Higher National Unit specification

General information

Unit title: 3D Computer Animation: Character Modelling Advanced

Unit code: H49V 35

Superclass: JB

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Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is designed to introduce and develop the learners understanding of the advanced techniques associated with character modelling, movement, rendering and animation.

Outcomes

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

1 Create a selection of 3D character models in a suitable 3D environment.
2 Surface and render a selection of 3D character models within a 3D environment.
3 Demonstrate movement with a selection of 3D Characters and a camera within a 3D environment.
4 Create a 3D animation sequence.

Credit points and level

2 Higher National Unit credits at SCQF level 8: (16 SCQF credit points at SCQF level 8)

Recommended entry to the Unit

Access to this Unit is at the discretion of the centre. It would be expected that the learner would have completed the *3D Computer Animation: Character Modelling 1* Unit prior to commencement of this Unit.

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.

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.

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. Learners 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 a selection of 3D character models in a suitable 3D environment.

Knowledge and/or Skills

- Modelling techniques

Outcome 2

Surface and render a selection of 3D character models within a 3D environment.

Knowledge and/or Skills

- Surface mapping techniques
- Characteristics of light
- Advanced lighting techniques

Outcome 3

Demonstrate movement with a selection of 3D Characters and a camera within a 3D environment.

Knowledge and/or Skills

- Animation principles
- Movement techniques
- Graph Editor

Higher National Unit specification: Statement of standards (cont)

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Outcome 4

Create a 3D animation sequence

Knowledge and/or Skills

- Storyboarding
- Soundtracks
- Dope Sheets
- Pre and Post Production techniques

Evidence Requirements for this Unit

Outcome 1

Learners will need to provide evidence to demonstrate their Knowledge and/or Skills across all Outcomes by showing that they can:

- Create 1 non-organic 3D model
- Create 1 organic 3D biped model
- Create or source a suitable 3D environment

Outcome 2

- Create or source textures for mapping purposes
- Surface one organic and one non-organic 3D Model
- Use a range of mapping techniques

Outcome 3

- Demonstrate animation principles
- Demonstrate camera movement
- Demonstrate use of Graph Editor

Outcome 4

- Create a storyboard for a thirty second animated sequence
- Create a minimum thirty second rendered sequence incorporating at least one organic and one non-organic model created in the previous Outcomes
- Create movements in their characters which demonstrate complex movement
- Demonstrate use of SFX

Higher National Unit Support Notes

Unit title: 3D Computer Animation: Character Modelling Advanced

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 80 hours.

Guidance on the content and context for this Unit

The Unit is designed to further develop learner's knowledge and skills involved in 3D Computer modelling, surfacing characters and applying movement using animation principles.

This Unit would be suitable for learners wishing to develop greater competence in the design, creation and production of animation for various applications. The Unit will encourage realistic workplace practices and work standards, using industry standard hardware and software. The Evidence Requirements are the minimum standards for assessment and should not exclude assessors from using up-to-date features as software and animation techniques develop.

Guidance on approaches to delivery of this Unit

This Unit is likely to form part of a Group Award designed to provide learners with the technical knowledge and skills for employment within a computer-aided design environment.

If this Unit is delivered as part of the HNC/HND 3D Computer Animation Group Award, opportunities may be taken to link with other aspects of the course and a thematic approach adopted for both delivery and assessment.

Outcome 1

Learners should be provided with information on the principles and mechanical concepts of 3D character modelling and surfacing techniques. Internet facilities could be made available for sourcing examples and tutorials as a supplement to lecturer led demonstrations.

Modelling techniques should be at an advanced level. When tackling this Outcome learners should already be familiar with basic model construction, using primitives, basic movement and animation techniques.

Polygonal and NURB modelling, splines and patches can be used by the learner to achieve more complex models.

Software may provide a range of animation options, including biped and bones. Learners can make use of all available technology to demonstrate complex organic or non-organic character construction.

Higher National Unit Support Notes (cont)

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Outcome 2

Learners need to show that they can surface and render realistically 3D models within a 3D environment. Standard mapping techniques should already have been assimilated and demonstrated by the learner and at this stage they should be capable of using radiosity for example to produce realistic renders of characters and non-organic models.

Outcome 3

At this stage learners must be more confident and experienced in the techniques of designing a 3D character model and surfacing techniques. To allow learners to fully appreciate the principles of animation they should be shown and study for example a range of animations from Betty Boop to Buzz Lightyear, from cel to the latest computer animated characters; 2D and 3D can be shown to learners to allow them to understand the principles of animation.

The learner should be able to demonstrate how the use of a Graph Editor or similar software facilities can enhance animation both in terms of animation principles and in character/story development.

Outcome 4

The assessment could take the form of a brief giving the learner a range of activities to be demonstrated using characters and models which have been created during the previous assessment process. The learners could be asked to generate a short animated sequence where characters demonstrate juggling, climbing, fighting, lifting, swimming, dancing or a combination of these activities. For example the learner could previously have created a rigged biped and a computer keyboard; the animation could incorporate these two elements and embrace the sounds associated with the keyboard. Further animated activities taking place on screen could add to the complexity of the movements and animation demonstrated. The brief must ensure that the learner can demonstrate all of the knowledge and skills.

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.

All Outcomes within this Unit could be assessed together or separately.

Higher National Unit Support Notes (cont)

Unit title: 3D Computer Animation: Character Modelling Advanced

Outcome 1

This Outcome could be assessed separately or with Outcomes 2 and 3. Construction of the models, both organic and non-organic should demonstrate advanced modelling concepts, ie NURBS, manipulation of curves, surfaces and progressive meshes.

The learner may create a suitable environment for the models however it is equally acceptable to source an environment from other sources, ie the internet, CD-ROM or DVD.

Outcome 2

This Outcome could be assessed separately or with Outcomes 1 and 3. Where the learner does not use the models created for Outcome 1 the models used must be identified by source, ie internet, DVD etc.

Mapping techniques can include bump or normal maps, diffuse maps and luminosity maps, specularity, advanced radiosity and ray-tracing.

Renders should use an advanced global illumination lighting solution, ie Radiosity to showcase model renders. At least two renders for each model/character are required to demonstrate understanding of the characteristics of light.

The maps used may be sourced from the existing software libraries, the internet, CD-ROM or DVD or they may be created by the learner using image manipulation packages like Photoshop — or indeed a combination of all of these techniques.

The material should be submitted for assessment using standard digital storage such as DVD which includes all support files, models, reference files, and finished photo-realistic renders.

Outcome 3

As Outcome 3 requires learners to produce demonstrate movement which combines all elements learned and practised in Outcomes 1 and Outcomes 2. All Outcomes could be assessed together.

The movements used should embrace and reflect a range (maximum four) of animation principles such as:

- Squash and stretch
- Timing and motion
- Anticipation
- Staging
- Follow through and overlapping action
- Straight ahead action and pose-to-pose
- Slow in and out
- Arcs

- Exaggeration
- Secondary action
- Appeal and personality

The use of the Graph Editor is strongly recommended for this portion of the Outcome.

Camera movement should be related to the movement activities, it will not be sufficient to simply move the camera randomly. Movement on a path may be easier to incorporate when recording movement of a character or facial movements.

The material should be submitted for assessment using standard digital storage method such as CD-ROM or DVD which includes all support files, models, reference files, rough sketches for movement activities and finished renders.

Outcome 4

As Outcome 4 requires learners to produce a minimum thirty second rendered animated sequence that combines all elements learned and practised in Outcomes 1, 2 and 3. It is recommended that all Outcomes be assessed together. Storyboards should be to a professional standard, reflecting camera and character movement and framing, dialogue, SFX or soundtracks as appropriate. Dope sheets should be submitted detailing dialogue and music.

Movement could include dancing, juggling, lifting, climbing or swimming or a combination of these movements using either or both of the organic and non-organic models.

While Global Illumination is not required for the animated sequence, if it is used learners should use compositing to speed up the rendering process.

Use of Particle systems or other software based advanced animation techniques may be demonstrated during pre or post-production.

The material should be submitted for assessment using standard digital storage such as CD-ROM or DVD which includes all support files, models, reference files, animatics, storyboards, dope sheets and a final rendered animation.

Assessment of this Outcome could be integrated with the assessment of Outcome 4 of F564 35, *3D Computer Animation Movement Studies Advanced*.

Higher National Unit Support Notes (cont)

Unit title: 3D Computer Animation: Character Modelling Advanced

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

There are opportunities to develop aspects of the Core Skills; *Communication* and *Information Communication Technology* at SCQF level 6. Experience can be gained in accessing and evaluating electronic sources that provide an effective source of information on the principles of movement applied to CG Animation. Character modelling and rigging will also ensure learners develop visual awareness and design skills through methodical working systems that require strong communication with peers and lecturers, not to mention fairly intensive numerical monitoring.

History of changes to Unit

Version	Description of change	Date

General information for learners

Unit title: 3D Computer Animation: Character Modelling Advanced

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.

The Unit is designed to further develop your knowledge and skills in 3D Computer Modelling, surfacing characters and applying movement using animation principles.

Access to this Unit is at the discretion of the centre. It would be expected that you would have completed the *3D Computer Animation: Character Modelling 1* Unit prior to commencement of this Unit.

On completion of this Unit you should be able to:

1 Create a selection of 3D character models in a suitable 3D environment.
2 Surface and render a selection of 3D character models within a 3D environment.
3 Demonstrate movement with a selection of 3D Characters and a camera within a 3D environment.
4 Create a 3D animation sequence.

It should be understood that this Unit is aimed at instilling a comprehensive knowledge of the entire animation process from modelling to relevant application of that model within a 3D Computer environment. Importantly, it should also be stated that this is not merely a technical exercise but also demands you explore advanced aesthetic skills which enhance employability or further study.

It would be expected that you should have acquired the knowledge, confidence and skills at this stage to provide the evidence required.

The Unit may also provide you with opportunities to develop the Core Skill of *Information and Communication Technology* at SCQF level 6 and *Communication* at SCQF level 6, although there is no automatic certification of Core Skills or Core Skills components.