SQA Advanced Unit specification

General information

Unit title: CAD: Technical Illustration (SCQF level 8)

Unit code: HV1R 48

Superclass: CH

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Version: 01

Unit purpose

This Unit is designed to introduce learners to the role of Technical Illustration within the design process. This Unit allows the learner to develop knowledge and skills, which will allow them to understand the processes involved in the preparation and development of technical illustrations.

Outcomes

On successful completion of the Unit the learner will be able to:

1 Use a vector graphics package to create technical illustrations from CAD data.
2 Use a bitmap graphics package to create technical illustrations from CAD data.
3 Create a presentation incorporating CAD drawings and finished technical illustrations.
4 Describe the key aspects of producing technical illustrations from CAD data.

Credit points and level

2 SQA Credits at SCQF level 8: (16 SCQF credit points at SCQF level 8)

Recommended entry to the Unit

Learners should possess a basic knowledge and understanding of design and in particular Computer Aided Design. This may be evidenced by the possession of SQA Advanced Units:

HV1H 47 *CAD: Graphical Design*
HR3L 47 *CAD: 2D I*
HR3H 47 *CAD: 2D II*
HR6H 47 *CAD: Visualisation, Rendering and Presentation*
HV1K 47 *CAD: 3D Surface and Solid Modelling*

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components 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.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website **www.sqa.org.uk/assessmentarrangements**.

SQA Advanced Unit specification: Statement of standards

Unit title: CAD: Technical Illustration (SCQF level 8)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Use a vector graphics package to create technical illustrations from CAD data.

Knowledge and/or Skills

- Concept development
- File transfer techniques
- Modification tools
- Text manipulation
- Shading techniques
- Colour palette

Outcome 2

Use a bitmap graphics package to create technical illustrations from CAD data.

Knowledge and/or Skills

- File transfer techniques
- Layers and effects
- Drawing tools (specific to software)
- Opacity
- Special effect filters
- Masks

Outcome 3

Create a presentation incorporating CAD drawings and finished technical illustrations.

Knowledge and/or Skills

- Presentation design considerations

Outcome 4

Describe the key aspects of producing technical illustrations from CAD data.

Knowledge and/or Skills

- File types
- Colour Palettes
- Typography
- Layout
- Aesthetics
- Vector images
- Bitmap images
- Copyright issues

Evidence Requirements for this Unit

Outcome 1

A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the learner is able to:

- produce annotated sketches of a minimum of two concept designs to be taken forward for illustration.
- use file transfer techniques to import CAD data into the vector graphics software being used to create the technical illustrations.
- use a minimum of five manipulation tools in the creation of the technical illustrations.
- create a minimum of two technical illustrations using vector graphic software.
- control and manipulate text, shading and colour elements of the technical illustrations.
- produce final prints of the completed technical illustrations.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Learners will be allowed to refer to relevant Course material.

Outcome 2

A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the learner is able to:

- use file transfer techniques to import CAD data into the bitmap graphics software being used to create the technical illustrations.
- use a minimum of five advanced features of bitmap graphic software in the creation of a minimum of two technical illustrations from imported CAD data.
- demonstrate effective organisation of layers within each image incorporating an appropriate naming convention, and work with the drawing, effect, opacity and mask tools.
- produce hardcopy print of the completed technical illustrations.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Learners should be allowed to refer to relevant Course material.

Outcome 3

A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the learner is able to:

- create a presentation in response to a given design brief that incorporates concept sketches, CAD data and technical illustrations.
- show knowledge and practical application of colour for the enhancement of the presentation.
- add and control the positioning and scale of annotation within the presentation.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Learners should be allowed to refer to relevant Course material.

Outcome 4

A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements for each item by showing that the learner is able to:

- describe the key aspects of producing technical illustrations from CAD data, focusing on file types, colour palettes, typography, layout, aesthetics, vector and bitmap images and copyright issues.

Evidence should be generated through assessment undertaken in controlled, supervised conditions. Learners should be allowed to refer to relevant Course material.

SQA Advanced Unit Support Notes

Unit title: CAD: Technical Illustration (SCQF level 8)

Unit Support Notes are offered as guidance and 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 has been written in order to allow learners to develop knowledge, understanding and skills in the following areas:

1 Use of a vector graphics package to create technical illustrations from CAD data.
2 Use of a bitmap graphics package to create technical illustrations from CAD data.
3 Creation of a presentation incorporating CAD drawings and finished technical illustrations.
4 Description of the key aspects of producing technical illustrations from CAD data.

This Unit is at SCQF level 8 and may form part of a group award or be completed as a free-standing Unit.

In designing this Unit, the Unit writer has identified the range of topics that would be expected to be covered by lecturers. The writer has also given recommendations as to how much time should be spent on each Outcome assessment. This has been done to help lecturers decide what depth of treatment should be given to the topics attached to each of the Outcomes. While it is not mandatory for centres to use this list of topics, it is recommended that they do so.

A list of topics for each Outcome is given below. Lectures are advised to study this list in conjunction with the assessment exemplar pack so that they can get a clear indication of the standard of achievement of learners in this Unit.

Outcome 1

Use of a vector graphics package to create technical illustrations from CAD data.

Outcome 1 requires the learner to use a vector graphics package to create technical illustrations from CAD data. Learners should demonstrate knowledge of file transfer techniques and format suitability. The learner should then demonstrate their ability to use the modification tools within the vector graphics package, eg path manipulation, transform, rotation etc. The learner should also demonstrate their ability to utilise the text manipulation tools within the software, eg text to path, extrusion, typeface modification etc. The learner should also evidence knowledge of shading techniques, eg block colouring, gradients/ blended fills, path colouring, etc. The learner should also demonstrate an awareness of colour palette suitability, eg CMYK/RGB, etc.

Learners should produce a minimum of two concept sketches with supporting annotation, Learners should then use the vector graphics package to produce a minimum of two vector graphic illustrations based on CAD drawings sourced, created or provided by the centre. The learner should save the vector illustrations using appropriate file formats and produce hardcopy prints of the illustrations.

Outcome 2

Use of a bitmap graphics package to create technical illustrations from CAD data.

Outcome 2 requires the learner to use a bitmap graphics package to create technical illustrations from CAD data. Learners should demonstrate knowledge of file transfer techniques and format suitability. The learner should then demonstrate an ability to utilise a layers system within a bitmap environment, eg layer opacity, layer blending, layer effects etc. while maintaining an appropriate layer naming convention.

During delivery of the Unit, learners should be introduced to software specific drawing tools (eg paintbrush/pencil), opacity controls, special effects filters and masking/selection tools. The learner should then utilise the parameters of the software to produce design solutions, save the illustrations using appropriate file formats and produce hardcopy prints of the illustrations.

Outcome 3

Creation of a presentation incorporating CAD drawings and finished technical illustrations.

In this Outcome the learner should be able to create a presentation. The learner will experiment with suitable backgrounds, text, and images. The learner will also show consideration for the presentation composition, eg positioning, scale and orientation of the previously named elements. Learners should show a sympathetic approach to colour choice for the overall enhancement of the presentation.

Outcome 4

Description of the key aspects of producing technical illustrations from CAD data.

In this Outcome the learner should explain the process of generating technical illustration in both vector and bitmap formats and identify the key aspects of this process. Learners should evidence knowledge of both vector and bitmap file types used in the generation of computer graphics (technical illustrations); colour palette options, typography, layout, aesthetic and copyright issues.

Guidance on approaches to delivery of this Unit

It is intended that this Unit be presented at all times using the specialist application CAD software available at the centre. Appropriate technical and support material should be available to the learner.

In delivery of this Unit, learners should be provided with the opportunity to gain as much ‘hands on’ experience as possible. Each learner should have access to a PC with the appropriate vector and bitmap graphics software installed.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of

assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Outcome 1 requires the learner to use a vector graphics package to create technical illustrations from CAD data. The assessment for Outcome 1 in this Unit should last a maximum four hours. Learners should be allowed to refer to relevant Course material. Outcome 2 requires the learner to use a bitmap graphics package to create technical illustrations from CAD data. The assessment for Outcome 2 in this Unit should last a maximum four hours. Learners should be allowed to refer to relevant Course material.

Outcome 3 requires the learner to develop a presentation incorporating CAD drawings, concept sketches and finished technical illustrations. The assessment for Outcome 3 in this Unit could be taken by learners at one single event that should last a maximum two hours. Learners should be allowed to refer to relevant Course material.

Outcome 4 requires the learner to describe the key aspects of producing technical illustrations from CAD data. The assessment for Outcome 4 in this Unit could be taken by learners at one single event that should last a maximum two hours. Learners should be allowed to refer to relevant Course material.

It would also be possible to assess the knowledge and skills of Outcomes 1, 2 and 3 as a single assignment.

It should be noted that learners must achieve all the minimum evidence specified for each Outcome in order to pass the Unit.

It is essential that the Centres ensure that evidence generated is the learner's own work.

Assessment Guidelines

Outcome 1

The assessment for this Outcome can be integrated with Outcomes 2 and 3 as part of a single assessment. The assessment for this Outcome could also be carried out as a separate event — this is at the discretion of the presenting centre. The time allocation for the assessment is a maximum four hours. It is recommended that centres develop checklists to support the assessment requirements for each of the Knowledge and/or Skills items.

Outcome 2

The assessment for this Outcome can be integrated with Outcomes 1 and 3 as part of a single assessment. The assessment for this Outcome could also be carried out as a separate event, this is at the discretion of the presenting centre. The time allocation for the assessment is a maximum four hours. It is recommended that centres develop checklists to support the assessment requirements for each of the Knowledge and/or Skills items.

Outcome 3

The assessment for this Outcome can be integrated with Outcome 1 and 2 as part of a single assessment for the Unit. The assessment for this Outcome could also be carried out as a separate event - this is at the discretion of the presenting centre. The time allocation for the assessment is 2 hours. It is recommended that centres develop checklists to support the assessment requirements for each of the Knowledge and/or Skills items.

Outcome 4

The assessment for this Outcome should take the form of a single written or oral recorded exercise. The assessment can be carried out after the topic has been taught or at the end of the Unit. This is at the discretion of the presenting centre. The time allocation for the assessment is two hours. It is recommended that centres develop checklists to support the assessment requirements for each of the Knowledge and/or Skills items.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at **www.sqa.org.uk/e-assessment**.

Opportunities for developing Core and other essential skills

There are opportunities to develop the Core Skills of *Communication, Problem Solving* and *Information and Communication Technology (ICT)* to SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components.

History of changes to Unit

Version	Description of change	Date

SQA acknowledges the valuable contribution that Scotland's colleges have made to the development of SQA Advanced Qualifications.

FURTHER INFORMATION: Call SQA's Customer Contact Centre on 44 (0) 141 500 5030 or 0345 279 1000. Alternatively, complete our Centre Feedback Form.

General information for learners

Unit title: CAD: Technical Illustration (SCQF level 8)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

This Unit has been designed to provide you with the knowledge and skills that will enable you to understand the basic concepts of *CAD: Technical Illustration*.

This Unit will also allow you to develop practical skills that will enable you to create technical illustrations generated from CAD data in both vector and bitmap formats. You will also be able to produce a presentation that incorporates CAD data and technical visuals. You will also be able to explain the process of generating technical illustration in both vector and bitmap formats and identify the key aspects of this process.

The formal assessment for this Unit includes both written and practical elements. The actual assessment times are as follows:

Outcome 1	Practical	4 hours
Outcome 2	Practical	4 hours
Outcome 3	Practical	2 hours
Outcome 4	Written or oral recorded	2 hours

You will be allowed access to all Course notes during the assessment event.

At the discretion of the individual centres, all Outcomes can be carried out after the teaching of the appropriate topics or as an integrated assignment, this will not usually be attempted until all teaching has been completed.