Higher National Unit Specification

General information for centres

Unit title: Multimedia Computing: Animation 2

Unit code: DF65 35

Unit purpose: This Unit is designed to enable candidates to knowledge and/or skills in 3-dimensional (3D) animation for use in interactive applications. Candidates should gain knowledge and/or skills in the fundamentals of 3D animation and in creating 3D animation sequences using appropriate software. Candidates should gain knowledge and/or skills in how to create and integrate 3D animation sequences into interactive applications and how to publish the application. Candidates should gain an understanding of why 3D animation is used in multimedia, how it is best utilised and the process of designing, developing, integrating and testing 3D animation within a completed multimedia application. This Unit should help to enhance candidate's knowledge and/or skills for both future multimedia projects and to familiarise them with this specialist aspect of industrial projects.

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

1. Describe the fundamentals of 3-D animation
2. Use modelling techniques to simulate solid objects
3. Apply animation to a 3-D model
4. Create a 3-D animation presentation and integrate it with an interactive application
5. Demonstrate a 3-D animation has been successfully published and runs error free on an appropriate delivery medium

Credit value: 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. However, it is recommended that DF64 34 Multimedia Computing: Animation 1 has already been achieved by candidates. It would be advantageous if candidates had some prior knowledge of scripting, Computer Graphics, electronic image generation, 2-D computer animation or 3-D modelling. This may be evidenced by the possession of relevant National Units, HN units or experience.

Core skills: There may be opportunities to gather evidence towards core skills in this Unit, although there is no automatic certification of core skills or core skills components.

General information for centres (cont)

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.

Assessment: This unit will be assessed using 2 assessments. For Outcome 1 a report will be produced to demonstrate the candidate's knowledge of the fundamentals of 3D animation: the stages involved in creating an animation, its purpose in interactive applications, file formats, compressed formats and underlying technologies. This report could be completed at the end of the Unit after candidates have gained sufficient knowledge and/or skills to be able to integrate the theory learned with the practical lessons.

It is strongly recommended that Outcomes 2, 3, 4 and 5 be integrated into one practical project assessment in which candidates are required to design, develop and publish a 3-D animated sequence and ensure that it runs successfully on the chosen published media. However, Centres may wish to assess each Outcome on an individual basis.

Higher National Unit specification: statement of standards

Unit title: Multimedia Computing: Animation 2

Unit code: DF65 35

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

Describe the fundamentals of 3-D animation

Knowledge and/or skills

♦ The differences between 2-D and 3-D animation
♦ The differences between dedicated 3D animation software packages and software packages which support 3D features
♦ The purpose of 3D animation in interactive applications
♦ The 3 fundamental stages of animation work
♦ File formats used for 3D animation

Evidence requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can write a report of approximately 750 words outlining the following fundamentals of 3D animation:

♦ The differences between 2D and 3D animation
♦ The purpose of 3D animation in interactive applications
♦ Explain what Modelling is
♦ Different styles of animation - keyframes, frame by frame animation
♦ Explain what rendering is
♦ Current file formats used for 3D animation — compressed and uncompressed,
♦ File size considerations for online and offline applications
♦ The advantages and disadvantages of current software packages used to create 3D animation.

Assessment guidelines

It is recommended that the report for this Outcome is completed by candidates towards the end of the unit. The advantages of this approach should be that candidates should be able to use their newly gained practical experience to support their findings and that information on compression can be integrated with 'Compression for 3D animation' in Outcome 5.

Higher National Unit specification: statement of standards (cont)

Unit title: Multimedia Computing: Animation 2

Outcome 2

Use modelling techniques to simulate solid objects.

Knowledge and/or skills

♦ How to create primitives
♦ How to modify primitives
♦ How to import plans
♦ How to import models and meshes
♦ How to apply multiple textures with various mappings to objects
♦ How to apply appropriate lighting to objects
♦ Naming conventions for models, lights and materials

Evidence requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can use the main features, including at least two complex features, of an appropriate software package to create a 3D model.

A still life must be designed and created to a given brief. An analysis of the design and of the objects to be modelled must be carried out and documented. In order to achieve the correct design decision for the objects candidates must supply research data, gather plans and import them into the workspace before starting construction.

The final design must be justified as suitable in terms of the objects form, the relevant techniques to be applied to the object, the aims of the brief, type of project, topic, target audience, delivery medium and playback platform.

Multiple textures with various mappings must be applied to the still life, these must be suitable for the object and can be from a library or captured from a digital source. Appropriate lighting must be added. Evidence of achievement will include an analysis document and portfolio of reference materials, assessors' checklist, prints of each of the screens, and the finished image submitted on disk using an appropriate file format.

Assessment guidelines

The assessment for this outcome can be integrated with Outcomes 3, 4 and 5 as one practical exercise. See assessment guidelines for Outcome 5. If Centres decide to use a separate assessment for this Outcome then they must ensure that the assessment covers all of the Knowledge and/or Skills and Evidence Requirements elements shown above.

Higher National Unit specification: statement of standards (cont)

Unit title: Multimedia Computing: Animation 2

Outcome 3

Apply animation to a 3-D model.

Knowledge and/or skills

♦ How to apply a variety of camera techniques
♦ Naming conventions for cameras
♦ How to apply a variety of animation techniques

Evidence requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can use the main features, including at least two complex features, of an appropriate 3D modelling/animation package to apply a variety of animation techniques to a model. At the very least one simple and one complex animation technique should be applied. At least 2 camera techniques must be applied to the model.

Where this Outcome is integrated with Outcomes 2, 4 and 5, evidence must be demonstrated in the requirements document and storyboards that the candidate has planned the animation to be used and understands the terminology for this.

Where this Outcome is assessed separately, candidates must be given an appropriate brief and produce an analysis for such. Animation solutions must be justified through different examples.

Assessment guidelines

The assessment for this outcome can be integrated with Outcomes 2, 4 and 5 as one practical exercise. See assessment guidelines for Outcome 5. If Centres decide to use a separate assessment for this Outcome then they must ensure that the assessment covers all of the Knowledge and/or Skills and Evidence Requirements elements shown above.

Outcome 4

Create a 3-D animation presentation and integrate it with an interactive application.

Knowledge and/or skills

♦ How to create a storyboard sequence
♦ How to render a 3-D animation
♦ Compression for 3-D animation
♦ How to implement a 3D-animation with an interactive application project
♦ How to control a 3D-animation in an interactive application

Higher National Unit specification: statement of standards (cont)

Unit title: Multimedia Computing: Animation 2

Evidence requirements

Candidates will need evidence to demonstrate their skills and/or knowledge by showing that they can use the features of an appropriate package for creating 3D animation, to render a completed animation sequence and select appropriate compression settings.

The Rendered animation must be designed in context with the application in terms of design and content. The chosen design solution must be reported. The animation has to be implemented into an interactive application project whereby interactivity is applied to control the animation. The candidate must carry all of these processes out.

Storyboards must be created to a given brief. Each storyboard must either be hand or digitally drawn and must include placeholders for main objects such as text, graphics, buttons, images, animated sequences, video. The storyboards must include annotations for each media element and explain the main purpose for each screen, as well as detailing events such as sound, interaction and animation. Screen prints of the finished presentation will not be accepted as a storyboard, as the storyboard should be completed prior to implementation. A hard copy of the storyboard must be produced.

Evidence of achievement will include an assessors checklist, a hard copy of the storyboards, prints of each of the screens and the rendered animation submitted on disk in a suitable compressed and uncompressed (where applicable) file format. The completed application must be saved in a suitable file format for the intended playback medium.

Where this Outcome is assessed separately, candidates must be given an appropriate brief and produce an analysis for such. Animation solutions must be justified through different examples.

Assessment guidelines

The assessment for this outcome can be integrated with Outcomes 2, 3 and 5 as one practical exercise. See assessment guidelines for Outcome 5. If Centres decide to use a separate assessment for this Outcome then they must ensure that the assessment covers all of the Knowledge and/or Skills and Evidence Requirements elements shown above

Outcome 5

Demonstrate a 3-D animation has been successfully published and runs error-free on an appropriate delivery medium.

Knowledge and/or skills

- How to prepare an authored application
- How to publish an authored application
- How to trouble shoot 3-D animation runtime errors

Higher National Unit specification: statement of standards (cont)

Unit title: Multimedia Computing: Animation 2

Evidence requirements

Candidates will need evidence to demonstrate their knowledge and/or skills by showing that they can publish their presentation to at least one delivery medium (e.g. CD or DVD or Website). File sizes must be as small as possible, and candidates must ensure that compression techniques are as current and effective as possible, and that the published file formats chosen represent up-to-date technology. Evidence must include an assessors' checklist and the published file submitted on disk. Where the presentation has been incorporated into a webpage, the files must be supplied on disk and the Uniform Resource Locator (URL) given.

In addition, the candidate will analyse and compare in report form, the performance of the published formats and submit the results on hard copy. The report must be in the form of a data table. The analysis must include how the file sizes compare, and the effect on the performance features, such as motion, sound, animation and interaction. Suitability of the utilisation of the formats used for various applications must be commented on in light of the content of Outcome 1.

Any runtime errors and the solutions applied must be documented accurately and in detail.

Candidates must provide:

♦ At least one Storyboard
♦ At least two 3D models
♦ A copy of the completed animation in an appropriate file format
♦ The Compressed file of the animation
♦ The unpublished version of the interactive application must be supplied on disk.
♦ The published file of the interactive application.
♦ The report on compressed files.
♦ The report of test data — runtime error(s) and the successful solution(s)
♦ The report on the evaluation of the animation — (e.g. were aims and objectives achieved, if not why not, what else should have been considered)

Assessment guidelines

The assessment for this outcome can be integrated with Outcomes 2, 3 and 4 as one practical exercise. If Centres decide to use a separate assessment for this Outcome then they must ensure that the assessment covers all of the Knowledge and/or Skills and Evidence Requirements elements shown above. If a separate assessment is used it is recommended that candidates either use the 3D animations they created earlier in the unit or appropriate files supplied by the Centre. In either case, storyboards and all required reports should be produced. The scope of the project is to design, develop and integrate the animation with an interactive application.

Higher National Unit specification: statement of standards (cont)

Unit title: Multimedia Computing: Animation 2

The details on the compressed file quantity and quality could be incorporated in the report for Outcome 1. Test information and evaluation findings must be in separate reports. The application should be published and the animation should be tested and modified until it runs error free.

If any runtime errors do occur candidates should investigate and provide solutions as appropriate. Where no runtime errors have occurred candidates should report on the common runtime errors that can occur and on their solutions. Centres may wish to provide candidates with a file that has errors in it. Runtime errors and their solutions should also be documented appropriately. Candidates should be allowed to obtain limited help from lecturers, technicians, classmates or other persons as appropriate. The use of help facilities and literature should be encouraged throughout the delivery of the Unit.

Administrative Information

Unit code: Multimedia Computing: Animation 2

Unit title: DF65 35

Superclass category: CE

Date of publication: December 2003

Version: 01

Source: SQA

Higher National Unit specification: support notes

Unit title: Multimedia Computing: Animation 2

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

This Unit is designed to enable candidates to gain knowledge and/or skills in 3-dimensional (3D) animation for use in interactive applications. Outcome 1 covers the theory of 3D animation, from what it is, why it is used in multimedia, when it should be used as opposed to other media elements, to how it is incorporated into a completed interactive application. Different applications should be reviewed in terms of their strengths and weaknesses. This approach should help candidates to make design decisions based on the software tool(s) they will be using and to become aware of the alternatives they may be required to select in industry.   The knowledge gained in Outcome 1 should help candidates gain a better understanding of the content of Outcomes 2, 3, 4 and 5 where the theory learned should be put into practice.

At the time of writing the common animation formats are Shockwave, QuickTime, AVI, MPEG and animated GIF. These may be used for this unit or substituted with any new ones that have emerged. For the context of Outcome 1, uses, disadvantages and advantages of various file formats should be discussed across a broad spectrum of multimedia applications, not just web-based.

For Outcomes 2-5, candidates may either be given topics by their lecturer or choose their own. A suggested brief could be to produce learning materials for the various departments in the Centre. Each of Outcomes 2-5 could either be assessed by a series of small projects or integrated into one large project. In either case an analysis of the project should be reported. This analysis should, at the very least, cover the project brief, type, topic, content, target audience, objects to be modelled, relevant techniques, delivery medium and playback platform. This should assist candidates in the preparation of their storyboards. A strong emphasis should be placed on good visual design.

By the end of the Unit candidates should have followed a structured method for completing a published project, whereby they have carried out analysis, design, implementation, testing, modifications and evaluation.

It is not necessary to use specialized 3D animation software for this Unit. Any software application that has the ability to create and animate 3D models will be suitable. At the time of writing 3D Studio Max 5 and LightWave are examples of specialized 3D animation software applications, whereas the authoring package Director MX has facilities to produce 3D animations. Techniques to optimise file sizes for quick downloading and playback should be applied and the results noted.

Higher National Unit specification: support notes (cont)

Unit title: Multimedia Computing: Animation 2

Interaction and runtime performance can be judged by running the published version with a web browser or some other platform. Where errors occur, candidates should report these and the solution(s). Should no errors occur, then it may be appropriate to supply candidates with at least one file with errors in it. Candidates would then be required to modify the file and include other common runtime errors and their solutions in the report. This should aid candidates to avoid common runtime error problems in future projects.

Guidance on the delivery and assessment of this Unit

This Unit is designed to introduce candidates to 3D animation and its purpose in interactive applications. The candidate should be exposed to animation delivery across a wide selection of applications, both online and offline. Candidates should seek limited help from lecturers, technicians, classmates and any other person(s) throughout the assessments. The use of help facilities, online documentation and books should be encouraged to find solutions.

Where the candidate is unsuccessful in achieving an Outcome, provision should be made for remediation and reassessment. Where Outcome 1 is not achieved on the first attempt, the candidate should be given an alternative objective assessment.

Outcome 1 will be an open-book assessment requiring candidates to submit a report of approximately1000 words. This can be carried out either early on in the unit, or as a summative report which is developed in tandem with the theory and practical skills covered throughout the unit. The evidence gained in Outcome 4, for compression and Outcome 5, for runtime errors, could be included in the file format and use of 3D animation in interactive applications section of Outcome 1, for this report.

Outcomes 2-5 are practically based assessments where candidates will be assessed on their ability to create 3D models of objects, animate them, integrate the animation into an interactive application, and produce an error free published version of the application. The successful design and delivery of the project(s) should be achieved through analysis, design, implementation, testing, modification and evaluation. Observation checklists carried out by the assessor should evidence practical achievement of Outcomes 2-5. Where candidates have carried out work in their study time, the assessor must question the techniques applied. The majority of practical work should be carried out in class time.

In addition to the report for Outcome 1, documentation for other outcomes will be required, as stated in the evidence requirements.

To achieve a pass in this unit, candidates must meet all the evidence requirements for each outcome.

Higher National Unit specification: support notes (cont)

Unit title: Multimedia Computing: Animation 2

Open learning

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, February 2001 — publication code A1030).

Special needs

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering special alternative Outcomes for Units. For information on these, please refer to the SQA document *Guidance on Special Assessment Arrangements* (SQA, 2001).

General information for candidates

Unit title: Multimedia Computing: Animation 2

This unit will enable you to learn about the subject of 3D computer animation.
On completion of the Unit you should be able to understand what 3D animation is, how it is used in multimedia, how to create design solutions, develop and deliver a 3D animation to web or disk-based multimedia applications, using industry standard animation file formats. Specifically, you should be able to:

1. Describe the fundamentals of 3-D animation
2. Use modelling techniques to simulate solid objects
3. Apply animation to a 3-D model
4. Create a 3-D animation presentation and integrate it with an interactive application
5. Demonstrate a 3-D animation has been successfully published and runs error free on an appropriate delivery medium

The Unit has been designed to flow smoothly from the theory of 3D animation and its role in interactive applications in Outcome 1 to the construction of an animated sequence (Outcomes 2 and 3), to integration with an interactive application (Outcome 4) and finally publishing an error free application (Outcome 5). The goal is to introduce you to 3D animation, not to provide you with the necessary knowledge and/or skills for you to become a professional 3D animator. Instead this unit will help you to understand the processes involved, what file formats you should be using for the intended playback medium and how to ensure that the animation will run smoothly and not interfere with the rest of the website or multimedia application.

Outcome 1 is assessed by means of a report of approximately 750 words in which you will be asked to outline the fundamentals of 3D animation.

For Outcomes 2, 3, 4 and 5, you will either be presented with four separate assessments or with a single practical exercise. In either case you will be asked to construct an animated presentation and then publish it in various animated file formats. Some of the skills you will learn include:

1. Preparing a storyboard.
2. Creating an appropriate 3D model for a given topic. The model must have multiple textures with various mappings.
3. Applying a variety of animation, camera and lighting techniques to objects, selecting the most appropriate for the model and sequence.
4. Incorporating these elements into a cohesive presentation.
5. Adding interaction.
6. Optimising animated file sizes.
7. Publishing your completed presentation into a suitable format for web or disk-based multimedia, eg CD or DVD.
8. Comparing the performance of your published files
9. Solving runtime errors with the animation

General information for candidates (cont)

Unit title: Multimedia Computing: Animation 2

To achieve a pass in Outcomes 2–5, you must successfully construct an animated presentation and then publish it in various animated file formats to either, CD, DVD or a Website. You should be able to seek limited help from lecturers, technicians, classmates and any other person(s) throughout the assessments. You should be encouraged to use help facilities, online documentation and books throughout the duration of the Unit.