

## National Unit Specification: general information

**UNIT** Building Services Engineering: Design Project (SCQF level 6)

**CODE** F1AR 12

### SUMMARY

This Unit will be suitable for candidates who have limited or no experience of Building Services Engineering Technology.

This Unit provides an opportunity for integration of knowledge and skills across the other Units of the National Certificate in Building Services Engineering SCQF level 6. This Unit takes the form of a candidate centred project/case study undertaken under direction and supervision allowing the candidate to work independently with freedom for individual student expressions of limited ability. The project will be based on the building engineering services requirement for a building development or refurbishment. Candidates will be required to identify system requirements and appropriate design data, prepare a project plan, develop and apply solutions, produce a technical design report and evaluate their performance and the technical credibility of their solutions.

### OUTCOMES

- 1 Produce a plan for a specified building services project.
- 2 Develop and apply system solutions to satisfy project requirements for a building development or refurbishment.
- 3 Produce a technical report on the design of a building services system in relation to building development or refurbishment.
- 4 Review and evaluate own performance and appropriateness of technical solutions in relation to the project.

### RECOMMENDED ENTRY

While entry is at the discretion of the centre and given the specific integrative nature of this Unit, candidates would normally be expected to be in the latter stages of study for:

- ◆ National Certificate in Building Services Engineering

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#### Administrative Information

**Superclass:** XA

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## **National Unit Specification: general information (cont)**

**UNIT** Building Services Engineering: Design Project (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.*

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

### **CORE SKILLS**

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

- ◆ Complete Core Skill/s                      Problem Solving at SCQF level 5
- ◆ Core Skill components                      None

There are also opportunities for candidates to develop aspects of the following Core Skills:

- ◆ Communication (SCQF level 5)
- ◆ Information Technology (SCQF level 5)
- ◆ Working with Others (SCQF level 5)

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

## **National Unit Specification: statement of standards**

### **UNIT Building Services Engineering: Design Project (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.

#### **OUTCOME 1**

Produce a plan for a specified building services project.

##### **Performance Criteria**

- (a) Project requirements are clearly defined.
- (b) Timescales are defined and are realistic.
- (c) A time-line plan defining appropriate sequence of activity is prepared.
- (d) Identify and obtain the necessary resources to carry out the plan.

#### **OUTCOME 2**

Develop and apply system solutions to satisfy project requirements for a building development or refurbishment.

##### **Performance Criteria**

- (a) Appropriate design data and systems solution criteria are identified.
- (b) Appropriate alternative solutions are considered.
- (c) A clear rationale is presented for the chosen solution.
- (d) Appropriate analytical methods are used to define details of the solution.
- (e) Appropriate evidence of design data and solutions are produced to include drawings, schedules, calculations and specifications.

#### **OUTCOME 3**

Produce a technical report on the design of a building services system in relation to building development or refurbishment.

##### **Performance Criteria**

- (a) The report includes a concise and accurate executive summary.
- (b) The report presents a comprehensive rationale for and information relating to the development and application of solutions.
- (c) Conclusions are reasoned and supported by facts.
- (d) Appendices include relevant supporting evidence.

## **National Unit Specification: statement of standards (cont)**

### **UNIT Building Services Engineering: Design Project (SCQF level 6)**

#### **OUTCOME 4**

Review and evaluate own performance and appropriateness of technical solutions in relation to the project.

#### **Performance Criteria**

- (a) Evaluate the project outcomes achieved compared with the time line action plan.
- (b) Compare submitted evidence against initial project requirements.
- (c) Identify lessons learned to inform future similar tasks.
- (d) Self evaluate candidate's own performance in relation to time management, technical solutions, use of technical design data, strengths and weaknesses in the implementation of the plan and applying the chosen solution.

#### **EVIDENCE REQUIREMENTS FOR THIS UNIT**

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

Evidence submitted by the candidate shall be submitted in the form of a Portfolio, with each separate Outcome segregated for marking purposes. The Outcomes, holistically, or the aggregate of the four Outcomes shall amount to a word count of no less than 1,500 — excluding drawings, illustrations etc that may be used to support the Portfolio. Evidence should be produced throughout the delivery of the Unit and candidates should have access to all relevant materials and resources required to produce the evidence.

Marking guidelines are provided in the Assessment Support Pack.

Other information used to support a candidate's assessment submission may be derived from the workplace, the World Wide Web or other sources as deemed applicable, providing that the evidence is appropriate and authenticated as the candidates own work. The authentication may include a witness testimony, if deemed necessary by the centre in authenticating a candidate's Portfolio.

Assessments must be manageable and practicable for centres and candidates. Assessment evidence should be gathered at appropriate points throughout the Unit.

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 Building Services Engineering: Design Project (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 Unit is a mandatory Unit within the National Certificate in Building Services Engineering level 6.

This Unit provides an opportunity for integration of knowledge and skills across other Units of the National Certificate in Building Services Engineering. This Unit takes the form of a candidate centred project/case study undertaken under direction and supervision but allowing freedom for individual candidate expression of ability.

This Unit has links with most other Units in the National Certificate in Building Services Engineering, it is recommended that it be undertaken in the latter stages of the course. The rationale behind doing this Unit in the latter stages is to allow the level of knowledge and understanding, accrued from undertaking other Units to be applied.

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 & 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**

Candidates should work independently within the context of a typical simulated working environment. The candidate should be given a date for completion of the project/case study. Common essential information should be provided to all candidates. Candidates should establish specific parameters on a continuing basis with the teacher/lecturer, who may also provide clarification, ongoing support and guidance.

The project task could take the form of a case study within the context of a domestic building development project (new build or refurbishment). The range of the tasks to be undertaken should be defined in relation to the context of the particular building development, and what it is reasonable to expect of candidates in the time scales available. If taken as part of the Building Services Engineering National Certificate, the issues selected should focus on demonstrating the ability to integrate knowledge and skills gained across the mandatory Units within the award.

The investigation should allow the candidate(s) to demonstrate valid and realistic responses to the current and future needs of an ongoing development including, where appropriate, issues of Health and Safety and sustainability.

## **National Unit Specification: support notes (cont)**

### **UNIT Building Services Engineering: Design Project (SCQF level 6)**

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.

Formative work for the Unit could specifically include group discussion. Such an approach could be particularly beneficial to candidates with no industrial experience.

#### ***Opportunities for developing Core Skills***

All elements of the Core Skill of Problem Solving, that is, planning and organising, critical thinking, and reviewing and evaluating, will be fully developed and enhanced in the Unit, which requires the application of knowledge to a practical task. Identifying and considering relevant factors, and maximising available resources in order to achieve project aims will involve a high level of critical thinking. Group discussion of issues may be useful and candidates would benefit from individual discussions with the assessor to reinforce individual approaches to work and evaluations of proposed design solutions.

Although skills in Communication are not formally assessed candidates should source, produce and present written and or oral evidence. Skills in accessing, analysing and evaluating a range of sources which provide background information should be developed, in order that candidates are able to consult current reference materials from a range of paper based and electronic sites. Evaluation of information accessed should include a check on the accuracy and currency of all information to be used.

Candidates should be encouraged to present ideas and information accurately and concisely, using a formal structure, language, and style. Support, including appropriate software packages, should ensure effective presentation of written reports using an acceptable format and accurate spelling and punctuation. Appropriate software could be useful to support the interpretation and production of numerical and graphical information in building services contexts. Evidence should focus on the practical and functional application and use of mathematical related skills.

As they gather information and communicate with a range of people candidates should also be encouraged to develop oral skills, adopting the most appropriate style and language for their listeners and providing information accurate and relevant to their intended purpose. They should use non-verbal communication techniques, such as making eye contact and maintaining an interested expression and they should be able to respond to questions confidently and in a way that progresses communication.

#### **GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT**

Centres may wish to informally question candidates at various stages on their knowledge and understanding of the project/case study on which they have embarked. Centres should ensure that where research is carried out in other establishments or under the supervision of others that the candidate does not receive undue assistance. Candidates should be allowed to use appropriate technology within and outwith the college/centre environment.

## **National Unit Specification: support notes (cont)**

### **UNIT Building Services Engineering: Design Project (SCQF level 6)**

To ensure authentication of work completed within the candidate's submitted portfolio it is advisable for candidates to complete a log or diary recording progress and tasks completed, or alternatively submit a witness testimony in support of the submission. There should be regular meetings between the tutor and candidate(s) to review progress and these meetings should be recorded.

Planning should allow time for re-submission of evidence that may have to be re-worked following initial scrutiny by assessors. Given that assessment parts of this Unit may be conducted in controlled conditions, centres should ensure 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](http://www.sqa.org.uk)).