Control Systems Training

Managing the processes and systems that support automation

Setting the Standard for Automation™

Expert-led training with real-world application from a global leader in automation and control training

Industrial control systems (ICS) are at the heart of industrial automation, playing a critical role in managing the operations of critical infrastructure, such as power grids; financial networks; and transportation, telecommunications, and manufacturing systems.

Many of ISA's instructors are world-renowned control systems experts with extensive, working knowledge of a variety of control systems and technologies used in industrial production, from supervisory control and data acquisition (SCADA) systems and distributed control systems (DCS) to programmable logic controllers (PLC).

ISA offers comprehensive control systems training across essential areas, including:
• Basic continuous control
• Control strategy design and application
• Integration and software
• Instrumentation maintenance and troubleshooting
• Control documentation
• Advanced control
• Automatic controls and robotics
• Industrial data communications
• Cybersecurity
• Certification and exam review courses

All ISA control system-related training courses deliver practical instruction that can be immediately applied in the workplace. Relevant examples and case histories further reinforce the real-world value. To ensure flexibility and to meet varying customer needs, training is available in an array of formats and offered in a variety of locations: at ISA headquarters in North Carolina, at ISA's many regional training centers, and onsite directly at customer facilities.

ISA also offers two certification programs for those working with control systems: Certified Control Systems Technician® (CCST®) and Certified Automation Professional® (CAP®). In addition, ISA provides comprehensive study materials and review courses for those preparing to take the Control Systems Engineer (CSE) Professional Engineer (PE) examination.

ISA Training: World-class subject-matter expertise

ISA's courses are known and respected worldwide for their unbiased, practical approach to technology application. For more than 65 years, ISA has built on its proven track record of identifying and providing the real-world resources needed by organizations and automation and control professionals by working with leading content experts to deliver rapid, customized solutions.

Taking an ISA training course will:
• Enhance on-the-job training
• Fill in missing knowledge gaps
• Teach you the Hows and Whys
• Provide continuing education credits
• Expand your professional network
• Give you access to industry experts

Table of Contents

Who is ISA?

Founded in 1945, ISA is a global organization that serves automation and control professionals through standards development, certification, education and training, technical publications, and technical conferences and events. To learn more about ISA, visit: **www.isa.org**

Introduction to Industrial Processes, Measurement and Control
(Combines lecture and hands-on labs)

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 BE ABLE TO:
- Communicate with measurement and control professionals
- Apply specific ISA standards to interpret symbols and drawings associated with process control documentation
- Discuss and apply the most common methods and devices used in temperature, pressure, level, and flow measurement
- Differentiate between control system architectures including single loop controllers, Distributed Control Systems (DCS), and Programmable Logic Controllers (PLC)

YOU WILL COVER:
- Concepts of Process Control
- Documentation
- Measurement: Pressure | Level | Flow | Temperature
- Control Valves
- Smart Field Devices
- Communicate with measurement and control professionals
- Discuss the role of measurement and control in industrial processes
- Differentiate between continuous, batch, and discrete control
- Apply specific ISA standards to interpret symbols and drawings associated with process control documentation
- And more…

CLASSROOM/LABORATORY EXERCISES:
- Calibrate process measurement devices for level, temperature, pressure, and flow using a variety of state-of-the-art calibration equipment
- Operate digital controllers
- Build and tune an actual feedback control loop
- Interpret simple P&IDs
- Configure smart transmitters
- And more…

COURSE DETAILS:
Course No.: FG07
Length: 4.5 days
CEUs: 3.2
Price: $3,080 ISA Member
$3,465 Affiliate Member
$3,855 Community Member/List
$3,080 Multi-Registration Rate

Recommended Resource:
ISA Text: *Measurement and Control Basics, Fourth Edition* by Thomas A. Hughes

2017 SCHEDULE

Research Triangle Park, NC	9–13 January; 10-14 July; 18–22 September;13–17 November
Charlotte, NC	6–10 March
Houston, TX	13–17 February; 15–19 May; 11–15 December
Columbia, IL	7–11 August
Newark, DE	10–14 April

Fundamentals of Industrial Process Measurement & Control—Online

DESCRIPTION:
This self-paced, online course provide an overview of industrial measurement and control for technician, engineers, and managers providing a basic understanding and foundation for communication with other control systems professionals.

YOU WILL BE ABLE TO:
- Communicate the latest trends in measurement and control
- Recognize the role of measurement and control in industrial processes
- Compare continuous, batch, and discrete control and how they are used in industry
- Interpret measurement and control terminology
- Compare the methods and devices used in temperature, pressure, level, and flow measurement
- Describe the operation and components of a feedback control loop
- Identify the fundamental concepts of controller tuning
- Compare different control system architectures, including single loop controllers, distributed control systems (DCS), and programmable logic controllers (PLCs)
- Apply ISA standards to interpret symbols and documentation

YOU WILL COVER:
Pre-Exam
Students are asked to take the pre-exam, which includes questions related to the subject matter areas. Answers will be provided for students to assess their knowledge, prior to beginning the course material.
WEEK 1—Module 1: Concepts of Process Control
WEEK 2—Module 2: Documentation
WEEK 3—Modules 3 & 4: Industrial Measurement Systems (Parts I & II)
WEEK 4—Module 5: Temperature Measurement (Part I)
WEEK 5—Module 6: Temperature Measurement (Part II) & Module 7: Pressure Measurement
WEEK 6—Modules 8 & 9: Level Measurement (Parts I & II)
WEEK 7—Modules 10 & 11: Flow Measurement (Parts I & II)
WEEK 8—Modules 12 & 13: Control Valves (Parts I & II)
WEEK 9—Modules 14 & 15: Feedback Control Strategies (Parts I & II)
WEEK 10—Module 16: Smart Field Devices
WEEK 11—Module 17: Advanced Control Strategies & Module 18: Control System Hardware
WEEK 12—Final Examination

CLASSROOM MATERIALS:
- Course noteset with slides from course modules and course syllabus

COURSE DETAILS:
Course No.: FG05E
Length: 12 weeks
CEUs: 2.1
Price: $1,680 ISA Member
$1,890 Affiliate Member
$2,105 Community Member/List
$1,680 Multi-Registration Rate

2017 SCHEDULE
Online .... 13 February –5 May
15 May–4 August;
14 August–3 November
11 September–1 December

Developing and Applying Standard Instrumentation and Control Documentation—Online

NEW!

This course will present the methodology for the designing and developing control systems documentation. The development of piping and instrument diagrams (P&IDs) and related ISA drawings are emphasized. This course covers both the development and the reading/interpreting of these documents, making it beneficial to engineers, designers, software programmers, system integrators, and technicians.

YOU WILL BE ABLE TO:
- Design, develop, and interpret the documents used to define instruments and control systems for a typical project, including P&IDs, loop diagrams, specification forms, instrument lists, logic diagrams, installation details, and location plans
- Explain the information included on each document
- Plan document development as it relates to project management
- Apply ISA standards for symbols and terminology to documentation
- Describe the relationship of ISO 9000, OSHA process safety management (PSM), and API 750 to control systems documentation

YOU WILL COVER:
- P&IDs
- Instrument Lists
- Control System Software
- Logic Diagrams
- Installation Details
- Location Plans
- Loop Diagrams
- And more…

COURSE DETAILS:
Course No.: FG15E
Length: 8 weeks
CEUs: 1.4
Price: $1,440 ISA Member
$1,620 Affiliate Member
$1,800 Community Member/List
$1,440 Multi-Registration Rate

Includes ISA Standards: ANSI/ISA-5.1-2009, ANSI/ISA-5.4-1991, ANSI/ISA-5.5-1985, ANSI/ISA-20-1981, and ISA-TR20.00.01-2007*—A $565 Value*

2017 SCHEDULE
Online .... 6 March–28 April;
5 June–28 July;
11 September –3 November;
4 December–26 January 2018

Tuning Control Loops

This course is recommended for anyone who would like to gain a better understanding of how to tune control loops—whether you have tuned loops but would like to become more proficient or you have never tuned a loop before.

NOTE: Registrants are expected to have a basic understanding of instrumentation and controls (either by working experience or taking fundamental courses such as ISA's course FG07: Introduction to Industrial Automation and Control) as this course does not cover that material.

YOU WILL BE ABLE TO:
- Identify the requirements for open-loop and closed-loop stability
- Use three methods to tune a control system for stated quality control
- Tune a cascade control loop for optimum control
- Tune a feedforward control system for optimum control
- Tune ratio control systems
- And more...

YOU WILL COVER:
- Review of Feedback Control Concepts and Components
- Control Modes
- Dynamic and Steady State Considerations
- Tuning Control Systems
- Safety Concerns and Procedures when Operating Control Systems
- And more...

CLASSROOM/LABORATORY EXERCISES:
- Demonstrate the operation of components required for closed-loop control
- Review start-up procedures for single- and multi-loop systems
- Tune cascade, ratio, and feedforward control systems
- Tune using a PC-based simulation software
- And more...

COURSE DETAILS:
Course No.: TC05
Length: 3 days
CEUs: 2.1
Price: $1,680 ISA Member
$1,800 Affiliate Member
$2,105 Community Member/List
$1,680 Multi-Registration Rate

Recommended Resource:
ISA Text: *Fundamentals of Process Control Theory, Third Edition* by P.W. Murrill

2017 SCHEDULE
Santa Ana, CA .... 23–25 January
Royersford, PA .... 13–15 March
Research Triangle Park, NC .... 10–12 April
Houston, TX .... 19–21 June
Santa Ana, CA .... 14–16 August
Newark, DE .... 16–18 October

Troubleshooting Instrumentation and Control Systems

This course presents a systematic approach to troubleshooting and start-up of single- and multi-loop control loops. You will learn how pressure, level, flow, and temperature loops operate to maintain good process control systems. Knowledge of instrumentation and control is assumed.

YOU WILL BE ABLE TO:
- Develop a systematic approach to troubleshooting
- Verify, locate, and identify performance problems and the causes of the problems
- Identify the common causes of sensor, transmitter, controller, and final control element problems
- Troubleshoot control systems
- Compare general troubleshooting procedures for conventional, FIELDBUS, and HART™ control systems
- And more...

YOU WILL COVER:
- Approaches to Troubleshooting
- Logical Analysis Troubleshooting
- Review of ISA Standard Diagrams and Symbols
- Single-Loop Feedback Control Troubleshooting
- Multi-Loop Control Systems Troubleshooting
- And more...

CLASSROOM/LABORATORY EXERCISES:
- Diagnose and solve problems with single-loop control loops
- Diagnose and solve problems with ratio, cascade, and three-element control loop systems
- Diagnose problems using distributed control system (DCS) displays for information
- Troubleshoot several single control loop problems

COURSE DETAILS:
Course No.: TC10
Length: 2 days
CEUs: 1.4
Price: $1,680 ISA Member
      $1,890 Affiliate Member
      $2,105 Community Member/List
      $1,680 Multi-Registration Rate

Recommended Resource:
ISA Text: *Troubleshooting: A Technician's Guide, Second Edition* by William L. Mostia, Jr., P.E.

2017 SCHEDULE
Santa Ana, CA	26–27 January
Royersford, PA	16–17 March
Research Triangle Park, NC	13–14 April
Houston, TX	22–23 June
Santa Ana, CA	17–18 August
Newark, DE	19–20 October

Designing and Tuning Feedback and Advanced Regulatory Control Strategies

For those who select or design process control strategies, this course provides a thorough background in feedback control, plus a working knowledge of the application of advanced regulatory control strategies such as ratio, cascade, feedforward, override, and decoupling. The course emphasizes the benefits of advanced regulatory control for improving the economics of process operations.

YOU WILL BE ABLE TO:
- Determine process characteristics that are relevant to the design and/or troubleshooting of a control loop
- Apply a variety of feedback controller tuning techniques and know the strengths and weaknesses of each
- Select an appropriate control strategy for a given application
- Provide the engineering design for control strategies using a DCS or other platform available at your plant
- And more…

YOU WILL COVER:
- Process Control Loop Characteristics
- Feedback Control
- Controller Tuning
- Advanced Control Strategies
- And more…

CLASSROOM/LABORATORY EXERCISES:
- Use a control loop simulation program for hands-on practice of several feedback controller tuning techniques
- Observe the effect of each topic, such as the behavior of cascade and feedforward control, through a simulation program demonstration

RECOMMENDED PREREQUISITES:
- Familiarity with fundamental process measurement techniques, signal transmission technologies used in the process industries, and some type of process operator (control room) work station
- Mathematical competency equivalent to high school Algebra

  (Note: A brief review of mathematical concepts used in class will be provided at the beginning of the course.)

COURSE DETAILS:
Course No.: EC05
Length: 3 days
CEUs: 2.1
Price: $1,440 ISA Member
$1,620 Affiliate Member
$1,800 Community Member/List
$1,440 Multi-Registration Rate

Includes ISA Text: *Basic and Advanced Regulatory Control: System Design and Application, Third Edition* by Harold L. Wade
—A $109 Value

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. Participants 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
- Effectively structure and subdivide equipment entities
- 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
- And more…

YOU WILL COVER:
- ANSI/ISA88 Standards
- Physical Model
- Procedural Control Mode
- Batch Tracking
- Control Activity Model
- 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
CEUs: 2.1
Price: $1,560 ISA Member
   $1,755 Affiliate Member
   $1,955 Community Member/List
   $1,560 Multi-Registration Rate

Includes ISA Standards:
ANSI/ISA-88.00.01-2010, ANSI/ISA-88.00.02-2001, and ANSI/ISA-88.00.03-2003—*A $490 Value!*

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. Participants 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
- Effectively structure and subdivide equipment entities
- Define procedural elements that can be effectively used with the above equipment entities
- 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
- Recognize the various control languages that are available
- 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

COURSE DETAILS:
Course No.: IC40E
Length: 7 weeks
CEUs: 2.1
Price: $1,560 ISA Member
$1,755 Affiliate Member
$1,955 Community Member/List
$1,560 Multi-Registration Rate

Includes ISA Standards:
ANSI/ISA-88.00.01-2010, ANSI/ISA-88.00.02-2001, and ANSI/ISA-88.00.03-2003—*A $490 Value!*

2017 SCHEDULE
Online .... 6 February–24 March
1 May–16 June
7 August–22 September
6 November–22 December

Certified Control Systems Technician® (CCST®) Level I Exam Review Course

EXAM PREP

This is a fast-paced review of the knowledge and practical skills necessary to install and maintain standard measurement and control instrumentation. It is intended for practicing technicians preparing for the CCST Level I exam. An explanation of the examination process and practice certification-type exam questions are provided.

YOU WILL BE ABLE TO:
- Cite principles and theories that explain measurement and control instrument functions
- Describe procedures required to properly maintain the function of measurement and control instrumentation
- Perform calculations and other analysis of information related to the calibration and troubleshooting of measurement and control instruments and systems
- Describe procedures required to safely start-up and shut-down a new or existing process
- Identify any need for further study or training in specific knowledge areas
- And more...

YOU WILL COVER:
- Concepts of Process Control
- **Domain 1:** Calibration, Maintenance, Repair, Troubleshooting
- **Domain 2:** Project Start-Up, Commissioning, Loop Checking, Project Organization, Planning
- **Domain 3:** Documentation
- And more…

CLASSROOM/LABORATORY EXERCISES:
- Unit conversion calculations
- Calibration documentation and analysis
- Trouble recognition and analysis
- ISA CCST Level I practice exams

COURSE DETAILS:
Course No.: TS00
Length: 4 days
CEUs: 2.8
Price: $2,380 ISA Member
$2,680 Affiliate Member
$2,980 Community Member/List
$2,380 Multi-Registration Rate

Includes ISA Text: *CCST® Study Guide Level I*—*A $39 Value!*

Special Savings Bonus!
Take this review course and sit for the CCST Level I electronic exam for FREE! You must submit a CCST application and course registration six (6) weeks prior to your course date **and** meet CCST Level I eligibility criteria to be qualified for the free exam. You will be able to schedule an electronic exam date once your application has been approved. For more details, visit **www.isa.org/CCST**.

2017 SCHEDULE
Research Triangle Park, NC	9–12 January; 23–26 October
Santa Ana, CA	20–23 February
Houston, TX	24–27 April
Newark, DE	1–4 May
Columbia, IL	7–10 August

Certified Control Systems Technician® (CCST®) Level I Online Exam Review Course

This online, instructor-assisted course is a fast-paced review of the knowledge and practical skills necessary to install and maintain standard measurement and control instrumentation. It is intended for practicing technicians preparing for the ISA Certified Control Systems Technician® (CCST®) Level I exam. Practice certification-type exams and an explanation of the examination process are provided.

YOU WILL BE ABLE TO:
- Cite principles and theory that explain measurement and control instrument functions
- Describe procedures required to properly maintain the function of measurement and control instrumentation
- Identify the procedures and safety requirements for loop checking and its purpose
- Perform calculations and other analyses of information related to the calibration and troubleshooting of measurement and control instruments and systems
- Describe procedures required to safely start-up and shut-down a new or existing process
- Define the education, experience, and examination requirements for becoming a CCST
- Identify important knowledge and skill requirements of a practicing CCST
- Describe the procedures involved in taking the CCST Level I exam
- Identify any need for further study or training in specific knowledge areas
- Complete simulated CCST Level I practice exams

YOU WILL COVER:
- **Week 1:** CCST Certification Overview/Concepts of Process Control
- **Week 2:** Domain 1—Calibration, Maintenance, Repair, and Troubleshooting
- **Week 3:** Domain 1—Calibration, Maintenance, Repair, and Troubleshooting (cont'd)
- **Week 4:** Domain 1—Calibration, Maintenance, Repair, and Troubleshooting (cont'd)
- **Week 5:** Domain 2—Project Start-up, Commissioning, Loop-checking, Project Organization, and Planning
- **Week 6:** Domain 2—Project Start-up, Commissioning, Loop-checking, Project Organization, and Planning (cont'd)
- **Week 7:** Domain 2—Project Start-up, Commissioning, Loop-checking, Project Organization, and Planning (cont'd)
- **Week 8:** Domain 3—Documentation
- **Week 9:** Domain 3—Documentation (cont'd)
- **Week 10:** Domain 3—Documentation (cont'd)
- **Week 11:** Final Course Examination

COURSE MATERIALS:
- Course Noteset and Syllabus
- **ISA Text:** *CCST® Study Guide Level I*—**A $39 Value!**

COURSE DETAILS:
Course No.: TS00E
Length: 11 weeks
CEUs: 2.8
Price: $2,380 ISA Member
$2,680 Affiliate Member
$2,980 Community Member/List
$2,380 Multi-Registration Rate

2017 SCHEDULE
Online .... 20 February–5 May;
22 May–4 August;
21 August–3 November;
16 October–29 December

Certified Control Systems Technician® (CCST®) Level II Exam Review Course

This is a fast-paced review of the knowledge and skills necessary for technicians with 7+ years of practical experience who are preparing to sit for the CCST Level II exam. An explanation of the requirements, examination process and practice certification-type exams are provided.

YOU WILL BE ABLE TO:
- Explain multi-step troubleshooting methodology
- Evaluate control systems tuning and system response to changes in control parameters
- Describe the isolation of a process component from an operational system to perform proper testing, maintenance, or troubleshooting
- Evaluate installed industrial network data and performance using network diagnostic tools
- Explain the process to identify and correct problems that may arise during the commissioning of control systems

YOU WILL COVER:
- Concepts of Process Control | Instrument Air
- Piping & Instrumentation Diagrams (P&ID) | Basic Measuring Units
- Fundamentals of Instrumentation
- Temperature | Pressure | Flow | Level
- Analyzers | Final Control Elements
- Safety | Electricity
- Advancing Technologies | Numbering Systems
- PLCS Basics | Basic Requirements for Protocol
- Fieldbus | Communications Protocol
- Fiber Optics | SCADA
- Process Dynamics | Control Action
- PID | Tuning | Advanced Control Strategy
- Calibration | Instrument Performance
- Pressure Test & Calibration Equipment | Instrument Maintenance
- Best Procedures for LAN's | Troubleshooting with Statistics | Tools
- DCS Troubleshooting | Hazardous Locations
- Installation | Start-Up | Loop Checking

CLASSROOM/LABORATORY EXERCISES:
ISA CCST Level II practice exams

COURSE DETAILS:
Course No.: TS02
Length: 4 days
CEUs: 2.8
Price: $2,380 ISA Member
         $2,680 Affiliate Member
         $2,980 Community Member/List
         $2,380 Multi-Registration Rate

Includes ISA Text: *CCST® Study Guide Level II*—*A $39 Value!*

2017 SCHEDULE
Research Triangle Park, NC .... 20–23 February
                                  27–30 November
Royersford, PA .... 8–11 May
Newark, DE..5–8 June
Columbia, IL ....10–13 July

Certified Control Systems Technician® (CCST®) Level II Online Exam Review Course

This is a fast-paced review of the knowledge and skills necessary for technicians with 7+ years of practical experience who are preparing to sit for the CCST Level II exam. An explanation of the requirements, examination process and practice certification-type exams are provided.

YOU WILL BE ABLE TO:
- Explain multi-step troubleshooting methodology
- Evaluate control systems tuning and system response to changes in control parameters
- Describe the isolation of a process component from an operational system to perform proper testing, maintenance, or troubleshooting
- Evaluate installed industrial network data and performance using network diagnostic tools
- Explain the process to identify and correct problems that may arise during   the commissioning of control systems
- Verify final control element functionality through manipulated variables using controller mode and output functions
- Define system documentation and symbology to effectively troubleshoot instrumentation, control loops, and electrical and pneumatic installations
- Identify electrical or hazard area classifications and determine appropriate procedures to be followed for safe and effective operation
- Identify any need for further study or training in specific knowledge areas

COURSE DETAILS:
Course No.: TS02E
Length: 13 weeks
CEUs: 2.8
Price: $2,380 ISA Member
        $2,680 Affiliate Member
        $2,980 Community Member/List
        $2,380 Multi-Registration Rate

Includes ISA Text: *CCST® Study Guide Level II—A $39 Value!*

2017 SCHEDULE
Online ....2 January–31 March;
                3 April–30 June;
                10 July–6 October;
                2 October–29 December

Certified Control System Technician® (CCST®) Level III Exam Review Course

This course reviews the knowledge and skills areas included on the Certified Control Systems Technician® (CCST®) Level III certification exam. The intent is to prepare practicing technicians who meet the exam criteria to take the exam. The content is based on the Job Analysis Domains, Tasks, Knowledge Areas, and Skill Areas developed as the basis for the CCST Level III certification exam.

YOU WILL BE ABLE TO:

- Define the scope and format of the CCST Level III exam
- Compare process variable measurements and control valve selections
- Discuss how the various types of control technologies are used in industrial automation, including process control from basic to advanced control, discrete, batch, motor, and motion control
- Determine the requirement for tuning and discuss tuning procedures
- Interpret the best practice methodology for troubleshooting automation projects
- And more…

YOU WILL COVER:

- Field Devices
- Control and Simulation
- Operator Interface and Alarm Management
- Safety, Reliability, and Electrical
- Maintenance Management
- Workflow and Project Leadership

CLASSROOM/LABORATORY EXERCISES:

- Practice CCST exam-style questions

COURSE DETAILS:

Course No.: TS03
Length: 4 days
CEUs: 2.8
Price: $2,380 ISA Member
$2,680 Affiliate Member
$2,980 Community Member/List
$2,380 Multi-Registration Rate

Includes ISA Text: *CCST® Study Guide Level III*—**A $39 Value**

JOIN. SAVE.

Save on training when you join ISA!
ISA members save 20% and ISA Automation Affiliate members save 10% on the Community Member/List price for all ISA training courses and products.

2017 SCHEDULE
Santa Ana, CA ....6–9 February
2–5 October
Research Triangle Park, NC ....27–30 March;
4–7 December
Royersford, PA ....19–23 June
Columbia, IL.............................. 14–17 August

Certified Control System Technician® (CCST®) Level III Online Exam Review Course

This online course reviews the knowledge and skills areas included on the Certified Control Systems Technician® (CCST®) Level III certification examination. The intent is to prepare an automation professional who meets the exam criteria to take the exam. The content is based on the latest Job Analysis Domains, Tasks, Knowledge Areas, and Skill Areas developed, and regularly reviewed and updated, as the basis for the CCST certification exams.

YOU WILL BE ABLE TO:
- Define the scope and format of the CCST Level III exam
- Compare process variable measurements and control valve selections
- Discuss how the various types of control technologies are used in industrial automation, including process control from basic to advanced control and discrete, batch, motor, and motion control
- Determine the requirement for tuning and discuss tuning procedures
- Identify the range of digital communications used in automation and how these are used in system integration
- Explain when safety instrumented systems (SISs) are needed and how they are specified
- Apply the critical areas of regulatory procedures and project documentation
- Interpret the best practice methodology for troubleshooting automation projects

YOU WILL COVER:
- **Week 1:** Review of Process Information and Process Control Concepts
- **Week 2:** Documentation—Part 1
- **Week 3:** Documentation—Part 2
- **Week 4:** Industrial Measurement and Instrument Performance
- **Week 5:** Calibration Principles and Procedures
- **Week 6:** Fundamentals of Instruments—Part 1
- **Week 7:** Fundamentals of Instruments—Part 2 | Final Control Elements
- **Week 8:** Troubleshooting | Common Loop Checking Problems | Computer-Based Troubleshooting
- **Week 9:** Feedback and Advanced Control Strategies | Loop Check Concepts
- **Week 10:** Programmable Electronic Systems | Fieldbus | Start-up Concerns
- **Week 11:** Installation in Hazardous Areas | Tuning Methods
- **Week 12:** Instrument Maintenance
- **Week 13:** Installation Practices
- **Week 14:** Project Management | Safety Standards | Cybersecurity
- **Week 15:** Final Course Examination

COURSE MATERIALS:
- Course noteset with slides from course modules and course syllabus
- ISA Text: CCST® Level III Study Guide**—A $39 Value!**

COURSE DETAILS:
Course No.: TS03E
Length: 15 weeks
CEUs: 3.2

Price: $2,380 ISA Member
$2,680 Affiliate Member
$2,980 Community Member/List
$2,380 Multi-Registration Rate

2017 SCHEDULE
Online .... 3 March–16 June;
19 June–29 September;
18 September–29 December;
4 December–16 March 2018

Introduction to Measurement and Control Webinar Series (5 courses)

INTRODUCTION TO PROCESS CONTROL
Date: 11 January 2017; 10 May 2017
Course No.: FG05W1

This webinar provides an introduction to process control, the technology of a loop, the method-ology of measurement in control, controller tuning, the technology of the control loop, control strategies, and ISA standard piping and instrumentation diagram (P&ID) symbols.

YOU WILL COVER:
- Process/Process Control Defined
- Process Control Loop
- Measurement Loop
- Control Loop
- Setpoint
- Steps: Measure | Compare | Decide | Action
- P&ID Drawings

INTRODUCTION TO TEMPERATURE MEASUREMENT
Date: 18 January 2017; 4 May 2017
Course No.: FG05W2

This webinar provides an introduction and overview of temperature measurement as it is currently practiced in measurement and control systems. Terminology, technology, and applications are covered in this presentation.

YOU WILL COVER:
- Introduction to Temperature Measurement
- RTDs and Thermistors
- Thermocouples
- Installation and Maintenance

INTRODUCTION TO LEVEL MEASUREMENT
Date: 25 January 2017; 7 June 2017
Course No.: FG05W3

This webinar provides an introduction and overview of level measurement as it is currently practiced in measurement and control systems. Terminology, technology, and applications are covered in this presentation.

YOU WILL COVER:
- Introduction to Level
- Hydrostatic Head Measurement
- Electrical Level Measurement
- Other Level Measurement Devices

Also available in recorded format: Advanced Process Control Webinar Series
www.isa.org/APC

Introduction to Measurement and Control Webinar Series (cont'd.)

INTRODUCTION TO FLOW MEASUREMENT

Date: 8 February 2017; 21 June 2017

Course No.: FG05W4

This webinar provides an introduction and overview of flow measurement as it is currently practiced in measurement and control systems. Terminology, technology, and applications are covered in this presentation.

YOU WILL COVER:
- Fundamentals of Flow
- Inferential Flow Measurement
- Velocity
- Mass

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$350 Community Member/List;
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INTRODUCTION TO PRESSURE MEASUREMENT

Date: 22 February 2017; 12 July 2017

Course No.: FG05W5

This webinar provides an introduction and overview of pressure measurement as it is currently practiced in measurement and control systems. Terminology, technology, and applications are covered in this presentation.

YOU WILL COVER:
- Introduction to Pressure Measurement
- Physical Measurement
- Electrical Pressure Measurement
- Applications and Smart Transmitters

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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.
- Complete the final exam for the course in order to receive Continuing Education Units (CEU) credit. The final exam will be taken and scored online. You must receive at least 80% on the course exam to receive CEU credit.
- Continuing Education Units (CEU) credits are awarded to all students who successfully complete the final course exam.

See the following online courses inside brochure:
- Fundamentals of Industrial Process Measurement & Control (FG05E)**—Page 5**
- Developing and Applying Standard Instrumentation and Control Documentation (FG15E)**—Page 6**
- Batch Control Using the ANSI/ISA88 Standards (IC40E)**—Page 11**
- Certified Control System Technician® (CCST®) Level I Exam Review Course (TS00E—Online)**—Page 13**
- Certified Control Systems Technician® (CCST®) Level II Online Exam Review Course (TS02E)**—Page 15**
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