



Higher National Unit specification

General information for centres

Unit title: 3D Computer Animation: Movement Studies Advanced

Unit code: F564 35

Unit purpose: This Unit is designed to develop candidates understanding of fundamental principles of animation, the techniques of 3D rigging, and weight mapping and their application in the environment of 3D computer animation.

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

- 1 Design advanced rigging systems.
- 2 Manipulate a rig within a 3D Computer environment.
- 3 Create lip-synched dialogue using morph tools to shape phonemes and expressions.
- 4 Create a short 3D animation sequence to a given brief.

Credit points and level: 2 HN credits at SCQF level 8: (16 SCQF credit points at SCQF level 8*)

**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. It would be beneficial if candidates had a general knowledge of computer applications and basic drawing skills. The candidate must have an understanding of basic 3D computer animation language including the terms: weight mapping primitives; isoparms; surface; open GL and render. Basic skeletal and addition morph systems should be universally understood at this level. It would be of significant benefit if the candidates came to the Unit having completed *3D Computer Animation Movement Studies 1* and *3D Computer Animation: Character Modelling*. It is also recommended that candidates have completed introductory Units such as an *Introduction to Computer Modelling and Animation*.

Core Skills: There are opportunities to develop the Core Skills of *Communications*, *Numeracy*, *Problem Solving*, and *Information Technology* 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.

General information for centres (cont)

Assessment: It is recommended that the assessment of all Outcomes be predominantly practical, with evidence being presented in digital format such as DVD or USB back up systems.

The assessment for Outcome 1 will require candidates to rig one quadruped or biped 3D computer model with weight mapping. In addition to this they will set morph targets that can be used to supplement the rig for facial expressions and lip-synching. It is not mandatory that the model used for this rig be created by the candidate.

It is recommended that Outcomes 2 and 3 be integrated and assessed together to test the efficiency of the rig and morph mapping, as well as the success of the characterisation, which must include a combination of body movement and facial movement in order to achieve maximum effect.

Outcome 2 must include: follow through; overlapping action and ease in, ease out. This will provide candidates with a fundamental grounding in the rudiments of animation movement and the need to apply these traditional techniques to a 3D computer animation environment.

For Outcome 4 candidates should utilise all elements learned and practised in Outcomes 1, 2 and 3. These skills should be developed with the aim of creating a short, cohesive narrative based on the elements learned. The use of lip-synching is mandatory. This should be rendered in the Open GL format at the very minimum and delivered to the assessor via some form of removable digital storage.

Higher National Unit specification: statement of standards

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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

Design advanced rigging systems

Knowledge and/or Skills

- ◆ Rigging Systems
- ◆ Kinematic Systems
- ◆ Morph targets
- ◆ Weight maps

Evidence Requirements

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

- ◆ set up a Kinematic rigging system for a quadruped or biped
- ◆ weight map one primitive box model
- ◆ design morph targets for one primitive box model
- ◆ design eight phonemes and expressions for one primitive box model

Assessment Guidelines

The assessment could be integrated with Outcomes 2 and 3. Candidates could be encouraged to investigate weight mapping to a detailed level with regard to its relationship with polygonal modelling and appropriate deformation.

Higher National Unit specification: statement of standards (cont)

Unit title: 3D Computer Animation: Movement Studies Advanced

Outcome 2

Manipulate a rig within a 3D Computer environment

Knowledge and/or Skills

- ◆ Characterisation

Evidence Requirements

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

- ◆ create scenes which show manipulation of a sophisticated rig and sophisticated morph targets to demonstrate: squash and stretch; follow through; overlapping action; ease in; ease out one scene for each of these traditional animation concepts

Assessment Guidelines

Candidates could provide short sequences that clearly illustrate the above fundamental animation principles. These could be presented, at the very minimum, in a decent resolution preview format such as Open GL. There is no official time limit but they should be of a sufficient timescale for the assessor to view the principle involved. Candidates may have access to reference materials and help files.

Outcome 3

Create lip-synched dialogue using morph tools to shape phonemes and expressions

Knowledge and/or Skills

- ◆ Phonemes
- ◆ Lip synching

Evidence Requirements

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

- ◆ create lip synched dialogue using morph tools to shape speech which is linked to an audio file

Assessment Guidelines

The audio file can be human or animal. In the case of a quadruped the lip synching can be realistic or exaggerated. Evidence could be rendered in the Open GL format and delivered in digital format via portable storage device.

Higher National Unit specification: statement of standards (cont)

Unit title: 3D Computer Animation: Movement Studies Advanced

Outcome 4

Create a 3D animation sequence

Knowledge and/or Skills

- ◆ Storyboarding
- ◆ Narrative structure
- ◆ Rendering
- ◆ Motion charts

Evidence Requirements

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

- ◆ produce a storyboard for a minimum 30 second duration 3D animated sequence
- ◆ produce motion charts for the sequence
- ◆ animate a model using a sophisticated rigging system
- ◆ render a minimum 30 second duration animated sequence and output to a standard storage source

Assessment Guidelines

Outcome 4 requires candidates to produce a rendered sequence that combines all elements learned and practised in Outcome 2. This should be a minimum 30 seconds duration and should incorporate at least one example of all elements contained in Outcomes 2 and 3.

Assessment of this Outcome could be integrated with the assessment of Outcome 4 of F7EV 35, 3D Computer Animation: Character Modelling Advanced.

Higher National Unit specification: statement of standards (cont)

Unit title: 3D Computer Animation: Movement Studies Advanced

The candidate's work could take account of all principles of animation and apply them in a convincing narrative sequence which nevertheless does not need to be a completed linear or chronological narrative. It is merely an exercise in adapting the principles within the context of these universally accepted animation principles.

The work could be submitted to the assessor in a standard duplicated digital format such as DVD disc whilst ensuring that the candidate also has back-up of all support files, Models, reference files and finished render. In addition all paper assessment materials such as Storyboards should be presented in a professional manner.

Administrative Information

Unit code: F564 35

Unit title: 3D Computer Animation: Movement Studies Advanced

Superclass category: JB

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History of changes:

Version	Description of change	Date
02	Minor amendment and clarification of Assessment Guidelines in Outcome 4.	25/04/13

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Higher National Unit specification: support notes

Unit title: 3D Computer Animation: Movement Studies Advanced

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 80 hours.

Guidance on the content and context for this Unit

The Unit is designed to provide candidates with the knowledge and skills involved in the fundamental principles of movement within an animation environment. Candidates may adapt these standard techniques and apply them to a 3D computer animated environment.

Candidates are required to evolve a rigging and morph targeting system that is generic to all major 3D software packages. Following this, candidates will engage with a series of isolated drill type exercises that will familiarise them with fundamental traditional principles which will be married to 3D computer animation techniques.

In Outcome 4 the experience gained in the previous Outcomes will be broadened to include an exercise giving candidates experience in storyboarding a 3D computer animation narrative that represents emotion through movement. This Unit would be suitable for candidates wishing to develop greater competence in the design, creation and production of animation for generic 3D Computer applications.

The Unit must encourage realistic professional practices and workplace standards, using industry appropriate 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 evolve.

Guidance on the delivery and assessment of this Unit

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

If this Unit is delivered as part of the HNC/D 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

Candidates must be provided with information on the basic principles and mechanical concepts of 3D rigging, weight mapping and morph techniques. Internet facilities must be made available for sourcing examples and tutorials as a supplement to assessor led demonstrations. Since candidates are not being assessed on their modelling ability, models can be imported from other legitimate sources (assuming these models are not copyright protected).

Higher National Unit specification: support notes (cont)

Unit title: 3D Computer Animation: Movement Studies Advanced

Outcome 2

Candidates could be shown example footage from a variety of sources, both modern and traditional. This could be followed by assessor led demonstrations on each of the techniques where evidence will be required. Given the fact that this is to be assessed at SCQF level 8 complex rigging concepts such as Forward and Inverse Kinematics (FK and IK) will be familiar to candidates. Exploration of the differences between Forward and Inverse Kinematics should be encouraged as both systems have advantages and disadvantages and are usually used in conjunction.

Outcome 3

Candidates must be shown examples of the mouth shapes used to generate the most common vowel and consonant sounds and must be encouraged to do this in tandem with basic expressions via a given brief.

Outcome 4

Candidates must be given a brief that is certain to necessitate the inclusion of all skills listed. This need not be a complex linear narrative as the aim is for candidates to create convincing movement that combines facial expressions and mouth movement while giving the rigging system a thorough testing, not telling a complex narrative. The given brief should make this clear.

Opportunities for developing Core Skills

If the candidate follows the instructions for Outcomes 1, 2 and 3 they will develop the Core Skill of accessing and evaluating electronic sources which provide an effective source of information on the basic concepts of movement applied to CG animation. The complexity of rigging will also ensure candidates develop methodical working systems that require strong communication with peers and assessors, not to mention fairly intensive numerical monitoring given the amount of numerical data that will be required when scaling the model. This will be further explored by the volume of numerical input necessary for calculating rotations and transformations. These concepts will help develop the Core Skills of literacy, *Numeracy* and *Problem Solving*.

Outcome 4 will build the Core Skills of *Problem Solving*, literacy and *Numeracy* as these will demand a cohesive conclusion to the Skills explored in Outcomes 1, 2 and 3.

Open Learning

This Unit could be delivered by open, distance and online learning. However, it would require planning by the centre to ensure sufficiency and authenticity of the candidate evidence.

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.

General information for candidates

Unit title: 3D Computer Animation: Movement Studies Advanced

This Unit will provide an introduction to fundamental animation concepts that are universally understood and practiced in the animation industry. These include the generically termed: follow through; squash and stretch; overlapping action; ease in and ease out.

In Outcomes 1 and 2 you will explore sophisticated rigging and morphing systems that will enable you to investigate the above fundamental concepts at a comprehensive level. In order to do this with any success you will explore the nuances of skeletal and morphing systems and their effect on 3D geometry.

Since you are not being assessed on your modelling ability you can use models imported from other sources provided they are used legally and legitimately (ie not copyright).

In Outcome 4 you will merge the concepts investigated in Outcomes 1, 2 and 3 into a cohesive narrative. This is not an instruction to make a complex storyline but simply provides an opportunity to bring the concepts studied and practiced in Outcomes 1, 2 and 3 into a more natural situation. In addition to this you will also demonstrate that you understand animation storyboarding ie Storyboarding extreme poses (Key Frames).

You will construct a sophisticated rigging system for a biped or quadruped, sophisticated polygonal model and construct a simple rig for this model. You will also construct weight mapping and a simple morphing system for this model.

Assessment will be based on presented evidence which demonstrates understanding of simple modelling, rigging, weighting and morphing. Outcomes 2 and 3 will require evidence that demonstrates exploration of fundamental animation concepts using the rigged, weighted and morphed model constructed in Outcome 1

You could develop Core Skills by accessing and evaluating electronic sources which provide an effective source of information on the basic concepts of movement applied to CG animation. The complexity of rigging will also ensure you develop methodical working systems that require strong communication with peers and assessors, not to mention fairly intensive numerical monitoring. Given the amount of numerical data that will be required when scaling the rigging system and applying the weight mapping to this model, this will be further explored by the volume of numerical input necessary for calculating rotations and transformations. These concepts will help develop the Core Skills of literacy, numeracy and problem solving.

Outcome 4 will build the Core Skills of *Problem Solving*, literacy and *Numeracy* as these will require a cohesive conclusion to the Skills explored in Outcomes 1, 2 and 3 which cannot be completed without development of these Core components.