



Accredited Africa Training Institute for Capacity Development

Unit FO409, Hatfield Plaza · 1122 Burnett St, Hatfield 0028 · Pretoria, Gauteng · South Africa

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COURSE BROCHURE

Process Instrumentation

Custom Courses / Instrumentation & Automation

Unit Standard AATICD-0228 · NQF Level 5 · 10 Credits · 5 Days

COURSE OVERVIEW

This course equips learners with the fundamental principles and practical skills required to understand, operate, and maintain process instrumentation systems commonly used in industrial environments. Participants will gain the ability to interpret technical specifications, calibrate instruments, and apply safety protocols, ensuring efficient and reliable process control.

Category	Custom Courses
Subfield	Instrumentation & Automation
Unit Standard	AATICD-0228
Accreditation	SAQA Accredited · NQF Level 5 · 10 Credits
Duration	5 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Demonstrate an understanding of process instrumentation principles and terminology.
- Apply measurement techniques for pressure, temperature, flow, and level using appropriate instruments.
- Calibrate and configure field instruments according to manufacturer specifications.
- Analyze instrument loop diagrams and identify components in a typical control loop.
- Implement safety procedures and troubleshoot common instrumentation faults.
- Evaluate instrument performance and recommend corrective actions.

WHO SHOULD ATTEND

- Ideal for technicians, engineers, and operators involved in process control, manufacturing, or utilities who need to work with instrumentation systems.
- Also suitable for maintenance personnel seeking to enhance their technical competencies.

COURSE OUTLINE

Day 1: Fundamentals of Process Instrumentation

- Introduction to process control and instrumentation
- Process variables and their importance
- Pressure measurement: principles and devices
- Temperature measurement: thermocouples, RTDs, thermistors
- Flow measurement: differential pressure, electromagnetic, ultrasonic
- Level measurement: guided wave radar, capacitance, displacer
- Instrumentation loop components: sensor, transmitter, controller, final element
- P&ID; symbols and instrument tags

Day 2: Signal Transmission and Calibration

- Analogue vs digital signal transmission
- 4-20 mA current loop: principles and troubleshooting
- HART communication protocol overview
- Fieldbus and wireless options
- Calibration fundamentals: standards, traceability, uncertainty
- Pressure transmitter calibration procedure
- Temperature transmitter calibration using a dry-block
- Safety considerations: lockout/tagout, hot work permits

Day 3: Control Valves and Final Control Elements

- Control valve components: body, trim, actuator, positioner
- Valve types: globe, ball, butterfly, diaphragm, gate
- Flow characteristics and selection criteria
- Actuator principles: spring-diaphragm, piston, electric
- Valve positioners: pneumatic and smart
- Valve sizing: Cv, choked flow, cavitation
- Valve maintenance and troubleshooting
- Practical: stroking a control valve and adjusting positioner

Day 4: Process Controllers and Loop Tuning

- On/off, proportional, integral, derivative control
- PID controller tuning methods: Ziegler-Nichols, Cohen-Coon, software-based
- Process reaction curve and ultimate gain method
- Tuning for different processes: flow, level, temperature, pressure
- Advanced control: cascade, ratio, feedforward
- Controller hardware: DCS, PLC, single-loop controllers
- Practical: tuning a simulated temperature loop
- Troubleshooting common control problems

Day 5: System Integration and Safety Instrumented Systems

- DCS architecture and I/O modules
- SCADA systems: RTUs, communication protocols (Modbus, Profibus)
- Integration of field devices with control systems
- Safety lifecycle and functional safety standards (IEC 61511)
- SIL determination and proof testing

- Loop checks: continuity, polarity, signal verification
- Commissioning procedures: pre-startup checks
- Maintenance strategies: preventive, predictive, corrective

ASSESSMENT & CERTIFICATION

Delegates are assessed through exercises and a final test. A mark of **50% or above** earns an **AATICD Certificate of Completion**, issued digitally with a unique verification code. This course carries **10 NQF credits** at **NQF Level 5**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 24,200.00	R 24,200.00
1	In-House	R 31,400.00	R 31,400.00
1	On-Campus (Pretoria)	R 36,200.00	R 36,200.00

UPCOMING SESSIONS

Start	End	Method	Venue
10 Aug 2026	14 Aug 2026	On-Campus	Durban, South Africa
10 Aug 2026	14 Aug 2026	On-Campus	Abu Dhabi, UAE
17 Aug 2026	21 Aug 2026	On-Campus	Harare, Zimbabwe
17 Aug 2026	21 Aug 2026	On-Campus	Shenzhen, China
24 Aug 2026	28 Aug 2026	On-Campus	Bangkok, Thailand
24 Aug 2026	28 Aug 2026	On-Campus	Victoria Falls, Zimbabwe
31 Aug 2026	04 Sep 2026	On-Campus	Lusaka, Zambia
31 Aug 2026	04 Sep 2026	On-Campus	London, UK

Contact us if no suitable date is listed – on-demand sessions can be arranged for groups.

HOW TO GET A QUOTE OR APPLY

1. **Get an instant quotation online:** visit www.aaticd.co.za, open the page for this course (Unit Standard AATICD-0228) and click **Get A Quote / Apply**. Select your training method and number of delegates – your quotation is generated immediately and emailed to you with the course brochure attached.
2. **Apply by email:** send the course title, your preferred training method (Online, In-House or On-Campus Pretoria), the number of delegates and your preferred dates to apply@aaticd.co.za – our team will reply with a formal quotation.
3. **Apply by phone or WhatsApp:** call **+27 12 004 8389** or WhatsApp **+27 65 077 6310** and we will prepare your quotation and reserve your seats.
4. **Confirm your booking:** accept the quotation and settle the invoice. As soon as payment is confirmed your delegates are enrolled and receive their AATICD LMS login details by email, along with joining instructions for their chosen training method.

Group discounts apply automatically – the more delegates you enrol, the lower the price per delegate. No payment is required to request a quotation.

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