



Higher National Unit specification

General information for centres

Unit title: Digital Imaging: Advanced Bitmap Techniques

Unit code: F6BS 35

Unit purpose: This Unit is designed to further develop the knowledge and skills required in the production of Bitmap graphics within screen based products. The focus of the Unit is on the techniques that can be applied. Candidates will investigate several design solutions for an interactive product and evaluate an end product. This Unit will expose Candidates to the more advanced techniques available in professional standard Bitmap Graphics software applications, helping them to progress to intermediate or advanced level in some cases. While this Unit focusses more on technical skills, there is scope for Candidates to develop their creative skills. Organisational skills are will be demonstrated in the preparation of materials for the incorporation into a product.

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

- 1 Discuss bitmap graphics and determine their effective use in screen based products.
- 2 Develop bitmap graphics.
- 3 Select and apply graphics to a screen based product.
- 4 Evaluate the use of bitmap graphics and the advanced features of bitmap editing software.

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 however, it is recommended that the candidate should have completed or be in the process of completing one of the following Units or have proof of a similar level of experience:

F1YX 34 *Digital Imaging: Bitmap and Vector*
F207 34 *Digital Imaging: Bitmap Techniques*

Core Skills:

There are opportunities to develop the Core Skill(s) of *Problem Solving* — Planning and Organising and Reviewing and Evaluating at SCQF level 6, 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

- 1 Outcome 1 is a closed-book assessment, consisting of extended questions where the candidate is required to produce evidence of a greater understanding of Bitmap graphics. This should be carried out under supervised conditions.
- 2 Outcome 2 is an open-book assessment and should take the form of a practical assessment carried out under supervised and unsupervised conditions. This assessment should demonstrate candidates' knowledge and/or skills in planning and producing bitmap graphics to a given brief. This assessment may be combined with Outcomes 3 and 4.
- 3 Outcome 3 is an open-book assessment and should take the form of a practical assessment carried out under supervised and unsupervised conditions. This assessment should demonstrate candidates' knowledge and/or skills in selecting and applying bitmap graphics to a screen based product. This assessment may be combined with Outcomes 2 and 4.
- 4 Outcome 4 is an open-book assessment and should take the form of a knowledge based assessment carried out under unsupervised conditions. This assessment should demonstrate candidates' knowledge and/or skills in evaluating bitmap graphics used in a screen based product and an industry standard bitmap graphics software application. This assessment may be combined with Outcomes 2 and 3.

Higher National Unit specification: statement of standards

Unit title: Digital Imaging: Advanced Bitmap Techniques

Unit code: F6BS 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

Discuss bitmap graphics and determine their effective use in screen based products

Knowledge and/or Skills

- ◆ Effective use of bitmapped graphics
- ◆ Quality issues
- ◆ Attributes
- ◆ File formats
- ◆ Compression
- ◆ Production techniques
- ◆ Preparing for distribution
- ◆ Copyright
- ◆ Current developments

Evidence Requirements

Evidence of the Knowledge and/or Skills in this Outcome will be assessed using extended response questions. These will be based on a representative sample of the range of content for Outcome 1. The assessment must be supervised, controlled and presented under closed-book conditions. Written and/or oral recorded evidence must be provided.

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

- ◆ determine and justify the appropriate use of bitmaps within screen based products. Comparisons of misuse may be used to support the argument.
- ◆ explain at least one issue relating to quality, eg performance, pixilation, colour depth, different published file formats.
- ◆ describe at least one of the main attributes of bitmap graphics.
- ◆ explain the difference between published and native file formats and discuss at least one format from each of these categories, eg features, advantages, disadvantages.
- ◆ determine which compression techniques are applied to a published file format, the effect on the Outcome, artefacts caused and the advantages and disadvantages.
- ◆ determine and describe some of the advanced techniques and tools used in bitmap editing software.

Higher National Unit specification: statement of standards (cont)

Unit title: Digital Imaging: Advanced Bitmap Techniques

- ◆ describe one of the main aspects of preparing a graphic for distribution (eg for web, TV, print).
- ◆ determine what copyright infringement is, ownership of graphics and the process to obtain permission. Within this, identify current UK copyright legislation including where updated information can be found and describe one method of copyright protection.
- ◆ identify and discuss a new development relating to bitmap graphics, eg new file specification, compression technique, browser support.

This assessment must change on each assessment occasion.

Assessment Guidelines

It is recommended that assessment should last no longer than 2 hours? Written responses could be generated in a report, presentation or question paper. Where a presentation is used candidates may also provide evidence orally, in a one-to-one situation with the assessor.

The sample could cover 60% of the Evidence Requirements.

Achievement can be decided by use of a 60% cutting score.

Outcome 2

Develop bitmap graphics

Knowledge and/or Skills

- ◆ Planning
- ◆ Compositions
- ◆ Creation techniques
- ◆ Advanced techniques and tools
- ◆ Preparation for distribution

Evidence Requirements

Candidates will require evidence of the Knowledge and/or Skills of this Outcome by demonstrating that they can in relation to a given brief:

- ◆ develop a range of suitable design ideas and present these in an accepted format used in industry, eg sketches, mock-ups, storyboards, mood boards
- ◆ justify the chosen design solution
- ◆ acquire bitmap graphics from suitable sources and acknowledge copyright.
- ◆ apply the correct capture settings including appropriate capture file formats, eg RAW, uncompressed JPEG
- ◆ use industry standard software in the production of bitmapped graphics
- ◆ customise and create elements of the software, eg interface, tools, presets that are relevant to the task
- ◆ create at least one bitmap graphic using a range of tools effectively:
 - for example paint brush, pen, eraser, patterns, gradients, effects

Higher National Unit specification: statement of standards (cont)

Unit title: Digital Imaging: Advanced Bitmap Techniques

- ◆ create a composition(s) consisting of at least one graphic and image:
 - work with and organise layers
 - apply relevant document settings and colour mode
 - utilise tools for laying out and aligning graphics
- ◆ apply advanced techniques effectively in the creation of a composition:
 - for example use of selection tools, image corrections, editing tools, drawing tools and paths, paint tools, masks, channels, layer techniques, effects, filters, gradients, patterns, palettes, video tools, blending modes, grouping layers, create layer styles, clipping groups, 3D tools, meta data, transformation methods, actions, batches, slices, variables, animation, any other relevant techniques.

Several techniques should be used, that are relevant to creating the composition. Effective use of the techniques and the quality of composition are more important than using wide range of techniques.

- ◆ apply copyright details to original works
- ◆ save files in an appropriate format for future editing
- ◆ use file naming conventions
- ◆ organise files into relevant directories
- ◆ submit all files in digital format
- ◆ print the completed composition

This is an open book, practical assessment which should be carried out under supervised and unsupervised conditions. Assessors must ensure the authenticity of Candidate work.

Assessment Guidelines

See the Assessment Guidelines for Outcome 4.

Higher National Unit specification: statement of standards (cont)

Unit title: Digital Imaging: Advanced Bitmap Techniques

Outcome 3

Select and apply graphics to a screen based product

Knowledge and/or Skills

- ◆ Purpose
- ◆ Output settings
- ◆ File formats
- ◆ Optimisation techniques
- ◆ Integration
- ◆ Publish

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can in relation to a given brief:

- ◆ select graphics that are appropriate for the brief. These graphics can be sourced and at least one must be created by the candidate. Justify the selection.
- ◆ prepare graphics for the chosen delivery medium. At a minimum this should include:
 - resolution
 - colour mode
 - colour depth

Any other required standard settings should be applied to ensure that the graphic displays properly in the chosen medium.

- ◆ save graphics into the correct file format for the chosen medium. Where appropriate, optimise graphics to maintain quality and file size.
- ◆ integrate the selected graphics into the chosen screen based product, eg webpage, presentation.
- ◆ publish the application to the chosen medium, eg online, DVD.

This is an open-book assessment which should be carried out under supervised and unsupervised conditions. Assessors must ensure the authenticity of candidate work.

Assessment Guidelines

See the Assessment Guidelines for Outcome 4.

Higher National Unit specification: statement of standards (cont)

Unit title: Digital Imaging: Advanced Bitmap Techniques

Outcome 4

Evaluate the use of bitmap graphics and the advanced features of bitmap editing software

Knowledge and/or Skills

- ◆ Effective use of bitmaps used within an screen based product
- ◆ Quality issues
- ◆ Software techniques and tools

Evidence Requirements

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

- ◆ how appropriate the bitmap graphics are for the screen based product. This should include factors such as whether the correct type of graphic has been used, how well the graphic(s) support and/or convey information, appropriateness for the brief, the amount of graphics, placement of the graphic(s), suggestions for any solutions for ineffective use and any other relevant factor(s).
- ◆ the quality of the graphic(s), eg appearance, artefacts, colour/tonal quality, file size, the overall effect on the performance of the application and any other relevant factor(s).
- ◆ the advanced features of the bitmap editing software application which the candidate used to produce the graphics. This should include the effectiveness of the interface, some of the advanced features used ease of use. Detailed evaluations should be given therefore it is not enough to say 'it was good/bad'.
- ◆ at least one alternative bitmap editing software applications which is available in terms why this wasn't used, the possible advantages of using this, different features available and if comparison possible, the ease of use.

The assessment should be open book and can be carried out unsupervised. It is the assessor's role to ensure the authenticity of the candidates work.

Assessment Guidelines

Outcomes 2, 3 and 4 could be combined into one single instrument of assessment. Proof of an organised directory could be evidenced with screen prints.

Achievement of Outcome 4 can be decided by use of a 60% cutting score.

Administrative Information

Unit code: F6BS 35

Unit title: Digital Imaging: Advanced Bitmap Techniques

Superclass category: CE

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Version	Description of change	Date

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Higher National Unit specification: support notes

Unit title: Digital Imaging: Advanced Bitmap Techniques

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 one of a series of Units at Higher National level relating to Interactive Media. It is an optional Unit within the HND Interactive Media Group Award and can also be taught stand-alone.

This Unit is about further developing the knowledge and skills required to produce bitmap graphics and to develop a further understanding of their use in screen based products. Centres would deliver this Unit if they wish candidates to focus further on a particular software application, eg Adobe Photoshop, or just bitmap graphics in general. Whilst the Unit suggests these products are interactive media, eg web, DVD, TV, mobile devices any other screen based medium could be used and it doesn't necessarily have to be interactive.

It is intended that this Unit will help candidates to develop their software skills to at least intermediate level or expert. Whilst creative skills are not assessed candidates will be made aware of what is an acceptable standard for professional quality bitmap graphics.

Industry standard software should be taught in this Unit. At the time of writing Photoshop CS3, Corel Paint Shop Pro, Adobe Fireworks are examples of industry standard software for working with bitmap graphics. Less complex paint packages like Microsoft Paint are not deemed suitable for delivery of this Unit. It is recommended that candidates use the same software application used in the precursor Unit(s) to enable advanced skills to be developed. It may be useful to expose candidates to some packages that they haven't used before so that they can evaluate the pros and cons of different software applications.

Candidates should be exposed to good and bad examples of bitmaps and their use in screen based applications. This will help them to design and select appropriate graphics and evaluate the effective use of graphics. Current copyright issues should be addressed and candidates should be able to follow the processes involved in acknowledging copyright.

Outcome 1

This Outcome focusses on the aspects of bitmap graphics that determine quality and purpose within a screen based product. Candidates should develop an understanding of what is an acceptable use of graphics so that they can justify their own selection of graphics for a product.

The main issues relating to quality should be discussed. This should cover performance, pixilation, colour depth, differences between different file formats, artefacts and any other relevant factors at the time.

A range of native and published file formats should be discussed and candidates should be given the opportunity to develop a greater knowledge of the attributes, advantages and disadvantages of a few of these formats.

Higher National Unit specification: support notes

Unit title: Digital Imaging: Advanced Bitmap Techniques

Discussion on file formats could lead into the different compression techniques used by lossy and lossless formats. These should at the very least include RLE, LZW, Huffman encoding. The effect of compression should be examined in terms of the artefacts caused and the advantages and disadvantages.

At this stage candidates should be exposed to the chosen bitmap editing software application for the Unit. Advanced techniques and tools should be examined, enabling candidates to describe their purpose.

From this, discussion should lead to examples of the preparing a graphic for distribution on a variety of mediums (web, TV, print). Candidates should then focus on one particular medium to become more familiar with the preparation process for it.

Throughout the Outcome references to copyright could be made. This should focus on determining all the factors of infringement and who actually owns a graphic. Candidates should be made aware that when they produce a graphic for a client, it is not their own. It would be useful for candidates to carry out an exercise in obtaining copyright permission, to help them understand the entire process. Current UK copyright legislation should be emphasised and candidates should be made fully aware of how and where to access this information. It would also be worthwhile to discuss the legislation of some other countries. Current methods of copyright protection should be discussed, eg watermarks, digimarc.

Candidates should be made aware of some of the current developments relating to bitmap graphics, eg new versions of file formats, compression techniques, browser and platform support and copyright legislation in the UK (other countries can be discussed, time permitting).

Outcome 2

This Outcome is purely focused on developing composite bitmap graphics. The focal point of this Outcome is to teach candidates how to apply the more advanced techniques and tools that are available in an industry standard bitmap editing software application. Emphasis should be placed on how to apply these effectively.

Candidates should be exposed to a variety of methods used by professionals, to plan and develop ideas for a design. Examples should include sketches, mock-ups, storyboards, mood boards and any other relevant method.

To help form concepts for the composition, candidates should be exposed to good and bad examples of designs. The principles of design could be discussed to justify decisions. Additional evaluation criteria to that discussed in the Quality element of Outcome 1 should be introduced at this stage. These discussions will help candidates to justify their chosen solution for the bitmap composition and the other graphics to be used in the screen based products.

Candidates should be exposed to various acceptable methods for acquiring graphics including royalty free stock images, copyright materials and reputable free sources. This will help candidates to source graphics more efficiently as opposed to trawling the web. Acquiring permission to use the assets and acknowledge copyright should be practised. Gaining permission should look at the type of information required within a request, eg asset, use, occurrences, and the typical terms included in a copyright agreement, eg timescale of the license, terms of renewal.

Higher National Unit specification: support notes (cont)

Unit title: Digital Imaging: Advanced Bitmap Techniques

With regard to acquiring their own materials, candidates should be reminded of the various devices available — camera, scanner, graphics tablet. The appropriate settings should be recapped. Where candidates are using a camera to capture part of their composition, they should be encouraged to try some of the different settings available such as filters and lenses. Candidates should ensure that they apply a form of copyright protection to their own works.

Industry standard software must be used in the production of the composition. Examples of acceptable software applications are mentioned earlier in this section.

Candidates should gain greater familiarity of the application to enable them to customise the interface, create presets and custom elements, eg tools, palettes. This should help them to create a more effective working environment that is suitable for the task of creating the composite graphic.

In terms of using the application, candidates must practise and be able to demonstrate using a wide range of tools and commands within the application. By the end of the Outcome, candidates should be able to demonstrate proficient use of several of these. The Evidence Requirements of this Outcome clearly state the range features of the software application that should be practised — these are based on Adobe Photoshop and Coral Paint Shop Pro. It should be noted that these are a minimum and are not exhaustive.

The range and type of features will vary between software applications, therefore Centres should refer to the vendor's documentation and recognised industry sources to determine the advanced techniques and tools that should be used.

Emphasis should also be placed on applying the techniques and tools effectively to create good designs.

Candidates are only required to create one composite graphic, as opposed to a variety, so that they are given the adequate opportunity to demonstrate their range and depth of technical skills.

Resource management should cover organising files effectively, using the correct formats for future editing, eg PSD, PNG and applying file naming conventions for the operating system. Candidates should also practise using file names pertinent to the graphic. Good practise should also cover the need to discard unused materials, not saving too many versions, version control, backups and cataloguing assets.

Candidates are expected to maintain good resource management throughout the Unit.

The various settings for printing graphics should be recapped and correct settings should be practised. The composite graphic should be able to fit on standard screen resolutions and 4A, at the most, for print media.

Higher National Unit specification: support notes (cont)

Unit title: Digital Imaging: Advanced Bitmap Techniques

Outcome 3

This Outcome puts into practise the knowledge gained in Outcomes 1 and 2 with regards to the good use of graphics and the level of quality expected in professional products.

Candidates should examine a variety of uses and examples to help them understand what is acceptable. From this they should develop skills to help them justify their own choice of graphics.

Examples of the differences between preparing graphics for different mediums should be given. This should look at the various settings such as size of display, resolution, colour mode, colour depth, compression techniques, file format and any other relevant settings should be practised. The end result should ensure that the graphic displays properly in the chosen medium. Candidates may have to make various attempts to get the correct result.

To help assess the effectiveness and performance of the graphic, candidates should integrate them into the screen based product and publish this to the delivery medium. It is not necessary to produce the complete product. It is sufficient for the graphic to be inserted into the page, eg html document, slide. No other content is required on the page.

Outcome 4

This Outcome focuses on evaluating the completed solutions for Outcome 2 and 3. Candidates should be aware of the criteria that should be used to evaluate graphics used in screen based products. This should include factors such as whether the correct type of graphic has been used, how well the graphic(s) support and/or convey information, appropriateness for the brief, the amount of graphics, placement of the graphic(s), suggestions for any solutions for ineffective use and any other relevant factor(s).

The quality of the graphic(s) in terms of appearance, artefacts, colour/tonal quality, file size, the overall effect on the performance of the application and any other relevant factor(s) should be examined.

Candidates should be able to summarise whether their solution has been effective and if any recommendations for the future should be made.

The software application used to develop the composite graphic should be evaluated. At the very least this should include the effectiveness of the interface, some of the advanced features used and ease of use. Detailed evaluations should be given therefore it is not enough to say 'it was good/bad'. Within this discussion candidates should mention what other application could have been used and state some of the differences.

Higher National Unit specification: support notes

Unit title: Digital Imaging: Advanced Bitmap Techniques

Guidance on the delivery and assessment of this Unit

If this Unit is being delivered as part of a Group Award, it is recommended that it is taught within the subject area of the Group Award to which it contributes.

Whilst this Unit was designed as a progression route from F1YX 34 *Digital Imaging: Bitmap and Vector* and F207 34 *Digital Imaging: Bitmap Techniques*, other graphics Units may be suitable or a similar level of experience may be acceptable.

There is no recommendation for when to deliver this Unit in the session. Where it may be important for candidates to apply some of the knowledge and skills in a Graded Unit, it may therefore be best to deliver this before that Unit. It is not recommended to deliver this Unit to candidates who don't have the prerequisite level of knowledge and skills as it is highly unlikely that a novice will be able to attain the level required.

It is recommended that a holistic approach be used to teach this Unit. The knowledge covered in Outcome 1 could be taught in tandem with the practical skills of Outcome 2 and 3. The knowledge covered in Outcome 1 will also help candidates with the evaluation task in Outcome 4. It would therefore be useful to teach elements of Outcome 4 early on in the Unit. A reverse engineering approach could be used.

Throughout the Unit, consideration should be given to enhancing the candidate experience with the chosen bitmap editing software application. Candidates should be exposed to this from the start of the Unit. At the very least they should be given demonstrations of how to use all the tools and techniques required of the Unit, to create acceptable standards of graphics. Video tutorials would also be useful, but may not be the best method of demonstration to solely rely on, since candidates have to toggle between windows.

It may help candidates if Outcome 1 is assessed at the end of the Unit once they have gained more practical experience.

Whilst it is recommended that Outcomes 2, 3 and 4 are assessed holistically, each Outcome can be assessed individually. Centres have to determine what approach gives the most accurate reflection of what happens in industry. The method chosen should not cause any obstacles for candidates.

The brief(s) for Outcomes 2, 3 and 4 should be issued early on in the Unit, to help give candidates adequate time to plan an effective design. The Outcomes should be assessed in their logical order.

This Unit can help candidates to prepare for the Adobe Photoshop ACA (Adobe Certified Academic) and ACE (Adobe Certified Expert) exams.

If Centres are using this Unit as a tool to prepare for any vendor exams they should also refer to the guidelines from the vendor to ensure that their curriculum is being covered. It must be noted however, that candidates achieve this Unit based on meeting the Evidence Requirements of the Outcomes, therefore additional criteria specified for vendor qualifications cannot be included.

Higher National Unit specification: support notes (cont)

Unit title: Digital Imaging: Advanced Bitmap Techniques

Candidates with proof of Photoshop ACA or ACE qualifications may automatically be credited with this Unit. Centres would have to ensure that these qualifications map to all of the Evidence Requirements of this Unit.

Opportunities for developing Core Skills

Evidence generated for Outcome 4 may contribute towards the Review and Evaluation element of *Problem Solving* at SCQF level 6.

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.

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: Digital Imaging: Advanced Bitmap Techniques

This Unit is designed to further develop the knowledge and skills required in the production of Bitmap graphics within screen based products. The focus of the Unit is on the techniques that can be applied. You will investigate several design solutions for an interactive product and evaluate an end product. This Unit will expose you to the more advanced techniques available in professional standard Bitmap Graphics software applications, helping you to progress to intermediate or possibly advanced level. While this Unit focusses more on technical skills, there is scope for you to develop your creative skills. You will also gain more organisational skills in managing resources, planning and managing your work flow.

On completion of the Unit you should be able to:

- 1 Discuss bitmap graphics and determine their effective use in screen based products.
- 2 Develop bitmap graphics.
- 3 Select and apply graphics to a screen based product.
- 4 Evaluate the use of bitmap graphics and the advanced features of bitmap editing software.

This is mainly a practical Unit, whereby you will be given demonstrations to help you develop skills in a software application that you already have experience with. You will be assessed on your depth of knowledge and on your practical skills. You will be exposed to industry standard software that you are already familiar with, to develop more advanced skills. You will also be introduced to alternative applications and some of the differences between these.

You will concentrate on developing your expertise in being able to use a variety of tools and techniques effectively to meet a given brief. Whilst applying recognised standards to a composite bitmap graphic is one of the aims of the Unit, it is not necessary to have creative skills, more so to know what is and isn't acceptable quality.

This Unit can help you to prepare for Adobe Photoshop ACA (Adobe Certified Academic) and ACE (Adobe Certified Expert) exams if you have used Photoshop previously, particularly for F1YX 34 *Digital Imaging: Bitmap and Vector* and/or F207 34 *Digital Imaging: Bitmap Techniques* or any other graphics Unit at HNC level or above.