



Accredited Africa Training Institute for Capacity Development

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

Tel: +27 12 004 8389 · Mobile: +27 65 077 6310

Email: apply@aaticd.co.za · Website: www.aaticd.co.za

COURSE BROCHURE

Potable Water Science Principles And Application Training

Physical Planning and Construction / Civil Engineering Construction

Unit Standard 115946 · NQF Level 4 · 20 Credits · 17 Days

COURSE OVERVIEW

This course equips learners with the scientific principles and practical applications of potable water science, ensuring they understand water quality standards, treatment processes, and safety regulations. Participants will gain the skills to monitor, analyze, and manage potable water systems effectively, contributing to public health and environmental sustainability.

Category	Physical Planning and Construction
Subfield	Civil Engineering Construction
Unit Standard	115946
Accreditation	SAQA Accredited · NQF Level 4 · 20 Credits
Duration	17 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Apply the fundamental chemical and microbiological principles governing potable water quality.
- Analyze water samples using standard testing methods to determine compliance with SANS 241 and WHO guidelines.
- Evaluate the effectiveness of various water treatment processes including coagulation, filtration, and disinfection.
- Implement corrective actions based on water quality monitoring data to ensure safe drinking water.
- Demonstrate proper sampling techniques and record-keeping procedures in accordance with regulatory requirements.

WHO SHOULD ATTEND

- This course is designed for water treatment plant operators, quality control technicians, environmental health practitioners, and professionals involved in water supply and sanitation management in municipal, industrial, or consulting sectors.

COURSE OUTLINE

Day 1: Introduction to Potable Water and Regulatory Framework

- What is potable water?
- Overview of the Water Services Act (Act 108 of 1997)
- SANS 241: Drinking water quality standards
- Unit standard 115946 outcomes and assessment criteria
- The hydrological cycle and water sources (surface, groundwater)

Day 2: Water Chemistry Fundamentals

- pH scale and buffer systems
- Alkalinity and its role in coagulation
- Water hardness (temporary vs. permanent)
- Common chemical parameters: TDS, conductivity, turbidity
- Introduction to chemical dosing calculations

Day 3: Microbiology of Potable Water

- Types of waterborne pathogens
- Indicator organisms and their significance
- Factors affecting microbial survival in water
- Biofilms in distribution systems
- Disease outbreaks: cholera, typhoid, cryptosporidiosis

Day 4: Water Quality Sampling and Testing Methods

- Sampling protocols: grab vs. composite samples
- Sample preservation and transport
- Field testing: pH, chlorine residual, turbidity, conductivity
- Laboratory analyses: microbiological, chemical, physical
- Quality control: blanks, duplicates, spikes

Day 5: Coagulation and Flocculation Principles

- Coagulation mechanisms: charge neutralisation, sweep floc
- Coagulant types and properties
- Jar testing for dose optimization
- Flocculation: slow mixing and floc formation
- Factors affecting coagulation: pH, turbidity, temperature

Day 6: Sedimentation and Clarification Processes

- Theory of sedimentation: Stokes' law, settling velocities
- Types of clarifiers: conventional, high-rate, lamella
- Design parameters: overflow rate, detention time, weir loading
- Sludge removal mechanisms
- Operational issues: short-circuiting, sludge blanket rising

Day 7: Filtration Technologies

- Filtration theory: media types, porosity, depth filtration
- Rapid gravity filtration: operation and backwashing
- Slow sand filtration: schmutzdecke layer
- Membrane filtration: microfiltration, ultrafiltration, nanofiltration, reverse osmosis

- Filter performance monitoring and troubleshooting

Day 8: Disinfection Processes – Chlorination

- Disinfection mechanisms: cell wall damage, enzyme inactivation
- Chlorine chemistry: free vs. combined chlorine, breakpoint chlorination
- Chlorine dosing calculations and residual monitoring
- Safety: handling chlorine gas and hypochlorite
- Disinfection by-products (DBPs): THMs, HAAs and regulation

Day 9: Alternative Disinfection Methods

- UV disinfection: wavelength, intensity, dose, and reactivation
- Ozone generation and contactor design
- Chloramination: formation of monochloramine, dichloramine
- Advantages and disadvantages of each method
- Case studies: disinfection selection for different sources

Day 10: Water Stabilisation and Corrosion Control

- Water chemistry: calcium carbonate saturation, LSI, RSI
- Corrosion types: galvanic, pitting, microbiologically influenced
- Corrosion inhibitors: orthophosphate, polyphosphate, silicate
- Lead and copper rule compliance
- Scaling control: pH adjustment, anti-scalants

Day 11: Advanced Treatment – Ion Exchange and Adsorption

- Ion exchange resins: cation, anion, mixed bed
- Ion exchange applications: softening, nitrate removal, demineralisation
- Activated carbon types: GAC, PAC, and adsorption isotherms
- Carbon contactor design and operation
- Resin and carbon regeneration methods

Day 12: Membrane Processes – Reverse Osmosis and Nanofiltration

- Membrane separation: osmotic pressure, flux, rejection
- RO vs. NF: pore size, operating pressure, applications
- System components: membranes, pressure vessels, pumps
- Pretreatment requirements: SDI, scaling prevention
- Membrane fouling: types (scaling, biofouling, colloidal) and cleaning

Day 13: Distribution System Management

- Water quality deterioration: disinfectant decay, nitrification, taste/odour
- Chlorine residual management: booster stations, rechlorination
- Hydraulic modelling for water age and residence time
- Flushing programs: conventional, unidirectional
- Sampling plan design for distribution system

Day 14: Water Safety Plans and Risk Assessment

- Water Safety Plan: system assessment, monitoring, management
- Hazard identification: microbial, chemical, physical, radiological
- Critical control points (CCPs) in treatment and distribution
- Operational monitoring: parameters, frequencies, limits
- Incident response and corrective actions

Day 15: Laboratory Quality Assurance and Data Interpretation

- QA/QC: calibration, control samples, proficiency testing
- Statistical tools: mean, median, standard deviation, percentiles
- Control charts: Shewhart, cumulative sum
- Data validation: outliers, holding times, method detection limits
- Report writing: compliance reports, annual summaries

Day 16: Operational Troubleshooting and Process Optimization

- Troubleshooting: coagulation, flocculation, sedimentation, filtration
- Optimisation: coagulant dose, filter run time, backwash frequency
- Energy management: pump efficiency, variable speed drives
- SOP development: disinfection, chemical handling, equipment operation
- Case studies: real-world process challenges

Day 17: Integrated Application, Assessment, and Certification

- Integrated case study: source to tap water quality management
- Practical assessment: sampling, on-site testing, process adjustments
- Review of unit standard 115946 outcomes
- Final exam preparation: theory and calculations
- Certification requirements and next steps

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 **20 NQF credits** at **NQF Level 4**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 53,800.00	R 53,800.00
1	In-House	R 69,900.00	R 69,900.00
1	On-Campus (Pretoria)	R 80,700.00	R 80,700.00

UPCOMING SESSIONS

Start	End	Method	Venue
03 Aug 2026	25 Aug 2026	On-Campus	Dubai, UAE
04 Aug 2026	26 Aug 2026	On-Campus	Pretoria, South Africa
04 Aug 2026	26 Aug 2026	On-Campus	Lagos, Nigeria
05 Aug 2026	27 Aug 2026	On-Campus	Johannesburg, South Africa
06 Aug 2026	28 Aug 2026	On-Campus	Mauritius
07 Aug 2026	31 Aug 2026	On-Campus	Cape Town, South Africa
10 Aug 2026	01 Sep 2026	On-Campus	Pretoria, South Africa
11 Aug 2026	02 Sep 2026	On-Campus	Abu Dhabi, 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 115946) 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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