Higher National Unit specification

General information for centres

Unit title: Woodmachining: Advanced Sawing Techniques

Unit code: F8R8 34

Unit purpose: This Unit is designed to enable candidates to develop their knowledge, understanding and skill in the set up and use of a specialist range of sawing machines. Candidates will be expected to use advanced sawing techniques and identify cutting agents used in the manufacture of sawing equipment for a range of purposes. This Unit is also designed to enable candidates to identify saw tooth geometries and tooth angles for machining various materials.

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

1 Demonstrate knowledge and understanding of specialist sawing machines and their functions.
2 Demonstrate knowledge and understanding of saw teeth and angles for specific applications.
3 Describe the theory of efficient cutting.
4 Safely set up and use a range of sawing machines.

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* 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: Advanced Sawing Techniques

Assessment: This Unit is assessed on the candidate's actual performance of safely selecting and setting up sawing machinery and tooling for appropriate production methods. The candidate will also have to show knowledge and understanding in the theory of efficient chip removal, tooth geometry, tooth angles and cutting agents for various applications.

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 must be made available for external verification.

Higher National Unit specification: statement of standards

Unit title: Woodmachining: Advanced Sawing Techniques

Unit code: F8R8 34

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

Demonstrate knowledge and understanding of specialist sawing machines and their functions

Knowledge and/or Skills

- Band re-saw
- Circular rip saw
- Panel saw
- Dimension saw
- Crosscut saw
- Straight line edger
- Wall saw
- Beam saw
- Sawing machine accessories
- Sawing machine feed arrangements

Evidence Requirements

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

- correctly identify **five** sawing machines and their functions
- correctly describe the purpose of the identified machines accessories and feed arrangements

Centres can sample five machines from the knowledge and skills list of assessment. For reassessment purposes three of the machines must be changed. Evidence will be gathered under closed-book and supervised conditions.

Assessment Guidelines

The candidate could provide written and/or oral evidence using correct technical terminology to identify and describe machine parts, accessories and feed arrangements. This could be combined with assessment of Outcomes 2 and 3.

Higher National Unit specification: statement of standards (cont)

Unit title: Woodmachining: Advanced Sawing Techniques

Outcome 2

Demonstrate knowledge and understanding of saw teeth and angles for specific applications

Knowledge and/or Skills

- Tooth angles
- Tooth shape
- Cutting efficiency
- Cutting agents
- Geometric drawing

Evidence Requirements

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

- correctly describe the effect of tooth angles on the cutting efficiency
- correctly describe the effect of tooth shape on cutting efficiency
- correctly select the appropriate cutting agents for specific work
- accurately determine tooth shapes by geometrical development

Evidence will be gathered under closed-book and supervised conditions.

Assessment Guidelines

The candidate should provide written and/or oral evidence using correct technical terminology to show knowledge and understanding of factors which affect cutting efficiency of saw teeth and the identification of cutting agents for a range of materials. Evidence can also be in the form of geometrical drawings containing three saw teeth to determine tooth shapes. This could be combined with assessment of Outcomes 1 and 3.

Higher National Unit specification: statement of standards (cont)

Unit title: Woodmachining: Advanced Sawing Techniques

Outcome 3

Describe the theory of efficient cutting

Knowledge and/or Skills

- Theory of chip removal
- Volume of saw dust removed by each tooth
- Deep cutting saw tooth pitch
- Feed speed calculations

Evidence Requirements

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

- correctly describe the theory of chip removal
- calculate accurately the volume of saw dust removed by each tooth
- correctly explain the effect of deep cutting on saw pitch
- accurately calculate feed speeds for circular saws on four occasions for the deep cutting and flatting of hardwood and softwood

Evidence must be gathered under open-book and supervised conditions with equations for feed speed and volume made available to candidates.

Assessment Guidelines

The candidate should provide written and/or oral evidence using correct technical terminology to show knowledge and understanding to describe the theory of chip removal and calculate the volume of dust per tooth removed. The candidate should also provide written and/or oral evidence to show understanding of the importance of correct pitch when deep cutting and calculating feed speeds. This could be combined with assessment of Outcomes 1 and 2.

Higher National Unit specification: statement of standards (cont)

Unit title: Woodmachining: Advanced Sawing Techniques

Outcome 4

Safely set up and use a range of sawing machines

Knowledge and/or Skills

- Machine set up
- Machine operation to produce sawn components
- Feed mechanisms, guards and accessories
- Work planning methods
- Wastage
- Current Health and Safety legislation

Evidence Requirements

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

- correctly set up and operate sawing machinery
- produce sawn components to specific given dimensions
- correctly utilise feed mechanisms, guards and accessories for various given operations
- plan methods of work, minimising wastage and complying with current health and safety legislation

All components must be to a tolerance of no more than $\pm$3mm on sawn size.

An assessor observation checklist should be completed to ensure that the candidate has met the required specification and tolerances and this observation checklist should be retained as evidence. Evidence must be gathered under controlled, supervised conditions.

Assessment Guidelines

The candidate will be assessed on actual performance of setting up sawing machines accurately using appropriate tooling, guarding and feed mechanisms to produce sawn components to the given tolerances.

Administrative Information

Unit code: F8R8 34

Unit title: Woodmachining: Advanced Sawing Techniques

Superclass category: WK

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Higher National Unit specification: support notes

Unit title: Woodmachining: Advanced Sawing Techniques

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 develop the candidate's knowledge and understanding to enable them to use a range of specialised sawing machines using advanced techniques. The successful completion of this Unit should enable the candidate to set up and operate specialist sawing machines after outlining design details of a range of machines.

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).

Centres may use the instruments of assessment which they consider to be most appropriate but are advised to use the Woodmachining Training and Assessment (TAP) at SCQF level 7 which has been developed centrally by SQA. Any other instruments of assessment used must be comparable to the TAP 7.

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.

Higher National Unit specification: support notes (cont)

Unit title: Woodmachining: Advanced Sawing Techniques

The candidate should be introduced to all relevant machinery components, tooling and ancillary equipment, feed mechanisms, feed speed calculations and the theory of efficient chip removal through classroom teaching with the use of visual aids, electronic presentations, DVD's, e-learning, reference books, classroom exercises, group discussions and site visits where appropriate. The function of each component 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 acquires the underpinning knowledge required for the Unit.

Candidates should be given as much practise as possible calculating volume of chip removal and drawing tooth shape and angles, prior to being set the assessments.

Evidence will be gathered through a combination of written and/or oral evidence of knowledge and understanding and observation that the candidates have met the given standards and tolerances during the production of drawings and practical assessment.

Candidates will be required to demonstrate their knowledge through questions relating to saw tooth design, feed speed and the identification of various specialist sawing machines, their functions and components.

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 candidate's work.

Opportunities for developing Core Skills

The delivery and assessment of this Unit may contribute towards the Core Skill of *Communication* at SCQF level 5 particularly in Outcomes 1, 2 and 3, where the requirement for assessment is in the form of a scaled drawing(s) and knowledge questioning. As candidates complete the practical tasks in Outcome 4 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 within Outcomes 2 and 3, where the candidate must complete calculations relating to feed speeds and chip removal. The candidates will also be required to interpret sizes and measurements, read and produce accurate drawings and transfer information accordingly.

The Core Skill of *Working with Others* at SCQF level 5 could be developed in this Unit through the practical work where candidates may work in pairs. Candidates will be expected to plan, agree, and take responsibility for tasks; to support co-operative working in appropriate ways; and to review the effectiveness of their own contribution.

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.

Higher National Unit specification: support notes (cont)

Unit title: Woodmachining: Advanced Sawing Techniques

Open learning

Although this Unit could be delivered by distance learning**,** it would require a considerable degree of 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

For information on open learning arrangements, please refer to the SQA guide *Assessment and Quality Assurance of Open and Distance Learning* (**www.sqa.org.uk**)

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: Advanced Sawing Techniques

This Unit has been designed to further your career in the timber industry by developing your competence and improving your knowledge of sawing machines. 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 knowledge and skills in the set up and use of a specialist range of sawing machines using advanced techniques and to identify cutting agents used in the of manufacture of sawing equipment for a range of purposes. This Unit will also enable you to identify saw tooth geometries and tooth angles for machining various materials.

You will be assessed on your knowledge of identifying specialist sawing machinery and equipment, saw tooth geometries, cutting agents, calculating volume of dust removed per tooth and the theory of efficient chip removal.

These assessments will take the form of open-book and closed-book question papers and will be supervised. Equations for the calculation of feed speeds and volume of dust removed will be made available during assessment.

You will also be assessed and observed on the safe set up of sawing machinery and the manufacture of various components to given dimensions/drawings within the practical workshop.

There are opportunities within the Unit to develop your Core Skills of *Communications*, *Numeracy*, *Problem Solving*, and *Working with Others* and at SCQF level 5, 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.