



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

Laboratory Apparatus And Equipment Operation Techniques Training

Agriculture and Nature Conservation / Secondary Agriculture

Unit Standard 114312 · NQF Level 2 · 12 Credits · 9 Days

COURSE OVERVIEW

This course equips learners with the knowledge and skills to operate common laboratory apparatus and equipment safely and effectively. It covers the principles of operation, calibration, and maintenance of laboratory instruments, ensuring accurate results and adherence to safety protocols. The course aims to enhance technical competence and promote a culture of safety in laboratory environments.

Category	Agriculture and Nature Conservation
Subfield	Secondary Agriculture
Unit Standard	114312
Accreditation	SAQA Accredited · NQF Level 2 · 12 Credits
Duration	9 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Apply safe operating procedures for handling and using laboratory apparatus and equipment.
- Demonstrate correct techniques for calibration and adjustment of common laboratory instruments.
- Analyze equipment performance data to identify potential malfunctions and maintenance needs.
- Implement routine maintenance schedules for laboratory apparatus to ensure reliability.
- Evaluate the suitability of different apparatus for specific laboratory procedures.
- Design a simple experimental setup using appropriate laboratory equipment.

WHO SHOULD ATTEND

- This course is designed for laboratory technicians, assistants, and new employees in laboratory settings who require hands-on training in the operation of laboratory apparatus and equipment.
- It is also suitable for individuals seeking to refresh their skills in laboratory instrumentation.

COURSE OUTLINE

Day 1: Introduction to Laboratory Apparatus and Equipment

- Overview of laboratory types (analytical, clinical, research).
- Classification of apparatus: glassware, plasticware, metalware.
- Introduction to basic equipment: balances, pH meters, hot plates.
- Safety symbols and hazard identification.
- Laboratory documentation and SOPs.
- Equipment logbooks and maintenance schedules.

Day 2: Glassware and Measuring Techniques

- Volumetric glassware: beakers, flasks, pipettes, burettes.
- Graduated cylinders and volumetric flasks.
- Reading meniscus and avoiding parallax error.
- Calibration of pipettes and micropipettes.
- Cleaning procedures: detergents, acids, safety.
- Storage and handling of glassware to prevent breakage.

Day 3: Balances and Weighing Techniques

- Types of balances: top-loading, analytical, microbalances.
- Principles of weighing: taring, zeroing, environmental effects.
- Weighing solids, liquids, and hygroscopic substances.
- Calibration procedure using standard weights.
- Common errors: static, drafts, thermal effects.
- Documentation of weighing data and GLP.

Day 4: pH Meters and Electrochemical Measurements

- Theory of pH and electrode operation.
- Parts of a pH meter: electrode, meter, temperature probe.
- Calibration buffers and procedures.
- Measuring pH of solutions, suspensions, and semi-solids.
- Electrode maintenance: cleaning, storage, regeneration.
- Troubleshooting common pH measurement errors.

Day 5: Centrifuges and Separation Techniques

- Centrifugation theory: relative centrifugal force (RCF).
- Types: microcentrifuges, refrigerated, ultracentrifuges.
- Rotor selection: fixed-angle, swing-bucket.
- Balancing tubes and loading rotors.
- Safety precautions: imbalance, aerosol containment.
- Applications: pelleting, density gradient, phase separation.

Day 6: Spectrophotometers and Optical Measurements

- Light spectrum, absorbance, and transmittance.
- Components: light source, monochromator, detector.
- Types: single-beam, double-beam, diode array.
- Cuvette selection and handling.
- Calibration with blank and standards.

- Quantitative analysis: Beer-Lambert law, standard curve.

Day 7: Microscopes and Imaging Techniques

- Microscope components: eyepiece, objectives, stage, condenser.
- Types of microscopy: brightfield, phase contrast, fluorescence.
- Slide preparation: smears, wet mounts, staining.
- Kohler illumination adjustment.
- Calibration of eyepiece reticle.
- Care and maintenance of microscopes.

Day 8: Sterilization and Aseptic Techniques

- Methods: moist heat, dry heat, filtration, radiation.
- Autoclave operation: cycles, loading, safety.
- Biological and chemical indicators.
- Aseptic technique: work area, personal hygiene.
- Laminar flow hoods and biosafety cabinets.
- Waste disposal of contaminated materials.

Day 9: Integration, Troubleshooting, and Practical Assessment

- Scenario-based exercises combining multiple instruments.
- Troubleshooting: error codes, calibration drift, contamination.
- Data interpretation and report writing.
- Practical assessment: set-up, operation, clean-up.
- Review of SOPs and GLP.
- Course evaluation and feedback.

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 **12 NQF credits** at **NQF Level 2**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 33,300.00	R 33,300.00
1	In-House	R 43,300.00	R 43,300.00
1	On-Campus (Pretoria)	R 50,000.00	R 50,000.00

UPCOMING SESSIONS

Start	End	Method	Venue
10 Aug 2026	20 Aug 2026	On-Campus	Durban, South Africa
10 Aug 2026	20 Aug 2026	On-Campus	Mauritius
11 Aug 2026	21 Aug 2026	On-Campus	Cape Town, South Africa
12 Aug 2026	24 Aug 2026	On-Campus	Dubai, UAE
13 Aug 2026	25 Aug 2026	On-Campus	Pretoria, South Africa
14 Aug 2026	26 Aug 2026	On-Campus	Abu Dhabi, UAE
17 Aug 2026	27 Aug 2026	On-Campus	Shenzhen, China
18 Aug 2026	28 Aug 2026	On-Campus	Dubai, UAE

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 114312) 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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