ABLE Instruments & Controls Limited

Introduction to Process Instrumentation

Course GS001B: Two day; Instructor-Led

ABLE Training - Education and Certification

Official Curriculum

Introduction

Elements of this syllabus are subject to change.

This two day instructor-led course offers a comprehensive review of process instrumentation to provide a broad understanding of the various types of commonly used instruments and their applications. Practical demonstrations of process instruments on a purpose built training rig are included in this course.

Audience

This course is suitable for those who would like an overview or refresher of process instrumentation and their applications but do not require in-depth knowledge of individual instrument technologies, which can be achieved on subsequent courses.

It is particularly suitable for:

- Graduates
- Managers
- Non-engineers
- Instruments Engineers
- Design Engineers
- Buyers

At Course Completion

After completing this course, students will:

- Attain a basic understanding of process instrumentation.
- Be familiar with basic terminology and applications including international system of units (SI), outputs and protocols.
- Be able to understand the most important factors in instrument selection.
- Have an insight into the practical operation of a variety of process instrumentation including communication methods and devices.
- Recognise the various types of commonly-used instrumentation and explain their basic function.
- Understand safe and hazardous area zones and categories, product approvals and ingress protection ratings.

Prerequisites

This course requires that students meet the following prerequisites:

- There are no prerequisites for this course.

Course Materials

The student kit includes a comprehensive workbook for this class and a rig manual for hands-on training.

Course Outline

Module 1: Terminology

After completing this module, students will gain knowledge of industry standard terminology used with reference to process instrumentation and their respective applications.

Module 2: International system of units (SI)

After completing this module, students will understand the international system of units and methods for converting units.

Module 3: Level Measurement – a comparison of typical level instruments, their principles of operation and main applications

After completing this module, students will have a good understanding of the available technology to measure level in a process environment. A practical demonstration of level instrumentation will be provided in this module. This module also includes Nucleonic level instrumentation.

Module 4: Flow metering – a comparison of typical flow metering techniques, their principles of operation and main applications

After completing this module, students will have a good understanding of the available technology to measure flow in a process environment. A practical demonstration of flow instrumentation will be provided in this module.

Module 5: Pressure Measurement – a comparison of pressure gauges, switches and transmitters, their principles of operation and main applications

After completing this module, students will have a good understanding of the available technology to measure pressure or differential pressure in a process environment. A practical demonstration of pressure instrumentation will be provided in this module.

Module 6: Temperature Measurement – a comparison of different types of temperature gauges, switches and transmitters, their principles of operation and main applications

After completing this module, students will have a good understanding of the available technology to measure temperature in a process environment. A practical demonstration of temperature instrumentation will be provided in this module.

Module 7: Methods of communicating with instruments – installation, commissioning, data logging, diagnosis, inputs, outputs and protocols

After completing this module, students will have a good understanding of available techniques for communicating with process instrumentation for installation, use, maintenance and diagnosis. This module includes:- Using local displays : Working with industry standard hand held communicators : Personal Computers : SMART devices : Remote connectivity techniques. This module also covers inputs, outputs and protocols such as Fieldbus, Profibus and Modbus.

Module 8: Area Zones & Categories, Product Approvals and Safety

After completing this module, students will have an understanding of safe and hazardous working zones and their classification. Students will also gain knowledge of product ratings, approvals, ingress protection (IP), and directives such as ATEX (Atmosphere Explosive). Offshore certification, work permits, fail safety, SIL ratings (Safety Integrity Level), emergency shut down and the importance of calibration, documentation, servicing and maintenance will be included in this module. Mean Time Between Failure (MTBF) or life expectancy of process instrumentation is also discussed.