

## Higher National Unit Specification

### General information for centres

**Unit title:** Multimedia Computing: Video with Audio

**Unit code:** DM36 34

**Unit purpose:** This Unit is designed to enable candidates to work with audio and video in multimedia and web development roles. The Unit prepares candidates for these roles by ensuring that the underpinning knowledge is gained to enable understanding of the basic operations involved in modern personal computer based multimedia. Practical experience is then gained of recording audio and video data from a variety of sources under varying conditions, then storing this data in a manner reflecting current industry standards. Data is manipulated in ways that reflect the normal requirements used in this sub-set of industry for inclusion in commercial multimedia products. A strong emphasis is placed on the production of content suitable for inclusion in specific briefs. This Unit is also relevant to all those on an Information Technology programme of study who require or wish to enhance their knowledge and skills to include a practical understanding of the use of audio and video in the world of Information Technology.

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

1. Identify the basic principles involved in the production and inclusion of digital audio and video content in a multimedia or web application.
2. Record, manipulate, store and play audio files relevant to multimedia and web applications.
3. Create, manipulate, store and play video files relevant to multimedia and web applications.
4. Include audio and video files in both traditional multimedia applications and multimedia web-pages.

**Credit points and level:** 2 HN Credits at SCQF level 7: (16 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 will be at the discretion of the Centre. However, it is recommended that candidates should have a good working knowledge of personal computers in a multimedia role and be capable of using an operating system, such as Windows, for file handling. This may be evidenced by the possession of relevant National Units, HN units or experience.

## General information for centres (cont)

**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.

**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:** Outcome 1 requires the candidate to answer a set of short or restricted responses and one extended response question under supervised, closed book conditions. Outcomes 2, 3 and 4 require candidates to carry out a series of practical exercises in order to demonstrate the various competences. Outcome 4 requires candidates to include audio and video files in both a multimedia and web-based applications, using industry standard techniques. Outcome 2, 3 and 4 will be assessed by means of an observation checklist covering all of the knowledge and/or skills elements from all 3 Outcomes and by candidates presenting their evidence as a portfolio with check-sheets and files (on backing storage). Assessment must be carried out under conditions that ensure confidence in the authenticity and integrity of each candidates work. Outcomes 2, 3 and 4 could be assessed separately but it is recommended that all three Outcomes are integrated into one project based assessment.

## **Higher National Unit specification: statement of standards**

**Unit title:** Multimedia Computing: Video with Audio

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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**

Identify the basic principles involved in the production and inclusion of digital audio and video content in a multimedia or web application.

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

- ◆ Hardware and Software requirements for production and presentation of digital audio and video content in multimedia computing
- ◆ Variables involved in the digitising process
- ◆ Problems involved with sizes of audio and video files and the need for compression
- ◆ Typical industry-standard audio and video file types

#### **Evidence requirements**

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

- ◆ Define the functions of the main hardware and software components of a multimedia computer that affect the machine's
  - capability to produce sound and video and
  - quality of processing of sound and video.
- ◆ Define the basic variables involved in digitising analogue data.
- ◆ Calculate uncompressed file sizes from data given
- ◆ State and give a brief description of a range of audio and video file types currently in use within:
  - multimedia applications
  - online materials.

This part of Outcome 1 will be assessed by a series of short response questions based on the 4 main element bullet points above. Candidates must achieve 60% of the available marks in order to obtain a pass in this part of Outcome 1.

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

### **Unit title:** Multimedia Computing: Video with Audio

- ◆ Discuss the need for data compression as a partial solution to the problems of storage requirements and data transfer time involved when working with audio and video files

This part of Outcome 1 will be assessed by a question based on the element above. Candidates must provide an extended response of approximately 250 words and must obtain 60% of the available marks in order to achieve a pass in this part of Outcome 1.

The assessment will be carried out in a supervised environment, will be closed book and is to be completed in no more than 1.5 hours. Candidates must be given reasonable notice of the timing of the assessment in order to have sufficient time to prepare.

### **Assessment guidelines**

The assessment should be sufficient to ensure that the candidate has demonstrated that he/she has acquired the background theoretical knowledge relevant to the practical skills inherent in the remaining parts of the Unit.

The questions for the two parts of the Evidence Requirements should be on the same question paper.

## **Outcome 2**

Record, manipulate, store and play audio files relevant to multimedia and web applications.

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

- ◆ Record, manipulate, store and play audio files relevant to multimedia and web applications
- ◆ Create, manipulate, store and play MIDI files relevant to multimedia and web applications.

### **Evidence requirements**

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

- ◆ Record three short audio recordings from a microphone directly connected to the computer
- ◆ Record three short audio recordings taken from an external recording device into the computer
- ◆ Record three short audio recordings from a CD-ROM or DVD drive
- ◆ Apply audio editing operations to recorded files on at least 2 occasions
- ◆ Apply audio special effects operations to recorded files on at least 2 occasions
- ◆ Undertake MIDI file creation on at least 1 occasion
- ◆ Apply MIDI operations to recorded files on at least 1 occasion

This outcome will be assessed by means of an observation checklist covering all of the elements above and by candidates presenting their evidence as a portfolio with check-sheets and files (on backing storage).

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

**Unit title:** Multimedia Computing: Video with Audio

### **Assessment guidelines**

A set of assessment briefs could be set and a suitable checklist provided to enable candidates to log their progress. It is recommended that assessment should be on-going throughout the series of tasks and should be such that the candidate's skills are clearly demonstrated to the assessor.

It is recommended that the assessments for outcomes 2, 3 and 4 are combined into one project.

### **Outcome 3**

Create video files suitable for inclusion in multimedia and web applications to a given brief.

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

- ◆ Create (on camera), capture, store, manipulate and play video files relevant to multimedia and web applications
- ◆ Create (from suitable software), store and play video files relevant to multimedia and web applications

#### **Evidence requirements**

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

- ◆ Create (on camera), capture, store, manipulate and play one short video sequence saved in such a manner that it could be included in:
  - a) a multimedia application developed through industry standard software and
  - b) a web page developed through industry standard software and delivered to the end user in a manner typical of standard web technology
- ◆ Create, on suitable multimedia authoring software, one short video sequence saved in such a manner that it could be included in:
  - a) a multimedia application developed through industry standard software and
  - b) a web page developed through industry standard software and delivered to the end user in a manner typical of standard web technology

This Outcome will be assessed by means of an observation checklist covering all of the elements above and by candidates presenting their evidence as a portfolio with check-sheets and files (on backing storage).

### **Assessment guidelines**

Candidates should be set a series of practical tasks that enable them to demonstrate that the skills required have been achieved. A set of assessment briefs could be set and a suitable checklist provided to enable the candidates to log their progress. It is recommended that assessment should be on-going throughout the series of tasks and should be such that integrity is maintained.

It is recommended that the assessments for Outcomes 2, 3 and 4 are combined into one project.

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

**Unit title:** Multimedia Computing: Video with Audio

### **Outcome 4**

Include audio and video files in both traditional multimedia applications and multimedia web-pages.

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

- ◆ Prepare media files for inclusion as required
- ◆ Include prepared media files within applications

#### **Evidence requirements**

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

- ◆ Prepare one short audio and one short video sequence saved in such a manner that it could be included in:
  - A multimedia application developed through industry standard software and
  - A web page developed through industry standard software and delivered to the end user in a manner typical of standard web technology.

Justification of the file format(s) used should be evident in the submission.

This outcome will be assessed by means of an observation checklist covering all of the elements above and by candidates presenting their evidence as a portfolio with check-sheets and files (on backing storage).

#### **Assessment guidelines**

Candidates should be given a brief that requires a demonstration, using familiar industry standard software, that they possess the skills to include video files in both traditional multimedia applications and multimedia web-pages. Check sheets should outline the assessable aspects and work should be presented as a formal portfolio.

It is recommended that the assessments for Outcomes 2, 3 and 4 are combined into one project.

## **Administrative Information**

<b>Unit code:</b>	DM36 34
<b>Unit title:</b>	Multimedia Computing: Video with Audio
<b>Superclass category:</b>	CE
<b>Date of publication:</b>	August 2004
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## **Higher National Unit specification: Support Notes**

### **Unit title: Multimedia Computing: Video with Audio**

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**

#### **Outcome 1**

It is assumed that candidates have prior knowledge of basic computer organisation and architecture. This outcome is therefore concerned with issues pertinent to audio and video in multimedia computing and must include Sound card, Video RAM card, Video capture/processing card, Driver software and relevant Applications software (including MIDI). Variables involved in digitising must include Frequency, Amplitude, Pitch, Sample Rate, Sample Size and Mode (Number of Channels). Calculations made using these variables should be formally structured as equations with formulae being shown. Candidates should be able to show an awareness of the implications of the large file sizes involved in both audio and video on storage and distribution of applications. File formats discussed should reflect industry standards appropriate to the time when the unit is being studied. As an example, at the time of writing, an important selection of the standards for audio are RAW, WAV, VOC, MID, MP3, RAM. For video, candidates should be aware of the difference between the Architecture and the CODEC of the files.

#### **Outcome 2**

Basic recording exercises should involve the candidates in using a range of recording settings and commenting on quality as appropriate. Candidates should become aware of the appropriateness of the settings used for the required output. For example, voice recordings need not be of the same quality as music. Editing and special effects for audio recordings should include Delete, Move, Copy and Combine, Amplify, Echo, Fade-in, Fade-out and Pan.

MIDI operations should involve the candidates in generating files using suitable sequencing software. It is envisaged that the files should be both single channel and multiple channels (to a maximum of 3). It is not necessary that the candidates have prior knowledge of music and simple scores should be employed to enable the development of the skills in using the sequencer. The software operations demonstrated by the candidate should include Change voice, Change Pitch, Modify notes, Exclude voice, Add effects and Convert to sampled file, although the possibility of alterations to this because of developments in software should be considered where appropriate whilst maintaining the appropriate level of assessment

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

### **Unit title: Multimedia Computing: Video with Audio**

#### **Outcome 3**

The camera based part of this Outcome should involve the candidate in planning the shots required for the proposed files. He/she should demonstrate, through the work, skills of composition, lighting (natural or artificial as appropriate), focussing and camera support. Capturing the video from camera and storing the work should involve the candidate in using industry standard video file formats that will allow compression suitable for the final destination or downloading. At this stage the candidate is expected to have only basic skills and knowledge in file compression but should learn about the effect of compression on quality.

The software based part of this outcome should involve the candidate in capturing video from an analogue or digital source, using relevant software package(s) and in storing the work using industry standard video file formats suitable for given platform(s). The software used in the delivery of this Unit should be capable of producing video output files that can be included in a video sequence with camera based video files (eg animated titles etc). At the time of writing, Adobe Premiere is the recommended video capture and editing tool with an extensive range of video formats supported, but it is recognised that many other software applications are available for this purpose. Macromedia Director is recommended as the multimedia integration tool.

#### **Outcome 4**

The preparation of media files for use in both traditional multimedia applications and multimedia web-pages requires the candidate to learn about which file formats are supported by, and reasonable for use with, the final authoring/presentation method. Examples, at the time of writing, would involve the candidates in converting basic files to highly compressed files (eg MP3, WMA, WMV, WME, Quicktime and supported compression codecs) or streaming media files (eg REAL, Quicktime, etc) for inclusion in web pages.

The inclusion of media files should involve the candidate in coding within the selected development software to cause the media files to play appropriately either on load or on selection.

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

Outcome 1 is theory based and can be delivered and assessed on its own. At this level, the knowledge gained by the candidate is likely to be somewhat superficial. Centres are encouraged to seek opportunities that serve to enhance the student learning experience. This could perhaps be achieved by introducing practical activities or tutor-led demonstrations of the concepts being conveyed.

This first part of Outcome 1 will be assessed by a series of 10 short response questions. Candidates must answer 6 out of the 10 questions correctly in order to obtain a pass in this part of Outcome 1. The second part of Outcome 1 will be assessed by a discussion question and candidates must provide an extended response of approximately 250 words and must obtain 60% of the available marks in order to achieve a pass in this part of Outcome 1. A marking scheme with a threshold of achievement would be beneficial and candidates should not be aware of the questions beforehand. The assessment will be carried out in a supervised environment, will be closed book and is to be completed in no more than 1 hour. Candidates must be given reasonable notice of the timing of the assessment in order to have sufficient time to prepare.

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

### **Unit title:** Multimedia Computing: Video with Audio

Outcomes 2, 3 and 4 are to be assessed by means of an observation checklist covering all of the knowledge and/or skills of each Outcome and by candidates presenting their evidence as a portfolio with check-sheets and files (on backing storage). It is recommended that the assessment for Outcomes 2, 3 and 4 could take the form of one project which covers the requirements of all three Outcomes.

### **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).

### **Candidates with additional support needs**

This Unit specification is intended to ensure that there are no artificial barriers to learning or assessment. 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 Special Assessment Arrangements for Candidates with Additional Support Needs* ([www.sqa.org.uk](http://www.sqa.org.uk)).

## **General information for candidates**

### **Unit title: Multimedia Computing: Video with Audio**

This Unit is designed to enable you to work with audio and video in multimedia and web development roles. The Unit enables you to gain an understanding of the basic operations involved in modern personal computer based multimedia. You will gain practical experience of recording audio and video data from a variety of sources under varying conditions, then storing this data in a manner reflecting current industry standards. A strong emphasis is placed on the production of audio and video content suitable for inclusion in multimedia and web applications.

Outcome 1 introduces you to audio and video in multimedia computing and you will learn about such devices as Sound cards, Video RAM cards, Video capture/processing cards, Driver software and relevant Applications software (including MIDI). You will also learn about the variables involved in digitising audio and video. You will learn how to calculate these variables and to manipulate the formulae used. You will gain an awareness of the implications of large file sizes involved in audio and video on storage and the on the distribution of applications. You will also learn about the different file formats employed in audio and video multimedia computing. The first part of Outcome 1 is assessed by a series of 10 short response questions. You must answer 6 out of the 10 questions correctly in order to obtain a pass in this part of Outcome 1. The second part of Outcome 1 is assessed by an extended response of approximately 250 words and you must obtain 60% of the available marks in order to achieve a pass in this part of Outcome 1.

In Outcome 2 you will be using a range of recording settings for audio and how to judge the quality of audio. You should become aware of the appropriateness of the settings used for the required output. For example, voice recordings need not be of the same quality as music. You will learn about editing and special effects for audio recordings and about MIDI operations.

In Outcome 3 you will use cameras and learn how to plan the shots required for inclusion in your multimedia application. You should learn the skills of composition, lighting (natural or artificial as appropriate), focussing and camera support. Capturing video from camera and storing the work should involve you in using industry standard video file formats and dealing with compression of video files for the final destination or downloading. In the software based part of this Outcome you should be involved in planning the work, developing animation sequences using a software package and in storing the work using industry standard video file formats.

In Outcome 4 you will learn how to prepare media files for use in multimedia applications and multimedia web-pages. You should learn how to convert basic files into highly compressed files or streaming media files for inclusion in web pages.

In Outcomes 2, 3 and 4 you will be presented with a project covering all three Outcomes. You will be assessed by means of an observation checklist (where your assessor will observe you carrying out all the required tasks) and where you present your evidence as a portfolio with check-sheets and files held on disk.