



National Unit specification: general information

Unit title: CADD Project (SCQF level 6)

Unit code: FT8R 12

Superclass: VF

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Summary

This is a mandatory Unit within the National Certificate in Computer Aided Design and Technology at SCQF level 6 but may also be taken as a free-standing Unit.

This Unit is suitable for candidates who would like to pursue a career in Computer Aided Design (CAD) and related industries.

This Unit aims to assess the ability of the candidate to carry out a project involving the integration and application of a range of computer aided draughting and design skills.

Outcomes

- 1 Develop a design brief and specification to an approved task.
- 2 Plan a project to given timescales.
- 3 Generate design concepts and solutions in response to the design specification.
- 4 Produce and present CAD models/drawings in response to the design solution.

Recommended entry

While entry is at the discretion of the centre, candidates would normally be expected to have attained one of the following, or equivalent:

- ◆ Relevant Units from the National Certificate in Computer Aided Design and Technology at SCQF level 6.
- ◆ Relevant industrial experience of Computer Aided Draughting and Design.

National Unit specification: general information (cont)

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Credit points and level

1 National Unit credit at SCQF level 6: (6 SCQF credit points at SCQF level 6*)

**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.*

Core Skills

Achievement of this Course gives automatic certification of the following:

Complete Core Skill Problem Solving @ SCQF level 5

Core Skill component None

There are also opportunities to develop aspects of Core Skills which are highlighted in the Support Notes of the Unit Specifications for this Course.

National Unit specification: statement of standards

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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

Develop a design brief and specification to an approved task.

Performance Criteria

- (a) Identify and select a design problem.
- (b) Create a design brief for the selected design problem.
- (c) Identify and research the main design issues.
- (d) Establish a design specification based on the design issues researched.
- (e) Justify the selection and the established design specification.

Outcome 2

Plan a project to given timescales.

Performance Criteria

- (a) Agree project aims and objectives with the project supervisor.
- (b) Identify planned sequence of project activities correctly and clearly set these out in a time-activity chart.

Outcome 3

Generate design concepts and solutions in response to the design specification.

Performance Criteria

- (a) Use concept generation techniques to generate design concepts which reflect the criteria of the design specification.
- (b) Produce sketches of design concepts.
- (c) Use evaluation techniques to evaluate design concepts.
- (d) Select appropriate design solution.

Outcome 4

Produce and present CAD models/drawings in response to the design solution.

Performance Criteria

- (a) Produce 3D CAD models of design solution.
- (b) Produce 2D drawings of design solution which are consistent with current drawing standards.
- (c) Create parts list/schedule table.
- (d) Present the completed design solution.

National Unit specification: statement of standards (cont)

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Evidence Requirements for this Unit

Evidence is required to demonstrate that the candidates have achieved all of the Outcomes and Performance Criteria.

Product and performance evidence is required to demonstrate that the candidate has achieved the Outcomes and Performance Criteria. Assessment must be conducted under supervised conditions. An integrated approach to the generation of assessment evidence is required with evidence being gathered at appropriate points throughout the delivery of the Unit.

In order to pass the Unit each candidate must produce sufficient evidence on his/her own to satisfy the Outcomes and Performance Criteria.

Outcome 1

- ◆ Candidates must create a structure design brief.
- ◆ Candidates must identify and research the main design issues of the project.
- ◆ Candidates must create a structured design specification which identifies the key design criteria.

Outcome 2

- ◆ Candidates must state a minimum of two project aims and three project objectives.
- ◆ Candidates must organise the project aims and objectives into a logical sequence.
- ◆ Time activity charts may take any appropriate form.

Outcome 3

- ◆ Candidates must produce a minimum of two sketched concept designs.
- ◆ Candidates must use an appropriate evaluation method in the selection of a suitable design solution and provide a short evaluative commentary.

Outcome 4

- ◆ Candidates must produce a 3D model of the design solution selected in Outcome 3.
- ◆ Candidates must create drawings of the 3D model which should conform to current drawing standards. The drawings should demonstrate the candidates ability to work to an appropriate angle of projection, produce section views, add relevant dimensioning and annotation.
- ◆ Candidates must create a parts list/schedule table.
- ◆ Candidates must plan, prepare and present a presentation which lasts a minimum of five minutes.

National Unit specification: support notes

Unit title: CADD project (SCQF level 6)

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.

Guidance on the content and context for this Unit

This Unit forms part of the National Certificate in Computer Aided Design and Technology at SCQF level 6, but may also be offered on a free-standing basis.

The aim of this Unit is to allow candidates to develop integrated knowledge, understanding and skills in Computer Aided Draughting and Design. On successful completion of the Unit candidates will be able to demonstrate an integrated approach to development, planning, detailing and presentation of a CADD project.

In Outcome 1 candidates should be supervised in the identification and selection of a design problem. The candidate should then develop a simple design brief which clearly communicates the design problem in agreement with the project supervisor. The candidate should be encouraged to identify and employ a basic research strategy relevant to the problem identified in the design brief. A simple but structured design specification should then be created which establishes the fundamental design criteria for potential design solutions.

In Outcome 2 candidates should identify and agree the project aims and objectives with the project supervisor. The candidate should then prepare a basic but structured project plan which identifies the activities, timings and resources required for the project.

In Outcome 3 candidates are required to demonstrate the use of a minimum of two concept generation techniques in the development of design concepts. The candidate is then required to generate a minimum of two sketched concept designs which reflect the needs and criteria of the design brief and specification. The candidate must evaluate the concept designs with respect to the criteria identified in the design specification and select a final design solution.

In Outcome 4 the candidate should demonstrate the ability to produce a basic 3D CAD model of the design solution. The 3D CAD model should incorporate a range of basic 3D CAD modelling techniques. The candidate must also demonstrate the ability to produce two dimensional drawings that meet current drawing Standards. Such drawings should include sufficient dimensions, tolerances, materials, finishes, treatments etc to define fully the object(s) in the drawing. The drawings could include detail, assembly and site drawings. Candidates should also demonstrate the ability to plot their work effectively to a suitable output device (printer/plotter). They should also demonstrate knowledge and skills in how to output their work to various scales on A4 and A3 paper dimensions.

The candidate should be able to plan, prepare and present a presentation of the project.

National Unit specification: support notes (cont)

Unit title: CADD project (SCQF level 6)

Guidance on learning and teaching approaches for this Unit

It is recommended that the Unit is delivered in the same sequence the Outcomes are presented in the National Unit Specification: statement of standards section of the Unit. The Unit may be delivered by a combination of lectures, group discussions and practical activities. Candidates must have access to appropriate workshop and/or laboratory facilities while undertaking practical project work.

To assist candidates in developing the knowledge and skills to produce time-activity charts such charts may be constructed for everyday activities so that candidates can practise setting out the logical flow of activities and estimating the duration of individual activities and the overall time to complete a task. Use should be made of Information and Communication Technology (ICT) products in creating such charts and other related project documentation. It is recommended that project supervisors allocate a defined time for the completion of the deliverables leading to closure of the project and ensure that this is included correctly in the time-activity charts prepared by candidates.

Candidates should have obtained the knowledge and skills in the production of CAD models and drawings for this project earlier (eg when studying other CAD Units) and 'new learning' in this context should not be required. Candidates should be observed while they undertake practical activities to ensure valid assessment.

Centres should regularly monitor and review the progress of each candidate so that problems can be discussed and corrective actions agreed between the project supervisor and candidate for resolving problems.

Project activities may provide opportunities to enhance skills in co-operative working. Candidates could be encouraged to analyse a task and its component elements. They could discuss the nature and scope of team roles and responsibilities involved, including safety issues. Feedback from the assessor can encourage self-evaluation of contributions to team working in a laboratory/workshop environment.

Guidance on approaches to assessment for this Unit

The role of the project supervisor includes that of advisor, mentor, facilitator and assessor. While candidates will need some guidance during the project all candidates should be encouraged to think through activities for themselves.

Candidate evidence will be generated during each of the sequential ongoing activities throughout the duration of the project. The assessment for this Unit should be integrated through all Outcomes.

Assessment of Outcomes 1 and 2

Candidates should be supervised in the creation of a project brief which sets out the scope and requirements of the project. Candidates should perform research activity relevant to the scope of the project brief and form a design specification which should be informed by the findings of the research. Candidates should select the appropriate aims and objectives for the project. These aims and objectives should be organised into a logical sequence.

National Unit specification: support notes (cont)

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Candidates should identify the appropriate resources for the project and produce a time-activity chart for the project.

Centres may wish to provide candidates with appropriate forms to record their responses to the tasks shown above or, alternatively, leave it to candidates to record information in the way they feel fit.

While candidates should be allowed to work at their own pace while completing the tasks shown above it is advisable that the supervisor places a limit on the time candidates have to complete the tasks so that the planning process becomes manageable in normal classroom time. Such a time limit may be two hours.

Assessment of Outcome 3

The core assessment for this Outcome involves the candidates generating a minimum of two concept designs. The candidates should identify and use recognised and appropriate concept generation methods/techniques to help establish suitable concepts which meet the criteria of the design spec and needs of the design brief. The candidates will also be required to produce a minimum of one concept sketch per concept design. The candidates are required to select a suitable design solution by establishing and applying relevant evaluation methods/techniques to evaluate the concept designs. Centres may wish to provide candidates with an appropriate form to write their evaluation or, alternatively, leave it to candidates to decide what format they will use for their evaluation.

Assessment of Outcome 4

Outcome 4 should be a practical exercise in which candidates create 3D model/s of the design solution selected in Outcome 3. A range of fully dimensioned drawings which conform to current drawing standards should then be produced by the candidate. The drawings should include standard orthographic views and section details on a minimum of one drawing. The range of drawings produced by the candidate could include detail, assembly and/or site.

The candidate to plan, prepare and present a presentation of the information gathered and created through Outcomes 1 – 4. The presentation should last five minutes with extra time for questioning.

Content of Project Portfolio

The content of candidate portfolios should contain only sufficient information to satisfy the requirements of the Outcomes and Performance Criteria. As a minimum a portfolio should contain the following information:

- ◆ Design Brief
- ◆ Design Specification
- ◆ Project aims and objectives
- ◆ A time-activity chart
- ◆ Concept Sketches
- ◆ CAD Models/Drawings
- ◆ Presentation

National Unit specification: support notes (cont)

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Opportunities for the use of 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 e-checklists. Centres which wish to use e-assessment must ensure that the national standard is applied to all candidate evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. Further advice is available in *SQA Guidelines on Online Assessment for Further Education (AA1641, March 2003)*, *SQA Guidelines on e-assessment for Schools (BD2625, June 2005)*.

Opportunities for developing Core Skills

Candidates have to evaluate, apply and convey a range of complex technical information. Support materials and self assessment checklists could emphasise the requirement for technical accuracy, formal structure and expression in both Oral and Written Communication.

Numeracy and Information and Communication Technology (ICT) Skills will be naturally enhanced as the Unit is achieved. Measurements and calculations will be essential and accurately recorded; data will be interpreted, applied and communicated using graphics and number. Access to technology will support the presentation of documents and diagrams, with use of CAD, or specialist application software to model, simulate or evaluate possible solutions.

All elements of the Core Skill of *Problem Solving*, that is, Critical Thinking, Planning, Organising, Reviewing and Evaluating, will be naturally developed as candidates learn how to plan and complete a CADD project. A range of factors relevant to defined objectives has to be identified, investigated and documented as candidates plan a strategy for project management. Appropriate resources are identified before deliverables are completed in accordance with safety requirements. Evaluation procedures are identified to verify the effectiveness of process and product.

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

History of changes to Unit

| Version | Description of change | Date |
|---------|--|------------|
| 02 | Core Skill Problem Solving at SCQF level 5 embedded. | 29/09/2011 |
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