



National Unit Specification: general information

UNIT Sustainability in the Construction Industry (SCQF level 6)

CODE F3JS 12

SUMMARY

This Unit is suitable for candidates who have limited or no experience of Civil Engineering and the Built Environment, or of sustainability and building performance.

This Unit aims to introduce candidates to the basic principles of sustainability in relation to the construction, occupation and demolition of buildings. The Unit is intended to give candidates confidence in the qualitative assessment of sustainability in relation to construction, and to develop his or her technical skills to be able to communicate effectively with other members of the construction team.

OUTCOMES

- 1 Explain the basic principles of sustainability in relation to material resources
- 2 Explain the basic principles of sustainability in relation to energy used in the construction of buildings
- 3 Explain the basic principles of sustainability in relation to design features

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

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.*

Administrative Information

Superclass: TK

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National Unit Specification: general information (cont)

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CORE SKILLS

There is no automatic certification of Core Skills in this Unit.

This Unit provides opportunities for candidates to develop aspects of the following Core Skill:

- ◆ Problem Solving (SCQF level 6)

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

National Unit Specification: statement of standards

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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

Explain the basic principles of sustainability in relation to material resources.

Performance Criteria

- (a) Explain the sustainability of raw materials accurately.
- (b) Explain the energy aspects of obtaining, refining and transporting raw materials clearly.
- (c) Identify the difficulties and benefits of using recycled materials.

OUTCOME 2

Explain the basic principles of sustainability in relation to energy used in the construction of buildings

Performance Criteria

- (a) Explain the uses of energy in transportation of materials.
- (b) Explain the uses of energy in processing raw materials.
- (c) Explain the concept of 'embodied energy' correctly.
- (d) Explain the influence of plant and labour on energy use correctly.
- (e) Identify the advantages and disadvantages of on site and off site methods of construction in terms of energy use.

OUTCOME 3

Explain the basic principles of sustainability in relation to design features

Performance Criteria

- (a) Explain the design features for sustainability in heating, ventilation and lighting.
- (b) Explain design features to minimise use of and reuse of water.
- (c) Explain the effect of location, orientation and building form on sustainable design.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS FOR THIS UNIT

The appendix to this Unit details the mandatory content of each Outcome.

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

Written and/or oral evidence is required to demonstrate that candidates have achieved all Outcomes to the standard specified in the Performance Criteria. Evidence should be produced in controlled open-book conditions.

An appropriate instrument of assessment could be a question paper consisting of a balance of multiple choice, short answer, restricted response and structured questions based on case study material for a simple domestic building. Candidates may use notes, textbooks, handouts and internet material in producing the assessment responses, but must provide appropriate bibliographies and references.

Candidates may be assessed on an Outcome by Outcome basis, combinations of Outcomes or by a single, holistic assessment covering all Outcomes.

Assessments must be manageable and practicable for centres and candidates and a single assessment covering all Outcomes should not exceed 2 hours in duration.

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

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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

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

This Unit has been developed as a mandatory Unit in the National Certificate Awards in Building and Civil Engineering, and can also be delivered as a free standing Unit.

Outcome 1

This Outcome will introduce candidates to the basic principles of sustainability arising from use of a range of materials. Assessors should begin with sources of common construction materials, and proceed to consider sustainability of these resources. Energy used to produce these materials should then be considered. Consideration of the energy required and effect on depletion of material resources by use of recycled materials should then be considered.

Outcome 2

This Outcome will provide candidates with the basic principles relating to energy use in construction. Assessors should include energy used in transportation, processing, and erecting structures, and proceed to the concept of embodied energy. Consideration should be given to how embodied energy could be minimised by appropriate choice of plant, and how off site methods of construction could impact on embodied energy.

Outcome 3

In this Outcome candidates will gain the basic knowledge and skills required to assess and improve building design in order to improve sustainability. Consideration will be given to heating, ventilation, lighting and water, and also to location, orientation and building form when considering design features.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

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

The use of case study material is particularly recommended for both the learning and assessment components of this Unit. Study material should provide candidates with drawings and/or a site visit to a low-rise domestic building to identify poor sustainability practices, and also drawings and/or a site visit to a low-rise domestic building to identify good sustainability practice. Practical application should be stressed throughout this Unit.

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, site visits. It would be suitable for delivery by distance learning or e-learning.

The Outcomes for this Unit could be completed in any order.

National Unit Specification: support notes (cont)

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OPPORTUNITIES FOR CORE SKILL DEVELOPMENT

All aspects of the Core Skill of Problem Solving — critical thinking, planning, organising, reviewing and evaluating could be developed and enhanced in the Unit, which requires the qualitative assessment of sustainability in the context of construction. Identifying and considering a wide range of relevant factors candidates will develop the skills required to assess and improve buildings design.

Exploring ways to maximise the benefits of sustainability and overcome potential difficulties or limitations will involve a high level of critical and creative thinking. A focus on case studies in formative work for the Unit will give candidates confidence in their ability to analyse issues, and to devise, justify and explain effective strategies for sustainability. Group discussion of construction design, energy and waste management solutions observed during site visits could be used to evaluate the strengths and limitations of various approaches to sustainability.

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)*.

Candidates may be assessed on an Outcome by Outcome basis, combinations of Outcomes or by a single, holistic assessment covering all Outcomes. In this Unit an appropriate instrument of assessment could be a question paper consisting of a balance of multiple choice, short answer, restricted response and structured questions based on case study material for a simple low-rise domestic building. Where possible, a single case study should form the basis for all assessments.

Assessments should be conducted under controlled open-book conditions.

Preparation for assessments could include formative work and/or project work.

Planning should allow time for re-assessment.

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

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)*.