbus H1 (31.25 kbits/s) and HSE (High-Speed Ethernet) buses are discussed. The benefits and cost savings of FOUNDATION Fieldbus technology will be compared to system architectures of the past (e.g. asset management). In addition, the course will discuss how FOUNDATION Fieldbus networks are put together and configured. Operation, troubleshooting, availability, and safety aspects are also covered.

> [This course] provided a basic background of fieldbus technology before jumping into the specific buses.
>
> —Jeffrey Bekasi

You Will Be Able To:

- Identify the benefits and cost savings of FOUNDATION Fieldbus
- Explain how fieldbus segments are built, including device requirements, wiring methodology, and segment configuration
- Discuss how FOUNDATION Fieldbus compares to other industrial bus systems
- Recognize the purpose of the Fieldbus Foundation
- Describe FOUNDATION Fieldbus interoperability and interoperability testing by the Fieldbus Foundation
- And more

You Will Cover:

- FOUNDATION Fieldbus
- Comparison of Other Industrial Bus Protocols
- FOUNDATION Fieldbus Technology
- FOUNDATION Fieldbus H1 Network

Course Details:

Course No.: FG25C
Length: 1 day
CEU Credits: 0.7

Includes ISA Standard:

ANSI/ISA-50.00.01-1975 (R2002), *Compatibility of Analog Signals for Electronic Industrial Process Instruments*

Picking the Right Bus—A Comparison of Field and Device Networks

The industrial market is flooded with different field, device, and sensor buses, all being promoted as the ideal solution for the plant floor. There is little doubt that buses can save your company money, but how do you select the right one and will it really have a significant economic impact?

This course provides an unbiased view of the fieldbus marketplace so you can make an informed decision. You will take an in-depth look at today's dominant fieldbus technologies and compare their uses and features. You will also discuss emerging Ethernet-based fieldbuses. The basic strategy behind each bus is outlined, including the type of applications where each fieldbus system is best and least suited. This course will discuss the wiring and installation requirements for each bus, as well as the highest levels of application interface for each bus. The bus protocol will be reviewed, but only enough to help you understand the differences. Several case histories of fieldbus applications in new and existing plant sites illustrate the potential benefits and pitfalls of each bus technology.

You Will Be Able To:

- Define the core concepts and terminology behind field device networks
- Evaluate fieldbuses including: AS-interface, FOUNDATION™ Fieldbus, DeviceNet, and Profibus
- Recognize the strengths and weaknesses of each of the dominant fieldbus technologies
- Identify the strengths and weaknesses of the new Ethernet-based fieldbuses
- Explain how to select the right bus for your plant, including when a combination of buses may be needed

You Will Cover:

- What is Ethernet (TCP/IP)?
- What is and Why ControlNet?
- What is DeviceNet?
- AS-Interface and Profibus
- Overview of FOUNDATION Fieldbus (FF)

Course Details:

Course No.: FG30C
Length: 1 day
CEU Credits: 0.7

> [This course was] well organized and professionally presented.
>
> —James St. Clair

Safety Instrumented Systems: The Must Know for Implementation

There are many different ways of designing a safety instrumented system (SIS). Questions like these are being asked by users and engineering firms alike:

- Which technology should be used (electric, electronic, or programmable)?
- What level of redundancy is appropriate (single, dual, or triple)?
- How often should systems be tested (monthly, quarterly, yearly, or once per shutdown)?
- What about field devices (technology, level of redundancy, and test intervals)?

Debate continues as to how one even makes these choices (past experience, qualitative judgment, quantitative analysis, etc.). This seminar will cover the basics of what needs to be done in the design and selection of safety systems.

> "An excellent one day overview of a complex and diverse subject."
>
> —Peter Skipp, Engineering Manager

You Will Be Able To:

- Describe the lifecycle set of activities that are necessary to design, implement, and maintain safety systems
- Discuss the basics of evaluating process risk levels
- Discuss the basics of determining Safety Integrity Levels (SILs)
- Describe the pros and cons of various logic system technologies
- Identify documentation requirements
- And more

You Will Cover:

- Guidelines and Standards
- General SIS Design Considerations
- Hazard and Risk Assessment
- System Technologies
- Operation and Maintenance
- And more

Course Details:

Course No.: EC50C
Length: 1 day
CEU Credits: 0.7

Includes ISA Standards:

ANSI/ISA84.00.01-2004, Parts 1-3

This course covers the ANSI/ISA84 Standards!

Safety Instrumented Systems—Design, Analysis, and Justification*

Instructor-led classroom course

This course focuses on the engineering requirements for the specification, design, analysis, and justification of safety instrumented systems (SIS) for the process industries. You will learn how to determine Safety Integrity Levels (SILs) and evaluate whether proposed or existing systems meet the performance requirements.

You Will Be Able To:

- Implement the ISA84 standard
- Calculate SILs using a variety of techniques
- Analyze the performance of various sensor, logic, and final element configurations, as well as the impact of diagnostics, test intervals, common cause, system size, and more
- Calculate optimum system test intervals
- Apply the documentation requirements for process safety management, regulations, and industry standards
- And more

You Will Cover:

- Guidelines and Standards
- General SIS Design Considerations
- Hazard and Risk Assessment
- System Technologies
- Operations and Maintenance
- And more

> "[This course] filled in the gaps in knowledge and understanding."
>
> —William Wilkins, Project Manager

Classroom/Laboratory Exercises:

- Calculate device failure rates and determine safe vs. dangerous performance
- Model the impact of field devices, automatic diagnostics, manual test intervals, common cause, and more
- Determine the SIL of a sample process and design a SIS to meet the performance requirements

Course Details:

Course No.: EC50
Length: 4 days
CEUs: 2.8

Includes ISA Text: *Safety Instrumented Systems: Design, Analysis, and Justification, Second Edition,* by Paul Gruhn, P.E., CFSE and Larry Cheddie, P.E., CFSE

Includes ISA Standards:

ANSI/ISA-84.00.01-2004 Parts 1–3 and ANSI/ISA-91.00.01-2001

This course covers the ANSI/ISA84 Standards!

Advanced Safety Integrity Level (SIL) Selection*

This course focuses on hands-on examples of safety integrity level (SIL) selection using a variety of different techniques. Students will be better able to save their companies time and money through the optimization of system performance requirements.

You Will Be Able To:

- Develop and implement different SIL selection techniques within your organization
  - Risk matrix
  - Risk graph
  - Layer Of Protection Analysis (LOPA)
- Determine the appropriate level of performance needed of your safety systems
- Help prevent over- or under-designing the system requirements to save your organization time and money

You Will Cover:

- Determination of the Appropriate Level of Performance Needed for Your Safety Systems
- Prevention of System Requirements Over- or Under-Design
- SIL Selection Hands-on Examples

Classroom/Laboratory Exercises:

- Multiple application exercises of SIL selection
- Students are encouraged to bring their own examples to cover in class

Course Details:

Course No.: EC52
Length: 2 days
CEUs: 1.4

This course covers the ANSI/ISA84 Standards!

The standard is important to you because...

- It can help your organization systematically and continuously identify, reduce, and mange its process safety risks
- The ISA-84.01 standard is considered to be a generally accepted and recognized good engineering practice under OSHA's process safety management standard's performance-based requirements
- Safety is everyone's concern

Advanced Design and SIL Verification*

This course focuses on more detailed design issues and further hands-on examples of system analysis/modeling. You will be better able to perform system design and analysis, thus saving your company time and money in optimizing system designs.

You Will Be Able To:

- Analyze any system technology and configuration to see if it will meet the required safety integrity level (SIL)
- Determine if existing systems are safe enough (or whether they need to be upgraded) and whether proposed systems will meet the performance requirements
- Determine the optimum manual test interval for any system, saving your company time and money by not over- or under-testing systems

You Will Cover:

- System Modeling/Analysis Hands-On Advanced Examples
- Detailed Design Topics

Classroom/Laboratory Exercises:

- Multiple application exercises of system modeling/analysis

Course Details:

Course No.: EC54
Length: 2 days
CEUs: 1.4

This course covers the ANSI/ISA84 Standards!

*These courses are part of the ISA84 Safety Instrumented Systems Certificate Programs

certificate program

ISA and the Automation Standards Compliance Institute (ASCI) offer three certificate programs that will increase knowledge and awareness of the ISA84 standard.

Each certificate program includes specialized training on ISA84 and an exam that is offered through the Prometric testing centers. Those who register for the training course and the certificate program and pass the exam will be issued an ISA certificate specifying that they have successfully completed that certificate program.

Certificate 1:

ISA84 SIS Fundamentals Specialist

This certificate requires the completion of the four-day instructor-led ISA training course **EC50** with exam (or the online, instructor-assisted version, **EC50E,** with exam). This Certificate is required to apply for Certificate 2 and Certificate 3. No application required.

Certificate 2:

ISA84 SIL Selection Specialist

This certificate requires the completion of the two-day instructor-led ISA training course **EC52** with exam. Certificate 1 is a prerequisite. Application required.

Certificate 3:

ISA84 SIL Verification Specialist

This certificate requires the completion of the two-day instructor-led ISA training course **EC54** with exam. Certificate 1 is a prerequisite. Application required.

ISA84 SIS Expert

Individuals who achieve Certificates 1, 2, and 3 are designated as ISA84 Safety Instrumented Systems (SIS) Experts.

Renewal

Because they are not certifications, you will not have to renew your ISA84 Certificates; however, your certificates will only be considered current for three years. Questions regarding extending your certificate's "current" status can be addressed by contacting ISA Customer Service at info@isa.org.

Learn more about these certificate programs, eligibility criteria, and upcoming courses at **www.isa.org/ISA84Certificate**.

Safety Instrumented Systems—Design, Analysis, and Justification

Online, instructor-assisted course

This course focuses on the engineering requirements for the specification, design, analysis, and justification of safety instrumented systems (SIS) for the process industries. Students will learn how to determine safety integrity levels (SILs) and evaluate whether proposed or existing systems meet the performance requirements.

You Will Be Able To:

- Implement the ISA84 standard
- Calculate SILs using a variety of techniques
- Analyze the performance of various sensor, logic, and final element configurations, as well as the impact of diagnostics, test intervals, common cause, system size, and more
- Calculate optimum system test intervals
- Apply the documentation requirements for process safety management, regulations, and industry standards
- And more

You Will Cover:

- Week 1/Module 1: Introduction and Background
- Week 2/Module 2: Hazard, Risk Assessment, and Determining SIL
- Week 3/Module 3: Layer of Protection Analysis—LOPA
- Week 4/Module 4: Reliability and Modeling Issues
- Week 5/Module 5: Logic System Technologies
- Week 6/Module 6: Field Devices and Their Impact
- Week 7/Module 7: Installation and Beyond
- Week 8: Final Course Examination

Course Details:

Course Number: EC50E
Length: 8 weeks
CEUs: 3.5 (35 PDHs)

Includes ISA Text:

Safety Instrumented Systems: Design, Analysis and Justification, 2nd Edition, by Paul Gruhn and Harry Cheddie

Includes ISA Standards:

- ANSI/ISA-91.00.01-2001, *Identification of Emergency Shutdown Systems and Controls that are Critical to Maintaining Safety in Process Industries*
- ANSI/ISA-84.00.01-2004, Parts 1–3

This course covers the ANSI/ISA84 Standards!

OPC: The Windows to the World Are Open

Sharing data between current control system offerings requires a myriad of hardware, software drivers, and configuration tools from each vendor. OLE for Process Control (OPC) is an industry-wide standard that breaks this proprietary lock by offering open connectivity based on principles adapted from MS Windows integration standards.

Using case studies and an OPC client/server demonstration, this course shows you the benefits and drawbacks of using OPC in your plant, how to link diverse industrial equipment into an effective plant-wide communications network, how to securely share plant data on the Internet, and how to justify the economics to move to OPC.

You Will Be Able To:

- Discuss what the OPC standards provide
- Recognize the benefits and drawbacks of OPC
- Justify the economics to move to OPC
- Post your process data seamlessly onto the Internet or Intranet
- Migrate your plant and process data into your business applications
- And more

You Will Cover:

- The OPC Foundation
- Benefits and Limitations of OPC
- The ISO/OSI Communications Reference Model
- Examine the Current OPC Standards
- Resources for Off-the-Shelf OPC Solutions
- And more

Classroom/Laboratory Exercises:

- Demonstration of OPC Server and Client

Course Details:

Course No.: IC50C
Length: 1 day
CEU Credits: 0.7

Implementing an Open Control Systems Network

This course will use lecture and hands-on exercises to help you explain how Open Control (OPC) works and how to implement it in your plant environment. This course shows you the benefits and drawbacks of using OPC in your plant, how to link diverse industrial equipment into an effective plant-wide communications network, how to securely share plant data on the Internet, and how to justify the economics to move to OPC.

You Will Be Able To:

- Describe how to link diverse industrial equipment into a plant-wide communications network
- Discuss what the OPC standards provide
- Recognize the benefits and drawbacks of OPC
- Post your process data seamlessly onto the Internet or Intranet
- Migrate your plant and process data into your business applications
- And more

You Will Cover:

- Introduction
- The OPC Overview Document
- The OPC Common Interface
  - Data Access Interface
  - Demonstration
  - Security Interface
  - Alarms and Events Interface
  - Historical Data Access (HDA)
  - Batch Interface
  - Product Testing
- OPC_DX
- OPC_XML_DA
- And more

Classroom/Laboratory Exercises:

- Hands-on exercises to understand the following standards:
  - OPC DA
  - OPC Alarms and Events (A&E)
  - OPC Historical Data Access (HDA)
- And more

Course Details:

Course No.: IC50
Length: 2 days
CEU Credits: 1.4

Introduction to SCADA Systems Integration

This course explains the parts and technologies that make up a supervisory control and data acquisition (SCADA) system and shows you how to evaluate potential benefits of applying the technology to your process application.

You Will Be Able To:

- Describe the various components of a SCADA system
- Recognize the base standards that apply to SCADA
- Sketch out a SCADA system for potential application in your industry
- Explain the concepts of digital coding, protocols, and modulation methods; why they are needed; and where they are most effectively applied
- Evaluate the benefits of several examples of Remote Terminal Units (RTUs), Master Terminal Units (MTUs), and communications methods
- And more

You Will Cover:

- Definition of SCADA Terminology
- Concepts of Communication
- RTUs
- Field Devices
- MTU Applications
- And more

Course Details:

Course No.: IC30C1
Length: 1 day
CEU Credits: 0.7

Practical Applications of SCADA Systems Integration

This course exposes you to practical applications that have been successfully implemented by many companies in the industries that use supervisory control and data acquisition (SCADA) systems. It will lead you toward an understanding of the features of SCADA that allows the technology to benefit industry. This seminar will familiarize you with existing and potential applications of SCADA technology and with the factors about SCADA that will allow you to develop your own applications.

You Will Be Able To:

- Describe the features that make SCADA different from other process control technologies
- Describe the components of a SCADA system, their functions, and how they communicate with each other
- Describe the major applications of SCADA across many industries
- Explain which types of applications should not use SCADA and why not
- Recognize application opportunities based on your existing knowledge of your process and your new knowledge of SCADA
- And more

You Will Cover:

- Overview of SCADA
- Data Interoperability
- Traditional SCADA Applications
- Examples of Future Applications
- And more

Course Details:

Course No.: IC30C2
Length: 1 day
CEU Credits: 0.7

SCADA Systems Integration

This course provides an in-depth introduction to supervisory control and data acquisition (SCADA) systems. Participants will learn how remote sensing and actuation are combined with modern communication techniques to effectively monitor and control very large industrial processes—like those used in oil fields, pipelines, and electrical power systems. This course will cover most major SCADA applications, system components, and architecture.

You Will Be Able To:

- Apply several different architectures common to SCADA systems
- Determine which process control parameters may or may not be controlled by SCADA
- Analyze the main building blocks and determine how they are integrated into a SCADA system
- Select protocols based on field-imposed parameters
- Calculate scan times for various sized systems
- And more

You Will Cover:

- Basic Concepts of SCADA
- Field Devices
- Wiring Methods
- Remote Terminal Units (RTU)
- Master Terminal Units (MTU)
- And more

Classroom/Laboratory Exercises:

- Calculate scan time for various sized systems
- Select protocols based on field-imposed parameters
- Develop specifications for SCADA systems selection

Course Details:

Course No.: IC30
Length: 2 days
CEU Credits: 1.4

Introduction to the Management of Alarm Systems

This course focuses on the key activities of the alarm management lifecycle provided in the ANSI/ISA-18.00.02: *Management of Alarm Systems for the Process Industries* standard. The key activities covered include the alarm philosophy development, alarm rationalization, basic alarm design, advanced alarm techniques, HMI design for alarms, monitoring, assessment, management of change, and audit.

You Will Be Able To:

- Identify types of alarms
- Discuss rationalization, classification, and prioritization of alarms
- Design basic alarms
- Determine when advance alarm techniques should be used
- Manage changes to alarm systems
- And more

You Will Cover:

- The Business Case for Alarm Management
- The Common Problems in Alarm Systems
- The Alarm Management Lifecycle
- Alarm:
  - Philosophy
  - Identification
  - Rationalization
  - Implementation
  - Operation
  - Maintenance
  - Monitoring and Assessment
  - Audit
- Sustaining Alarm Management
- And more

Classroom/Laboratory Exercises:

- Alarm Objective Analysis
- Alarm Classification
- Alarm Prioritization
- Alarm Monitoring
- And more

Course Details:

Course No.: IC39C
Length: 1 day
CEU Credits: 0.7

Includes ISA Text:

Alarm Management: A Comprehensive Guide, 2nd Edition, by Bill Hollifield and Eddie Habibi

Includes ISA Standard:

ANSI/ISA-18.00.02: *Management of Alarm Systems for the Process Industries*

Implementing Business to MES Integration Using the ANSI/ISA95 Standard

Many manufacturing firms have made significant investments in flexible shop-floor execution systems and in sophisticated enterprise planning (ERP) systems. Those investments, however, cannot yield their full potential until each has access to the information and capabilities of the other. The ANSI/ISA95 standard addresses that coordination problem by providing a sound, robust definition of business activities and of the information that must flow between those two realms. This course also teaches the terminology used in Information Technology (IT) departments so that manufacturing and IT personnel can effectively work together on integration projects.

You Will Be Able To:

- Specify the requirements for an enterprise-control integration solution
- Identify the business processes that need information from manufacturing systems and vice versa
- Explain the business drivers involved in integration
- Discuss the roles of UML, XML, and B2MML in vertical integration
- Apply the ISA95 object models
- And more

You Will Cover:

- Standards and Models
- Business Processes
- Production Processes
- Information Model

Classroom/Laboratory Exercises:

- Identify key business drivers for integration
- Identify key business processes and objects
- Identify process segment definitions
- Develop shared product definition information

Course Details:

Course No.: IC55
Length: 2 days
CEU Credits: 1.4

Includes ISA Standards:

- ANSI/ISA-95.00.01-2000, *Enterprise-Control System Integration, Part 1: Models and Terminology*
- ANSI/ISA-95.00.02-2001, *Enterprise-Control System Integration, Part 2: Object Model Attributes*
- ANSI/ISA-95.00.03-2005, *Enterprise-Control System Integration, Part 3: Models of Manufacturing Operations Management*

This course covers the ANSI/ISA95 Standards!

Implementing Enterprise-Control Integration Using the ANSI/ISA95 Standards

This course defines an approach to integration of manufacturing systems with other business logistics systems using the models defined in the ISA95 standards. You will be better prepared to integrate your manufacturing systems into the corporate supply chain. This course also defines the activities associated with manufacturing control business logistics systems and describes, in detail, the information that must be shared between enterprise and control systems.

You Will Be Able To:

- Specify the requirements for an enterprise-control integration solution
- Identify the issues involved in the integration of logistics to manufacturing control
- Explain the business drivers involved in integration
- Identify the business processes that need information from manufacturing systems and vice versa
- Identify the information associated with integration

You Will Cover:

- Standards and Models
- Business Processes
- Production Processes
- Information Model

Course Details:

Course No.: IC55C
Length: 1 day
CEU Credits: 0.7

Includes ISA Standards:

- ANSI/ISA-95.00.01-2000, *Enterprise-Control System Integration, Part 1: Models and Terminology*
- ANSI/ISA-95.00.02-2001, *Enterprise-Control System Integration, Part 2: Object Model Attributes*
- ANSI/ISA-95.00.03-2005, *Enterprise-Control System Integration, Part 3: Models of Manufacturing Operations Management*

This course covers the ANSI/ISA95 Standards!

Applying Manufacturing Execution Systems

Today's manufacturing environment demands smaller lot sizes, faster cycle times, greater flexibility, and smaller inventory buffers than ever before. This course addresses not only what a Manufacturing Execution System (MES) is and where it came from, but how it can affect market share and competitive position through faster response, broader product offerings, reduced time-to-market, and better performance against commitments to customers.

You Will Be Able To:

- Identify the business drivers that make effective MES a competitive weapon in today's manufacturing environment
- Visualize where MES fits in relationship to planning systems (ERP) and plant equipment control devices
- Explain how to develop a business case that drives a requirements definition document
- List the basic steps in developing the user requirements for an MES
- Define and apply an implementation approach that delivers results
- And more

You Will Cover:

- History and Evolution of MES
- Core and Support Modules
- MES System Benefits
- System Configuration Examples
- Implementation Approaches
- And more

Classroom/Laboratory Exercises:

- Examine a possible MES business case and requirements definition
- Configure and operate a simulated MES demonstration

Course Details:

Course No.: IC60
Length: 2 days
CEU Credits: 1.4

Includes ISA Standard:

ANSI/ISA-95.00.03-2005, *Enterprise-Control System Integration, Part 3: Models of Manufacturing Operations Management*

This course covers the ANSI/ISA95 Standards!

Applying the ANSI/ISA95 Standard

This course will give you a very good understanding of how to apply the ISA95 standard, including how to use all the models of ISA95 Part I. This course builds on the ISA course IC55: Implementing Business to MES Integration Using the ANSI/ISA95 Standard—which provides a good foundation on ISA95 and is a recommended pre-requisite for this course (see page 14)—teaching you how to apply what you learned to a real project.

You Will Be Able To:

- Analyze a plant using the ISA95 Models
- Use the data models of ISA95 in an application

You Will Cover:

- Models of ISA95 Recap
- Case Study: "The bread company" (or from your own company)
- ISA95 Analysis
- Object Models
- Putting It All Together

Classroom/Laboratory Exercises:

- Identify business drivers, make them "smart," and put them in a matrix
- Define enterprise functions
- Create the equipment hierarchy model
- Define resources and properties
- Define the process segment specifications
- Define the product definition information
- Define the relationships between process segments and product segments
- Draft a sample request
- Draft a sample response

Course Details:

Course No.: IC66
Length: 2 day
CEU Credits: N/A

This course covers the ANSI/ISA95 Standards!

Introduction to Industrial Automation Security and the ANSI/ISA99 Standards

Understanding how to secure factory automation, process control, and supervisory control and data acquisition (SCADA) networks is critical if you want to protect them from viruses, hackers, spies, and saboteurs. This course teaches you the basics of the ANSI/ISA99 standard on security for Industrial Automation and Control Systems (IACS) and how these can be applied in the typical factory or plant. You will be introduced to the terminology, concepts, and models of ANSI/ISA99 cybersecurity. This course will cover the elements of creating a cybersecurity management system and explain how these should be applied to IACS.

You Will Be Able To:

- Discuss why improving industrial security is necessary to protect people, property, and profits
- Define the terminology, concepts, and models for electronic security in the industrial automation and control systems environment
- Define the elements of the of ISA99 Part 2 standard for establishing an IACS security program
- Define the core concepts of risk and vulnerability analysis methodologies
- Explain the basic principles behind the policy development and key risk mitigation techniques
- And more

> "[This course] gave me a general overview of how to setup security measures."
>
> —Donald Peck,
> Utility SCADA Supervisor

You Will Cover:

- How IT and the Plant Floor are Different and How They are the Same
- Current Security Standards and Practices
- Creating a Security Program
- Using ISA-99.00.02 – Addressing Risk with:
  - Security Policy, Organization, and Awareness
  - Selected Security Countermeasures
  - Implementation Measures
- Using ISA-99.00.02 – Monitoring and Improving the CSMS
- And more

Course Details:

Course No.: IC32C
Length: 1 days
CEU Credits: 0.7

Includes ISA Standards:

- ANSI/ISA99.00.01-2007
- ANSI/ISATR99.00.01-2007
- ANSI/ISA99.02.01-2009

Using the ANSI/ISA99 Standard to Secure Your Control System

The move to using open standards such as Ethernet, TCP/IP, and web technologies in supervisory control and data acquisition (SCADA) and process control networks has begun to expose these systems to the same cyber attacks that have wreaked so much havoc on corporate information systems. This course provides a detailed look at how the ANSI/ISA99 standards can be used to protect your critical control systems. It also explores the procedural and technical differences between the security for traditional IT environments and those solutions appropriate for SCADA or plant floor environments.

You Will Be Able To:

- Discuss the principles behind creating an effective long-term security program
- Interpret the ANSI/ISA99 industrial security guidelines and apply them to your operation
- Define the basics of risk and vulnerability analysis methodologies
- Analyze the current trends in industrial security incidents and methods hackers use to attack a system
- Define the principles behind the key risk mitigation techniques, including anti-virus and patch management, firewalls, and virtual private networks
- And more

You Will Cover:

- How Cyberattacks Happen
- Creating A Security Program
- Using ISA-99.00.02—Risk Analysis
- Using ISA-99.00.02—Addressing Risk with:
  - Security Policy, Organization, and Awareness
  - Selected Security Countermeasures
  - Implementation Measures
- Using ISA-99.00.02—Monitoring and Improving the CSMS
- And more

Classroom/Laboratory Exercises:

- Develop a business case for industrial security
- Conduct a security threat analysis
- Investigate scanning and protocol analysis tools
- Apply basic security analysis tools software

Course Details:

Course No.: IC32
Length: 2 days
CEU Credits: 1.4

Includes ISA Standards and Technical Report:

- ANSI/ISA-99.00.01-2007, *Security for Industrial Automation and Control Systems Part 1: Terminology, Concepts, and Models*
- ANSI/ISA-TR99.00.01-2007, *Security Technologies for Industrial Automation and Control Systems*
- ANSI/ISA-99.02.01-2009, *Security for Industrial Automation and Control Systems: Establishing an Industrial Automation and Control Systems Security Program*

This course covers the ANSI/ISA99 Standards!

Cybersecurity for Automation, Control, and SCADA Systems

The move to using open standards such as Ethernet, TCP/IP, and web technologies in supervisory control and data acquisition (SCADA) systems and process control networks has begun to expose these systems to the same cyber attacks that have wreaked so much havoc on corporate information systems. This course provides a detailed look at how the ANSI/ISA99 standards can be used to protect your critical control systems. It also explores the procedural and technical differences between the security for traditional IT environments and those solutions appropriate for SCADA or plant floor environments.

You Will Be Able To:

- Identify the principles behind creating an effective long-term security program
- Interpret the ANSI/ISA99 industrial security guidelines and apply them to your operation
- Explain the principles of security policy development
- Define the concepts of defense-in-depth and zone/conduit models of security
- Analyze the current trends in industrial security incidents and methods hackers use to attack a system
- And more

You Will Cover:

Week 1/Module 1: Defining Industrial Cybersecurity
Week 2/Module 2: Risk Assessment
Week 3/Module 3: Threats and Vulnerabilities
Week 4/Module 4: Security Policies, Programs, and Procedures
Week 5/Module 5: Understanding TCP/IP, Hackers, and Malware
Week 6/Module 6: Technical Countermeasures
Week 7/Module 7: Architectural and Operational Strategies
Week 8: Final Course Examination

Course Details:

Course Number: IC32E
Length: 8 weeks
CEUs: 2.1 (21 PDHs)

Includes ISA Text::

- *Industrial Network Security* by David J. Teumin

Includes ISA Standards and Technical Report:

- ANSI/ISA-TR99.00.01-2007, *Security Technologies for Manufacturing and Control Systems*
- ANSI/ISA-99.00.01-2007, *Security for Industrial Automation and Control Systems Part 1: Terminology, Concepts, and Models*
- ANSI/ISA-99.02.01-2009, *Security for Industrial Automation and Control Systems: Establishing an Industrial Automation and Control Systems Security Program*

This course covers the ANSI/ISA99 Standards!

Introduction to Human Machine Interface (HMI) for Industrial Automation

NEW!

The human-machine interface (HMI) is the software application running in the operator consoles that permits operators to visualize the process. This course will provide an introduction to the primary aspects of HMI configuration: best practices in information presentation for process equipment, text, numbers, historical trends, and alarm information. Presentation of related on-demand information, including reports and links out to other documents, will also be covered. A basic overview of best practices in scripting will be provided.

You Will Be Able To:

- Design a graphical hierarchy for navigation
- Design an HMI system with varied classes of display types
- Design each of the major classes of display types
- Explain best practices in HMI
- Plan and design for key communication errors
- And more

You Will Cover:

- Graphics and Controls
- Trends
- Alarms
- Reports
- Scripts
- And more

Classroom/Laboratory Exercises:

- Build a GUI
- Construct a tag table
- Configure a system
- Connect to a Programmable Logic Controller (PLC)
- And more

Course Details:

Course No.: EA20
Length: 3 days
CEUs: 2.1

Implementing Wireless Industrial Automation Systems

This course will cover the most relevant details associated with industrial wireless systems with an emphasis toward how the various technological choices coexist, interoperate, and interact with each other. Numerous examples of real-world deployments are covered for facilities such as SCADA systems, petrochemical plants, and electrical power generation and transmission systems. The operational differences posed to the wireless systems' performance by discrete manufacturing needs, monitoring of devices, and even control systems are addressed. Considerable emphasis is placed specifically on ISA100 (the standard for industrial wireless) including deep dives into some of the standard's most pertinent details. Comparisons of ISA100 with other protocols and specifications (e.g., Industrial Bluetooth, ZigBee, WirelessHART) are provided.

You Will Be Able To:

- Explain how wireless applications utilizing different wireless technologies may interplay at your plant
- Identify if a combination of schemes is needed in your plant
- Identify secure methods for linking multiple plants together
- Examine how return on investment can accurately guide you in prioritizing wireless applications that different plant departments are requesting
- Answer the question: "Can I remove the wires from my automation system?"
- And more

You Will Cover:

- Week 1/Module 1: Introduction and Background
- Week 2/Module 2: Communication Fundamentals
- Week 3/Module 3: Communication Network Concepts
- Week 4/Module 4: Networking Approaches
- Week 5/Module 5: Existing Wireless Options—IEEE 802.11 and Licensed Radios
- Week 6/Module 6: Existing Wireless Options—Zigbee, Bluetooth, and WiMax
- Week 7/Module 7: Advanced Concepts and Final Review
- Week 8: Final Course Examination

Course Details:

Course Number: IC85E
Length: 8 Weeks
CEUs: 2.1 (21 PDHs)

This course covers the ANSI/ISA100 Standards!

Includes ISA Text:

- *Wireless Networks for Industrial Automation, Second Edition*, by Dick Caro

Includes ISA Standard:

- ISA-100.11a-2009, *Wireless Systems for Industrial Automation: Process Control and Related Applications*

Includes Additional Resources:

- *Wireless Communication Standards,* by Todor Cooklev, IEEE Press
- ISA-100.11a Proposed Standard Principles of Operation Overview
- Access to specific articles from *Sensors Magazine* and ISA *InTech* publications

Industrial Wireless Systems

Wireless systems and wireless technologies have advanced to the point where stable, robust, and secure networks are ready for deployment in industrial settings. As such, professionals crossing many disciplines (e.g. process, IT, controls) come face-to-face with understanding the implications and opportunities that such wireless networks may provide to them and their plant. This course will cover the most relevant details associated with industrial wireless systems with an emphasis towards how the various technological choices coexist, interoperate, and interact with each other. The operational differences posed to the wireless systems' performance by discrete manufacturing needs, monitoring of devices, and control systems are addressed. Considerable emphasis is placed specifically on ISA100 (the standard for industrial wireless), including deep dives into some of the standard's most pertinent details. Comparisons of ISA100 with other protocols and specifications (e.g. Industrial Bluetooth, ZigBee, Wireless HART) are provided.

You Will Be Able To:

- Explain how wireless applications utilizing different wireless technologies may interplay at your plant
- Identify secure methods for linking multiple plants together
- Examine how return on investment can accurately guide you in prioritizing wireless applications that different plant departments are requesting
- Answer the question: "Can I remove the wires from my automation system?"
- Conduct an accurate assessment of wireless systems robustness with a sample application and technology selection
- And more

> "This course presented a comprehensive overview of the details of wireless technology. Good balance of details and highlights."
>
> —Richard Zimmerman, Technical Director

You Will Cover:

- Communication Fundamentals
- Numbers and Letters
- ISA100
- Network Designs and Topologies
- Advanced Concepts
- And more

This course covers the ANSI/ISA100 Standards!

Course Details:

Course No.: IC85C
Length: 1 Day
CEUs: 0.7

Developing a ISA-100.11a Wireless Standard Compliant Product (IC90)

This course focuses on gaining a fundamental understanding of the organizations, technologies, terminology, and steps required in developing a ISA-100.11a wireless standard compliant product. You will become familiar with the market applicability of the current ISA-100.11a standard, as well as the basic concepts and new terminology. You will learn key strategies necessary in developing compliant products that will include identifying significant functional components as well as compliance testing requirements. Additionally, you will learn how to work with the ISA100 Wireless Compliance Institute (WCI) and the Wireless Toolkit for testing of compliant products.

You Will Be Able To:

- Explain the operation of the ISA-100.11a standard's technology and architecture
- Identify the ISO layers as applied to the standard
- Define general wireless terminology and usage
- Explain what the standard provides and what it doesn't in building a wireless product
- Implement products consistent with the ISA-100.11a standard
- And more

You Will Cover:

- Introduction to the ISA-100.11a Standard
- ISA-100.11a Standard Technology
- Product Development
- The ISA100 Wireless Compliance Institute (WCI)
- Demonstration

Classroom/Laboratory Exercises:

- Demonstration of ISA-100.11a technology
- Exercise for using the Wireless Toolkit for compliance

Course Details:

Course No.: IC90
Length: 2 days
CEU Credits: 1.4

This course covers the ANSI/ISA100 Standards!

Project Management for Automation and Control (MT07)

This course deals with the project management functions and responsibilities from the viewpoint of an instrumentation and controls supplier. The roles and requirements are discussed along with the techniques and tools needed to work with the project manager of the engineering organization. This course includes project initiation, definition, execution, and close out, along with the phases involved for each. A particular emphasis is placed on the functional needs of providing what the customer needs in a project execution environment.

You Will Be Able To:

- Identify project types and overall goals and objectives
- Define the roles and responsibilities of project managers
- Communicate with the engineering organization project manager in a meaningful manner
- Explain the four important objectives critical to projects vs. the three objectives typical of other projects
- Execute projects in the phases unique to an automation and control endeavor
- And more

You Will Cover:

- Introduction
- Project Manager Qualification
- Project Development
- Initiation Phase
- Project
  - Planning
  - Executing
  - Controlling
  - Closing
- And more

Classroom/Laboratory Exercises:

- Evaluate project manager skills in strategic planning
- Practice project scheduling techniques
- Demonstrate risk review and analysis

Course Details:

Course No.: MT07
Length: 3 days
CEU Credits: 2.1

This course covers Project Management.

Advanced Project Management for Team Leaders

This course teaches you advanced management techniques and tools for project leaders/project managers. This course builds on general project management techniques of project planning, project scope, and project scheduling. The course focus is on best practices for a leader in regard to development and implementation of the project communications plan, management of team relationships, resources procurement, risk management, cost control, and performance measurements during the automation project lifecycle.

You Will Be Able To:

- Properly scope the project and identify project definitions and customer expectations
- Select resources, outsource work effectively, and coordinate the project team properly by applying management and teambuilding skills to projects
- Improve your interpersonal skills
- Establish a communications plan and improve relationships among vendors, industrial organizations, and engineering organizations
- Identify risks and perform risk management
- And more

> "This course gave me a broad use of project management, mostly from a controls and instrumentation point-of-view."
>
> —Jeffrey Cerny, Director of Plant Engineering and Maintenance

You Will Cover:

- Project Management Knowledge Areas
- Project Processes
- Customer Satisfaction
- Skills
  - Leadership
  - Communication
  - People
- Management
  - Resource
  - Cost
  - Risk
- And more

Classroom/Laboratory Exercises:

- Resource balancing
- Project schedule and cost assessment

Course Details:

Course No.: MT10
Length: 2 Days
CEUs: 1.4

This course covers Project Management.

Project Management for Automation Engineers (MT10C2)

This course teaches project management as specifically applied to automation projects. Because automation projects require specialized approaches, it is critical for lead automation project engineers to take responsibility for implementing those techniques and approaches. It is also critical for their employers and their clients to ensure that this person has both the skills and the motivation to do those tasks, meshing the project leadership/management role with technical work. Since many projects employ levels of project managers, this course will also help you to work effectively with senior project managers who are responsible for high-level planning and other management tasks.

While this course is focused on lead automation engineers and others in the project management role, it is equally valuable for customers and stakeholders of the automation project who want to work effectively with the project team and ensure that the project team focuses on the real deliverables. The material in this course is consistent with accepted project management terminology and concepts from the Project Management Institute (PMI) and with ISA's Certified Automation Professional® (CAP®) certification program.

You Will Be Able To:

- Recognize the special techniques needed in automation projects to deal with the special characteristics of these projects
- Identify the four objectives critical to automation projects rather than the three typical of other types of projects
- Discuss the full range of planning needed for automation projects—not just cost, schedule, and work plan
- Define the optimum relationships among vendors, industrial groups, and engineering organizations
- Identify projects in their unique phases and achieve the specific deliverables needed from each phase
- And more

You Will Cover:

- Top Ten Issues in Leading Automation Projects
- Characteristics and Objectives of Automation Projects
- Project Phase Concept
- Phases of an Automation Project—Content and Deliverables of Each
- Team and Management Skills for Lead Engineers
- And more

Classroom/Laboratory Exercises:

- Small group exercise to develop a list of deliverables from key project phases

Course Details:

Course No.: MT10C2
Length: 1 day
CEU Credits: 0.7

This course covers Project Management.

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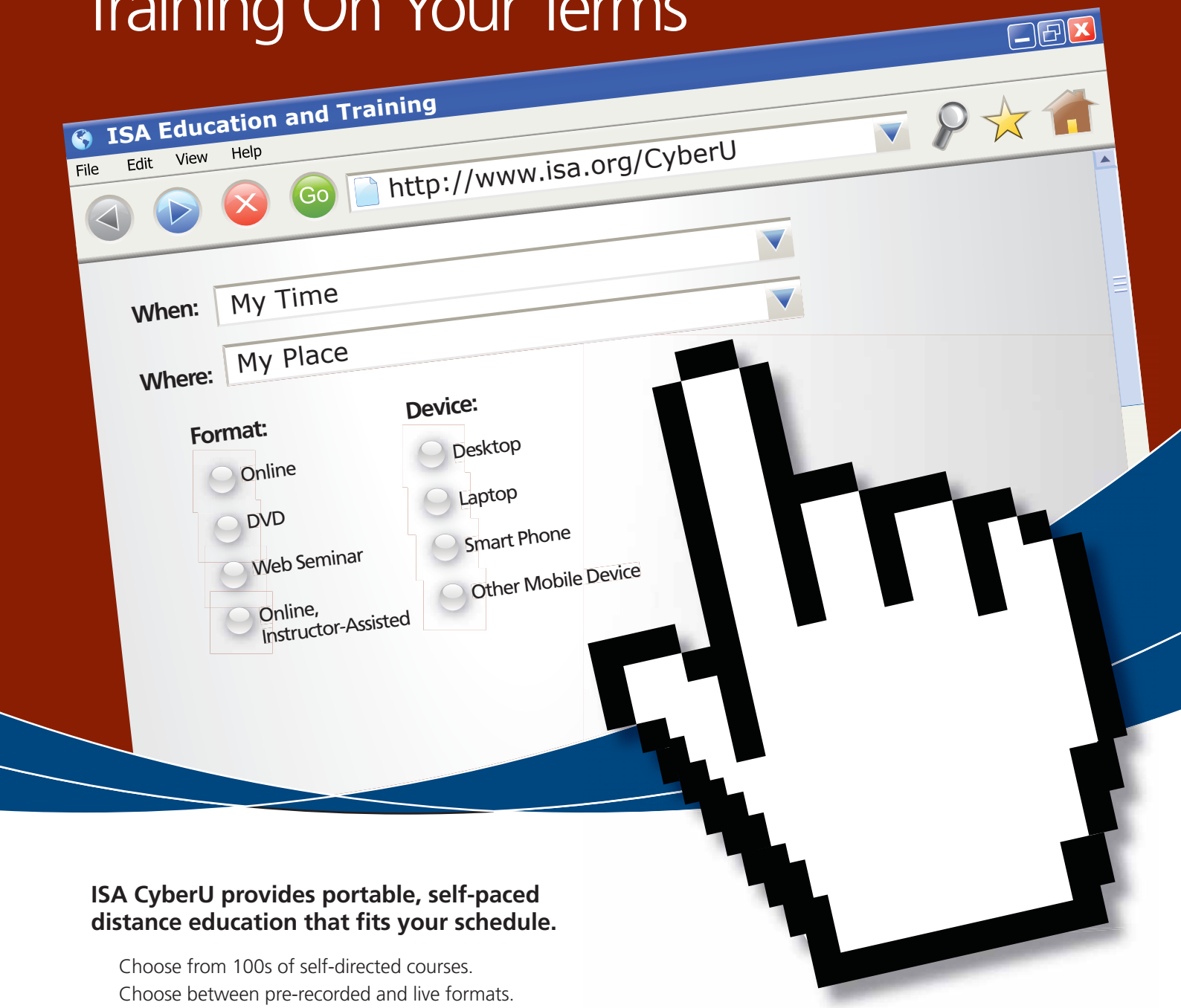

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Course Materials

All course notesets and supporting materials will be sent to course registrants prior to the course start date.

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Your instructor has pre-recorded each course module so that you
can access the course presentations when it is convenient for your schedule. Each module is a web/audio session that takes approximately 60 minutes.

Ask the Expert**

Interact with your expert instructor via email throughout the course and through scheduled live phone Q&A sessions. You can expect a reply to your email within 24 hours. This email address is active for the course duration. The Q&A sessions provide an opportunity for you and your classmates to speak one-on-one with the instructor. You will have an opportunity to ask any questions you may have about the course material and to interact with your fellow classmates.

Class Discussions

You will be invited to subscribe to a course listserve for course participants. You can use this listserve to post questions and share experiences relevant to the course with other class members.

Course Assignments and Exams

Take the course pre-test before you begin studying the course material to get a better understanding of areas that you will want to focus on more during the course.

Homework assignments for all modules will be indicated on the syllabus. The homework assignments are designed to help expand your understanding of the course material.

The final exam will be taken and scored online.

CEUs and PDHs

You must receive at least 80% on the course final exam to receive Continuing Education Units (CEUs) and Professional Development Hours (PDHs) credit and your Certificate of Completion.

*CAP® Online Review Course does not have pre-recorded modules. This course has an online question bank with answers and printed textbook modules.
**Live phone Q&A Sessions not available with CAP Online Review course—email only.

2011 Schedule

Winter Semester

Certified Automation Professional® (CAP®) Online Exam Review Course (EC00E) ..... 24 January – 25 March
Safety Instrumented Systems—Design, Analysis, and Justification (EC50E) ..... 21 February – 15 April

Spring Semester

Cybersecurity for Automation, Control, and SCADA Systems (IC32E) ..... 4 April – 27 May
Implementing Wireless Industrial Automation Systems (IC85E) ..... 2 May – 24 June

Summer Semester

Introduction to Industrial Pressure, Level, and Density Measurement Technologies (EI05E) **NEW!** ..... 11 July – 26 August

Fall Semester

Safety Instrumented Systems—Design, Analysis, and Justification (EC50E) ..... 12 September – 4 November
Certified Automation Professional® (CAP®) Online Exam Review Course (EC00E) ..... 19 September – 18 November
Overview of Industrial Flow Measurement Engineering (EI10E) **NEW!** ..... 26 September – 9 December

Coming Soon

Certified Control Systems Technician® (CCST®) Level I Online Exam Review Course (TS00E) **NEW!**

For a description of each scheduled course and to register, visit **www.isa.org/cyberu/onlineassisted**.

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ISA Web Seminars are interactive presentations, conducted via the Internet and your telephone, covering the hottest topics in industry today.

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ISA offers a recorded version of these seminars following the live event. Visit **www.isa.org/websem** for more information, or to see other currently available topics.

For a description of each seminar and to register, visit **www.isa.org/websem.**

2011 Web Seminar Schedule

Introduction to Measurement and Control Series

Series Pricing: $725 (per site) ISA Member; $875 (per site) List

- Introduction to Process Control ..... 12 January
- Introduction to Temperature Measurement ..... 19 January
- Introduction to Level Measurement ..... 26 January
- Introduction to Flow Measurement ..... 2 February
- Introduction to Pressure Measurement ..... 9 February

Advanced Process Control Series

Series Pricing: $585 (per site) ISA Member; $735 (per site) List

- pH Control Solutions ..... 16 February
- Overview of Enhanced EDDL..... 2 March
- Designing and Applying Model Predictive Control Strategies..... 16 March
- System Identification for Control ..... 23 March

Control Systems Security and ANSI/ISA99 Series

Series Pricing: $435 (per site) ISA Member; $550 (per site) List

- Cybersecurity Risk Assessment for Automation Systems 30 March
- Firewalls and Filtering Security Zones on the Plant Floor .... 6 April
- A Tour of the ANSI/ISA99 Security Standards ..... 13 April

Enterprise-Control Integration and ANSI/ISA95 Series

Series Pricing: $585 (per site) ISA Member; $735 (per site) List

- The ISA95 Object Models for Enterprise-Control System Integration Part 1: Introduction..... 20 April
- The ISA95 Object Models for Enterprise-Control System Integration Part 2: Application ..... 27 April
- Applying Manufacturing Execution Systems..... 11 May
- Applying ISA95 for Specification of MES User Requirements ..... 25 May

Electrical Safety Series

Series Pricing: $290 (per site) ISA Member; $365 (per site) List

- Grounding in Instrumentation Systems ..... 8 June
- Noise Reduction in Signal and Power Circuits..... 15 June

CSE Licensure Series

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