

**GRAPHIC COMMUNICATION**  
**Higher**

**Third edition – published May 1999**

**NOTE OF CHANGES TO ARRANGEMENTS  
THIRD EDITION TO BE PUBLISHED ON CD-ROM MAY 1999**

**COURSE TITLE:** Graphic Communication (Higher)

**COURSE NUMBER:** C033 12

**National Course Specification:**

Course Details No significant changes.

**National Unit Specification:**

Unit Details No significant changes.

## National Course Specification

### GRAPHIC COMMUNICATION (HIGHER)

**COURSE NUMBER** C033 12

#### COURSE STRUCTURE

<i>D171 12</i>	<i>Technical Graphics 1 (H)</i>	<i>1 credit (40 hours)</i>
<i>D172 12</i>	<i>Technical Graphics 2 (H)</i>	<i>1 credit (40 hours)</i>
<i>D173 12</i>	<i>Computer Graphics (H)</i>	<i>1 credit (40 hours)</i>

All courses include 40 hours over and above the 120 hours for the component units. This may be used for induction, extending the range of learning and teaching approaches, support, consolidation, integration of learning and preparation for external assessment.

#### RECOMMENDED ENTRY

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

- Standard Grade Graphic Communication at Grade 1 or 2
- Intermediate 2 Graphic Communication, or equivalent.

#### CORE SKILLS

Information on the automatic certification of any core skills in this course is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

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#### Administrative Information

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## **National Course Specification: course details**

**COURSE**                      Graphic Communication (Higher)

### **RATIONALE**

Communication in all its forms is vital to society and the means of passing on information graphically is an important and relevant skill. Communication through graphics, in whatever medium, permeates all spheres of life, including education, industry and commerce. In increasingly global markets, graphic communication is a chosen medium in aspects of life from consumer to education, industry and commerce. The development of skills in the production, interpretation and analysis of graphics in a range of contexts is of broad educational value.

Higher Graphic Communication offers progression in the acquisition of knowledge and skills from Standard Grade or from Intermediate 2 Graphic Communication. The Higher course is intended to prepare candidates for more advanced study or for employment.

The structure of the course reflects the use of graphics in business and industry, both in content and methodology, while embracing the changes brought about by the continuing advances in technology. Manual and computer skills and their effective application will be developed through preliminary, production and promotional graphics.

Emphasis will be placed on the graphics incorporated in the product design process from concept through to marketing. This element will be assessed by means of an extended form of coursework in the form of a Thematic Presentation.

The use of the computer as a learning and teaching aid will permeate all aspects of the course and opportunities will exist to develop expertise in computer applications.

The course should fulfil the following aims:

- develop aspects of technological capability
- develop technological creativity in relation to selecting information and evaluating its appropriateness for graphic communication
- develop an ability to read and interpret a range of drawings and information presented graphically
- develop a technological perspective on the role of graphic communication in an industrial context
- develop an ability to communicate graphical information using both manual and computer graphic skills and techniques
- develop a knowledge of appropriate computer hardware and software for graphic communication and its related industrial applications
- develop technological confidence in planning and implementing a graphic presentation on a theme, using appropriate samples from a range of manual and computer graphic skills and techniques.

## National Course Specification: course details (cont)

**COURSE**                      Graphic Communication (Higher)

### **COURSE CONTENT**

All of the course content will be subject to sampling in the external assessment.

#### **Summary of the course outcomes**

##### ***Technical Graphics 1 (H)***

- 1 Apply manual techniques of pictorial representation to suit a range of subject matter.
- 2 Apply manual techniques of geometric construction in the generation of orthographic drawings.
- 3 Apply manual techniques of illustration and presentation to give emphasis and realism to graphic presentations.

##### ***Technical Graphics 2 (H)***

- 1 Apply manual techniques of orthographic projection to produce drawings of components, assemblies and locations.
- 2 Apply the principles of dimensioning to orthographic production drawings.
- 3 Demonstrate knowledge of the use of graphic communication within the consumer, engineering, and construction industries.

##### ***Computer Graphics (H)***

- 1 Produce orthographic and pictorial drawings using a computer-aided draughting package.
- 2 Produce computer-rendered drawings for promotional purposes using an illustration package.
- 3 Plan and produce single and double page layouts using a desktop publishing package.
- 4 Demonstrate knowledge of terminology and hardware associated with computer graphics.

The course should be seen as an integrated package of study that will take the candidate beyond the level of the pass requirements for the component units. The course will take the candidate through an integrated application of graphic knowledge and skills to produce high-quality graphics.

Computer aspects would benefit from study concurrent with manual techniques to make best use of access to information technology hardware. Knowledge of conventional representations, dimensions and types of graphic communication may be used in many parts of the course. The relevant British Standards are PP7307, PP7308 and PP7320.

To aid integration in the teaching of the component units of the course, the following cross-referencing is offered with suggested time allocations for guidance.

## National Course Specification: course details (cont)

**COURSE**                      Graphic Communication (Higher)

### Details of the syllabus and cross-references for the outcomes

Abbreviations:     DA - Drawing Abilities  
                           GA - Graphic Abilities  
                           GK - Graphic Knowledge  
                           O1 - Outcome 1 (O2, Outcome 2, and so on)

Time allocation is suggested for guidance.

<b>CONTENT TECHNICAL GRAPHICS 1 (H)</b>	<b>TIME/OUTCOME/ ASSESSMENT</b>	<b>NOTES</b>
<b><i>Pictorial representation</i></b>	<b><i>24 hours</i></b>	
Perspective views.	O1 DA GA	Sketching should be done in 1- and 2-point perspective as appropriate to the subject matter. Consideration of spectator point to show object to good effect.
Measured perspective.	O1 DA	Drawing in 2-point perspective. Construction using the projected plan method.
Isometric, planometric and oblique (cabinet) views.	O1 DA GA	Use of appropriate drawings to suit subject matter. Use of appropriate sketches to suit subject matter.
Assemblies, exploded views and sectional views.	O1 DA GA	Assemblies should consist of at least three parts. Exploded views may involve more than one axis of separation. Sectional views include half sections, part sections and cutaways, as appropriate.
<b><i>Geometric constructions and orthographic drawings</i></b>	<b><i>11 hours</i></b>	
Interpenetration, intersection and development of right prisms and cylinders.	O2 DA	This should be taught in the context of real examples and limited to single plane configurations. The generator method should be used.
True shapes		
Construction of ellipses.	O2 DA	Knowledge of one method of ellipse construction, and the ability to apply it to practical situations.

## National Course Specification: course details (cont)

**COURSE**                      Graphic Communication (Higher)

<b>CONTENT</b> <b>TECHNICAL GRAPHICS 1 (H)</b> <b>(CONTINUED)</b>	<b>TIME/OUTCOME/</b> <b>ASSESSMENT</b>	<b>NOTES</b>
Tangency.	O2 DA	Ability to use tangency in the construction of a drawing. There is no need to mark tangent points.
<i>Illustration &amp; presentation</i>	<i>3 hours</i>	
Manual rendering to represent light, shade, shadow, reflection, tone, and texture.  Layout, lettering and display.	O3 DA GA  GA	Some competence and fluency in manual techniques is required to enable appropriate responses to be used in a Thematic Presentation.
<i>Conventional representation</i>	<i>2 hours</i>	
Purpose and use of conventional representation.  Types of line and their applications.  Sections.	O1 O2 GK	

## National Course Specification: course details (cont)

**COURSE** Graphic Communication (Higher)

CONTENT TECHNICAL GRAPHICS 2 (H)	TIME/OUTCOME/ ASSESSMENT	NOTES
<i>Types of orthographic view</i>	<i>31 hours</i>	
Full, partial and interrupted views including representation of symmetrical parts.	O1 DA	Detail, assembly and location drawings. Third angle projection.
Sectional views: full, half, stepped and partial; hatching conventions; parts and features of parts not normally sectioned.	O1 DA GK	A range of sectional views including revolved and removed sections.
Auxiliary views: first auxiliary elevations and plans, in full or part.	O1 DA	Views of this type should only be used to clarify features not clear from other views.
Exploded views: full and sectioned.	O1 DA GK	
Use of recommended scales in engineering and construction drawing practice.	O1 O3 DA GK	Knowledge and use of recommended scales. Scale rules should be used where appropriate – examples to range from large buildings to small components.
<i>Dimensioning</i>	<i>2 hours</i>	
Principles of dimensioning in engineering and construction drawing.	O1 O2 O3 DA GA	Knowledge and use of different styles of dimensioning used in different contexts.

## National Course Specification: course details (cont)

**COURSE** Graphic Communication (Higher)

<b>CONTENT TECHNICAL GRAPHICS 2 (H) (CONTINUED)</b>	<b>TIME/OUTCOME/ ASSESSMENT</b>	<b>NOTES</b>
<i>Conventional representation</i>	<i>2 hours</i>	
British Standards conventions for engineering and construction drawing.	O1 O2 DA GA GK	Candidates should be familiar with British Standards conventions and symbols and their use.
Graphic symbols.	GA	Where specific symbols are required in an examination, the symbols will be provided.
<i>Dimensional tolerance</i>	<i>1 hour</i>	
Concept, use and purpose of tolerancing in the engineering and construction industries.	O2 DA GA	Ability to read and understand dimensional tolerances (size and location) and to represent a given dimensional tolerance in a drawing, in an appropriate manner.
<i>Types of graphic communication</i>	<i>4 hours</i>	
Main types of graphic communication / drawing and their integrated application in terms of specification, planning, production, implementation and evaluation. All should be considered in the context of design, manufacture and marketing.	O3 GK	The use of preliminary, production and promotional graphics in the engineering, construction and consumer industries should be emphasised.  Main types of graphic communication and their use.

## National Course Specification: course details (cont)

**COURSE** Graphic Communication (Higher)

CONTENT COMPUTER GRAPHICS (H)	TIME/OUTCOME/ ASSESSMENT	NOTES
<i>Computer-aided draughting (CAD)</i>	<i>16 hours</i>	
<p>The use of CAD packages to produce complex orthographic and pictorial views of plane and solid objects in 2D and 2<sup>1</sup>/<sub>2</sub>D.</p> <p>Drawings should include different line types, different dimension types, arcs, fillets, tangents and hatching.</p> <p>Candidates should be aware of the following commands and features and their use in CAD: layering, pan, zoom, snap or grid lock, hatch, line styles, copy, scale, rotate, mirror, use of CAD library.</p>	<p>O1 O4 GK GA</p> <p>O1 O4 GA GK</p>	<p>With regard to 3D solid modelling, where this is available, hard copy may be used in the Thematic Presentation.</p> <p>Drawings should be created using software which includes commands and features typical of those used in industry and commerce.</p> <p>Knowledge of CAD terminology and associated hardware.</p>
<i>Computer illustration and presentation</i>	<i>12 hours</i>	
<p>Use of an illustration package to produce rendered promotional graphics.</p> <p>Main features: colour fills, airbrush, colour gradients, cut, copy, paste, layers, autotracing, exporting files, importing files, highlights and lettering.</p>	<p>O2 O4 GK GA</p>	<p>The candidate should use the package to produce promotional graphics, to give visual impact.</p> <p>Knowledge of illustration and presentation terminology and associated hardware.</p>

## National Course Specification: course details (cont)

**COURSE** Graphic Communication (Higher)

<b>CONTENT COMPUTER GRAPHICS (H) (CONTINUED)</b>	<b>TIME/OUTCOME/ ASSESSMENT</b>	<b>NOTES</b>
<i>Desktop publishing</i>	<i>12 hours</i>	
<p>The use of DTP packages to produce effectively presented and formatted single- and double-page layouts.</p> <p>DTP documents should include: imported and manipulated graphics, creative use of text styles.</p> <p>Stages in planning a DTP document include: research; annotated thumbnail sketches; rough layouts.</p> <p>Awareness of the following terminology: columns, rules, margins, captions, headers, footers, gutters, boxes, reverses, and page orientation.</p> <p>Hardware: modems, scanners, video digitizers, video/still cameras, plotters, printers and monitors.</p>	<p>O3 O4 GA GK</p> <p>O3 GA GK</p> <p>O4 GK</p>	<p>Layouts should include a mix of text, graphics and imported information, using work created as part of the course or from a library source.</p> <p>Knowledge of DTP terminology and associated hardware.</p>



## National Course Specification: course details (cont)

### **COURSE**                      Graphic Communication (Higher)

In order to allow integration across a range of work, each candidate on the course has to undertake a Thematic Presentation. Some high quality work produced for the units can be selected for inclusion in this presentation. Additional work for this aspect can be tackled within the time allocated for preparation for course assessment (10-15 hours maximum). The main purpose of the Thematic Presentation is to offer an opportunity for the candidate to show a collection of high-quality work, limited to the common theme, for presentation to an external client.

The Thematic Presentation is a folio of work, on a theme chosen by the candidate, and should address the following range:

- preliminary (informal) drawings - for example, market-research data, freehand sketches, planning charts, and sequence diagrams
- production (formal) drawings CAD - for example, assembly drawings, site plans, detailed production drawings, service diagrams, installation diagrams, and constructional drawings
- promotional (for effect) drawings CAG and DTP - for example, illustrations, displays, cutaways, exploded views, and perspective views and DTP layouts.

In preparing graphics for the Thematic Presentation, preliminary work may be manually produced. The production and promotional work should be computer-produced.

Summary of marks for course assessment:

external assessment by examination paper	70%
external moderation of Thematic Presentation	30%

### **GRADE DESCRIPTIONS**

The grade of award A, B or C will be based on the total score obtained from the two elements of external course assessment. The descriptions below indicate the nature of the achievement which is required for the award of a Grade C and a Grade A in the course assessment.

For performance at Grade C, candidates should be able to:

- apply manual graphic techniques to produce: a range of pictorial representations; geometric orthographic drawings; orthographic drawings (with dimensions) of components, assemblies and locations
- use computer hardware and software to produce: orthographic and pictorial drawings using a computer-aided draughting package; computer rendered drawings for promotional purposes using an illustration package; single and double page layouts using a desktop publishing package
- demonstrate knowledge of the use of graphic communication within the consumer, engineering and construction industries and of the terminology and hardware associated with computer graphics.

## National Course Specification: course details (cont)

### COURSE                      Graphic Communication (Higher)

For performance at Grade A, candidates should be able to:

- apply manual graphic techniques to produce: a range of accurate pictorial representations; accurate and precise geometric orthographic drawings; accurate orthographic drawings (with dimensions) of complex components, assemblies and locations
- use computer hardware and software to produce: complex orthographic and pictorial drawings using computer-aided draughting package; computer rendered drawings with high visual impact for promotional purposes using an illustration package; well planned and presented single and double page layouts using a desktop publishing package
- demonstrate detailed knowledge of the use of graphic communication within the consumer, engineering and construction industries and of the terminology and hardware associated with computer graphics.

### APPROACHES TO LEARNING AND TEACHING

The units of the course should be delivered in an integrated manner. The use of terms such as preliminary, production and promotional graphics should be seen as stepping stones to an understanding of the use of graphic communication skills in industry and commerce.

Illustration and presentation techniques can be applied across the component units and candidates should be allowed to develop a natural flair in presentation. Preliminary sketches should not be excessively and unnecessarily enhanced. The main use of preliminary sketching should be seen as a progression towards formal drawings. Some, but not all, formal drawings could be developed to produce presentation graphics for promotional purposes.

Geometric work should be taught through examples of real objects constructed from geometric forms.

The depth of treatment of the study of British Standards should be relevant to the task and should reflect industrial and commercial practice; candidates should be encouraged to reference from a resource base of information.

The *Computer Graphics* unit may require course and resource management to facilitate adequate access to IT.

Candidates should be made aware of the best industrial and commercial practice in computer graphics by the use of video and through industrial visits.

An important part of the course should be an induction. This phase should be used to give candidates a broad outline of the course and the component units and in particular the role of assessment in the course and in the component units. The importance of setting a theme for the Thematic Presentation at an early stage of the course is vital to the ongoing development of this presentation. Some work carried out for the unit outcomes should quickly form the focus of some quality work for the Thematic Presentation.

## National Course Specification: course details (cont)

**COURSE**                      Graphic Communication (Higher)

### **SPECIAL NEEDS**

This course 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).

### **SUBJECT GUIDES**

A Subject Guide to accompany the Arrangements document has been produced by the Higher Still Development Unit (HSDU) in partnership with the Scottish Consultative Council on the Curriculum (SCCC) and Scottish Further Education Unit (SFEU). The Guide provides further advice and information about:

- support materials for each course
- learning and teaching approaches in addition to the information provided in the Arrangements document
- assessment
- ensuring appropriate access for candidates with special educational needs

The Subject Guide is intended to support the information contained in the Arrangements document. The SQA Arrangements documents contain the standards against which candidates are assessed.

## National Unit Specification: General Information

<b>UNIT</b>	Technical Graphics 1 (Higher)
<b>NUMBER</b>	D171 12
<b>COURSE</b>	Graphic Communication (Higher)

### SUMMARY

The purpose of the unit is to develop competence in applying manual techniques of pictorial representations, illustration and presentation graphics, and geometric constructions.

### OUTCOMES

- 1 Apply manual techniques of pictorial representation to suit a range of subject matter.
- 2 Apply manual techniques of geometric construction in the generation of orthographic drawings.
- 3 Apply manual techniques of illustration and presentation to give emphasis and realism to graphic presentations.

### RECOMMENDED ENTRY

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

- Standard Grade Graphic Communication at Grade 1 or 2
- Intermediate 2 Graphic Communication, or equivalent.

### CREDIT VALUE

1 credit at Higher.

### CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

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### Administrative Information

<b>Superclass:</b>	VF
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## National Unit Specification: statement of standards

### UNIT Technical Graphics 1 (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

Apply manual techniques of pictorial representation to suit a range of subject matter.

##### Performance criteria

- a) 1- and 2-point perspective sketches of appropriate subject matter are produced accurately in terms of scale and proportion.
- b) Isometric drawings of consumer products incorporating curves, oblique drawings of engineered components and planometric drawings of room interiors are produced accurately.
- c) Isometric and oblique drawings of assembled and exploded parts and sections are accurately produced.
- d) The application of the 'measured-plan' method of drawing 2-point measured perspective is correct.
- e) The production of drawings, under test conditions, shows competence in applying a selection of techniques of pictorial representation.

##### Evidence requirements

Graphical evidence that the candidate can apply manual pictorial presentation techniques, as detailed in PCs (a) to (d), to an appropriate degree of difficulty. Test evidence for PC (e) which samples some of the techniques listed in PCs (b) to (d).

#### OUTCOME 2

Apply manual techniques of geometric construction in the generation of orthographic drawings.

##### Performance criteria

- a) Constructions used to produce drawings of intersections, interpenetrations and developments of right prisms and cylinders are appropriate to the purpose and demonstrate effective use of the principles of plane and solid geometry.
- b) Constructions used to produce true shapes, ellipses and tangencies are appropriate to the purpose.
- c) The production of drawings, under test conditions, shows competence in applying a selection of the techniques of geometric construction.

##### Evidence requirements

Graphical evidence that the candidate can apply manual techniques of geometric construction in the generation of orthographic drawings, as detailed in PCs (a) and (b), to an appropriate degree of difficulty. Test evidence for PC (c) which samples some of the techniques listed in PCs (a) and (b).

## **National Unit Specification: statement of standards (cont)**

**UNIT**                      Technical Graphics 1 (Higher)

### **OUTCOME 3**

Apply manual techniques of illustration and presentation to give emphasis and realism to graphic presentations.

#### **Performance criteria**

- a) The use of freehand illustration and presentation techniques is appropriate and effective in the context of preliminary graphics.
- b) Line, tone and colour are used effectively to give emphasis and realism to graphic presentations.

#### **Evidence requirements**

Graphical evidence that the candidate can apply appropriate illustration and presentation techniques to graphic presentations, as detailed for PCs (a) and (b).

## **National Unit Specification: support notes**

### **UNIT**                      Technical Graphics 1 (Higher)

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**

The candidate should achieve a level of competence and skill in a range of graphic communication techniques that could be applied in an industrial or commercial context.

This unit will build on Standard Grade or Intermediate 2 Graphic Communication skills in pictorial representation, illustration and presentation techniques, and on the basic geometric constructions used in the generation of orthographic drawings. It will show how graphics are utilised in the consumer, engineering and construction industries and will provide an opportunity for the candidate to develop some of the graphic techniques used to create preliminary graphics.

The exercises chosen should involve products suitable for freehand sketching, formal pictorial drawings and illustration and presentation techniques. Preliminary sketches should progress to formal pictorial drawings that could be developed later in the course to produce presentation graphics of the type that would be produced for promotional purposes.

Geometry should be taught in the context of real examples and limited to single plane configurations. Geometric forms should be confined to right prisms and cylinders. The use of templates should be encouraged for informal drawings. The construction of true shapes, ellipses and tangents should not be taught in isolation from practical examples.

#### **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**

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

A series of drawing exercises could be used to gather evidence for all the performance criteria for pictorial representation. The candidate could be asked to produce sketches and formal pictorial drawings of products and constructions. Linking with illustration and presentation would test the development of these skills within an integrated context.

A series of drawing exercises could be used to gather evidence of geometric constructions, mainly by production of manual orthographic drawings using examples from real situations, such as components with cylindrical branches and bosses, dormer windows, stair rails and newel posts.

A series of graphic exercises could be used to gather evidence for all the performance criteria for illustration and presentation. The candidate could use photocopies, tracings or originals of some of the work produced in the preceding exercises for pictorial representation, and apply the skills of illustration and presentation.

Applications which are integrated should test the development of skills and knowledge of more than one outcome in the context of the whole unit.

## **National Unit Specification: support notes (cont)**

**UNIT**                      Technical Graphics 1 (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).

## National Unit Specification: General Information

<b>UNIT</b>	Technical Graphics 2 (Higher)
<b>NUMBER</b>	D172 12
<b>COURSE</b>	Graphic Communication (Higher)

### SUMMARY

The purpose of the unit is to:

- develop competence in applying manual techniques of orthographic projection
- develop awareness of graphics within a typical company structure.

### OUTCOMES

- 1 Apply manual techniques of orthographic projection to produce drawings of components, assemblies and locations.
- 2 Apply the principles of dimensioning to orthographic production drawings.
- 3 Demonstrate knowledge of the use of graphic communication within the consumer, engineering and construction industries.

### RECOMMENDED ENTRY

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

- Standard Grade Graphic Communication at Grade 1 or 2
- Intermediate 2 Graphic Communication, or equivalent.

### CREDIT VALUE

1 credit at Higher.

### CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

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### Administrative Information

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## **National Unit Specification: statement of standards**

**UNIT**                      Technical Graphics 2 (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**

Apply manual techniques of orthographic projection to produce drawings of components, assemblies and locations.

#### **Performance criteria**

- a) A variety of orthographic drawings is produced; the drawings are effective and include sectional, auxiliary and exploded views.
- b) Drawings produced of components and assemblies are neat and accurate, effectively represent desired features and are in accordance with PP7308.
- c) Drawings produced of locations are neat and accurate, represent desired features and are in accordance with PP7320 and PP7307.
- d) Scales used are appropriate as specified in PP7308 and PP7320
- e) The production of drawings, under test conditions, shows competence in applying a selection of the techniques listed in (a) to (d).

#### **Evidence requirements**

Graphical evidence of drawings produced by the candidate for PCs (a) to (d), to an appropriate degree of difficulty. Assemblies must have a minimum of three parts and be drawn from details of single components. Test evidence for PC (e) which samples some of the techniques listed in PC (a) to (d).

### **OUTCOME 2**

Apply the principles of dimensioning to orthographic production drawings.

#### **Performance criteria**

- a) Dimensions are accurate and in accordance with PP7308 and PP7320.
- b) Dimensional tolerances on components are accurate and represented in accordance with PP7308.

#### **Evidence requirements**

Graphical evidence that the candidate can apply the principles of dimensioning as detailed in PCs (a) and (b).

## **National Unit Specification: statement of standards**

**UNIT**                      Technical Graphics 2 (Higher)

### **OUTCOME 3**

Demonstrate knowledge of the use of graphic communication within the consumer, engineering and construction industries.

#### **Performance criteria**

- a) The main types of graphic communication are correctly identified and their purpose justified.
- b) The explanation of appropriate types of graphic communication for given requirements is clear.

#### **Evidence requirements**

Written evidence which indicates that the candidate can explain the wide use of graphic communication.

## **National Unit Specification: support notes**

### **UNIT**                      Technical Graphics 2 (Higher)

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**

The unit will develop the skills required in orthographic projection through component drawings, assemblies and locations and the use of British Standards. The drawing abilities required in these areas will be developed through a range of production drawings and planning diagrams of the type used in the consumer, engineering and construction industries. The knowledge and understanding of how graphic communication is used within industry will be studied.

Opportunities should be provided to relate the work to the industrial and commercial world through choice of drawing examples, industrial visits, videos and personal experiences. The types of drawing skills developed should be exemplified by the place they occupy in industry in the context of design, manufacture and marketing. It is suggested that many aspects of the unit can be dealt with in an integrated manner.

The objects chosen for drawing should be readily recognisable and the purpose of the drawings made clear to the candidate. Auxiliary views should be used to clarify features not clear from other views. Recommended British Standards scales and scale rules should be used. Dimensional tolerance values should be given however, reference to 'Tolerance tables' is not required.

#### **GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT**

A resource-based learning approach is recommended. 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**

Centres may use the instruments of assessment that are considered to be most appropriate. Examples of instruments of assessment which could be used to generate and gather evidence of achievement are given below.

The candidate could be asked to produce drawings of existing products and locations to illustrate production drawings and diagrams. Drawings of locations and floor plans should use an appropriate scale and should include the use of graphical symbols.

The candidate could be set a sample of matching questions to test the ability to identify, classify and justify the use of types of graphic communication within the consumer, engineering or construction industries. These questions should test knowledge of how the types of graphic communication are used by departments of design, manufacture, sales and marketing. Where possible, actual examples of the types of graphic communication should be used for this exercise.

#### **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).

## National Unit Specification: General Information

<b>UNIT</b>	Computer Graphics (Higher)
<b>NUMBER</b>	D173 12
<b>COURSE</b>	Graphic Communication (Higher)

### SUMMARY

The purpose of the unit is to develop computer graphic skills related to industrial and commercial practice.

### OUTCOMES

- 1 Produce orthographic and pictorial drawings using a computer-aided draughting package.
- 2 Produce computer-rendered drawings for promotional purposes using an illustration package.
- 3 Plan and produce single and double page layouts using a desktop publishing package.
- 4 Demonstrate knowledge of terminology and hardware associated with computer graphics.

### RECOMMENDED ENTRY

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

- Standard Grade Graphic Communication at Grade 1 or 2
- Intermediate 2 Graphic Communication, or equivalent.

### CREDIT VALUE

1 credit at Higher.

### CORE SKILLS

Information on the automatic certification of any core skills in this unit is published in *Automatic Certification of Core Skills in National Qualifications* (SQA, 1999).

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### Administrative Information

<b>Superclass:</b>	CE
<b>Publication date:</b>	May 1999
<b>Source:</b>	Scottish Qualifications Authority
<b>Version:</b>	03

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# National Unit Specification: statement of standards

## UNIT Computer Graphics (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

Produce orthographic and pictorial drawings using a computer-aided draughting package.

#### Performance criteria

- a) Orthographic drawings produced are of an appropriate degree of difficulty and are correct in terms of projection and detail.
- b) Pictorial drawings are of an appropriate degree of difficulty and effectively represent the object in terms of detail and proportion.
- c) Functional dimensions on orthographic drawings are clear and unambiguous in terms of their positioning and statement of size.

#### Note on range for this outcome

The following must be included in the selection of CAD drawings: 5 different line types; 4 different dimension types; fillets, arcs, tangents and hatching; pictorial drawings – 2 from isometric, oblique, planometric.

#### Evidence requirements

Graphical evidence of drawings produced by the candidate for each PC (a) to (c).

### OUTCOME 2

Produce computer-rendered drawings for promotional purposes using an illustration package.

#### Performance criteria

- a) The use of computer illustration and presentation techniques is appropriate for the presentation of promotional graphics.
- b) The illustration and presentation techniques are effective in terms of visual impact.

#### Note on range for this outcome

The following must be included in the selection of computer-rendered drawings: a range of illustration graphics showing evidence of the use of illustration and presentations techniques to include colour gradients, imported files, highlights and lettering.

#### Evidence requirements

Graphical evidence of rendered drawings produced by the candidate for each PC (a) to (b).

## **National Unit Specification: statement of standards (cont)**

**UNIT**                      Computer Graphics (Higher)

### **OUTCOME 3**

Plan and produce single and double page layouts, using a desktop publishing package.

#### **Performance criteria**

- a) The stages involved in the planning and production of a DTP document are carried out correctly.
- b) The page layouts produced show effective use of DTP techniques.

#### **Note on range for this outcome**

The following must be included in the selection of DTP documents: evidence of planning to include research information, annotated thumbnail sketches and rough layouts; single- and double-page layouts to include appropriate text style, imported and manipulated graphics and integration of text and graphics.

#### **Evidence requirements**

Graphical and written evidence of the candidate's ability to plan and produce DTP layouts as specified in PCs (a) and (b).

### **OUTCOME 4**

Demonstrate knowledge of terminology and hardware associated with computer graphics.

#### **Performance criteria**

- a) Common terms used in computer graphics are described correctly.
- b) The uses of common hardware devices are described correctly.

#### **Evidence requirements**

Written evidence of the candidate's ability to demonstrate knowledge of terminology and hardware associated with computer graphics as specified in PCs (a) and (b).

## National Unit Specification: support notes

### UNIT Computer Graphics (Higher)

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**

Knowledge and understanding of manual orthographic and pictorial drawing will be used in computer-aided draughting. Knowledge and understanding of illustration and presentation will be used with an illustration package in producing computer-rendered drawings. In the desktop publishing area, graphics and text will be brought together. The unit will also develop knowledge of the related terminology and hardware. The relevant range of terminology can be found in the course content pages of the Arrangements document.

With regard to hardware, the relevant range includes modems, scanners, video digitizers, video/still cameras, plotters, printers and monitors.

Opportunities should be provided to relate the work to the industrial and commercial world through choice of drawing examples, industrial visits, videos and personal experience. The types of drawing skills developed should be exemplified by the place they occupy in the progression of a design from concept to marketing. Although discrete items of new knowledge and skills have to be introduced, it is suggested that many aspects of the unit can be dealt with in an integrated manner with other units.

#### **GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT**

Work should be integrated, to cover more than one topic, where it is natural to do so.

The unit could make use of knowledge from the units *Technical Graphics 1* and *Technical Graphics 2*. The unit will develop techniques of computer graphics for producing drawings and how to integrate graphics and text in the production of a graphic presentation.

Familiarity with the main features of software packages can be gained through exercises. Drawings produced for pictorial representation in promotional work can be integrated with work for computer-rendering and presentation.

Candidates should be made aware of the scope of more powerful software, popular within industry and commerce. Specific practice in becoming familiar with the software should lead into applications such as importing graphics into a text document.

Demonstrations, use of video resources, or practical exercises should be used to illustrate the concept of 3D drawing and modelling and the scope, purpose and application of computer graphics.

#### **GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT**

Centres may use the instruments of assessment that are considered to be most appropriate. Examples of instruments of assessment which could be used to generate and gather evidence of achievement are as follows.

A holistic approach is recommended for assessment of work on hard copy.

## National Unit Specification: support notes (cont)

### UNIT Computer Graphics (Higher)

The candidate should produce a range of production and promotional drawings using CAD and CAG techniques and making use of knowledge gained in units *Technical Graphics 1 (H)* and *Technical Graphics 2 (H)*, for example, pictorial drawing, orthographic views, sections, dimensions and dimensional tolerances.

The candidate should produce a range of promotional graphics.

The candidate should produce a range of layouts showing a mix of text, graphic and imported information, using work created elsewhere.

Appropriate contexts could include: reports, technical instructions, learning materials, in-house newsletters, and promotional graphics.

### 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).