Certified Control Systems Technician (CCST) Course

Venue Information

Venue: London UK

Place:

Start Date: 2026-11-17

End Date: 2026-11-21

Course Details

Net Fee: £4750.00

Duration: 1 Week

Category ID: EAPET

Course Code: EAPET-69

Syllabus

Course Description

This five days course focuses on a fast paced review of the knowledge required to properly install and maintain standard measurement and control instrumentation. It is designed specifically for practicing technicians preparing for the Level Certified Control Systems Technician (CCST) examination.

Course Objectives

Participant 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
- Understand the procedures and safety requirements for loop checking and its purpose

- Understand 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 exam
- Identify any need for further study or training in specific knowledge areas

Course Outlines

- Concepts of Process Control
    - Definition of a Process
    - Types of Process
    - Typical Industries
    - Continuous vs. Batch Processing
    - Typical Continuous Processes
    - Continuous Process Example
    - Typical Batch Processes
    - Batch Process Example
    - Process Control
    - The Process Control System (Loop)
    - Industrial Process Example
    - Control Loop on P & I Drawings
    - Process Dynamics (Response to Change)
    - First Order Lag plus Dead Time
- Basic Measurement Units
    - Pressure and Level Measurement Units
    - Relationship between Pressure Terms
    - Density
    - Specific Gravity
    - Viscosity
    - Pressure of Fluids
    - Liquid Head Measurement
    - Effect of S.G. on Liquid Head Measurement
    - Unit Systems - Flow Measurement
    - Flow Measurement of Fluids
    - Flow Terms
- Test & Calibration Equipment
    - Temperature Scales
    - Hydraulic Dead Weight Tester
    - U-Tube Manometers

    - Voltage Measurement
    - Current Measurement
    - Resistance Measurement
    - Electro-Pneumatic Calibrator
- Instrument Performance
    - Range and Span
    - Suppressed and Elevated Zero Range
    - Range and Span Terminology
    - Span and Range Calculation Practice
    - Accuracy
    - Repeatability
    - Importance of Accuracy
    - Linearity
    - Hysteresis and Dead Band
- Calibration Principles & Procedures
    - Calibration
    - Verification: Without Adjustment
    - Calibration Block Diagram
    - Shop Calibration - DP Transmitter
    - RTD Calibration Arrangement
    - Thermocouple Calibration Arrangement
    - Hierarchy of Standards
    - Five-Point Calibration Check
    - Calibration Chart
    - In-Shop or Field Calibration
- Advancing Technology
    - Standard Practice
    - Industry’s changing Needs
    - Smart Devices
    - Smart Transmitters
    - Digitizing a Measurement
    - The Microprocessor
    - Smart Instrument Characterization
    - Smart Transmitter Functions
    - Smart Transmitter Operation
    - Configuration vs. Calibration
    - Reranging

    - Controllers and Control Strategies
    - Direct Acting Controller
    - Reverse Acting Controller
    - Direct or Reverse Acting?
    - On-Off Control of Heating
    - Proportional Control
    - Proportional Action
    - Proportional Control of a Continuous Process
    - Offset with Proportional Control
    - Level Control Offset Example
    - Integral Action
    - Proportional + Integral Control
    - Integral Control
    - Derivative Action
    - Derivative (Rate) Control Action
    - Proportional + Integral + Derivative Control
    - Characteristics of Controller Modes
- Tuning Methods
    - Objectives of Tuning
    - Trial & Error Tuning
    - Tuning Map - Gain and Reset
    - The Effect of Adding Derivative
    - Tuning by Open Loop Testing
    - Ziegler-Nichols (Z-N)
    - Open Loop Method Open Loop Considerations
    - Tuning by Closed Loop Testing
    - Z-N Closed Loop Method
    - Closed Loop Considerations
- Advanced Control Strategies
    - Ratio Control - Wild Stream
    - Ratio Control - Both Streams Controlled
    - Automatic Ratio Set: Example
    - Cascade Control: Diagram
    - Application: Without Cascade
    - Application: With Cascade
    - Inner and Outer Loops
    - Cascade Control Considerations

    - Feedforward Control of Heat Exchanger
- Loop Checking Concepts
    - Loop Check Considerations
    - Loop Check Process
    - Loop Check Procedure
- Instrument Installation
    - Instrument Installation
    - Installation Detail
    - Installation Details
    - Instrument Location Plan
    - Installation Practices
    - Manufacturer's Requirements
    - Instrument Air Quality Considerations
    - Instrument Air Supply System
- Troubleshooting Considerations
    - Purpose of Troubleshooting
    - Why Troubleshoot?
    - Bottom Line
    - What Are You Expected to Troubleshoot?
    - Troubleshooting Skills
    - Troubleshooting Productivity
    - Approaches to Troubleshooting
    - Equipment History Approach
    - Input/Output (Serial) Approach
    - Input/Output Approach
    - Halving Approach
    - Shotgun Approach
    - Logical Analysis Troubleshooting
    - Verify something is wrong
    - Identify and Locate the Cause of the Problem
    - Fix the Problem
    - Verify the Problem is corrected
    - Follow up to Minimize Future Problems
- Final Control Elements
    - Control Valves
    - A Typical Control Valve with Actuator
    - Globe Valves

    - Inherent Flow Characteristics
    - Cavitation
    - Cv - Valve Coefficient of Flow
    - Actuators
    - Direct (Air-to-Extend)
    - Reverse (Air-to-Retract)
    - Positioners
    - Typical Motion-Balance Positioner
    - I/P Transducer
    - Other Final Control Elements
- Common Problems
    - Pressure
    - Level
    - Flow
    - Temperature
    - Valves
    - Actuators
    - Positioners
    - Dampers
    - Variable Speed Drives
- Troubleshooting with DCS
    - Distributed Control System
    - Elements of a Distributed Control System
    - DCS Graphic Display
    - DCS Trend Display
    - DCS Alarm Summary
- Instrument Maintenance
    - What is Instrument Maintenance?
    - Importance
    - Types
- Programmable Electronic Systems
    - Basic PLC System
    - Numbering Systems
    - Decimal Number
    - Binary Number
    - Octal Number
    - Hexadecimal Number

    - Relay Type Instructions
    - Start/Stop Ladder Logic
    - Input Wiring Diagram
    - Output Wiring Diagram
- Fieldbus
    - Fieldbus Definition
    - What is a Fieldbus?
    - Bus Hierarchy
    - Why Use a Fieldbus?
    - Foundation Fieldbus H1 Bus Segment
    - Device Descriptions
    - Fieldbus Summary Slide
- Start-Up Concerns
    - Start-Up Safety Concerns
    - Start-Up Documentation