

## Instrumentation for Operators

### General Objectives:

The objective of this learning event is to provide the students with general instrumentation knowledge and skills that will enable them to perform safety job when working with instrumentation in plants. Be able to make a superficial checkup in control equipments which affect their operation tasks, perform tests when authorized by the instrumentation responsible in the plant as well as to help the instrument technicians to solve troubleshooting.

### Specific Objectives:

At the end of training the trainees will be able to:

- Interpret a PID and recognize control loops, automatisms and safety instrumented functions;
- Recognize main types of sensors and control valves, and understand their working principle and failures;

### Audience:

Engineers and technician and all staff from process industries (refining, chemical, nuclear and pharmaceutical industries...).

### Workload:

40 hours

### CONTENTS:

#### **Module I – Theory Process Variables:**

- Pressure measurements;
- Level measurements;
- Flow measurements;
- Temperature measurements;
- Instrumentation symbols and diagrams.

#### **Module II – Measurement of Variables**

- Manometers, pressure transmitters;
- Local level indicators, level transmitters;
- Local flow indicators, flow transmitters, recorders;

- Thermometers, thermocouples (TC), thermo resistors (RTD), temperature transmitters;
- Pneumatic controllers;
- Control valves and positioners.

### **Module III – Troubleshooting, Calibrations and Alignments**

- Manometers;
- Thermometers;
- Transmitters;
- Recorders.