

## Higher National Unit Specification

### General information for centres

**Unit title:** 3D Computer Visualisation

**Unit code:** DW9H 34

**Unit purpose:** This Unit is designed to enable candidates to utilise 3D Modelling software to create 3D Visualisations from source materials.

On completion of the Unit the candidate should be able to:

- 1 Create 3D geometries from source material.
- 2 Visualise 3D virtual models.
- 3 Incorporate 3D visualisation techniques within a design brief.

**Credit points and level:** 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7\*)

*\*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.*

**Recommended prior knowledge and skills:** Access to this Unit is at the discretion of the centre. However, it would be beneficial if candidates were proficient in the use of a computer, and had prior understanding of file management techniques. This may be evidenced by the possession of relevant National Units such as Computer Aided 3D Modelling, Visualisation & Presentation, or by prior experience. Higher Art & Design and/or Craft Design and Technology would provide useful background knowledge. It is also recommended that candidates have either completed, or are currently undertaking HN Unit, Digital Imaging 1.

**Core Skills:** There are opportunities to develop the Core Skills of Information Technology and Problem Solving at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

**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 most appropriate approach to delivery is one that requires the candidate to integrate an appropriate Design Project on the course with that of Outcome 3: Incorporate 3D visualisation techniques within a design brief).

## General information for centres (cont)

**Assessment:** The assessment for this Unit will be product based in the form of:

- ◆ a project work/sketchbook containing examples of modelling assignments
- ◆ a project work/sketchbook containing examples of visualisation assignments
- ◆ presented visuals
- ◆ electronic storage media containing back-up copies of the above

Holistic assessment should be encouraged across a range of design Units as appropriate to the framework in which the Unit is offered. If this approach is taken, then a matrix for assessment should be devised.

## Higher National Unit specification: statement of standards

**Unit title:** 3D Computer Visualisation

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

### Outcome 1

Create 3D geometries from source material

#### Knowledge and/or skills

- ◆ Developmental drawing
- ◆ Creation tools
- ◆ 2D geometries
- ◆ 3D geometries
- ◆ Modification tools

#### Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ produce a minimum of four rendered preliminary 2D sketches, developmental drawings or photographs, as a basis for future 3D modelling project
- ◆ produce a single, non-complex wire-frame 2D model utilising creation and modification tools within 2D geometries
- ◆ produce a single, non-complex wire-frame 3D model utilising creation and modification tools within 3D geometries
- ◆ save to relevant electronic file format, and produce hard copy evidence of the above in a project work/sketchbook

Work produced outwith controlled conditions must be subject to authentication by the tutor.

#### Assessment guidelines

Candidates should be given demonstration in the use of the 3D software interface, and be allocated time to familiarise themselves to its uses. It is unlikely that candidates would use all of the functions and commands available to them at this stage. However, candidates should be encouraged to experiment with the use of the Interface command tools (such as Move, Scale, Rotate); the View-port command tools, (such as Zoom, Toggle and Arc Rotate), and the Creation and Modification tools (including, Loft, Extrude, Lathe, Edit Mesh, 2D and 3D Boolean Geometries). Candidates should be encouraged to create non-complex models at the beginning of the course, and, as knowledge and skills develop, produce more complex geometries.

## Higher National Unit specification: statement of standards (cont)

### Unit title: 3D Computer Visualisation

It would be useful, at this early stage, if reference is made to Outcome 3, in order that candidates are made aware of how these tools may be applicable to a project brief. This will assist in holistic assessment, (if applicable), across other Art and Design Units on the candidate's course. Research into the variety of use and the creative application of 3D software, is also to be encouraged as part of the Art and Design process.

### Outcome 2

Visualise 3D virtual models

#### Knowledge and/or skills

- ◆ Create a virtual environment
- ◆ Apply surface colour
- ◆ Apply surface texture maps
- ◆ Create virtual lighting
- ◆ Create and apply a virtual camera

#### Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ produce a virtual environment appropriate to their virtual model
- ◆ apply simulated surface colour to a virtual model
- ◆ apply simulated surface texture maps to a virtual model
- ◆ create and apply appropriate virtual lighting to a virtual model or environment
- ◆ create a static virtual camera for use as a visualisation device to a 3D virtual model or within a virtual environment
- ◆ produce at least four full colour hard copy renders through the camera view
- ◆ save all four renders to appropriate file format and locate in dedicated storage device

Work produced outwith controlled conditions must be subject to authentication by the Tutor.

#### Assessment guidelines

The above Knowledge and/ or Skills may be assessed individually, or holistically by the creation of one or more model(s) in a virtual environment, where simulated surface colour and texture maps, virtual lighting and camera are applied to a single object, or series of objects. (A single texture map applied to an object or environment would be enough evidence at this level, but multiple maps may be applied to the model or environment, as the candidate's skills develop.) This should be evidenced, as above, by hard copy colour print-outs in the candidate's project work/ sketchbook, and also saved to an appropriate storage device.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** 3D Computer Visualisation

### **Outcome 3**

Incorporate 3D visualisation techniques within a design brief

#### **Knowledge and/or skills**

- ◆ Devise a solution
- ◆ Execution
- ◆ Presentation
- ◆ Evaluation

#### **Evidence Requirements**

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ visually define the functional requirements of 3D visualisation within a design brief
- ◆ analyse the specific process within the brief
- ◆ evaluate both process and finished product in either oral or written format (250 words or equivalent)
- ◆ produce presentation visuals in the form of either hard copy or screen based, if forming part of a digital solution
- ◆ save to relevant electronic file format

Work produced outwith controlled conditions must be subject to authentication by the tutor.

#### **Assessment guidelines**

This third assessment may be presented by an individually set project brief, written, or negotiated with the candidate as a stand alone element. Live project briefs, such as National Competition briefs may also be used.

3D design solutions may not necessarily be the only briefs considered. 3D modelling and visualisation may be incorporated within a 2D, DTP, illustration or graphic design solution, as they may well be within a web, multimedia or fine art installation piece.

There is a major opportunity, therefore for holistic assessment of this Outcome with a number of existing Art and Design projects throughout a variety of Art and Design, Craft and Design, Multimedia, Web, Television and Broadcast Media and Creative Industries frameworks.

If used in this manner, an assessment matrix should be devised.

## **Administrative Information**

<b>Unit code:</b>	DW9H 34
<b>Unit title:</b>	3D Computer Visualisation
<b>Superclass category:</b>	CE
<b>Date of publication:</b>	June 2006
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## **Higher National Unit specification: support notes**

### **Unit title:** 3D Computer Visualisation

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 may be studied as a standalone Unit, or may be studied sequentially in conjunction with Developmental Drawing 1, Design Project 1 and 3D Computer Animation.

It is designed to develop the knowledge and skills of the candidate within the context of a 3D modelling and visualisation environment. The Unit should encourage candidates to work towards realistic workplace practices and standards, using standard hardware and software. This Unit may be applicable across a variety of the creative industries sectors including Fine Art, Architecture, Visual Communication, 3D Design, Film, Television and Broadcast Media, and Games Design.

The content of the Unit has been kept non-subject specific, in order that centres may customise delivery to their own needs. Three learning Outcomes cover both process and project, allowing the candidate to both learn specific software skills and apply these within the context of a subject orientated project brief.

### **Guidance on the delivery and assessment of this Unit**

It is expected that this Unit will be delivered as a stand alone Unit, but may be integrated closely with other Units in any one course programme. If the latter, then a matrix for delivery and assessment should be devised by individual centres. This Unit could be delivered on a weekly or bi-weekly basis at the discretion of the centre. A typical delivery pattern for the Unit might be:

- ◆ Introduction to the Unit
- ◆ Overview of 3D Software Interface
- ◆ Outcome 1 — Planning and Developmental Drawing
- ◆ Modelling: Demonstration and practice of basic Creation tools
- ◆ Modelling: Demonstration and practice of Modification tools
- ◆ Creation of preliminary models
- ◆ Outcome 2. Creation of Environment
- ◆ Surface Colour — demonstration and application of techniques
- ◆ Surface Texture Mapping- demonstration and application of techniques
- ◆ Lighting — demonstration and practice of basic skills
- ◆ Creation of Camera — demonstration and application of techniques
- ◆ Outcome 3: Implementation of Design solution
- ◆ Remediation

It is recommended that assessment should be continuous.

## Higher National Unit specification: support notes (cont)

### Unit title: 3D Computer Visualisation

#### *Opportunities for developing Core Skills*

Candidates will develop skills in the use of Information Technology as they manage the practical aspects of design activities. Instruction in and demonstration of the applications and use of current software should assist candidates to create non-complex models before developing and applying their skills to a project brief. Demonstration should allow candidates to analyse in detail relevant aspects of computer visualisation and to become aware of a range of tools available for the creation of environment and implementation of design solutions. Candidates should be advised on the effective and responsible use of equipment and software applications, and learn methods for keeping all data gathered secure and well organised. They should be made aware of the importance of saving and performing back ups and of the need to develop efficient systems of recording, coding and storing notes and drafts of design work.

As they undertake the Unit candidates are required to analyse and seek solutions to a range of theoretical and practical problems. Research into the variety of creative applications of 3D software is also to be encouraged as part of the Art and Design process. Planning decisions on interface elements, colour, texture and mapping will involve identifying and examining variables. Consideration of the significance of each before appropriate approaches are analysed and implemented will provide opportunities to develop creative problem solving skills to an advanced level. Evaluation which examines all stages of the design and potential and actual impact and effectiveness would be on-going.

#### **Open learning**

This Unit could be delivered by open learning provided suitable online materials were developed. There would also have to be a well-defined brief which took into account any factors specific to open learning. Feedback from the lecturer and peers could come from the formation of an online group where discussions relevant to the Unit could take place.

If this Unit is delivered by open or distance learning methods, additional planning and resources may be required for candidate support, assessment and quality assurance. A combination of new and traditional authentication tools may have to be devised for assessment and re-assessment purposes. For further information and advice, please see *Assessment and Quality Assurance for Open and Distance Learning* ( SQA, publication code A1030).

#### **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. For information on these, please refer to the SQA document *Guidance on Alternative Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on SQA's website: [www.sqa.org.uk](http://www.sqa.org.uk).

## General information for candidates

### Unit title: 3D Computer Visualisation

This Unit is designed to enable you to plan, create models and then visualise them in a 3D software environment.

In Outcome 1 you should learn how to plan for a 3D computer generated visualisation. You should learn how to use drawing, photography or other rendering and imaging process to create storyboards or design developments in order to prepare for future modelling exercises.

You should learn how to create, modify and render simple 2D and 3D geometries using a variety of software exercises and tutorials.

In order to achieve Outcome 1 you need to:

- (a) Produce at least four reference visuals for the models to be generated.
- (b) Produce a simple 2D virtual model based on reference drawings.
- (c) Produce a simple 3D virtual model based on reference drawings.
- (d) Present your reference visuals in a work/sketchbook, save your electronic data to a relevant file format and produce hard copy printouts of the above.

In Outcome 2 you should learn about creating 3D computer models and environments. You should also learn how to apply colour, surface and texture mapping to 3D models appropriately. You will also learn how to apply lighting and cameras to your model or environment.

In order to achieve Outcome 2 you need to:

- (a) Create at least one finished models or environment.
- (b) Apply appropriate surface colour and texture maps.
- (c) Apply appropriate virtual lighting to your model or environment.
- (d) Apply a virtual camera to your model or environment.
- (e) Present any relevant reference visuals in a work/ sketchbook, save your electronic data to a relevant file format and produce full colour hard copy printouts of the above.

In Outcome 3 you should learn how to apply your knowledge to a practical design brief or assignment. The content of this will very much depend on your course of study, including fine art, architecture, visual communication, 3D design, film, television and broadcast media, and games design.

You should learn how to assemble 3D models and environments as specified by the brief you are working with, how to move models and camera positions appropriately to create visualisations for a range of applications, and how to create the final rendered output in an appropriate format.

In order to achieve Outcome3 you need to:

- (a) Produce an evaluation, of no less than 250 words or equivalent. This evaluation will look at both the process and finished product in relation to the design brief.
- (b) Produce presentation visuals of the final project. If forming part of a digital solution these must be in the form of hard copy and electronic media.

## **General information for candidates (cont)**

### **Unit title:** 3D Computer Visualisation

On completion of this Unit you should be able to:

- ◆ Create 3D geometries from source material
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- ◆ Incorporate 3D visualisation techniques within a design brief