

Title	Program a 3-axis CNC machining centre		
Level	4	Credits	15

Purpose	<p>This unit standard, intended for on job assessment, is for people training to work in CNC machining roles.</p> <p>People credited with this unit standard are able to prepare to program, and program, a 3-axis CNC machining centre.</p>
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Classification	Mechanical Engineering > Engineering Machining and Toolmaking
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Available grade	Achieved
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Guidance Information

- 1 References

Health and Safety at Work Act 2015.
- 2 Definitions

ae – radial width of cut
ap – depth of cut or axial depth of cut.
CAD – Computer aided design.
CAM – Computer aided manufacturing.
CNC – Computer Numerical Control.
3-axis CNC machining centre – CNC machine that combines point-to-point and continuous path operations. Features include automatic tool selection and changing, and the ability to carry out drilling, milling, and boring operations with three controlled axes.
Specifications – detail that defines an object being made; commonly communicated by annotated and dimensioned drawings; by written description, or by other communication media. External references may also be used to specify objects such as tables or industry standards.
Workplace procedures – procedures used by the organisation carrying out the work and applicable to the tasks being carried out. Examples are – standard operating procedures, safety procedures, equipment operating procedures, codes of practice, quality management practices and standards, procedures to comply with legislative and local body requirements.

- 3 Recommended for entry
Unit 22910, *Produce a part program for a CNC engineering lathe or machining centre.*
Unit 30273, *Set up and operate a CNC engineering lathe or machining centre.*
- 4 Assessment Information
Technical problems encountered may be resolved in consultation with technical advisors.
- 5 Timeframe
All activities are expected to be completed within commercially acceptable timeframes.

Outcomes and performance criteria

Outcome 1

Prepare to program a 3-axis CNC machining centre.

Range examples are – machining of contouring and pocketing;
may use sub-routines;
evidence of programming for machining of three different components is required, with at least one from a CAD model.

Performance criteria

- 1.1 Machining sequence is determined from component specifications.
- 1.2 Production run efficiency is explained in terms of tooling, time, machine movement, loading and unloading of workpieces.
- 1.3 Tools are selected to meet component specifications.
- 1.4 Cutting parameters are defined for tool and material selection.

Range examples are surface speed, feed per tooth, ae, ap.

Outcome 2

Program a 3-axis CNC machining centre.

Range components prepared in outcome 1.

Performance criteria

- 2.1 Program is produced to meet component specifications and production efficiency.

Range examples of program production methods are – using CAM software, using machine controller, minimising machine movements, tool change delays.

2.2 Tool path is verified in accordance with workplace procedures.

Range path verification could include – dry run, computer simulation, CAD or CAM software simulation, machine controller graphics.

2.3 Modifications are made to ensure compliance with specifications.

Range examples are modification of – speeds and feeds, tooling, offsets.

2.4 Job documentation is produced in accordance with workplace procedures.

2.5 Program produces component to specification.

Replacement information	This unit standard replaced unit standard 2719.
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Planned review date	31 December 2022
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Status information and last date for assessment for superseded versions

Process	Version	Date	Last Date for Assessment
Registration	1	26 September 2001	31 December 2012
Review	2	20 June 2006	31 December 2022
Rollover and Revision	3	17 November 2011	31 December 2022
Review	4	14 December 2017	N/A

Consent and Moderation Requirements (CMR) reference	0013
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This CMR can be accessed at <http://www.nzqa.govt.nz/framework/search/index.do>.

Comments on this unit standard

Please contact Competenz qualifications@competenz.org.nz if you wish to suggest changes to the content of this unit standard.