



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

Mineral Processing Activities In Mining And Minerals Sector Training

Manufacturing, Engineering and Technology / Fabrication and Extraction

Unit Standard 110430 · NQF Level 1 · 14 Credits · 11 Days

COURSE OVERVIEW

This course equips learners with the fundamental knowledge and skills required to perform mineral processing activities within the mining and minerals sector. It covers key processes such as crushing, grinding, screening, and classification, emphasizing operational efficiency, safety, and quality control. The training ensures compliance with South African mining regulations and industry best practices.

Category	Manufacturing, Engineering and Technology
Subfield	Fabrication and Extraction
Unit Standard	110430
Accreditation	SAQA Accredited · NQF Level 1 · 14 Credits
Duration	11 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Apply basic principles of mineral processing to crushing, grinding, and screening operations.
- Demonstrate safe operating procedures for mineral processing equipment and machinery.
- Analyze process parameters to optimize recovery and product quality.
- Implement quality control measures and sampling techniques in mineral processing.
- Evaluate environmental and health impacts of mineral processing activities.
- Interpret process flow diagrams and standard operating procedures.

COURSE OUTLINE

Day 1: Introduction to Mineral Processing and the Mining Sector

- Overview of the mining and minerals sector in South Africa
- Stages of the mining value chain: exploration, extraction, processing, beneficiation
- Key legislation: MHSA, MPRDA, NEMA
- Role of SAQA and unit standards in skills development
- Introduction to mineral processing terminology

Day 2: Ore Characteristics and Sampling

- Types of ores: metallic, non-metallic, industrial minerals
- Ore mineralogy and liberation
- Sampling theory: principles of representivity
- Sampling methods: grab, channel, core, and bulk sampling
- Sample preparation: crushing, splitting, pulverizing
- Introduction to mass balance calculations

Day 3: Comminution – Crushing and Grinding

- Comminution theory: fracture mechanics, work index
- Primary, secondary, and tertiary crushing: jaw, gyratory, cone crushers
- Grinding mills: rod, ball, SAG, AG mills
- Classification: screens and hydrocyclones
- Closed-circuit vs open-circuit operations
- Energy considerations in comminution

Day 4: Sizing and Classification

- Particle size analysis: sieving, laser diffraction, sedimentation
- Screening: vibrating screens, trommels, grizzlies
- Classification: hydrocyclones, spirals, classifiers
- Efficiency of classification: partition curves
- Cut size and sharpness of separation
- Applications in dewatering and closed-circuit grinding

Day 5: Gravity Concentration

- Principles of gravity separation: settling velocity, hindered settling
- Jigs, spirals, shaking tables, centrifugal concentrators
- Dense medium separation: heavy liquids, dense medium cyclones
- Applications for coal, diamonds, gold, and heavy minerals
- Operating parameters: feed rate, water flow, pulp density
- Troubleshooting common issues

Day 6: Flotation

- Surface chemistry fundamentals: hydrophobicity, contact angle
- Flotation reagents: collectors, frothers, depressants, activators
- Flotation machines: mechanical, pneumatic, column cells
- Flotation circuits: rougher, scavenger, cleaner stages
- Factors affecting flotation: particle size, pulp density, pH
- Flotation kinetics and grade-recovery curves

Day 7: Magnetic and Electrostatic Separation

- Magnetic properties: ferromagnetic, paramagnetic, diamagnetic
- Low-intensity and high-intensity magnetic separators
- Wet vs dry magnetic separation
- Electrostatic separation: principles and equipment (plate, screen, drum)
- Applications: iron ore, ilmenite, rutile, zircon
- Operating parameters and maintenance

Day 8: Dewatering and Solid-Liquid Separation

- Thickening: sedimentation, thickener types, flocculants
- Filtration: vacuum, pressure, and centrifugal filters
- Drying: rotary dryers, spray dryers, fluidized bed dryers
- Factors: particle size, cake permeability, pressure differential
- Water recovery and tailings management
- Environmental considerations in dewatering

Day 9: Hydrometallurgy and Leaching

- Hydrometallurgy overview: leaching, SX, EW
- Leaching reagents: cyanide, sulfuric acid, ammonia
- Heap leaching: design, operation, environmental controls
- Vat and agitation leaching
- Factors: temperature, pressure, particle size, reagent concentration
- Gold and copper leaching case studies

Day 10: Process Control and Optimization

- Process control fundamentals: feedback, feedforward, PID
- Sensors: density, flow, level, pH, particle size analyzers
- Control loops for grinding, flotation, and thickening
- Data acquisition and SCADA systems
- Statistical process control: control charts, capability analysis
- Optimization strategies: throughput, recovery, grade

Day 11: Integrated Plant Operations and Quality Assurance

- Flowsheet development: from ore to final product
- Mass and water balance calculations
- QA/QC: sampling protocols, laboratory analysis, metal accounting
- Plant troubleshooting and debottlenecking
- Safety: lock-out/tag-out, confined space, hazard identification
- Environmental management: tailings storage, water management
- Case study: integrated plant simulation

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 **14 NQF credits** at **NQF Level 1**.

PRICING (PER DELEGATE, EX-VAT)

Delegates	Training Method	Price per Delegate	Total
1	Online	R 38,400.00	R 38,400.00
1	In-House	R 49,900.00	R 49,900.00
1	On-Campus (Pretoria)	R 57,600.00	R 57,600.00

UPCOMING SESSIONS

Start	End	Method	Venue
31 Jul 2026	14 Aug 2026	On-Campus	Lagos, Nigeria
03 Aug 2026	17 Aug 2026	On-Campus	Mauritius
04 Aug 2026	18 Aug 2026	On-Campus	Cape Town, South Africa
05 Aug 2026	19 Aug 2026	On-Campus	Dubai, UAE
06 Aug 2026	20 Aug 2026	On-Campus	Pretoria, South Africa
06 Aug 2026	20 Aug 2026	On-Campus	Lagos, Nigeria
07 Aug 2026	21 Aug 2026	On-Campus	Johannesburg, South Africa
10 Aug 2026	24 Aug 2026	On-Campus	Cape Town, South Africa

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 110430) 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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