



Higher National Unit specification

General information

Unit title: CAD: Systems Management (SCQF level 8)

Unit code: HE2C 35

Superclass: VF

Publication date: May 2016

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

This Unit is designed to introduce learners to customising a CAD system. The Unit allows learners to develop the necessary knowledge and skills to allow them to increase draughting productivity using customising techniques.

Outcomes

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

- 1 Customise the user interface of a CAD system.
- 2 Create custom automated drawing tools.
- 3 Create custom setup of a CAD system.
- 4 Evaluate the application of customised setup.

Credit points and level

1 Higher National Unit credits at SCQF level 8: (8 SCQF credit points at SCQF level 8)

Recommended entry to the Unit

Access is at the discretion of the centre. However, learners should possess a basic knowledge and understanding of 2D draughting techniques. This may be evidenced by possession of HN Units in *Computer Aided Draughting* and/or a Higher in Graphical Communication (or equivalent).

Higher National Unit specification: General information (cont)

Unit title: CAD: Systems Management (SCQF level 8)

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. The Unit may be linked/integrated with the following Units: *Computer Aided Draughting and Design: Graded Unit 1; CAD: User Systems.*

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.

Higher National Unit specification: Statement of standards

Unit title: CAD: Systems Management (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.

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. Learners 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

Customise the user interface of a CAD system.

Knowledge and/or Skills

- ◆ User-defined toolbar
- ◆ Custom icon commands
- ◆ Flyout icon
- ◆ User-defined icon button
- ◆ Draughting aids
- ◆ Screen layout
- ◆ Mouse functions (software side)
- ◆ Keyboard command aliases and short-cut keys ('hotkeys')

Outcome 2

Create custom automated drawing tools.

Knowledge and/or Skills

- ◆ Simple linetypes containing dashes, dots and spaces
- ◆ Complex linetypes containing text
- ◆ Complex linetypes containing shapes
- ◆ Multiple linetypes with more than two elements
- ◆ Hatch patterns containing horizontal and vertical elements
- ◆ Macro scripting using existing tools and options
- ◆ Custom scripts

Higher National Unit specification: Statement of standards (cont)

Unit title: CAD: Systems Management (SCQF level 8)

Outcome 3

Create custom setup of a CAD system.

Knowledge and/or Skills

- ◆ System options
- ◆ System variables
- ◆ Software launch options
- ◆ Template usage
- ◆ Drawing standard setup/Units
- ◆ Input devices/peripherals (hardware)
- ◆ Output devices/peripherals (hardware)

Outcome 4

Evaluate the application of customised setup.

Knowledge and/or Skills

- ◆ Types of customisation
- ◆ Provided 'packaged' variations of existing software
- ◆ Dedicated specialised software
- ◆ Hardware/Software needs
- ◆ In-house vs. third party customisation
- ◆ Advantages and disadvantages of customisation
- ◆ Role of a CAD Manager
- ◆ The effects of customisation on CAD standards

Higher National Unit specification: Statement of standards (cont)

Unit title: CAD: Systems Management (SCQF level 8)

Evidence Requirements for this Unit

Outcome 1

Evidence for the Knowledge and/or Skills in this Outcome will be provided on a sample basis. In any assessment of this Outcome **four of the eight** Knowledge and/or Skills should be sampled, demonstrating that the learner can create a **minimum of six** customised changes. In order to ensure that learners will not be able to foresee what items they will be assessed on, a different sample of Knowledge and/or Skills is required on each assessment occasion. A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements of the sample by showing that they are able to customise features such as:

- ◆ User-defined toolbar
- ◆ Custom icon commands
- ◆ Flyout icon
- ◆ User-defined icon button
- ◆ Draughting aids
- ◆ Screen layout
- ◆ Mouse functions (software side)
- ◆ Keyboard command aliases and short-cut keys ('hotkeys')

Evidence should be generated through assessment undertaken in controlled, supervised open-book conditions. Learners may refer to textbooks, handouts or notes for this assessment.

Outcome 2

Evidence for the Knowledge and/or Skills in this Outcome will be provided on a sample basis. In any assessment of this Outcome **four of the seven** Knowledge and/or Skills should be sampled, demonstrating that the learner can create a minimum of **four** custom tools. In order to ensure that learners will not be able to foresee what items they will be assessed on, a different sample of Knowledge and/or Skills is required on each assessment occasion. A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements of the sample by showing that they are able to create custom tools such as:

- ◆ Simple linetypes containing dashes, dots and spaces
- ◆ Complex linetypes containing text
- ◆ Complex linetypes containing shapes
- ◆ Multiple linetypes with more than two elements
- ◆ Hatch patterns containing horizontal and vertical elements
- ◆ Macro scripting using existing tools and options
- ◆ Custom scripts

Evidence should be generated through assessment undertaken in controlled, supervised open-book conditions. Learners may refer to textbooks, handouts or notes for this assessment.

Higher National Unit specification: Statement of standards (cont)

Unit title: CAD: Systems Management (SCQF level 8)

Outcome 3

Evidence for the Knowledge and/or Skills in this Outcome will be provided on a sample basis. In any assessment of this Outcome **five of the seven** Knowledge and/or Skills items should be sampled, demonstrating that the learner can create a **minimum of six** customised changes. A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements of the sample by showing that the learner is able to customise features such as:

- ◆ System options
- ◆ System variables
- ◆ Software launch options
- ◆ Custom template usage
- ◆ Drawing standard setup/Units
- ◆ Input devices/peripherals (hardware)
- ◆ Output devices/peripherals (hardware)

Evidence should be generated through assessment undertaken in controlled, supervised open-book conditions. Learners may refer to textbooks, handouts or notes for this assessment.

Outcome 4

Evidence for the Knowledge and/or Skills in this Outcome will be provided by the learners choice as written and/or oral recorded or a presentation of their custom setup reflecting Outcomes 1-3. A learner's response can be judged to be satisfactory where evidence provided is sufficient to meet the requirements by showing that the learner is to evaluate/justify the effects of their changes and reflect on the topics below to aid the discussion:

- ◆ Types of customisation
- ◆ Provided 'packaged' variations of existing software
- ◆ Dedicated specialised software
- ◆ Hardware/Software needs
- ◆ In-house vs. third party customisation
- ◆ Advantages and disadvantages of customisation
- ◆ Role of a CAD Manager
- ◆ The effects of customisation on CAD standards

Evidence should be generated through assessment undertaken in controlled, supervised open-book conditions. Learners may refer to textbooks, handouts or notes for this assessment.



Higher National Unit Support Notes

Unit title: CAD: Systems Management (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 40 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 Customise the user interface of a CAD system.
- 2 Create custom automated drawing tools.
- 3 Create custom setup of a CAD system.
- 4 Evaluate the application of customised setup.

This Unit is at SCQF level 8 and has been devised as an optional Unit within the HNC and HND Computer Aided Draughting and Design awards. However this does not preclude the use of the Unit in other awards where award designers feel this to be appropriate.

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 recommendation that learners need only complete all Outcomes by the end of delivery, there are no individual time limits per Outcome. This has been done as a guide to allow learners to explore with agency what they find important in customising for the given use case with their own time management. The minimum requirements for each Outcome should be met clearly.

Guidance on approaches to delivery of this Unit

In the 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 CAD software installed. Centres may decide whether learners work in groups or individually for Outcomes 1–3, however learners must produce their own evidence for Outcome 4. If group work is used for delivery it is important to ensure learners meet the Evidence Requirements for Outcomes 1–3 individually.

Higher National Unit Support Notes (cont)

Unit title: CAD: Systems Management (SCQF level 8)

Hardware customisation where knowledge and skills are concerned is the choice or alteration of physical equipment to be used in the scenario when using CAD. Examples of this include but are not limited to:

- ◆ Display devices (especially those focused on long term user health considerations)
- ◆ Chair ergonomics
- ◆ Desk ergonomics
- ◆ Computer choice
- ◆ Standard Input devices
- ◆ Printers
- ◆ 3D Mouse
- ◆ 3D printers
- ◆ 3D Scanners

Learners are expected to explain the benefits of a hardware based choice in relation to CAD operation and/or user health to qualify for the knowledge and skill completion.

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.

All Outcomes could be delivered as one integrated project focused on a given use case/scenario of a CAD software package. Each Outcome could however be delivered individually as stand-alone assessments at the centres discretion.

Outcome 1	Practical	Customise the user interface of a CAD system
Outcome 2	Practical	Create custom automated drawing tools.
Outcome 3	Practical	Create custom setup of a CAD system.
Outcome 4	Written/Oral/Presentation	Evaluate the application of customised setup.

It is intended that this Unit is 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.

Assessments should be conducted under open-book conditions with access to any resources and materials to reflect a project based approach. No individual time limits are present for each Outcome, only that learners must complete all Outcomes in the Unit by the end of delivery. Ideally the scenario/use case mentioned in each Outcome below should remain the same to keep the Unit holistic and consistent.

Higher National Unit Support Notes (cont)

Unit title: CAD: Systems Management (SCQF level 8)

Outcome 1

In this Outcome the learner will be required to alter the standard user experience of a CAD software package for a given scenario/use case. The centre should decide whether to focus on one or a choice from a number of scenarios that the learner must direct the customisation to improve efficiency and ease-of-use of the standard software setup. The learner must customise a minimum of six user input aspects. Changes should be sampled by a combination of screen or video captures for visual elements or demonstration under observation if required. When completing as part of an integrated assessment, this evidence can be presented in the production of the report/oral/presentation of Outcome 4.

Outcome 2

In this Outcome the learner will be required to create custom automated drawing tools for a given scenario/use case. The centre should decide whether to focus on one or a choice from a number of scenarios that the learner must direct the customisation to improve efficiency and ease-of-use of the standard software setup. The learner must customise a minimum of four automated drawing tools. How these tools are used should be sampled by a combination of screen or video captures for visual elements or demonstration under observation if required. When completing as part of an integrated assessment, this evidence can be presented in the production of the report/oral/presentation of Outcome 4.

Outcome 3

In this Outcome the learner will be required to create custom system setup for the use of CAD operations. This should include hardware, input/output peripherals and system variables/options as options for investigation. The centre should decide whether to focus on one or a choice from a number of scenarios that the learner must direct the customisation to improve efficiency and ease-of-use of the standard software setup. The learner must customise a minimum of six system and setup decisions. How these affect the user should be sampled by a combination of screen or video captures for visual elements or demonstration under observation if required. When completing as part of an intergrated assessment, this evidence can be presented in the production of the report/oral/presentation of Outcome 4.

Outcome 4

In this Outcome the learner will be required to produce a written report/oral recording or a presentation (it is intended that the learner may choose for themselves to promote agency). This should contain reference to elements customised in Outcomes 1–3 which should be delivered with a given use case scenario. This is the learners chance to explain their decisions and evaluate the effectiveness of the customised setup for the given use case/scenario. Key skills and knowledge should be followed with reference to their specific custom setup created during Outcomes 1–3.

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

Higher National Unit Support Notes (cont)

Unit title: CAD: Systems Management (SCQF level 8)

Assessment of the practical activities should be supervised, to help authenticate work produced. In addition, centres may choose to employ the use of a student signed statement of authenticity.

Centres may decide whether learners work in groups or individually for Outcomes 1–3, however learners must produce their own evidence for Outcome 4. If group work is used for delivery it is important to ensure learners meet the Evidence Requirements for Outcomes 1–3 individually.

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

There is naturally occurring evidence that the specific skills elements for Information Technology are developed to an advanced level as learners undertake the Unit and become competent in CAD systems management in a working context. Learners are required to demonstrate that they are able to customise, create and use automated drawing tools such as line types, scripts, macros and hatching patterns. Consideration for other users and an adherence to practices and procedures impacting on security and safety would be a routine aspect of good practice.

All elements of the Core Skill of *Problem Solving*, that is, Planning, Organising, Critical Thinking, and Reviewing and Evaluating, will be fully developed and enhanced in the Unit which applies theoretical knowledge to a range of practical tasks. Identifying and assessing the relevance of all factors, identifying and maximising all available resources involves a high level of critical thinking. Justifying and adopting effective strategies which allow on-going opportunities for review and potential adjustment should reflect and apply current systems management theory and practice. Although a checklist approach to *Problem Solving* is not particularly useful for the level of skill involved learners may benefit from personal interviews with the assessor to reinforce analytical evaluative approaches which may inform any future activities and further development.

Although skills in written communication are not formally assessed, learners should be expected to be able to analyse and summarise complex information effectively. Essential ideas, and information should be expressed coherently, using formal language and structure appropriate to professional standards. Spelling, punctuation and syntax should be accurate.

History of changes to Unit

Version	Description of change	Date

© Scottish Qualifications Authority 2016

This publication may be reproduced in whole or in part for educational purposes provided that no profit is derived from reproduction and that, if reproduced in part, the source is acknowledged.

Additional copies of this Unit specification can be purchased from the Scottish Qualifications Authority. Please contact the Business Development and Customer Support team, telephone 0303 333 0330.

General information for learners

Unit title: CAD: Systems Management (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 customising a CAD system to improve draughting productivity and ease of use.

You will understand the range of CAD management options and learn how to customise the user-interface for a given industry based scenario.

This Unit will also allow you to develop practical skills that will enable you to create automated drawing tools and aids.

The formal assessment for most of this Unit is Practical. You will be given certain tasks relating to customisation of CAD software that you need to complete to a satisfactory standard. Outcome 4 will give you the option to make either a written and/oral record or to create a presentation to demonstrate your findings.

The actual assessment structure is as follows:

Outcome 1	Practical	Customise the user interface of a CAD system.
Outcome 2	Practical	Create custom automated drawing tools.
Outcome 3	Practical	Create custom setup of a CAD system.
Outcome 4	Written/Oral/Presentation	Evaluate the application of customised setup.

The Unit can be delivered as one integrated project, or you may cover each topic and be assessed on each individual Outcome. This is at the discretion of the delivering centre.

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