Higher National Unit specification

General information for centres

Unit title: Digital Imaging: Bitmap and Vector

Unit code: F1YX 34

Unit purpose: This Unit is designed to introduce candidates to the creation of digital images for use within a variety of computer applications. It will enable candidates to explore digital imaging, screen based graphics, digital imaging software, acquisition of digital still images and the manipulation of graphics. The candidate will also be made aware of the importance of file types, file management and optimisation of digital images. The candidate will use the relevant software to produce a product to a given brief.

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

1   Demonstrate an understanding of graphics used in computer applications.
2   Acquire, create and manipulate bitmapped graphics to a given brief.
3   Create and manipulate vector graphics to a given 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. It is recommended that candidates should be able to competently operate the basic functions of a computer. An awareness of how to operate design software applications would be an advantage though not essential.

Core Skills: There are no opportunities to develop Core Skills 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.

This Unit is within the HNC Interactive Media and the PDA (Personal Development Award) Certificate in Digital Imaging at SCQF level 7 (subject to validation at time of publication).

The term 'bitmapped graphics' used throughout this document, refers to both images and graphics.

General information for centres

Assessment: Evidence is required that candidates have achieved all Outcomes.

Candidates are encouraged to use the internet in any research etc, however, the evidence produced must be the candidate's own words. Assessors should assure themselves of the authenticity of candidate's evidence.

Written and/or oral recorded, performance and product evidence is required which demonstrates that the candidate has achieved the requirements of all of the Outcomes to show that the candidate has appropriate knowledge and understanding of the content of this Unit.

This Unit should be assessed by the following:

1   Outcome 1 is a closed-book assessment and should take the form of a set of objective questions where the candidate is required to produce evidence of their knowledge of digital graphics.
2   Outcome 2 is an open-book assessment and should take the form of a practical assessment carried out under supervised conditions and is designed to demonstrate the candidate's knowledge and/or skills in producing designs to a given brief.
3   Outcome 3 is open-book assessment and should take the form of a practical assessment carried out under supervised conditions designed to demonstrate candidate's knowledge and/or skills in creating, manipulating and optimising bitmap graphics. There must be a checklist submitted which records that a candidate has achieved all necessary items from the Evidence Requirements and this checklist must have the candidate's name an ID along with an endorsement by the assessor with their name, signature and date.

Assessments for Outcomes 2 and 3 can be integrated into one holistic assessment. The practical assessments within this Unit should be based on the same case study.

Assessors should ensure themselves of the authenticity of the candidate's evidence.

The Assessment Exemplar Pack for this Unit provides sample assessment materials including assessor checklists, practical tasks and an instrument of assessment for the knowledge. Centres wishing to develop their own assessments should refer to the Assessment Exemplar Pack to ensure a comparable standard.

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

Demonstrate an understanding of graphics used in computer applications

Knowledge and/or Skills

♦   Categories of digital graphics
♦   Purpose of graphics in applications
♦   Uses of different types of graphics
♦   Attributes of graphics
♦   File formats
♦   Compression
♦   Software applications

Evidence Requirements

Evidence of all the Knowledge and/or Skills in this Outcome will be assessed using a representative sample covering the bullet points below:

♦   identify categories of digital graphics used in computer applications. This must include vector, bitmap, and one from either animated or meta
♦   explain the purpose of graphics in applications, eg why graphics are preferential over other media elements (ie text, sound, video and animation)
♦   identify the uses of different types of graphics (candidates must be aware of what each type of graphic is best used for)
♦   differentiate between vector and bitmap graphics:
— vector eg paths, co-ordinates/points, lines, curves, shapes, fill colour, colour modes
— bitmap eg pixels, resolution, colour depth, colour modes
♦   identify and describe compressed and uncompressed file formats for vector and bitmap graphics, eg what format(s) should be used for particular delivery media, their attributes, advantages and disadvantages
♦   describe compression, eg what compression is, the need for compressing graphics, lossy, lossless, what compression trying to achieve and artefacts caused by compressing graphics
♦   identify software applications for creating/editing vector, bitmap, meta and animated graphics with candidates able to differentiate between paint and drawing packages

Higher National Unit specification: statement of standards (cont)

Unit title: Digital Imaging: Bitmap and Vector

Evidence for all Knowledge and Skills in this Outcome will be assessed using a representative sample of twenty questions. The assessment will be supervised, controlled and under closed-book conditions and should last no more than 1 hour. The instrument of assessment must provide opportunities for the Outcome to be fulfilled by means of sampling across the range of the content of Outcome 1. This assessment must change on each assessment occasion. Achievement can be decided by use of a 60% cut-off score.

Where re-assessment is required it should contain a different sample from the range of mandatory content.

Outcome 2

Acquire, create and manipulate bitmapped graphics to a given brief

Knowledge and/or Skills

♦ Acquire bitmapped graphics
♦ Create bitmapped graphics using appropriate software
♦ Manipulate bitmapped graphics using appropriate software
♦ Edit bitmapped graphics using appropriate software

Evidence Requirements

See Outcome 3.

Outcome 3

Create and manipulate vector graphics to a given brief.

Knowledge and/or Skills

♦ Create vector graphics using appropriate software
♦ Manipulate vector graphics using appropriate software
♦ Edit vector graphics using appropriate software

Evidence Requirements

Candidates will require evidence to provide evidence to demonstrate their Knowledge and/or Skills by showing they can in relation to a given project brief(s):

♦ use appropriate graphics software to create, edit and manipulate bitmap and vector graphics. Software must be of commercial standard
♦ acquire at least one bitmap using an input device, eg scanner, digital camera, stylus, graphics tablet, in the creation of digital imagery

Unit title: Digital Imaging: Bitmap and Vector

♦ apply relevant attributes to bitmaps for screen use. These should at least include:
— resolution
— colour mode
— colour depth
♦ create at least one bitmap graphic using appropriate tools, eg paint brush, pen, eraser, patterns, gradients

Bitmap

♦ manipulate bitmap graphics in a manner appropriate to the brief/s. Manipulations must include the following:
— apply basic photo corrections: correct image size; straighten and crop image; adjust the tonal range, saturation and brightness and apply unsharp masking
— retouch and repair images by removing unwanted part(s), apply basic repairs, blend in corrections and use the history palette
♦ use selection tools to select specific areas, reposition a selection, move and duplicate a selection, deselect, add to and subtract and rotate a selection
♦ work with layers: organise work into layers, create, view, hide rearrange and select layers, apply blending modes, link layers, apply layer effects and flatten layers
♦ work with masks and channels including: applying quick masks and channel masks, save a mask, load a mask and modifying selections using masks
♦ apply at least one edit to a bitmap, eg cut, copy, paste

Vector

♦ create at least one composite vector graphic using appropriate attributes:
— use drawing tools to create straight and curved paths
— apply colour to shapes and objects, including at least one gradient fill
— create text and apply font type, font size, leading
— use layers to create a composite object
♦ manipulate vector graphics in a manner appropriate to the brief/s
— using selection tools
— applying at least one transformation, eg flip, rotate
♦ apply at least one edit to a vector graphic, eg cut, copy, paste

Bitmap and Vector

♦ optimise graphics as appropriate for intended method of delivery: correct file formats, compression, resolution, colour mode and appropriate file size
♦ save graphics in a format suitable for future editing
♦ use suitable naming conventions and filing structure
♦ files should be submitted to the assessor

Higher National Unit specification: statement of standards (cont)

Unit title: Digital Imaging: Bitmap and Vector

Throughout the development all work must be organised and contained in a production folder. There must be a checklist submitted which records that a candidate has achieved all necessary items from the Evidence Requirements and this checklist must have the candidates name and ID along with an endorsement by the assessor with their signature and date.

It is recommended that Outcomes 2 and 3 are integrated into one holistic assessment, however, these may be assessed individually if barriers are being placed on the learning process through this holistic approach.

It is recommended that this assessment is based around a theme. Candidates could be given a range of themes to choose from or select their own them from a source agreed by the assessor. Where candidates select their own theme this must be approved by the assessor.

Administrative Information

Unit code: F1YX 34

Unit title: Digital Imaging: Bitmap and Vector

Superclass category: CE

Original date of publication: August 2007

Version: 01

History of changes:

Version	Description of change	Date

Source: SQA

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of Higher National qualifications.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Customer Contact Centre for further details, telephone 0845 279 1000.

Higher National Unit specification: support notes

Unit title: Digital Imaging: Bitmap and Vector

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.

This could be allocated as follows:

♦   Outcome 1   10 hours
♦   Outcome 2   10 hours
♦   Outcome 3   20 hours

Guidance on the content and context for this Unit

This Unit is one of a series of Units at Higher National level relating to Interactive Media and it can also be taught as a standalone Unit.

It is recommended that candidates should have a basic knowledge of using a computer system. Prior use of graphics software would be beneficial but is not essential before commencing this Unit. This experience could have been gained by undertaking another Unit that has a graphics element, for example, by candidates who have already undertaken some other course of study at a lower level than Higher National level.

This Unit introduces candidates to the use and creation of graphics primarily for use in digital applications, ie websites, interactive media applications, contributory elements, etc. The nature of the Unit is such that it can also be used to demonstrate that graphics use within different mediums and contexts. The purpose is to introduce candidates the differences between different types of graphics (vector, bitmap, meta, animated), their purpose, use and creation and storage on supported media (ie CD, etc). The primary aim of this Unit is to allow a candidate to develop an understanding of graphics and not to teach creative design although there may be opportunities for candidates to develop their creative skills.

At the time of writing, the software application packages suitable for use in the delivery of this Unit include:

♦   Paint: Adobe Photoshop, Adobe Photoshop Elements, Corel Paint Shop Pro, Adobe Fireworks
♦   Draw: Adobe Illustrator, Adobe Freehand, CorelDRAW

It is not necessary to use separate paint and drawing packages during the delivery of this Unit if one package integrates these features.

This Unit is part of the PDA in Digital Imaging at SCQF level 7 (subject to validation at time of writing) and maps (at the time of writing) to the Adobe Certificate Expert (Photoshop) certification.

An up-to-date list of the Adobe Photoshop ACE exam topics can be found at:
http://partners.adobe.com/public/en/ace/ACE_Exam_Guide_Photoshop.pdf or
http://partners.adobe.com/public/ace/main.html.

Higher National Unit specification: support notes (cont)

Unit title: Digital Imaging: Bitmap and Vector

Outcome 1

It should be borne in mind that the phrase 'At the time of writing….' should preface much of what is said in relation to the examples given below of hardware, software, applications packages, file types, etc.

Discussion should be based on the following:

♦ categories of digital images: raster (bitmapped), vector (object-orientated), animated and metafile
♦ the purpose of graphics in applications and why they can be used instead of other media types
♦ uses of screen based graphics (ie interfaces, icons, buttons, logos, banners, digital photographs, etc) in websites, multimedia applications and computer games, etc
♦ common attributes, such as resolution, bit-depth, colour palette (including: Microsoft Windows, Apple MacIntosh system and Web Safe), colour modes, models and spaces (mono, greyscale, HSB and RGB)
♦ the main differences between lossy and lossless compression
♦ common graphic formats, eg Windows Bitmap, GIF, GIF87a and GIF89a, JPEG and JPEG2000, Portable Network Graphic, Tagged Image File Format, Scalable Vector Graphic, X3D, Fractal file format and application specific formats (Adobe Illustrator, Adobe Freehand, CorelDraw, ShockWave Flash, Windows MetaFile and PhotoShop Document file)
♦ graphic development and manipulation applications:
   — **Paint:** Adobe Photoshop, Jasc Paint Shop Pro
   — **Draw:** Adobe Illustrator, CorelDraw, Adobe Freehand
   — **Animation:** Adobe Flash
♦ characteristics and limitations of current image formats, such as:
   — generic raster issues like pixelation, support of vector formats online, cross platform colour palettes (eg 256 Windows system palette, 256 Apple MacIntosh system palette, 216 common Web Safe colours)
   — file format specific issues like colour capability, dithering, supported compression, etc
   — special attributes (eg transparency, progression, interleaving, anti-aliasing, animation, gamma correction, alpha channel transparency)
   — optimisation (eg file size, quality, bit-depth, download speed, etc)
   — issues relating to external support for file formats
   — intended use

Outcome 2

This Outcome relates to acquiring, creating and manipulating images and the use of various industry-standard image file formats and appropriate software.

Higher National Unit specification: support notes (cont)

Unit title: Digital Imaging: Bitmap and Vector

Using the available hardware and software, candidates should investigate the method(s) of capture and creation. This will involve the use of a scanner to digitise data from an analogue source. Ideally a digital camera (stills or video) should be available to demonstrate the digital aspect of capture. Access to a graphics tablet and/or pen would be useful but is not essential. Candidates should make use of a paint program to manipulate capture images (eg tonal adjustment, colour balance, crop, rotate, remove red eye). Images should be created using draw and paint applications (eg Adobe Illustrator CS3 and Adobe Photoshop CS3 or Adobe Photoshop Elements 5). Candidates may typically produce images such as buttons (including rollover variations), logos and interfaces.

Typical image manipulations include: resolution, colour-depth, colour palette, type, resize, flip, rotate, skew, use of layers, fills/gradients, filters, effects, anti-aliasing, matting, masks, alpha channel, transparency, opacity, crop and use of other available tools within the application (eg move, marquee, lasso, magic wand, type effects, etc). Various tools for creating graphics include: pen, pencil, line, brush, fill colour, gradients, patterns, effects etc.

The range of file types to study should include the common screen-based image types:

♦   image stills: GIF, JPEG and PNG
♦   2D Animation: GIF 89 and Flash
♦   vector file formats: AI or SVG
♦   metafile formats: WMF

Note: As technology changes, any other image type available at the time of delivery (eg those which support layers such as PSD).

Candidates should be introduced to each of the graphic and image processes and be given time to practice the skills and techniques required to acquire, create and manipulate graphics and images.

Outcome 3

This Outcome relates to creating, editing and manipulating vector graphics and the use of various industry-standard image file formats and appropriate software.

Using the available hardware and software, candidates should investigate the method(s) of capture and creation. Access to a graphics tablet and/or pen would be useful but is not essential. Candidates should make use of a program with vector drawing tools to manipulate vector graphics (eg flip, skew, rotate). Graphics should be created using draw and paint applications (eg Adobe Illustrator CS3 and Adobe Photoshop CS3). Candidates may typically produce graphic such as buttons (including rollover variations), logos and interfaces.

Tools for creating graphics include: pen, pencil, line, brush, fill colour, gradients, patterns, effects etc.

Candidates should be introduced to each of the graphic and image processes and be given time to practice the skills and techniques required to acquire, create and manipulate graphics and images.

Higher National Unit specification: support notes (cont)

Unit title: Digital Imaging: Bitmap and Vector

Opportunities exist to combine the assessments for Outcomes 2 and 3. It is recommended that candidates are given a brief based on a topic or selection of topics to choose from, whereby the assessor will act as the client. Where candidates are given the option to select their own topic, it is recommended that these must be approved by the assessor. The range of topics should accommodate and engage the candidate cohort with the brief being issued early on in the Unit.

Assessment evidence for Outcome 2 will be a series of practical tests designed to demonstrate candidates' knowledge and/or skills in acquiring, creating and manipulating bitmap graphics. Candidates will be required to build a portfolio of images over an extended period. This will be an open-book assessment, carried out under supervised conditions where the assessor has the opportunity to ask candidates to demonstrate tasks. Each candidate must submit their completed portfolio and accompanying assessors' checklist to achieve a pass in Outcome 2.

Assessment evidence for Outcome 3 will be a series of practical tests designed to demonstrate candidates' knowledge and/or skills in creating and manipulating vector graphics. Candidates will be required to build a portfolio of graphics over an extended period. This will be an open-book assessment, carried out under supervised conditions where the assessor has the opportunity to ask candidates to demonstrate tasks. Each candidate must submit their completed portfolio and accompanying assessors' checklist to achieve a pass in Outcome 3.

Guidance on the delivery and assessment of this Unit

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. This is a mandatory Unit of the HNC Interactive Media, it is recommended that it be taught early on in the Course as it holds the underpinning knowledge and skills required for the Interactive Media: Graded Unit 1 and other project based Units. The most appropriate approach to delivery is one that requires candidates to integrate all knowledge and/or skills for the Unit to create a design solution to a given brief(s). The assessor should act as the client for the finished design and the candidate should respond accordingly.

It should be borne in mind that this Unit, for many candidates, will be the first that they have studied with the intention of developing their knowledge and skills in the production of graphics.

The Evidence Requirements demand that candidates create graphics for use in a website, multimedia application, interface, etc. Focus, therefore, should be on fundamental knowledge, skills, principles and techniques.

It is recommended that a holistic approach be used to teaching this Unit. The knowledge covered in Outcome 1 could be taught in tandem with the practical skills of Outcomes 2 and 3. This approach may help candidates, particularly those completely new to the subject area, to further their understanding of the concepts and techniques being introduced.

Throughout the Unit, consideration should be given to enhancing the candidate learning experience by tutor-led demonstrations, eg using projectors to demonstrate using software, using scanners, graphics tablet/pen and digital camera (where resources permit) may help with the candidates' understanding of the concepts being conveyed.

Outcome 1 will be assessed using a series of questions within a closed-book environment.

Higher National Unit specification: support notes (cont)

Unit title: Digital Imaging: Bitmap and Vector

Opportunities for developing Core Skills

There are no opportunities to develop Core Skills in this Unit.

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.

This Unit may be delivered using open/distance learning provided that they are assessed in the mode defined in this specification. Centres delivering this Unit using open or distance learning should refer to the SQA document *Assessment and Quality Assurance of Open and Distance Learning* (SQA, 2000).

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. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* (**www.sqa.org.uk**).

General information for candidates

Unit title: Digital Imaging: Bitmap and Vector

This Unit is designed to introduce you to the creation of digital images for use within a variety of computer applications, eg websites, digital based interactive applications. It will enable you to explore digital imaging, screen based graphics, digital imaging software, acquisition of digital still images and the manipulation of graphics. You will also be made aware of the importance of file types, file management and optimisation of digital images using industry standard software to produce a product to a given brief(s).

On completion of the Unit you should be able to:

1   Demonstrate an understanding of graphics used in computer applications.
2   Acquire, create and manipulate bitmapped graphics to a given brief.
3   Create and manipulate vector graphics to a given brief.

The purpose of this Unit is to introduce you to the differences between the different types of graphics (vector, bitmap, meta, animated), what they are used for, how they should be use, what medium they are supported on and how to create them. The primary aim is not to teach you to be a designer rather to help you develop an understanding of graphics, although, the Unit does have scope for more creative candidates to practice their skills.

Outcome 1 relates to the theoretical elements of graphics, the use and purpose of graphics, hardware and software, file formats, compression and copyright issues. Assessment for this Outcome is by a series of questions.

Outcomes 2 and 3 are the practical elements of the Unit. You will be exposed to software and hardware used to acquire, create and manipulate bitmap and vector graphics. The emphasis is placed on the process used for creating graphics and your interpretation of a design brief. Assessment for these Outcomes requires you to produce a range of graphics.

An assessor may ask you to explain parts of your work to authenticate the evidence.

In order to complete this Unit successfully you will be required to demonstrate you have achieved success in all three Outcomes.