National Unit Specification: general information

UNIT Graphical Detailing (SCQF level 6)

CODE F1AM 12

SUMMARY

This Unit will be suitable for candidates who have limited or no experience of Graphical Detailing.

This Unit aims to develop candidate skills in reading and understanding drawings and other forms of graphical communication, together with the basic skills required to produce graphical information using both manual and Computer Aided Design (CAD) techniques. The candidate will be introduced to the current drawing practices, conventions and symbols and will investigate, where appropriate, how to list and schedule components from such drawings.

OUTCOMES

1 Describe and use a range of equipment, media and techniques used in graphical detailing.
2 Interpret dimensional and schedule data from graphical information on Building Services Engineering drawings.
3 Produce graphical details and schedules using traditional manual and CAD techniques.

RECOMMENDED ENTRY

Entry is at the discretion of the centre.

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.*

6 credit points, indicates a notional Unit design length of 40 hours of contact and 20 hours of self-directed learning.

Administrative Information

Superclass: VF

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Version: 01

National Unit Specification: general information (cont)

UNIT Graphical Detailing (SCQF level 6)

CORE SKILLS

Achievement of this Unit gives automatic certification of the following Core Skills:

- Complete Core Skill/s None
- Core Skill components Using Graphical Information at SCQF level 5

The Unit also provides opportunities for candidates to develop aspects of the following Core Skills:

- Numeracy (SCQF level 6)
- Information Technology (SCQF level 5)

These opportunities are highlighted in the Support Notes of this Unit Specification.

National Unit Specification: statement of standards

UNIT Graphical Detailing (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 the Scottish Qualifications Authority. The Appendix forms a part of this statement of standards.

OUTCOME 1

Describe and use a range of equipment, media and techniques used in graphical detailing.

Performance Criteria

(a) Describe accurately and use appropriately a range of equipment used in graphical detailing.
(b) Describe accurately and use appropriately a range of media used in graphical detailing.
(c) Describe accurately and use appropriately a range of graphical detailing techniques.

OUTCOME 2

Interpret dimensional and schedule data from graphical information on Building Services Engineering drawings.

Performance Criteria

(a) Interpret accurately dimensional and relational data from 2D and 3D technical drawings.
(b) Interpret accurately typical plant, component and equipment schedules from Building Services Engineering drawings.

OUTCOME 3

Produce graphical details and schedules using traditional manual and CAD techniques.

Performance Criteria

(a) Apply accurately the three methods of projection in graphical detailing.
(b) Produce accurate graphical details and schedules using CAD techniques.
(c) Produce accurate graphical details and schedules using traditional manual techniques.

National Unit Specification: statement of standards (cont)

UNIT Graphical Detailing (SCQF level 6)

EVIDENCE REQUIREMENTS FOR THIS UNIT

The Appendix to this Unit details the mandatory content for each Outcome.

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

In any assessment of Outcomes 1, 2 and 3 **all** items of content must be assessed.

Assessment of Outcome 2 will require candidates to be provided with drawings, schedules or plans indicating building services installations in a construction/structural context.

Product evidence is required which demonstrates that the candidate has achieved all Outcomes to the standard specified in the Outcomes and Performance criteria. Candidates will produce two technical drawings one of which must be produced using manual drawing techniques and one produced using a suitable CAD software drawing package.

Graphical evidence must be produced in controlled, supervised, open-book conditions. Candidates may bring notes, textbooks or handouts to the assessment.

Assessments must be manageable and practicable for centres and candidates.

Assessment evidence from the workplace may be considered, providing that the evidence is appropriate, authenticated as the candidates own work and has been generated under the conditions detailed above.

The Assessment Support Pack for this Unit provides appropriate sample assessment materials. Where centres wish to develop their own assessment materials they should refer to the Assessment Support Pack to ensure a comparable standard.

National Unit Specification: support notes

UNIT Graphical Detailing (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

This is a mandatory Unit in the National Certificate in Building Services Engineering (SCQF level 6). The knowledge and skills developed in this Unit will have application in other Units in the qualification and as such should be reinforced and could be assessed within other Units.

This Unit aims to develop candidate skills in reading and understanding drawings and other forms of graphical communication, together with the basic skills required to produce graphical information using both manual and CAD techniques. The candidate will be introduced to current drawing practices, conventions and symbols and will investigate, where appropriate, how to list and schedule components from such drawings.

When delivered as part of the National Certificate in Building Services Engineering (SCQF level 6) the knowledge and skills developed in this Unit will have application in, and as such should be reinforced and could be assessed within the following other Units:

- *Air Conditioning and Ventilation Technology* (SCQF level 6)
- *Refrigeration Technology* (SCQF level 6)
- *Heating and Plumbing Technology* (SCQF level 6)
- *Electrical and Electronic Technology* (SCQF level 5)
- *Building Services Engineering : Design Project* (SCQF level 6)
- *Building Services Engineering Technology* (SCQF level 5)
- *Construction Technology and Design* (SCQF level 5)

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

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

When delivered as part of the National Certificate in Building Services Engineering (SCQF level 6) candidates will perform the techniques included in this Unit within the context of other Units as listed above. Learning and assessment might therefore be integrated into other Units. Candidates will apply the knowledge and skills in the work place where they will have full access to reference material, hence while they should be assessed in controlled conditions they should be allowed the use of reference material.

National Unit Specification: support notes (cont)

UNIT Graphical Detailing (SCQF level 6)

The learning environment for this Unit will be mainly classroom based however where possible opportunities to enhance learning may include engineering drawing workshop and industrial visits.

Suggested teaching and learning methods for this Unit could include: the use of visual aids, ICT, group lectures and discussion, practical demonstrations, question and answer sessions, directed study, industrial/site visits.

Emphasis in the delivery of the Unit should be on familiarisation with terminology and basic concepts.

Opportunities for developing Core Skills

Numeracy involves a wide range of skills in number and graphic communication and implies a flexibility, dependent on the needs and purposes of the task, which should be encouraged and developed as candidates undertake the Unit and focus on different types and applications of graphic detailing. The emphasis of formative work should be on Numeracy as a tool to be used and applied efficiently and critically in building services contexts. Accuracy in interpreting complex graphic information and the ability to calculate, apply and present complex data underpins the competencies developed in the Unit.

Candidates will develop skills in the use of Information Technology as they undertake the Unit. Accessing, analysing and experimenting with software applications relevant to dimensional and relational data for construction and building services installations would be useful to developing knowledge and skills across several linked Units across the award. Candidates should be aware of the effective and responsible use of equipment and software applications, learn methods for keeping all data gathered secure and well organised and be advised of the importance of saving and performing back ups.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

To be read in conjunction with the **Evidence Requirements**.

Candidates may be assessed on an Outcome by Outcome basis, combinations of Outcomes or by a single, holistic assessment. In this Unit an appropriate instrument of assessment could be a question paper consisting of a balance of short answer, restricted response and structured questions.

Identification and use of the equipment, media and techniques contained in Outcome 1, together with the knowledge and skills for Outcome 2 might well be taught and assessed within the tasks required for Outcome 3.

Preparation for assessment should include formative work with opportunities for constructive feedback. Well planned assignments and project work will also be useful preparation.

Where the Unit is taken as part of the National Certificate in Building Services Engineering (SCQF level 6), there may be opportunities to integrate the assessments for this Unit with other Units in the award. For example:

- *Air Conditioning and Ventilation Technology* (SCQF level 6)
- *Refrigeration Technology* (SCQF level 6)
- *Heating and Plumbing Technology* (SCQF level 6)
- *Electrical and Electronic Technology* (SCQF level 5)
- *Building Services Engineering : Design Project* (SCQF level 6)
- *Building Services Engineering Technology* (SCQF level 5)
- *Construction Technology and Design* (SCQF level 5)

Planning should allow time for re-assessment. Given that assessment for this Unit must be conducted in controlled conditions, centres should ensure that a different assessment is given for re-assessment purposes and that similar controlled conditions apply.

Open learning

Where appropriate materials and facilities are available, this Unit could be delivered by distance learning which might include some degree of on-line support. Centres must ensure that for all modes of delivery the same assessment conditions, standards and quality assurance procedures apply to all candidates.

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)**.

Appendix

National Unit Specification: statement of standards

UNIT Graphical Detailing (SCQF level 6)

APPENDIX: CONTENT AND CONTEXT FOR THIS UNIT

This Appendix is within the Statement of Standards, ie the mandatory requirements of the Unit.

Recommended time allocations to each Outcome are given as guidance towards the depth of treatment which might be applied to each topic and are inclusive of time for teaching and assessment. This guidance has been used in the design of Assessment Support Pack material provided with the Unit.

1 Describe and use a range of equipment, media and techniques used in graphical detailing (4 hours).

- Equipment:
  Pens, pencils, crayons, scale rules, erasers, erasing shields, set squares, adjustable set squares, protractors, compasses, templates, stencils, French curves, flexible curves, drawing boards, drawing board clips, drafting tape, computer hardware, CAD software

- Media:
  Pencil (HB, H, 2H), ink (pens 0.2 – 0.25 mm and 0.4 – 0.5 mm thick)

- Paper:
  Detail paper, cartridge paper, tracing paper, A1, A2, A3 and A4 sizes

- Techniques
  Drawing lines and shapes, drawing to scale, lettering and dimensioning, graphic conventions, use of standard symbols, projection techniques, relevant British Standards

2 Interpret dimensional and schedule data from graphical information on Building Services Engineering drawings (6 hours).

- Information:
  Extraction of dimensional and relational data relating to construction and building services installations

- Drawings:
  - Both 2D and 3D as appropriate, planning and surveying drawings, preliminary
  - Sketch drawings, design drawings, production drawings, structural and constructional drawings, services drawings, layout drawings, freehand sketches

National Unit Specification: statement of standards (cont)

UNIT Graphical Detailing (SCQF level 6)

3 Produce graphical details and schedules using traditional manual and CAD techniques (30 hours).

- Methods of projection:
  Isometric, axonometric, orthographic

- Graphical communication:
  - Plans, elevations, sections, projection, developments, sketches
  - Working drawings, details, perspectives, presentational schedules, pie charts, bar charts, critical path networks