

National Unit Specification: general information

UNIT Building Construction: Superstructure (Higher)

CODE DV3R 12

COURSE Building Construction (Higher)

SUMMARY

This Unit is a mandatory Unit of the *Higher Building Construction* Course, but may also be taken as a free-standing Unit.

This Unit introduces the principles and processes of the construction of superstructure for low-rise housing on greenfield sites. The content of the Unit includes a consideration of the functional requirements of the different superstructure elements and the process of constructing building superstructures. Candidates will produce sketches of details of superstructure construction.

The Unit is suitable for candidates who aim for a career in the construction industry as technicians, technologists and other construction professionals. The Unit may be undertaken by both full-time and part-time candidates in further education as well as candidates currently at school. Candidates may use this qualification to progress to further study at Higher National or Degree level.

OUTCOMES

- 1 Select, describe and justify an appropriate form of superstructure construction for a given situation.
- 2 Explain an appropriate construction sequence for the erection of superstructure for a given situation.
- 3 Produce annotated sketches to illustrate the construction of building superstructure.

Administrative Information

Superclass: TD

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National Unit Specification: general information (cont)

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:

- ◆ An Intermediate 2 Course in Product Design, Graphic Communication or Technological Studies, or their Units
- ◆ Two Standard Grades at Credit level, one from each of the following groupings:
 - Mathematics, Physics or Technological Studies
 - either Craft and Design or Graphic Communications

No prior knowledge of building technology is required of candidates undertaking this Unit, although building site experience will be of benefit.

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

Achievement of this Unit gives automatic certification of the following:

Complete Core Skill	None
Core Skills components	Using Graphical Information at SCQF level 4 Critical Thinking at SCQF level 5

National Unit Specification: statement of standards

UNIT Building Construction: Superstructure (Higher)

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

Select, describe and justify an appropriate form of superstructure construction for a given situation.

Performance Criteria

- (a) A correct form of superstructure is selected for a given situation.
- (b) The form of construction selected is described correctly and complies with current building legislation.
- (c) The selection of a form of construction is justified in terms of functional requirements and performance.

OUTCOME 2

Explain an appropriate construction sequence for the erection of superstructure for a given situation.

Performance Criteria

- (a) An erection sequence for superstructure is outlined in accordance with current industry practice.
- (b) The detailed erection sequence and method is described in terms of function, efficiency and health and safety.
- (c) The detailed erection sequence is justified in terms of function, efficiency and health and safety.

OUTCOME 3

Produce annotated sketches to illustrate the construction of building superstructure.

Performance Criteria

- (a) Annotated sketches produced contain correct detailing of superstructure with respect of current building legislation and good practice.
- (b) Annotated sketches of superstructure produced are accurate and in proportion.
- (c) Annotations produced are correct with respect to the specification of materials and components.
- (d) Annotation and presentation of sketches is in accordance with current industry practice.

National Unit Specification: statement of standards (cont)

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EVIDENCE REQUIREMENTS FOR THIS UNIT

Written/oral and product evidence is required which demonstrates that the candidate has achieved all Outcomes in this Unit and all Performance Criteria within Outcomes. The content for this Unit is detailed in the Appendix.

The Outcomes should be assessed with two assessments comprising:

- ◆ a 60 minutes for a closed-book test for Outcomes 1 and 2
- ◆ folio of work for Outcome 3, produced in an open-book environment as a natural part of the learning and teaching process

The closed-book test will include a series of short answer and/or restricted response questions on forms of superstructure construction and the processes associated with the erection of superstructure construction for a given construction project. This will be carried out in controlled conditions: candidates are not permitted to collaborate in their responses.

The folio of work is a collection of annotated sketches of the construction of building superstructure. The form of superstructure selected will be **either** traditional masonry cavity wall **or** timber frame construction. The production of the folio of work will be carried out in open-book, supervised conditions. Candidates are free to co-operate with colleagues in the researching of technical information and construction technology details. They may also confer with regard to drawing and sketching techniques and presentation. Assessors must, nevertheless, satisfy themselves that candidates' folios contain their own work.

The assessment instruments will sample the content and skills, detailed in the Appendix, to the Unit. The assessment instruments must, taken together, cover all Outcomes and all Performance Criteria.

Achievement in the closed-book test can be decided by the use of a cut-off score. The National Assessment Bank items illustrate the standard that should be applied and also the nature and extent of the sample to be used. If a centre wishes to design its own assessments for this Unit, they should be of a comparable standard.

Achievement in the folio of work will be decided on an achieved/not achieved basis. The criteria for achievement in the folio of work are the Performance Criteria in Outcome 3.

An exemplar for the folio of work for Outcome 3 can be accessed via the SQA Coordinator for each centre. The exemplar illustrates the standard that should be applied for the folio of work.

For the closed-book test for Outcomes 1 and 2, where candidates fail to reach the agreed threshold score, reassessment should follow using an alternative instrument of assessment.

For the folio of work for Outcome 3, where candidates fail to achieve the required performance, reassessment of one or more sub-tasks may be all that is required to bring the candidate's performance up to an acceptable standard.

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Superstructure (Higher)

APPENDIX

NB: All of the content in this section should be covered and is liable to sample through Unit and/or Course assessment.

Content to be covered (Outcomes 1 and 2)

These Outcomes deal with forms of superstructure construction and the erection process for superstructure in the context of low-rise domestic construction.

Based on a given construction project, candidates will be expected to respond to questions dealing with the sequencing and processes involved in low-rise housing superstructure, including:

- ◆ the selection of a form of superstructure construction (**either** traditional **or** timber frame — although both will be covered in learning and teaching)
- ◆ a description of the form of construction selected
- ◆ a justification of the selection of the form of superstructure construction in terms of function and performance requirements, including empirical evidence where appropriate, for the following building elements:
 - external walls
 - internal walls and partitions
 - timber suspended floors or beam and block floors
 - flat roof structures or pitched roof structures
- ◆ the selection of an erection sequence for the form of superstructure construction
- ◆ a justification of the selected erection sequence in terms of function, efficiency and health and safety

Open-book folio of work (Outcome 3)

A folio of work will be prepared by each candidate individually. It is anticipated that the folio of work is produced as a natural part of the learning and teaching process.

The folio of work will include, for **either** traditional **or** timber frame construction (although both will be covered in learning and teaching):

Annotated sketches showing the details of superstructure construction including the junction of the external wall with:

- ◆ upper floor (suspended timber **or** beam and block floor — although both will be covered in learning and teaching)
- ◆ eaves of roof (pitched **or** flat — although both will be covered in learning and teaching)

The *sketches* must:

- ◆ contain correct detailing with respect to current building legislation and good practice
- ◆ be accurate and in proportion
- ◆ be in accordance with current good practice in the construction industry

National Unit Specification: statement of standards (cont)

UNIT Building Construction: Superstructure (Higher)

The *annotations* must:

- ◆ include correct specifications of materials and components
- ◆ include correct description of the selected form of construction
- ◆ be in accordance with current good practice in the construction industry

National Unit Specification: support notes

UNIT Building Construction: Superstructure (Higher)

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 on the subject of superstructure construction is set in the context of low-rise domestic buildings or dwelling houses. It shares some subject matter in common with the topics of industrial and commercial construction technology. However, there are some distinct differences between domestic and other forms of construction. No prior knowledge of building construction is required of candidates undertaking this Unit.

Corresponding to Outcomes 1-3:

- Outcome 1 This Outcome provides candidates with knowledge of different forms of low-rise domestic construction. It focuses on the functional requirements of the building and its elements. Candidates learn about the different forms of construction commonly employed in house-building and how these possess strength and stability, fire resistance, resistance to heat loss and other properties.
- Outcome 2 This Outcome covers superstructure processes and detailing. It considers traditional masonry cavity wall construction, timber frame construction, internal walls, timber upper floors, and beam and block upper floors, as well as pitched and flat roofs.
- Outcome 3 This Outcome requires candidates to produce sketches, in proportion, of superstructure in low-rise housing construction, and to annotate these sketches.

Candidates should be made aware of alternative forms of construction to traditional and timber frame, for example concrete and steel framed housing. Nevertheless, the assessment in the Unit will be on the two main forms in use in the housing industry in Scotland.

Candidates will study the processes associated with superstructure construction. Temporary works including scaffolding and trestles, as well as screens and protective sheeting should be discussed.

The functional requirements of external walls, internal walls and roofs will be explored: what you want these parts of the building to do and what properties you require them to possess. For example, the functional requirements of external walls include:

- ◆ strength and stability
- ◆ dimensional stability
- ◆ exclusion of rain and snow
- ◆ resistance to heat loss
- ◆ resistance to transmittance of impact noise
- ◆ durability
- ◆ and others

National Unit Specification: support notes (cont)

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Empirical evidence can demonstrate that certain forms of construction fulfil the functional requirements of buildings and their elements. Candidates should become familiar with aspects of this evidence such as ‘U’ values, crushing strengths etc.

Candidates will learn to explain why superstructures are erected in the way they are and in what order. They should look at the materials and details associated with both traditional and timber frame construction. The ventilation of the cavity wall and roof space is a topic that must be given some time and attention.

Candidates will study the properties of superstructure materials. The focus here should be on the functional requirements of superstructure elements and how the properties of commonly used building materials and components have led to their use in domestic construction. Such materials should include: bricks, blocks, timber and timber products including trussed rafters. Empirical evidence of the performance of building materials should be researched.

Candidates will study health and safety practice associated with the erection of superstructure. Specific legislation should be discussed, for example, legislation covering manual handling. The focus for the candidate must be on how such legislation is applied or put into practice. The importance of providing health and safety information to contractors at an early stage in the project must be emphasised. The candidate should understand the hazards associated with superstructure construction.

The study of superstructure in this Unit complements the study of the Unit *Building Construction: Substructure*. This *Superstructure* Unit covers the building above damp-proof course level including internal walls and the roof structure. The *Substructure* Unit deals with the building below damp-proof course level and includes the ground floor construction.

Annotated sketches

Regarding Outcome 3, which requires the sketching of details, the reasons for having standards in drawing layout and symbols should be emphasised.

Sketches should be in proportion. This requires that each component of the detail being sketched is depicted in sensible proportion to the rest of the sketch. A particular scale is not prescribed for these sketches – the important thing is for the sketches to contain clarity of detail. This may require candidates to sketch certain details at a larger ‘scale’ than others.

Candidates may be referred to textbooks, technical literature and architectural drawings to gain an appreciation of the detail required for specific sketches. This may guide them as to the sort of approximate ‘scale’ to be adopted for their own sketches.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The topic of the superstructure of a building is logically taught in the general order in which the construction of the building is carried out. This permits candidates to relate the different elements of the building to one another and to think logically about the process of superstructure construction. Another approach is to discuss the whole topic under the heading of function and functional requirements. Teaching and learning that combines these different approaches may be especially effective.

National Unit Specification: support notes (cont)

UNIT Building Construction: Superstructure (Higher)

The teaching of construction technology can be made visual with the use of construction drawings. Use of electronic whiteboards, projectors, photographic images and computer-aided drawings is increasing in some centres to demonstrate the different stages of building work. Candidates who are remote from their centre will still benefit from these learning materials if they can be sent the files electronically. For those that have no access to such facilities, the use of hard copy resources will be appropriate.

Textbooks and videos on house construction are readily available. Some centres subscribe to electronic libraries that contain a vast wealth of written and pictorial information on house building. Resources also exist from national construction research organisations and trades organisations.

Increasingly manufacturers and suppliers of building materials produce technical literature that highlights how their products comply with current building legislation. Candidates will likely find that such literature is very informative and visual. The current legislation pertaining to building construction in Scotland should be referred to throughout the Unit. The technical guidelines provided by the NHBC (National House Building Council) will be of particular interest and value because they relate purely to house construction.

Furthermore, technical literature often refers the reader to the company's website where even more information and photographs or diagrammatic details are available for inspection.

Field trips to building sites are always of benefit to candidates. On housing sites there are invariably several plots under development at any one time; candidates can often see at one glance the process of construction in its various stages. Note should be taken of all plant and equipment being used in the construction works. Aspects of health and safety should be particularly noted. After visiting the site, candidates could be encouraged to write down a simple method statement for the construction of the superstructure. This activity will reinforce their learning from the field trip.

A visit to a building site to study superstructure construction is also an opportunity to examine other aspects of building work which are covered by other Units in the *Higher Building Construction* Course:

- ◆ *Building Construction: Substructure (Higher)* — site layout and the planning of temporary works and installations such as site huts, concrete mixers and batching plant, temporary screens and materials storage facilities. Also of interest would be underground drainage and incoming services. Candidates can note how these aspects of a building project are carried out on site and in what order.
- ◆ *Building Construction: Components and Finishes (Higher)* — candidates should examine how these aspects of a building are constructed and fit together. Particular note might be taken of the storage of components and materials as well as the precautions to protect the building's finishes.

Building companies may agree to site visits by groups of students if things are arranged through the proper channels and when groups are escorted round the site by the appropriate site personnel.

Candidates should be made aware that methods employed in construction may vary from project to project. The designer does not always dictate to the builder exactly how the building is to be erected. In particular contractors often employ the techniques of prefabrication even when the design does not dictate this. Candidates can be encouraged to look out for examples of prefabrication when they visit sites.

National Unit Specification: support notes (cont)

UNIT Building Construction: Superstructure (Higher)

Candidates may be given a brief introduction to aspects of builders' work associated with building services in this Unit, for example, pipeboxing and built-in meter boxes. Nevertheless, the focus of learning for this Unit is clearly to be the basic superstructure.

Especially for Outcome 3 emphasis must be given to good sketching and drawing practice, neatness, clarity and the layout of sketches and drawings. Examples of good practice can be demonstrated by drawings carried out by professional draughtspeople and designers. Visiting designers may demonstrate how accurate drawing work is often preceded by well-planned sketching.

The effective use of annotation must be emphasised to candidates. Techniques in planning the layout of drawings and the relationship between drawings and annotations must be examined carefully.

Relating to Outcome 3 the reasons for standards and good practice in sketching and drawing layout and symbols should be covered, although not forming part of the assessment. Many of the published standards include practical examples of the uses of the symbols in a construction context.

Whilst the sketching work that candidates undertake will merely be in proportion, they will be made aware of the different prescribed scales that are commonly used in instrument-aided building drawings. This may be best demonstrated by displaying a range of drawings from an actual building project. Local designers and architects may be willing to contribute drawings as long as copyright is not infringed.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

This Unit gives candidates experience of planning superstructure erection and detailing superstructure construction. Although candidates will develop their knowledge and understanding of the factors and issues involved in planning superstructure construction, Unit assessment is focused on the application of this knowledge and understanding.

Candidates should achieve a satisfactory mark in the tests for Outcomes 1 and 2. The standard to be applied is detailed in the National Assessment Bank item for the Unit.

Candidates should gather a folio of work which will provide evidence for Outcome 3. The standard to be applied is exemplified in the exemplar provided. The folio of work will be assessed on an achieved/not achieved basis only.

CANDIDATES WITH ADDITIONAL SUPPORT NEEDS

This Unit Specification is intended to ensure that there are no artificial barriers to learning or assessment. 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. For information on these, please refer to the document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (SQA, 2004).