Higher National Unit specification

General information

Unit title: CAD: Architectural 1 (SCQF level 7)

Unit code: DW1D 34

Superclass: TD

Publication date: August 2006

Source: Scottish Qualifications Authority

Version: 02 (August 2016)

Unit purpose

This Unit is designed to develop the skills and knowledge involved in 3D CAD modelling using an Architectural CAD package.

Outcomes

On successful completion of the Unit the learner will be able to:

1 Create floor plans for a multi-level roomed structure.
2 Create a 3D model of a multi-level roomed structure from created floor plans.
3 Add detail to a 3D model of a multi-level roomed structure to a given specification.
4 Add symbols and annotations to an architectural drawing and produce scaled plots of the complete drawing.

Credit points and level

1 Higher National Unit credit at SCQF level 7: (8 SCQF credit points at SCQF level 7)

Recommended entry to the Unit

Access is at the discretion of the centre. However, learners should possess a basic knowledge and understanding of 2D draughting techniques. This may be evidenced by the possession of HN Units in Computer Aided Draughting and/or a Higher in Graphical Communication or equivalent.

Higher National Unit specification: General information (cont)

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Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

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

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

The Assessment Support Pack (ASP) for this Unit provides assessment and marking guidelines that exemplify the national standard for achievement. It is a valid, reliable and practicable assessment. Centres wishing to develop their own assessments should refer to the ASP to ensure a comparable standard. A list of existing ASPs is available to download from SQA's website **(http://www.sqa.org.uk/sqa/46233.2769.html)**.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

Higher 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

Create floor plans for a multi-level roomed structure.

Knowledge and/or Skills

- Line diagrams of a multi-level roomed structure
- Internal rooms/spaces within the 2D line diagram
- 3D conceptual development and representation of the 2D outline design

Outcome 2

Create a 3D model of a multi-level roomed structure from created floor plans.

Knowledge and/or Skills

- Exterior and interior walls in 3D
- Doors and windows into 3D walls
- Floors and appropriate roof(s) for the 3D building
- Stairs to the 3D building

Outcome 3

Add detail to a 3D model of a multi-level roomed structure to a given specification.

Knowledge and/or Skills

- Fixture and fittings libraries

Outcome 4

Add symbols and annotations to an architectural drawing and produce scaled plots of the complete drawing.

Knowledge and/or Skills

- Appropriate symbols, notes, schedules and annotation for Plan, Elevation and Section drawings of the 3D building
- Multiple views of the completed 3D building
- Print/plot the completed drawings

Higher National Unit specification: Statement of standards

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Evidence Requirements for this Unit

The learner will be required to demonstrate his/her Knowledge and/or Skills in Outcomes 1–4 with the production of practical and graphical evidence. The learner will be required to create a 2D space plan and 3D concept drawing of the proposed building. From these drawings a complete 3D structure will be created including walls, doors, windows, furniture, fixtures and fittings, both within the interior and exterior to the structure. From the 3D structure Plan, Elevation and Section drawings will be produced with appropriate annotation and notes. Data extraction will be carried out to create appropriate schedule information. The learner will be able to:

- create line diagrams of a multi-level roomed structure.
- produce internal rooms/spaces within the 2D line diagram with names and area information attached.
- create a concept drawing as a 3D development and representation of the 2D outline design.
- create both straight and curved exterior cavity walls and interior walls in 3D using appropriate structural elements.
- insert multiple styled doors and windows with attached schedule data into 3D walls.
- create floors and appropriate roof(s) for the 3D building.
- add stairs to the 3D building.
- add furniture, kitchen cabinets, fixture and fittings with attached schedule data to the 3D building.
- add appropriate symbols, notes, schedules and annotation to produce Plan, Elevation and Section drawings of the 3D building.
- create multiple orthographic plan and elevation and perspective views of the completed 3D building.
- print/plot the completed drawings (Plan, Elevations, Sections and Details) to a specified scale for a given size of paper.

Higher National Unit Support Notes

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Unit Support Notes are offered as guidance and 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 an optional Unit of the HNC in Computer Aided Draughting and Design but may be delivered on a standalone basis or as an option to another Group Award. If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

This Unit has been written in order to allow learners to develop knowledge, understanding and skills in the use of a dedicated 3D Architectural CAD package towards the development of standard drawings for Planning submission. The contents of the Unit require the use of commercially available software.

In designing this Unit a range of topics have been included which lecturers are expected to cover. Recommendations are given below as to how much time should be spent on each Outcome assessment. This has been done to help lecturers decide what depth of treatment should be given to the topics attached to each of the Outcomes. Whilst it is not mandatory for a centre to use this list of topics, it is strongly recommended that it do so to ensure continuity of teaching and learning across the Units. The assessment exemplar pack for this Unit is based on the Knowledge and/or Skills and list of topics in each of the Outcomes as well as covering aspects of the discipline that it is used in, ie Architectural Technology or Civil Engineering.

The list of topics is given below. Lecturers are advised to study this list of topics in conjunction with the assessment exemplar pack so that they can get a clear indication of the standard of achievement expected of learners in this Unit.

Outcome 1

Create floor plans for a multi-level roomed structure **(1 hour)**

Create a Conceptual Model:

- produce line diagrams of a multi-levelled roomed structure with 2D lines/polylines
- produce rooms/spaces within the 2D line diagram with room IDs, labels and descriptions
- produce a 3D conceptual model from mass, shape, plane elements and present it in multiple views: top, front, side, 3D viewpoints, with and without hide

Higher National Unit Support Notes (cont)

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Outcome 2

Create a 3D model of a multi-level roomed structure from created floor plans **(2 hours)**

Create Wall Styles:

- create wall styles (cavity wall) for the external wall with or without insulation, brick or block for the external leaf, timber or block for the internal leaf
- create internal wall styles for use with all internal partition walls with or without insulation, block or timber
- create a Curtain wall style
- create wall Endcap styles
- produce 3D external and internal, both straight and curved, walls using wall styles

Outcome 3

Add detail to a 3D model of a multi-level roomed structure to a given specification. **(2 hours)**

Details:

- create door styles and install doors within the 3D structure
- create a window style and install windows within the 3D structure
- create a stair style and install stairs within the 3D structure
- create floors and ceilings within the 3D structure
- create a roof detail for the 3D structure
- add furniture, kitchen cabinets, fixtures and fittings to the rooms of the 3D house
- add garden furniture, lighting, trees, perimeter walls

Outcome 4

Add symbols and annotations to an architectural drawing and produce scaled plots of the complete drawing. **(3 hours)**

Create Standard House Plans:

- produce Floor Plans, Elevations and a Section drawing from the 3D structure
- add appropriate Architectural symbols to the completed drawings
- create a schedule of data from the doors and windows installed in the 3D structure and present as a table
- add general notes and text, revision clouds, drawing scale, border and title box to the drawings

Printing:

- use of Layouts
- Viewports within Layouts
- scale to an appropriate scale within a Viewport
- control layer viewing within a Viewport
- control hidden line removal and shading within a Viewport
- a hard copy of the specified drawings is produced to a given scale appropriate to the paper specified

Higher National Unit Support Notes (cont)

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Guidance on approaches to delivery of this Unit

As this Unit provides advanced 2D and 3D CAD skills, which require a sound knowledge of CAD and construction principles, it is recommended that the Unit be delivered towards the end of an award so that it may be used with other more advanced Unit requirements.

Where this Unit is incorporated into other Group Awards it is recommended that it be delivered in the context of the specific occupational area(s) that the award is designed to cover, ie architectural drawings with Built Environment courses.

Details on approaches to assessment are given under Evidence Requirements and Assessment Guidelines under each Outcome in the Higher National Unit specification: Statement of Standards section. It is recommended that these sections be read carefully before proceeding with assessment of learners.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

The assessment for all Outcomes in this Unit should be integrated into a single practical assessment over a maximum eight hour period. The assessment may be given over the course of the Unit or as an end assessment. Assessment will be under open-book conditions and as such learners will be allowed to bring any textbooks or notes to the assessment or use the Help system available within the application software.

Graphical evidence will be in the form of CAD application template and drawing files presented on a disk and printed copies of finished drawings.

It should be noted that learners must achieve all the minimum evidence specified for each Outcome in order to pass the Unit.

An Assessment Support Pack is available for this Unit.

Assessment Guidelines

In any assessment of these Outcomes all of the Knowledge and/or Skills should be assessed.

Evidence must be generated through practical assessment undertaken in controlled, supervised conditions over an eight hour period.

Higher National Unit Support Notes (cont)

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Opportunities for 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 Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

Learners are working in a context which requires original computer aided design work. Access, to and interpretation and evaluation of examples of complex graphic design would be of value. Learners should be able to work unaided in the selection of appropriate software and the modification or customising of applications to meet the identified needs of purpose and context. They could, however, benefit from discussions with the class group and/or assessor to reinforce analytical evaluation of approaches to the design process.

As they produce solutions to a given brief, learners need to analyse and seek solutions to a range of theoretical and practical problems, and identify specific objectives. Identifying and considering the variables, including all potential resources, and analysing the relative significance of each before identifying and justifying an appropriate strategic approach will provide opportunities to develop elements of planning, critical thinking and general problem solving skills to an advanced level. Analysing and evaluating the potential impact of proposed strategies will be a critical aspect of underpinning knowledge and understanding, and learners could be supported in identifying appropriate evaluative methods to measure achievement and explore progress.

Accuracy of interpretation and effective communication of graphic information underpins the competencies developed in the Unit. Some learners may benefit from formative opportunities to further develop effectiveness in the analysis and application of graphic data, and the use of software packages or on-line tutorials to enhance skills may be useful.

History of changes to Unit

Version	Description of change	Date
02	No change to context. Updated to current template.	02/08/16

General information for learners

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This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit has been designed to allow you to develop knowledge, understanding and advanced skills in the use of an Architectural Computer Aided Design application software package for the creation of three-dimensional drawn structures. From the creation of concept diagrams, space plans and massing elements to form a 3D structure; to creation of standard 2D Architectural drawings and presentation drawings, this Unit will provide a sound basis for creation of 3D Architectural models and may be used within a chosen award group, such as Computer Aided Draughting and Design, Built Environment, Architectural Technology or Civil Engineering.

Through a series of practice exercises and drawing tutorials, you will logically progress through advanced CAD commands in producing a 3D structure from which 2D Plans, Elevations and Section working drawings and Detail drawings will be created to a given specification.

There is one formal practical assessment taken over the course of the Unit:

Outcome 1–4 Practical 8 hours

The assessment may be given in whole or in parts at the discretion of the lecturer. The assessment will be supervised and conducted under open-book conditions in which you will be allowed to take notes, textbooks, etc into the assessment. You will sit this assessment during the Unit at the discretion of the lecturer.

This is a practical Unit requiring you to have individual access to a CAD system. A CAD system is defined as hardware and software, which will enable an operator to generate (and regenerate) drawings at an acceptable processor speed. A typical minimum hardware configuration would be a current single user PC fitted with suitable peripherals attached such as a printer/plotter to produce hard copiers of their work. Alternatively other configurations such as networked CAD stations are possible provided they can satisfy the Unit's criteria.