



## 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

# Milling Machine Operation and Monitoring

Manufacturing, Engineering and Technology / Manufacturing and Assembly

Unit Standard 258678 · NQF Level 2 · 12 Credits · 9 Days

## COURSE OVERVIEW

This course equips learners with the knowledge and skills to safely set up, operate, and monitor a milling machine to produce components to specified tolerances. It covers machine controls, cutting parameters, workpiece holding, and quality inspection, enabling learners to perform milling operations in a manufacturing environment.

|                 |                                            |
|-----------------|--------------------------------------------|
| Category        | Manufacturing, Engineering and Technology  |
| Subfield        | Manufacturing and Assembly                 |
| Unit Standard   | 258678                                     |
| 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 safety rules and procedures when operating a milling machine.
- Set up the milling machine by selecting appropriate cutting tools, workholding devices, and machining parameters.
- Operate the milling machine to perform basic milling operations such as face milling, slotting, and drilling.
- Monitor the milling process by checking workpiece dimensions, surface finish, and tool condition.
- Perform in-process quality checks using measuring instruments and adjust machine settings as required.
- Demonstrate correct shutdown, cleaning, and maintenance procedures for the milling machine.

## WHO SHOULD ATTEND

- This course is intended for machine operators, artisans, and technicians who need to operate and monitor a milling machine in a manufacturing or engineering environment.

## COURSE OUTLINE

### Day 1: Introduction to Milling Machines and Safety

- Types of milling machines: vertical, horizontal, universal
- Safety regulations and lockout/tagout procedures
- Machine components: column, knee, table, spindle, arbor
- Cutting tool materials and geometries
- Workholding devices: vises, clamps, fixtures
- Introduction to cutting parameters: speed, feed, depth of cut
- Coolants and lubricants
- Housekeeping and workshop etiquette

### Day 2: Milling Machine Setup and Workholding

- Machine startup and shutdown procedures
- Installing and aligning milling cutters (end mills, face mills)
- Workholding methods: vise alignment, clamping techniques
- Using dial indicators and edge finders
- Setting spindle speed and feed rate
- Trimming the head of a vertical mill
- Measuring tools: vernier calipers, micrometers, gauges
- Workpiece layout and marking

### Day 3: Basic Milling Operations – Facing and Squaring

- Face milling techniques with insert cutters
- Squaring a block: sequence of cuts
- Reading and interpreting orthographic projections
- Calculating spindle speed and feed rate formulas
- Depth of cut and stepover considerations
- Surface finish requirements
- Inspection using surface plates and squares
- Troubleshooting common issues: chatter, burn marks

### Day 4: Edge Finishing and Slot Milling

- Peripheral milling with end mills
- Slot milling: width and depth control
- Keyway cutting methods
- Use of parallels and shims
- Climb vs conventional milling
- Deburring techniques
- In-process measurement using gauges
- Adjusting for tool deflection

### Day 5: Drilling, Boring, and Reaming Operations

- Center drilling and pilot holes
- Twist drill geometry and selection
- Peck drilling for deep holes
- Boring head setup and operation
- Boring to size: incremental cuts

- Reaming: allowances and alignment
- Hole location tolerancing
- Coolant application for drilling

#### **Day 6: Thread Milling and Tapping**

- Tap selection: hand taps, spiral point, spiral flute
- Tapping procedures: speed, depth, lubrication
- Thread milling with a thread mill cutter
- Thread gauges: go/no-go inspection
- Thread repair methods
- Metric vs imperial thread standards
- Common tapping problems: breakage, oversize
- Safety in tapping operations

#### **Day 7: Angular Milling and Contouring**

- Angle milling using universal vise
- Tilting the milling head for compound angles
- Contour milling with manual feed
- Rotary table setup and operation
- Dividing head for indexing
- Cutting arcs and radii
- Inspection of angles using protractors
- Applications: dovetails, vee-blocks

#### **Day 8: Advanced Operations and Quality Control**

- Compound angle milling techniques
- Using digital readouts (DRO) for precision
- Geometric dimensioning and tolerancing (GD&T;) basics
- Surface finish measurement (Ra)
- Statistical process control (SPC) introduction
- Tool wear monitoring and replacement
- Cutting parameter optimization
- Documentation and reporting

#### **Day 9: Integration, Troubleshooting, and Assessment**

- Project: manufacture a multi-feature component
- Troubleshooting: chatter, poor finish, size errors
- Preventative maintenance: cleaning, lubrication
- Cutting tool economics
- Review of unit standard outcomes
- Written and practical assessment
- Feedback and certification requirements
- Career pathways in machining

## 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        | <b>R 33,300.00</b> |
| 1         | In-House             | R 43,300.00        | <b>R 43,300.00</b> |
| 1         | On-Campus (Pretoria) | R 50,000.00        | <b>R 50,000.00</b> |

## UPCOMING SESSIONS

| Start       | End         | Method    | Venue                   |
|-------------|-------------|-----------|-------------------------|
| 10 Aug 2026 | 20 Aug 2026 | On-Campus | Pretoria, South Africa  |
| 11 Aug 2026 | 21 Aug 2026 | On-Campus | Abu Dhabi, UAE          |
| 12 Aug 2026 | 24 Aug 2026 | On-Campus | Durban, South Africa    |
| 12 Aug 2026 | 24 Aug 2026 | On-Campus | Mauritius               |
| 13 Aug 2026 | 25 Aug 2026 | On-Campus | Cape Town, South Africa |
| 14 Aug 2026 | 26 Aug 2026 | On-Campus | Dubai, UAE              |
| 17 Aug 2026 | 27 Aug 2026 | On-Campus | Abu Dhabi, UAE          |
| 18 Aug 2026 | 28 Aug 2026 | On-Campus | Durban, 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](http://www.aaticd.co.za), open the page for this course (Unit Standard 258678) 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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