National Unit specification: general information

Unit title: 3D Virtual Environment (SCQF level 6)

Unit code: H2TR 12

Superclass:	CE
Publication date:	October 2012
Source:	Scottish Qualifications Authority
Version:	01

Summary

This Unit introduces candidates to the techniques and concepts involved in producing 3D virtual environments using 3D software. The Unit is practical in nature and candidates will gain knowledge and understanding of the techniques and concepts used in the creation of 3D virtual environments. The Unit offers candidates the opportunity to develop basic skills in the use of modelling tools that are a feature of 3D virtual environments and a range of methods for achieving materials and textures and renders.

Candidates will produce a 3D virtual environment and rendered still images. This Unit is suitable for candidates who are undertaking the subject of 3D animation for the first time, but those with prior knowledge have the opportunity to further develop their skills beyond basic modelling.

This is an optional Unit in the National Certificate (NC) in Architecture and Art at SCQF level 6 and the NC in Architecture and Interior Design at SCQF level 6, but is also available as a freestanding Unit.

Outcomes

1   Create a 3D virtual environment.
2   Apply materials and textures using 3D computer software.
3   Produce 3D rendered still images.

Recommended entry

While entry is at the discretion of the centre, it would be beneficial for candidates to have basic computer skills.

General information (cont)

Unit title: 3D Virtual Environment (SCQF level 6)

Credit points and level

1 National Unit credit at SCQF level 6: (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

Opportunities to develop aspects of Core Skills are highlighted in the support notes of this Unit specification.

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

National Unit specification: statement of standards

Unit title: 3D Virtual Environment (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 SQA.

Outcome 1

Create a 3D virtual environment.

Performance Criteria

(a) Create model objects using a 3D software package.
(b) Edit and modify using a variety of software tools.

Outcome 2

Apply materials and textures using 3D computer software.

Performance Criteria

(a) Apply surface colour on a model.
(b) Apply texture maps on a model.
(c) Create lighting in a scene.
(d) Create and apply a camera in a scene.

Outcome 3

Produce 3D rendered still images.

Performance Criteria

(a) Produce rendered still images through camera views.
(b) Render final images using appropriate formats and storage devices.

National Unit specification: statement of standards (cont)

Unit title: 3D Virtual Environment (SCQF level 6)

Evidence Requirements for this Unit

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

For Outcomes 1, 2 and 3 performance evidence is required which demonstrates that candidates can:

♦ create 3D model objects to produce a virtual environment using a 3D software package, to include the use of interface command tools move, scale, rotate, viewports commands zoom, toggle and arc rotate creation tools loft extrude, lathe, edit mesh 2D/3D Boolean geometries
♦ edit and modify the 3D objects using the modification tools in the modify commands, eg modifier, extrude, lathe, edit mesh
♦ apply simulated surface colour to a 3D virtual model to a series of objects
♦ apply simulated surface texture maps to a 3D virtual model to a series of objects
♦ create and apply appropriate virtual lighting to a 3D virtual environment
♦ create a static virtual camera for use as a visualisation device within a 3D virtual environment
♦ produce at least four full colour hard copy renders through the camera view
♦ save all four renders in appropriate file formats and on an appropriate storage device

Evidence will be produced under open-book conditions and gathered throughout delivery of the Unit.

National Unit specification: support notes

Unit title: 3D Virtual Environment (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 an optional Unit in the National Certificate (NC) in Architecture and Art at SCQF level 6 and the NC in Architecture and Interior Design at SCQF level 6, but is also available as a freestanding Unit.

Candidates with no prior knowledge of 3D modelling will learn the basic skills required but those with prior knowledge have the opportunity to go beyond basic modelling, texturing cameras and rendering, to produce more complex pieces.

In this Unit, candidates are required to produce a 3D virtual environment. The Unit is designed in such a way that the complexity of the 3D modelling is flexible enough to allow candidates with no prior experience of 3D modelling to produce a basic 3D model (such as a cube, sphere, cylinder), apply simple colours/textures to the model, then apply some lights to the project and then set up camera view. For example, candidates could produce some 3D text, such as a name, and apply colour to the text. However, the Unit also affords the opportunity to those who have prior knowledge of 3D modelling to produce a 3D virtual environment.

Candidates will learn how to produce a 3D model using an appropriate software package. This will provide an introduction to the interface of the software, and basic modelling techniques will be learned. Candidates will learn how to edit and manipulate their models using the modifier commands.

Candidates may populate their scene by importing pre-modelled assets. The model produced can be of a basic nature (such as a cube or sphere), or a more complex model if familiar with the software being used.

Candidates will also learn texturing techniques, whether simply assigning a colour to their model, or using bitmapping/procedural mapping techniques, and basic lighting skills. The model should be lit appropriately. This could be as simple as introducing an omni-directional light, or more complex, six target directional lights.

Candidates will learn camera views and a minimum of four different camera views should be created. This could be as simple as introducing a target camera. Candidates will learn how to render camera views to an appropriate file format (.jpg, .png, .tif) and a high resolution render (300 dpi) should be produced for printing and saved to a storage device.

National Unit specification: support notes (cont)

Unit title: 3D Virtual Environment (SCQF level 6)

Guidance on learning and teaching approaches for this Unit

The Outcomes within this Unit should be delivered in sequence to enable candidates to utilise the 3D virtual environment created in Outcome 1 in later stages.

Practical activities should be tutor-led in that techniques and processes should be explained clearly and demonstrate the use, capability and design potential of different aspects of the chosen design software packages, and understood by candidates prior to undertaking practical tasks.

Instructions could be supplied that gradually guide candidates through a series of practical tasks, encouraging them to use and evaluate the features and potential of design software packages. Candidates should have the opportunity to become familiar with the capability and potential of the software package.

Design work produced should demonstrate that candidates have thoroughly explored and experimented creatively with the use of a range of the components and features.

Candidates will require individual access to the appropriate software and hardware throughout the Unit, and the time and space to use traditional art and design materials. While the actual distribution of time is at the discretion of the centre, a suggested distribution might be:

Outcome 1 – 15 hours
Outcome 2 – 15 hours
Outcome 3 – 10 hours

Guidance on approaches to assessment for this Unit

While Outcomes 1 and 2 could be assessed separately, it is recommended that a single project brief be used. This should allow candidates to demonstrate the use of tools, manipulation of models and application of the materials to the model created in Outcome 1.

For Outcome 3, candidates should continue from the single project brief to produce rendered still images. The assessor should review the 3D virtual environment project with candidates prior to the production of the rendered still images. The assessor should check the final renders to ensure that the brief is satisfied and that materials, lighting and camera views are demonstrated.

Candidates should be given the opportunity to improve work on an ongoing basis following feedback from the assessor.

Assessor observation checklists should be used to record that all tasks have been undertaken correctly by candidates.

National Unit specification: support notes (cont)

Unit title: 3D Virtual Environment (SCQF level 6)

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 Communication 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).*

Opportunities for developing Core Skills

In this Unit candidates may have opportunities to develop aspects of the Core Skills of *Information and Communication Technology*, *Problem Solving* and *Numeracy*.

Aspects of *Information and Communication Technology* may be developed through activities in which candidates are using technology to digitally create and manipulate 3D objects.

Problem Solving with particular reference to the component *Critical Thinking,* may be developed through all Outcomes.

Aspects of *Numeracy* may be developed where candidates engage in parametric modelling.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**

History of changes to Unit

Version	Description of change	Date