



## 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

# Mechanical Electrical Hydraulic Equipment Control Systems Operation Training

Physical Planning and Construction / Civil Engineering Construction

Unit Standard 115960 · NQF Level 4 · 10 Credits · 7 Days

## COURSE OVERVIEW

This course provides participants with the essential knowledge and practical skills to operate, monitor, and maintain mechanical, electrical, and hydraulic equipment control systems in industrial settings. It covers system components, control principles, safety protocols, and troubleshooting techniques to ensure efficient and safe operation.

|                 |                                            |
|-----------------|--------------------------------------------|
| Category        | Physical Planning and Construction         |
| Subfield        | Civil Engineering Construction             |
| Unit Standard   | 115960                                     |
| Accreditation   | SAQA Accredited · NQF Level 4 · 10 Credits |
| Duration        | 7 days                                     |
| Training Method | Online, On-Campus, In-House                |
| Certificate     | Issued via AATICD LMS – verifiable online  |

## LEARNING OUTCOMES

- Identify and describe the key components and functions of mechanical, electrical, and hydraulic control systems.
- Apply safe operating procedures and interpret system schematics and diagrams.
- Demonstrate correct start-up, shutdown, and normal operation sequences for integrated control systems.
- Analyze system performance data to detect faults and implement corrective actions.
- Evaluate system efficiency and recommend adjustments to optimize operation.
- Implement routine maintenance and inspection procedures as per manufacturer and regulatory requirements.

## WHO SHOULD ATTEND

- This course is designed for technicians, operators, and maintenance personnel who work with or supervise mechanical, electrical, and hydraulic control systems in manufacturing, mining, or process industries.

## COURSE OUTLINE

### Day 1: Introduction to Control Systems and Safety

- Overview of control systems: open-loop vs closed-loop.
- Safety regulations (OHS Act, SANS standards).
- Basic electrical principles: voltage, current, resistance.
- Hydraulic fundamentals: pressure, flow, Pascal's law.
- Mechanical components: actuators, linkages, gears.
- Introduction to schematic symbols and P&IDs.;

### Day 2: Electrical Control Systems

- Power supplies and distribution.
- Switches, relays, contactors, and timers.
- Motor starters: DOL, star-delta.
- Electrical safety: lockout/tagout, earthing.
- Reading ladder diagrams.
- Troubleshooting techniques: continuity testing, multimeter use.

### Day 3: Hydraulic Control Systems

- Hydraulic pumps: gear, vane, piston.
- Actuators: cylinders, motors.
- Valves: relief, check, directional, flow control.
- Accumulators and filters.
- Hydraulic circuit design and symbols.
- Common faults: leaks, cavitation, contamination.

### Day 4: Mechanical Systems and Integration

- Bearings, couplings, belts, chains, gears.
- Linear motion: rails, ball screws.
- Mechanical advantage and torque calculations.
- Shaft alignment techniques.
- Integration with electrical drives and hydraulic actuators.
- Maintenance practices: lubrication, wear inspection.

### Day 5: Programmable Logic Controllers (PLCs) and Automation

- PLC hardware: CPU, I/O modules, power supply.
- Ladder logic programming: contacts, coils, timers, counters.
- Sensors: proximity, limit switches, pressure transducers.
- Actuator control via PLC outputs.
- HMI basics.
- Troubleshooting PLC programs and wiring.

### Day 6: System Commissioning and Troubleshooting

- Commissioning procedures: checks, testing, calibration.
- Troubleshooting flowcharts.
- Using oscilloscopes, data loggers, and pressure gauges.
- Common system faults and root cause analysis.
- Case studies: integrated system failures.

- Reporting and documentation.

#### Day 7: Practical Assessment and Integration Project

- Practical exercise: operate and maintain a mechatronic system.
- Team troubleshooting scenario.
- Individual competency assessment.
- Review of key concepts.
- Feedback and certification guidance.

## 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 4**.

## PRICING (PER DELEGATE, EX-VAT)

| Delegates | Training Method      | Price per Delegate | Total       |
|-----------|----------------------|--------------------|-------------|
| 1         | Online               | R 28,200.00        | R 28,200.00 |
| 1         | In-House             | R 36,700.00        | R 36,700.00 |
| 1         | On-Campus (Pretoria) | R 42,300.00        | R 42,300.00 |

## UPCOMING SESSIONS

| Start       | End         | Method    | Venue                      |
|-------------|-------------|-----------|----------------------------|
| 03 Aug 2026 | 11 Aug 2026 | On-Campus | Pretoria, South Africa     |
| 03 Aug 2026 | 11 Aug 2026 | On-Campus | Lagos, Nigeria             |
| 04 Aug 2026 | 12 Aug 2026 | On-Campus | Johannesburg, South Africa |
| 05 Aug 2026 | 13 Aug 2026 | On-Campus | Mauritius                  |
| 06 Aug 2026 | 14 Aug 2026 | On-Campus | Cape Town, South Africa    |
| 07 Aug 2026 | 17 Aug 2026 | On-Campus | Dubai, UAE                 |
| 10 Aug 2026 | 18 Aug 2026 | On-Campus | Abu Dhabi, UAE             |
| 11 Aug 2026 | 19 Aug 2026 | On-Campus | Mauritius                  |

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](http://www.aaticd.co.za), open the page for this course (Unit Standard 115960) 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](mailto: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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