



Higher National Unit specification

General information for centres

Unit title: Woodmachining: CNC Machining (Routing)

Unit code: F8R9 34

Unit purpose: This Unit is designed to enable candidates to develop their knowledge, understanding and skill in the preparation, set up and use of a C.N.C. machine to produce a range of piece parts using appropriate tooling, using various fixtures, holding and location devices.

On completion of the Unit the candidate should be able to:

- 1 Prepare for CNC machining.
- 2 Load and prove a part program.
- 3 Safely set up the machine for the production of part components.

Credit points and level: 1 HN credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: Access to this Unit will be at the discretion of the centre. It would be beneficial if candidates have successfully completed the Professional Development Award (PDA) in Woodmachining at SCQF level 6 (G9FH 46) or have the equivalent level of industrial experience and prior learning.

Core Skills: There are opportunities to develop the Core Skills of *Communication, Numeracy, Working with Others, Information and Communication Technology* and *Problem Solving* all at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

Context for delivery: This Unit forms part of the Professional Development Award in Woodmachining at SCQF level 7 and is aimed at candidates following a career in Machine Woodworking and receiving complementary industrial experience. It is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes

General information for centres (cont)

Unit title: Woodmachining: CNC Machining (Routing)

Assessment: This Unit is assessed on the candidates' actual performance of safely preparing the C.N.C. machine, selecting the appropriate tooling, accurately fabricating suitable fixtures and correctly applying holding and locating devices. Evidence of actual performance that the candidate has transmitted the program to the machine, proved the program, completed a dry run, and checked the program for errors before machine the piece parts.

Evidence will be gathered through observation of work processes and assessment of the completed work. Assessment should be carried out under controlled, supervised conditions. In order to achieve this Unit, candidates are required to present sufficient evidence that they have met all the Knowledge and/or Skills elements for each Outcome. Details of these requirements are given for each Outcome.

The assessment instruments used should follow the general guidance offered by the Scottish Qualifications Authority (SQA) assessment model and an integrative approach to assessment is encouraged. Centres may use the instruments of assessment which they consider to be most appropriate but are advised to use the Woodmachining Training and Assessment Programme (TAP) SCQF level 7 which has been developed centrally by SQA. Any other instruments of assessment used must be comparable to the TAP 7.

Accurate records should be made of the assessment instruments used showing how evidence is generated for each Outcome and given marking schemes, checklists and recorded candidate feedback. Records of candidates' achievements should be retained. These records will be made available for external verification.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Prepare for CNC machining

Knowledge and/or Skills

- ◆ Tooling and equipment
- ◆ Drills
- ◆ Saws
- ◆ Base boards
- ◆ Clamps
- ◆ Vices
- ◆ Cams
- ◆ Screws spikes and pins
- ◆ Vacuum holding
- ◆ Location devices
- ◆ Manual and automatic tool changes

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ fabricate correctly functional holding devices
- ◆ apply correct location and securing fixings
- ◆ select the correct tooling specification

Evidence will be gathered under supervised, controlled conditions. Evidence should be recorded using observation checklists and recorded candidate feedback to ensure that the candidate has met the required standard for this Outcome.

Assessment Guidelines

The candidate will be assessed on actual performance of manufacturing functional holding and location devices and the selection of correct tooling for specific operations. Evidence may be gathered by means of on going assessment in supervised, controlled conditions.

Higher National Unit specification: statement of standards (cont)

Unit title: Woodmachining: CNC Machining (Routing)

Outcome 2

Load and prove a part program

Knowledge and/or Skills

- ◆ Use of computer
- ◆ Program transfer
- ◆ Loading programs
- ◆ Saving programs
- ◆ Inserting data
- ◆ Manual operation
- ◆ Automatic operation
- ◆ Dry runs
- ◆ Test runs
- ◆ Error messages

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ transfer a program to the control unit
- ◆ initiate a dry run and eliminate any errors
- ◆ test run the program without any tooling to prove program
- ◆ modify program using findings from test run

Evidence will be gathered under supervised, controlled conditions. Evidence should be recorded using observation checklists and recorded candidate feedback to ensure that the candidate has met the required standard for this Outcome.

Assessment Guidelines

The candidate will be assessed on actual performance to show they can transmit the program to the control Unit, run the program in memory, complete a test run and make essential modifications to the program. Electronic evidence of actual performance can also be stored on disk. Evidence may be gathered by means of on going assessment in supervised, controlled conditions.

Higher National Unit specification: statement of standards (cont)

Unit title: Woodmachining: CNC Machining (Routing)

Outcome 3

Safely set up the machine for the production of part components

Knowledge and/or Skills

- ◆ Tool store
- ◆ Single tools
- ◆ Stacked tools
- ◆ Saws and drills
- ◆ Location pieces
- ◆ Hoods, brushes, guards and interlocks
- ◆ Chucks
- ◆ Collets
- ◆ Automatic tool changer
- ◆ Rubber seals
- ◆ Vacuum pump
- ◆ Current Health and Safety requirements

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ insert the correct tool number and length offsets
- ◆ correctly apply fixtures and guards
- ◆ locate component to fixture and make any necessary adjustments
- ◆ safely complete a trial run
- ◆ safely complete production run of dimensioned components with defect free surface finish

Evidence will be gathered under supervised, controlled conditions. Evidence should be recorded using observation checklists and recorded candidate feedback to ensure that the candidate has met the required standard for this Outcome.

Assessment Guidelines

The candidate will be assessed on actual performance to show they can set the machine to manufacture 2 dimensional components. The candidate will also be assessed on actual performance that they can produce accurate defect free surface finishes while fully complying to current health and safety legislation. Evidence should be recorded using observation checklists and recorded candidate feedback to ensure that the candidate has met the required standard for this Outcome.

Administrative Information

Unit code: F8R9 34

Unit title: Woodmachining: CNC Machining (Routing)

Superclass category: WK

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Higher National Unit specification: support notes

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This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit has been developed as a mandatory Unit in the PDA in Woodmachining at SCQF level 7. The content and context of this Unit is aimed at candidates who are pursuing a career in the craft of Machine Woodworking.

This Unit has been designed to enable the candidate to develop their knowledge and understanding of loading and proving programs, the safe preparation, set up and use of a C.N.C. machine to produce a range of piece parts using appropriate tooling, using various fixtures, holding and location devices, tool compensation and tool length.

Health and Safety and Sustainability are integral and key to the construction industry therefore throughout the Unit emphasis will be placed where appropriate on the application of Health and Safety and Sustainability. Safe working practices should be looked at in accordance with current safety codes of practice and regulations. Sustainability should include reference to criteria affecting sustainability, impact of not implementing sustainability on the environment and the legislation promoting sustainability.

Where feasible, centres should also incorporate modern machining methods, tooling, equipment and materials used within the Machine Woodworking industry. Candidates should be made aware of current industry practice and emerging practice or technology which may become conventional in the future.

Guidance on the delivery and assessment of this Unit

As part of the Professional Development Award (PDA) in Woodmachining at SCQF level 7, this Unit may be delivered in a sequence suitable to individual candidates and centres. When completing this Unit as part of the PDA it is recommended that, where possible, opportunity is taken to integrate aspects of Constructional Technical Communication Skills (DW4D 34).

Where this Unit is incorporated into other Group Awards it is recommended that it be delivered in the context of the specific occupational area that the award is designed to cover. Details on approaches to assessment are given under Evidence Requirements and Assessment Guidelines under each Outcome in the Higher National Unit specification statement of standards section. It is essential that these sections be read carefully before proceeding with assessment of candidates.

The candidate should be introduced to all relevant machinery components, tooling and ancillary equipment, through classroom teaching with the use of visual aids, electronic presentations, DVD's, e-learning, reference books, classroom exercises and group discussions. The functions of the machine should be thoroughly demonstrated. Safe working practice methods should be demonstrated by candidates showing good technique in the setting and safe operation of machinery. This teaching approach should help ensure the candidate is acquiring the underpinning knowledge required for the Unit.

Higher National Unit specification: support notes (cont)

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Where available, evidence from the workplace can be incorporated to enhance the Outcomes, provided that this evidence is appropriate and authenticated as the candidate's own work. It is the responsibility of the centre to satisfy themselves that the portfolio of evidence submitted for assessment is entirely original and solely the respective student's work.

Opportunities for developing Core Skills

The delivery and assessment of this Unit may contribute towards the Core Skill of *Communication* at SCQF 5 particularly as candidates complete the practical tasks they will be expected to communicate with others using correct terminology, tone and style suited to the workplace.

There are opportunities to develop the Core Skill of *Numeracy* at SCQF level 5 as the candidate will also be required to interpret sizes and measurements, read and drawings and transfer information accordingly.

The Core Skill of *Working with Others* at SCQF level 5 could also be developed in this Unit in the practical work where candidates may work in pairs. Working with Others involves the ability to work with others to plan, agree, and take responsibility for tasks; to support co-operative working in appropriate ways; and to review the effectiveness of one's own contribution.

The Core Skill of *Information and Communication Technology* at SCQF level 5 is evidenced throughout the Unit with the practical aspect of creating and sending programs via personal computers.

The Core Skill of *Problem Solving* at SCQF level 5 could be developed through the choice of tooling, appropriate materials, safety issues, safety equipment and sustainability.

Open learning

Although this Unit could be delivered in part by distance learning, it would require considerable planning by the centre to ensure the sufficiency and authenticity of candidate evidence. Arrangements would have to be made to ensure that:

- ◆ candidates have access to a suitable workshop with suitable equipment and tools
- ◆ health and safety considerations are fully taken into account
- ◆ the practical activities are supervised by a responsible person and clearly recorded (using an assessment checklist for the assessor)
- ◆ the assessor is, at some point, able to question the candidate on that performance
- ◆ assessment is carried out under the stated conditions

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website

www.sqa.org.uk/assessmentarrangements

General information for candidates

Unit title: Woodmachining: CNC Machining (Routing)

This Unit has been designed to further your career in the timber industry by developing your knowledge and skill to prepare and load a part program as well as setting up and using a C.N.C. machine to produce accurate component piece parts. It has been written as part of the Professional Development Award (PDA) in Woodmachining at SCQF level 7, and is for experienced crafts persons working in the timber industry as woodmachinists.

The Unit will help develop your underpinning knowledge and skills of loading, proving and running a C.N.C. program. You will also be competent in the selection of the correct tooling, adjusting the tool length and tool compensation and manufacturing fixtures, holding devises and various vacuum systems.

You will be assessed on the safe set up of a C.N.C. machine and the manufacture of various components to given dimensions/drawings within the practical workshop through observation.

There are opportunities to develop the Core Skills of *Communication, Numeracy, Working with Others, Information and Communication Technology* and *Problem Solving* all at SCQF level 5 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

If you successfully complete this Unit and the full PDA at SCQF level 7, you will not only have advanced your craft skills, but will also automatically receive some credit for your achievement if you progress on to the HNC Construction.