



National Unit Specification: general information

UNIT	Computer-Aided 3D Modelling, Visualisation and Presentation (Advanced Higher)
NUMBER	D175 13
COURSE	Graphic Communication (Advanced Higher)

SUMMARY

The purpose of the unit is to develop computer-aided graphic skills to produce 3D surface and solid models.

OUTCOMES

- 1 Create 3D Computer-Aided Design surface models.
- 2 Create 3D Computer-Aided Design solid models.
- 3 Produce Computer-Aided drawings from a 3D Computer-Aided Solid model.
- 4 Produce Computer-Aided rendered images from 3D Computer-Aided Design model.

RECOMMENDED ENTRY

While entry is at the discretion of the centre, candidates would normally be expected to have attained Higher Graphic Communication at grade A or B, or relevant experience in computer-aided draughting.

CREDIT VALUE

1.5 credit at Advanced Higher.

Administrative Information

Superclass:	VF
Publication date:	June 2009
Source:	Scottish Qualifications Authority
Version:	03

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National Unit Specification: general information (cont)

UNIT Computer-Aided 3D Modelling, Visualisation and Presentation (Advanced Higher)

CORE SKILLS

There is no automatic certification of core skills or core skills components in this unit.

Additional information about core skills is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

National Unit Specification: statement of standards

UNIT Computer-Aided 3D Modelling, Visualisation and Presentation (Advanced Higher)

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 the Scottish Qualifications Authority.

OUTCOME 1

Create 3D Computer-Aided Design surface models.

Performance criteria

- (a) 3D models are produced using appropriate techniques to meet given specifications.
- (b) Irregular shaped surfaces are created to meet given specifications.
- (c) Surfaces are created using Boolean operations.
- (d) Multiple views of a 3D CAD model are simultaneously displayed.
- (e) Co-ordinate systems are created for producing 3D CAD models.

Evidence requirements

Graphical evidence that the candidate can create surface models as detailed in PCs (a) to (e).

Note on range for the outcome

- a) Techniques: thickness; ruled surface; revolved surface and edge defined surface.
- b) Boolean operations: union; subtraction and intersection.

OUTCOME 2

Create 3D Computer-Aided Design solid models.

Performance criteria

- (a) 3D models are produced using appropriate techniques to meet given specification.
- (b) 3D models are created using specified primitives to meet given specification.
- (c) 3D models are created using Boolean operations to meet given specification.
- (d) 3D models are modified through specified techniques to meet given specification.

Evidence requirements

Graphical evidence that the candidate can create solid models as detailed in PCs (a) to (d).

Note on range for the outcome

- a) Appropriate techniques: revolution; extrusion.
- b) Primitives: box; wedge; cone; sphere; cylinder and torus.
- c) Boolean operations: union; subtraction and intersection.
- d) Specified techniques: chamfer; fillet.

National Unit Specification: statement of standards (cont)

UNIT Computer-Aided 3D Modelling, Visualisation and Presentation (Advanced Higher)

OUTCOME 3

Produce Computer-Aided drawings from a 3D Computer-Aided Solid model.

Performance criteria

- (a) Multiple views of a 3D CAD model are created to a given specification.
- (b) Representations of a 3D CAD model are created with hidden lines removed.
- (c) A sectional view of a 3D Solid CAD model is created.
- (d) Multiple views of a 3D CAD model including dimensions, are generated.
- (e) Hard copies of presentations are produced to a given specification.

Evidence requirements

Graphical evidence that the candidate can generate and present 3D CAD drawings as detailed in PCs (a) to (e).

OUTCOME 4

Produce Computer-Aided rendered images from 3D Computer-Aided Design model.

Performance criteria

- (a) Perspective views of a 3D CAD model are created.
- (b) Attach materials to a 3D CAD model.
- (c) Lights are applied to a 3D CAD model.
- (d) The scene environment into which a 3D CAD model is placed is effectively rendered.

Evidence requirements

Evidence that the candidate can produce rendered images from CAD 3D models as detailed in PCs (a) to (d).

National Unit Specification: support notes

UNIT Computer-Aided 3D Modelling, Visualisation and Presentation (Advanced Higher)

This part of the unit specification is offered as guidance. The support notes are not mandatory.

While the time allocated to this unit is at the discretion of the centre, the notional design length is 60 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

The level of competence and skill in 3D modelling techniques should reflect industrial or commercial practice.

Use should be made of 3D entities with X, Y and Z co-ordinates.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Work should be integrated to cover more than one topic, to create a natural progression through the unit.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

National Assessment Bank materials have been created specifically to assess knowledge and understanding for each outcome. Assessments can take place either at the completion of an outcome or as an end test.

Examples of instruments of assessment which could be used are as follows.

Outcome 1

A series of drawings incorporating basic, swept and edge primitives should be used to gather evidence for all the performance criteria of this outcome. At least 3 different views should be visible and they should include – front; top; left and a 3D view. Co-ordinate systems will allow creation of new models in relation to existing models.

Outcome 2

A series of drawings should be used to gather evidence for all the performance criteria of this outcome; mainly by producing simple solids involving interpenetrating solids and solids with holes and subtraction areas. At least one of the combined solids will be required to be rendered and one displayed in perspective. Revolution and extrusion solid modelling techniques should both be by height, taper and path.

Outcome 3

This outcome could be integrated by completing a full layout drawing of an assembled component showing main dimensions. The drawing would contain plan, elevation, end elevation and 3D view of an assembled artefact containing individually produced solid primitives. 3D views should include front; top; left and isometric.

Outcome 4

Rendered outputs should be produced from existing solid and surface models. It may be useful to base rendered outputs on the model produced in one of the earlier outcomes. At least 2 materials should be attached and should be appropriate for the model they represent. Lights will include distant, or ambient/ spotlight.

National Unit Specification: support notes (cont)

UNIT Computer-Aided 3D Modelling, Visualisation and Presentation (Advanced Higher)

SPECIAL NEEDS

This unit specification is intended to ensure that there are no artificial barriers to learning or assessment. Special needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments or considering alternative outcomes for units. For information on these, please refer to the SQA document *Guidance on Special Assessment and Certification Arrangements for Candidates with Special Needs/Candidates whose First Language is not English* (SQA, 1998).