

# FUNDAMENTALS OF PROCESS CONTROL TRAINING



**ICE145**  
**Instrumentation**  
**s & Control**  
**Engineering**

**COURSE TITLE**

**FUNDAMENTALS OF PROCESS CONTROL TRAINING**

**COURSE DATE/ VENUE**

16 – 20 December, 2019

London, UK

**COURSE REFERENCE**

ICE145

**COURSE DURATION**

05 days

**DISCIPLINE**

Instrumentations & Control Engineering

**COURSE INTRODUCTION**

This course should adequately pre-prepare a prospective technician or serve as an introduction for a prospective engineer wishing to get a solid basic understanding of instrumentation and process control.

Basic Control Concepts, the basic concepts encountered in automatic process control. Some of the basic terminology is also presented.

Fundamental Process Control focuses on the fundamental nature of process control, which includes an extensive discussion on control methodologies.

Instrumentation and process control involve a wide range of technologies and sciences, and they are used in an unprecedented number of applications. Examples range from the control of heating, cooling, and hot water systems in homes and offices to chemical and automotive instrumentation and process control.

This course is designed to cover all aspects of industrial instrumentation, such as sensing a wide range of variables, the transmission and recording of the sensed signal, controllers

for signal evaluation, and the control of the manufacturing process for a quality and uniform product.

## **COURSE OBJECTIVE**

### **Upon successful completion of this course, the delegates will be able to:**

- ✓ Explain the theory of process control
  - ✓ Identify all industrial process applications, control of process variables
  - ✓ Act safe and efficiently operate the process.
  - ✓ Recognize the most common variables controlled are pressure, level, temperature, and flow.
  - ✓ Define many different methods used to control these processes, this monitoring and control is generically called process control. Level, pressure, temperature, and flow are all controlled in a similar fashion.
  - ✓ Discuss the difference between direct- and reverse-acting controllers.
  - ✓ Define common terms and symbols used in process control.
  - ✓ Describe the function of self-regulated and non-self-regulated processes."
  - ✓ Introduction to industrial instrumentation
  - ✓ Refresh knowledge of basic electricity, electronics and physics
- Sensors and their use in the measurement of a wide variety of physical variables—such as level, pressure, flow, temperature, humidity, and mechanical measurements—are discussed in The use of regulators and actuators for controlling pressure, flow, and the control of the input variables to a process are discussed in Documentation as applied to instrumentation and control is introduced, together with standard symbols recommended by the Instrument Society of America (ISA) for use in instrumentation control diagrams.

## **COURSE AUDIENCE**

This course is tailored for:

- Electrical Operators, Technicians and Engineers.
- Chemical Operators, technicians and Engineers

- Managers, engineers, and technicians working in the field of instrumentation and process control.

It is anticipated that the prospective participant will have a basic understanding of mathematics, electricity, and physics.

## **COURSE CONTENT**

### Chapter 1. Introduction and Review

- 1.1 Introduction
- 1.2 Process Control
- 1.3 Definitions of the Elements in a Control Loop
- 1.4 Process Facility Considerations
- 1.5 Units and Standards
- 1.6 Instrument Parameters

### Chapter 2. Basic Electrical Components

- 2.1 Introduction
- 2.2 Resistance
- 2.3 Capacitance
- 2.4 Inductance

### Chapter 3. Documentation and Symbols

- 3.1 Introduction
- 3.2 System Documentation
- 3.3 Pipe and Identification Diagrams
- 3.4 Functional Symbols
- 3.5 P and ID Drawings

### Chapter 4. Process Control

- 4.1 Introduction
- 4.2 Basic Terms
- 4.3 Control Modes
- 4.4 Implementation of Control Loops

## 4.5 Digital Controllers

### Chapter 5. Pressure

#### 5.1 Introduction

#### 5.2 Basic Terms

#### 5.3 Pressure Measurement

#### 5.4 Pressure Formulas

#### 5.5 Measuring Instruments

#### 5.6 Application Considerations

### Chapter 6. Level

#### 6.1 Introduction

#### 6.2 Level Formulas

#### 6.3 Level Sensing Devices

#### 6.4 Application Considerations

### Chapter 7. Flow

#### 7.1 Introduction

#### 7.2 Basic Terms

#### 7.3 Flow Formulas

#### 7.4 Flow Measurement Instruments

#### 7.5 Application Considerations

### Chapter 8. Temperature and Heat

#### 8.1 Introduction

#### 8.2 Basic Terms

#### 8.3 Temperature and Heat Formulas

#### 8.4 Temperature Measuring Devices

#### 8.5 Application Considerations

### Chapter 9. Humidity, Density, Viscosity, and pH

#### 9.1 Introduction

#### 9.2 Humidity



9.3 Density and Specific Gravity

9.4 Viscosity

9.5 pH Measurements

## Chapter 10. Actuators and Control

10.1 Introduction

10.2 Pressure Controllers

10.3 Flow Control Actuators

10.4 Power Control

10.5 Motors

10.6 Application Considerations

### **COURSE CERTIFICATE**

**TRAINIT ACADEMY** will award an internationally recognized certificate(s) for each delegate on completion of training.

### **COURSE FEES**

\$6,150 per Delegate. This rate includes participant's manual, Hand-Outs, buffet lunch, coffee/tea on arrival, morning & afternoon of each day.

### **COURSE METHODOLOGY**

The training course will be highly participatory and the course leader will present, guide and facilitate learning, using a range of methods including formal presentation, discussions, sector-specific case studies and exercises. Above all, the course leader will make extensive use of real-life case examples in which he has been personally involved. You will also be encouraged to raise your own questions and to share in the development of the right answers using your own analysis and experiences. Tests of multiple-choice type will be made available on daily basis to examine the effectiveness of delivering the course.

- 30% Lectures
- 30% Workshops and work presentation
- 20% Case studies & Practical Exercises

- 10% Role Play
- 10% Videos, Software or Simulators (as applicable) & General Discussions

