

35 days

IR/INSTECH

Overview

LEVEL

Knowledge

PURPOSE

Improve instrumentation technicians performance in safety, quality and work efficiency. This course will provide an IFP Training Certification according to the IFP Training procedures.

LEARNING OBJECTIVES

Upon completion of the course, participants will be able to:

- range, configure and commission instruments,
- troubleshoot field instruments and instrument loops,
- perform calibration checks in workshop and on the field,
- write maintenance procedures related to instrumentation.

WAYS AND MEANS

Training split into thematic modules and "On The Job Training" (OJT). To give participants the opportunity to better assimilate the content of the previous course modules and apply the studied subjects to the facilities.

Workshop practice.

Exercises on site.

If available, use of dynamic benches.

Use of process simulators.

Intermediate and final tests to evaluate trainee according to IFP Training certification procedure.

LEARNING ASSESSMENT

Knowledge assessment according IFP Training Certification specific standards.

PREREQUISITES

Basic knowledge in technical and instrumentation.

WHY AN IFP TRAINING CERTIFICATION?

- An international recognition of your competencies.
- A Vocational Certificate delivered.
- An expertise confirmed in Instrumentation Technicians Certification.
- Ready-to-use skills.

MORE INFO

This course is composed of 7 modules of 5 days each. It includes all the evaluations related to the IFP Training Certification. In case of a local training, the customer will supply all the material and equipment needed for the course, including workshop and tools.

Agenda

MODULE 1: PHYSICS & PROCESS FUNDAMENTALS

5 d

Physics: mass, force, pressure, temperature, flowrate, density concept and units. Application: pressure gage, temperature gage and displacer level working principles.

Process, products and drawings: processing and conversion units overview. Process flow diagram, equipment symbolization. Main properties of products. Applications: process scheme, use of P&ID's . Electricity fundamentals, voltage, intensity, power, Ohm law. Applications on a transmitter loop load calculation and wirings.

Safety at work: hazards and risks, protections layers concept, work permit, hazardous area. Application and case studies.

MODULE 2: SENSORS & TRANSMITTERS

5 d

Local instruments: pressure, temperature, flow and level gages. P&ID symbolization. Range and accuracy. Process specification. Hook up sketches. Practical applications: gages selection and replacement. Practical works.

On/Off sensors: pressure, temperature, level and flow switch. working principles. P&ID symbolization. ON/OFF loops wirings. Range and calibration procedures. Applications on Process switch calibration and replacement.

Transmitters, pressure, temperature, level and flow transmitter. Working principles. P&ID symbolization. Process specification. 2 wires and 4 wires Analog loops wirings. Range and calibration procedures. Accuracy calculation. Applications and practical works.

MODULE 3: AUTOMATIC VALVES

5 d

On/Off valves: process use, technologies, P&ID symbolization, limit switches and solenoid valves, hook up sketches and electrical drawings. Applications on ON/OFF valve overhaul and troubleshooting. Practical works.

Control valves: process use, technologies, process specification and sizing, positioners, P&ID symbolization, hook up sketches and electrical drawings, applications on positioner calibration, control valve overhaul, specification and selection.

Applications and practical works.

MODULE 4: ON THE JOB TRAINING 1 & MINI-PROJECT (SAFETY & SENSORS)

5 d

OJT (3 days)

Application of the previous module(s) content to the actual plant. According to a subject submitted by the lecturer, the trainees will be requested to a written report and 20 minutes presentation about "Sensors calibration in process units": process role of the selected sensors; safety (work permit, risk analysis, safeguards...); detailed calibration procedures (tools and checklist); results analysis (accuracy, acceptance criteria...).

The trainee will present its work to other trainees and instructor during an other module.

Mini-Project - Team Work (2 days)

Each team has to identify the priorities for an assigned instrumentation subject submitted by the lecturer. Specific hazards and barriers, critical process variables, critical pieces of equipment, critical operations. Team oral presentation of the results.

MODULE 5: MAINTENANCE OF DCS (DISTRIBUTED CONTROL SYSTEM) LOOPS

5 d

DCS: technologies, controller, DCS architecture, power supplies. Application: DCS architecture review. Practical works.

Control schemes: single, cascade and split-range control, ratio and overrides, controller tuning.

Application: PID controller tuning (workshop on process simulators).

DCS loops troubleshooting: DCS loops drawings, troubleshooting methodology. Applications: DCS loops wiring analysis (from field to control room); DCS loops maintenance procedure writing. Applications and practical works.

MODULE 6: AUTOMATISMS, SEQUENCES & SAFETY SYSTEMS

5 d

PLC and relays: technologies, controller, power supplies, programming tools. Application: electrical motor commands review (on site).

Logic: logic gates, typical function blocs (bypass, voters...). Application: PLC programming (in workshop).

Safety Instrumented Systems (SIS): process role, safety matrix, SIL, SIS specific requirements for maintenance.

Troubleshooting methodology. Applications and practical works.

Applications: SIS loops wiring analysis; PLC logic diagram analysis; SIS loops test procedure writing; test of a safety transmitter.

OJT (3 days):

Application of the previous module(s) content to the actual plant. The subject is submitted by the lecturer . At the end of the OJT period, the trainees will be requested to prepare a written report and a 20 minutes presentation about “Valves, DCS and PLC loops maintenance in process units”: process role of the selected loops and control valves; safety (work permit, risk analysis, safeguards...); selected instrument specification review; detailed maintenance procedures (calibration and overhaul); results analysis (accuracy, acceptance criteria...).

Final test (2 days):

Presentation of OJTs to the classroom.

Written test about all the training contents according to the IFP Training Certification procedure.