National Unit Specification: general information

UNIT Pattern Development (SCQF level 6)

CODE F5F8 12

SUMMARY

This Unit can be delivered as part of a National Qualification Group Award in Engineering but can also be taken as a free-standing Unit by candidates who wish to enhance their skills in a fabrication environment. The Unit is also suitable for those who are studying the subject for the first time or who are interested in pursuing a career requiring these skills.

This Unit will develop the candidates' ability to use the parallel line, radial line, and triangulation methods to produce component patterns in right cylinders, right and oblique cones (cut on inclined planes), and transition pieces on-centre and between parallel planes. On completion of this Unit, the candidate will be able to interpret and translate drawings, instructions and specifications into a set of operational drawings and templates.

OUTCOMES

1 Produce patterns for fabricated components and assemblies using the parallel line method.
2 Produce patterns for fabricated components and assemblies using the radial line method.
3 Produce patterns for fabricated components and assemblies using the method of triangulation.

RECOMMENDED ENTRY

While entry is at the discretion of the centre but it would be beneficial if candidates had some basic knowledge of Graphical Communications.

Administrative Information

Superclass: XD

Publication date: March 2008

Source: Scottish Qualifications Authority

Version: 01

National Unit Specification: general information (cont)

UNIT Pattern Development (SCQF level 6)

CREDIT VALUE

1 credit at Higher (6 SCQF credit points at SCQF level 6*).

**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.*

CORE SKILLS

There are opportunities to develop the Core Skills of *Problem Solving*, *Numeracy* and *Information Technology* at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

National Unit Specification: statement of standards

UNIT Pattern Development (SCQF level 6)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit Specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

OUTCOME 1

Produce patterns for fabricated components and assemblies using the parallel line method.

Performance Criteria

(a) Setting out of the required views, construction lines and joint lines of fabricated components is correct in terms of the given dimensions and instructions.
(b) Development of patterns for specified parts of fabricated assemblies is correct, within tolerance, and includes user information.

OUTCOME 2

Produce patterns for fabricated components and assemblies using the radial line method.

Performance Criteria

(a) Setting out of the required views, construction lines and joint lines of fabricated components is correct in terms of the given dimensions and instructions.
(b) Development of patterns for specified parts of fabricated assemblies is correct, within tolerance, and includes user information.

OUTCOME 3

Produce patterns for fabricated components and assemblies using the method of triangulation.

Performance Criteria

(a) Setting out of the required views, construction lines and joint lines of fabricated components is correct in terms of the given dimensions and instructions.
(b) Development of patterns for specified parts of fabricated assemblies is correct, within tolerance, and includes user information.

National Unit Specification: statement of standards (cont)

UNIT Pattern Development (SCQF level 6)

EVIDENCE REQUIREMENTS FOR THIS UNIT

Evidence is required to demonstrate that the candidates have achieved all of the Outcomes and Performance Criteria.

Product evidence will be required to demonstrate that the candidate has achieved all the Outcomes and Performance Criteria to the standard specified. This can be produced during one or more assessment occasions throughout the duration of the Unit but should last no more than two hours in total.

This evidence should be produced under supervised conditions and will comprise 5 drawings to be produced complete with layouts, joint lines, developed templates and user instructions as detailed below:

- Tee piece in equal diameter pipes
- Tee piece in unequal diameter pipes
- Right cone cut inclined to the base
- Oblique cone cut inclined to the base
- Square to round on-centre transition piece, between parallel planes

Satisfactory achievement of the Unit is based on all templates being within a tolerance of ± 2%.

The Assessment Support Pack (ASP) for this Unit provides samples of assessment materials which exemplify the national standard. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard.

National Unit Specification: support notes

UNIT Pattern Development (SCQF level 6)

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

The Unit is in the National Qualification Group Award (NQGA) in *Engineering: Fabrication and Welding* but it can also be taken on a free-standing basis.

On completion of this Unit, the candidate will be able to interpret and translate drawings, instructions and specifications into a set of operational drawings and templates, taking account of the various parameters which may affect them, the accuracy of which have been checked and tested, and which are suitable for use in a manufacturing environment.

The candidate should achieve the level of competence of someone who is required to produce appropriate drawings complete with joint positions and necessary templates for the artefact being produced. S/he should check the accuracy and furnish full, clear and concise instructions for using the template(s) supplied.

Corresponding to Outcomes 1–3

This could be carried out initially by visual aids, ie scaled items, but predominantly by hands-on examination of drawings and specifications to ascertain functional dimensions and correct joint positions.

Full use should be made of integrating geometry, calculations and software wherever possible. Candidates can proceed to work on individual artefacts or drawings/information sheets under the supervision of the tutor/trainer who will correct any errors or faults as they occur.

Dimensional checks should be carried out on all templates; candidates who omit forming/folding instructions should not achieve this Outcome.

The dimensional accuracy of flat templates can be checked using software profile templates or tracing sheets. Guidance may need to be given to candidates during this Outcome.

The delivery of the Unit can be supplemented by the explanation and definition of the technical terminology used.

This Unit should be delivered by a combination of teaching and learning approaches which could include:

- Lecturing
- Case studies
- Practical activities
- Group discussions
- Tutorials
- Directed study

National Unit Specification: support notes (cont)

UNIT Pattern Development (SCQF level 6)

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The delivery of the Unit could be organised in such a way that the interpretation of drawings, use of software), appropriate books, numerical checks and scale templates are dealt with prior to the candidates' setting out their drawings and templates from the given instruction sheets. Candidates can then proceed to work individually. It should be the tutor's aim constantly to integrate all the aspects of the Outcomes into one coherent whole. The final stage is of critical importance, that of checking instructions and accuracy, and it must constantly be stated that the quality level of a component starts (and may finish) with the template(s) produced.

'Hands-on' candidates' activities and support material can, and should, be used throughout all the Outcomes. Any practical work required in the Unit would be best managed by the production of a drawing from which the finished template(s) will be produced.

OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

Problem Solving skills such as critical thinking, planning, organising, and reviewing and evaluating, could be effectively developed and enhanced in the Unit, which requires the application of theoretical knowledge to a practical task. Candidates interpret and translate drawings, instructions and specifications into a set of operational drawings and templates.

Initially candidates will have to establish needs before identifying critical requirements. Analysing the relevance of all factors affecting the production of accurate drawings and applying the information will be essential. The ability to interpret, calculate and translate numerical and graphical data effectively in a practical working context will underpin solutions devised. Class discussions with assessor support during formative work could support the analytical evaluation of potential and actual strategies for pattern development and enhance problem solving skills.

Exercises to support development of relevant Core Skills will be an aspect of formative work across the award, with an emphasis on efficient application in workplace situations. Access to appropriate software wherever possible could also encourage production of evidence to industry standard.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Opportunities for the use of e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by information and communications technology (ICT), such as e-testing or the use of e-portfolios or e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003), SQA Guidelines on e-assessment for Schools (BD2625, June 2005).*

A series of graphical drawing assessment sheets containing a drawing/sketch/information from which the candidate has to produce the necessary drawing to enable a pattern development to be produced.

National Unit Specification: support notes (cont)

UNIT Pattern Development (SCQF level 6)

The assessment of this Unit could also be approached in an integrated way with worksheets covering Outcomes 1–3 developed as one assessment exercise but it is suggested that the Unit is assessed on an Outcome basis.

Examples of Instruments of Assessment which could be used are as follows:

Outcome 1

Graphical questions for Performance Criteria (a) and (b) since they are practical activities could best be carried out with calculations, layover sheets and software wherever possible.

The suggested number of templates would be two, comprising:

- Equal diameter branch pipes, (template and true shape of section)
- Unequal diameter branch pipes, (template and true shape of section)

Outcome 2

Graphical questions for Performance Criteria (a) and (b) since they are practical activities could best be carried out with calculations, layover sheets and software wherever possible.

The suggested number of templates would be two comprising:

- Truncated right cone cut by a parallel plane (template only) and true shape of section
- Truncated oblique cone (vertical side type only) (template and true shape of section)

Outcome 3

Graphical questions for Performance Criteria (a) and (b) since they are practical activities could best be carried out with calculations, layover sheets and software wherever possible.

The suggested number of templates would be one, comprising:

- Square to round (on centre) between parallel planes (template only)

CANDIDATES WITH DISABILITIES AND/OR ADDITIONAL SUPPORT NEEDS

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering alternative Outcomes for Units. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* **(www.sqa.org.uk)**.