



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

Turning Operations for Component Production

Manufacturing, Engineering and Technology / Manufacturing and Assembly

Unit Standard 258717 · NQF Level 3 · 20 Credits · 17 Days

COURSE OVERVIEW

This course equips learners with the skills to safely and efficiently produce components using turning operations on a lathe. Learners will gain practical competence in setting up, operating, and maintaining turning equipment to achieve specified tolerances and surface finishes. The course emphasizes adherence to quality standards and occupational health and safety regulations.

Category	Manufacturing, Engineering and Technology
Subfield	Manufacturing and Assembly
Unit Standard	258717
Accreditation	SAQA Accredited · NQF Level 3 · 20 Credits
Duration	17 days
Training Method	Online, On-Campus, In-House
Certificate	Issued via AATICD LMS – verifiable online

LEARNING OUTCOMES

- Apply safety procedures and use personal protective equipment when performing turning operations.
- Set up and prepare the lathe, workholding devices, and cutting tools for turning operations.
- Demonstrate the ability to turn components to specified dimensions, tolerances, and surface finishes.
- Perform in-process inspection and adjust machining parameters to maintain quality.
- Implement basic maintenance procedures on the lathe and cutting tools.
- Analyze and troubleshoot common turning defects and process deviations.

WHO SHOULD ATTEND

- This course is designed for machine tool operators, artisans, and technicians in manufacturing environments who need to perform turning operations as part of component production.
- It is also suitable for apprentices and individuals seeking formal recognition of their machining skills.

COURSE OUTLINE

Day 1: Introduction to Turning Operations

- Overview of machining processes
- Safety in the turning workshop
- Introduction to the centre lathe: bed, headstock, tailstock, carriage
- Cutting tool materials and geometry
- Workholding methods: chucks, collets, faceplates
- Basic lathe accessories
- Introduction to cutting parameters: speed, feed, depth of cut
- Workshop rules and housekeeping

Day 2: Lathe Components and Maintenance

- Detailed study of the headstock: spindle, gears, speed selection
- Tailstock: quill, taper, alignment
- Carriage: saddle, cross-slide, compound rest, toolpost
- Lead screw and feed rod
- Coolant systems
- Daily maintenance checklist
- Lubrication points and lubricants
- Cleaning and storage of tooling

Day 3: Workholding and Toolholding

- Three-jaw and four-jaw chucks: mounting and centering
- Collet chucks and their applications
- Faceplates and angle plates
- Steady rests and follower rests
- Toolholders: turning, facing, boring, threading
- Insert tooling and tool clamping
- Setting tool tip at centre height
- Workpiece runout and how to minimise it

Day 4: Cutting Parameters and Tool Wear

- Cutting speed calculation: revolutions per minute (RPM)
- Feed rate: mm per revolution
- Depth of cut and material removal rate
- Effect of cutting parameters on chip formation
- Tool wear mechanisms: flank wear, crater wear, notching
- Tool life and Taylor's tool life equation
- Coolants and their effect on cutting
- Adjusting parameters for different materials

Day 5: Facing, Turning, and Chamfering

- Facing: tool setup, feed direction, surface finish
- Straight turning: roughing and finishing passes
- Chamfering: angle calculation and tool movement
- Deburring techniques
- Using micrometers and vernier callipers

- In-process measurement and inspection
- Common errors and troubleshooting
- Safety during manual turning

Day 6: Taper Turning

- Taper definitions: included angle, half-angle, taper per foot
- Methods: compound rest, offset tailstock, taper attachment
- Setting compound rest to angle
- Calculating tailstock offset
- Using a taper attachment
- Cutting external tapers
- Cutting internal tapers
- Inspecting tapers with gauges

Day 7: Knurling and Forming

- Knurling tools: types and selection
- Knurling tool setup: alignment and pressure
- Straight knurling technique
- Diamond knurling technique
- Common knurling defects
- Form tools: design and use
- Cutting with form tools
- Safety precautions for knurling

Day 8: Drilling and Boring on the Lathe

- Centre drilling: purpose and technique
- Drilling: drill chucks, tailstock alignment, speeds
- Boring: boring bar setup, boring head
- Rough boring and finish boring
- Achieving concentricity
- Boring to tolerance
- Using plug gauges and telescoping gauges
- Troubleshooting: bellmouth, taper, chatter

Day 9: Thread Cutting – External

- Thread terminology: pitch, major/minor diameter, thread angle
- Change gear setup for metric and imperial threads
- Thread chasing dial and half-nut engagement
- Tool grinding for thread cutting
- Setting tool perpendicular to workpiece
- Cutting external threads: roughing and finishing
- Using thread micrometers and thread rings
- Common thread defects and corrections

Day 10: Thread Cutting – Internal

- Internal threading tool selection and grinding
- Boring to minor diameter
- Setting tool height and alignment

- Cutting internal threads: technique and feeds
- Using thread plug gauges
- Fit classes: clearance, transition, interference
- Troubleshooting: torn threads, poor fit
- Safety during thread cutting

Day 11: Parting Off and Grooving

- Parting-off tools: blade types, holders
- Parting-off technique: speed, feed, coolant
- Safety: avoiding tool breakage and workpiece ejection
- Grooving: external and internal
- Groove width and depth control
- Using grooving tools
- Deburring after parting
- Common parting problems and solutions

Day 12: Eccentric and Off-Centre Turning

- Eccentric turning: applications
- Setting up four-jaw chuck for eccentric turning
- Using dial indicator to set eccentricity
- Turning eccentric diameters
- Off-centre turning using faceplate
- Balancing workpieces
- Inspection: measuring eccentric throw
- Safety considerations

Day 13: Advanced Workholding and Fixtures

- Soft jaws: machining and application
- Pie jaws and collet blocks
- Steady rest setup for slender shafts
- Follower rest for threading long parts
- Fixture design basics: locating and clamping
- Quick-change tooling systems
- Workholding for fragile parts
- Reducing setup time

Day 14: Machining Difficult Materials

- Machining stainless steel: work hardening, tool selection
- Machining aluminium: speed, chip evacuation
- Machining plastics: heat management, tool sharpness
- Machining brass and bronze
- Coolant selection for material groups
- Chip breakers and chip control
- Surface finish optimisation
- Safety when machining exotic materials

Day 15: Quality Control and Inspection

- Engineering drawing symbols: GD&T, surface finish

- Using micrometers, callipers, bore gauges
- Thread gauges and taper gauges
- Surface roughness measurement
- Introduction to SPC: control charts
- Process capability and Cp/Cpk
- Inspection reports and traceability
- Corrective actions for non-conformance

Day 16: Production Planning and Optimisation

- Operation sequence planning
- Machining time calculation: turning, facing, threading
- Tool life optimisation for cost reduction
- Cutting parameter optimisation using charts
- Lean manufacturing: 5S, setup reduction
- Total productive maintenance (TPM)
- Batch production vs. single part
- Continuous improvement in turning

Day 17: Final Assessment and Integration

- Review of key concepts
- Practical assessment: turning a multi-feature component
- Inspection and quality report
- Troubleshooting during assessment
- Feedback session
- Career pathways in machining
- Course evaluation
- Certification criteria

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 3**.

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
05 Aug 2026	27 Aug 2026	On-Campus	Dubai, UAE
06 Aug 2026	28 Aug 2026	On-Campus	Pretoria, South Africa
06 Aug 2026	28 Aug 2026	On-Campus	Lagos, Nigeria
07 Aug 2026	31 Aug 2026	On-Campus	Johannesburg, South Africa
10 Aug 2026	01 Sep 2026	On-Campus	Cape Town, South Africa
11 Aug 2026	02 Sep 2026	On-Campus	Dubai, UAE
12 Aug 2026	03 Sep 2026	On-Campus	Pretoria, South Africa
13 Aug 2026	04 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 258717) 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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