

**CRAFT AND DESIGN**  
**Higher**

**Fourth edition – published December 1999**

**NOTE OF CHANGES TO ARRANGEMENTS  
FOURTH EDITION PUBLISHED ON CD-ROM DECEMBER 1999**

**COURSE TITLE:** Craft and Design (Higher)

**COURSE NUMBER:** C024 12

**National Course Specification**

Course Details: Core skills statements expanded

**National Unit Specification**

All Units: Core skills statements expanded

## National Course Specification

### CRAFT AND DESIGN (Higher)

**COURSE NUMBER** C024 12

#### COURSE STRUCTURE

This course comprises four mandatory units as follows:

<i>D125 12</i>	<i>Product Evaluation and Graphic Techniques (H)</i>	<i>0.5 credit (20 hours)</i>
<i>D126 12</i>	<i>Designing for People (H)</i>	<i>1 credit (40 hours)</i>
<i>D127 12</i>	<i>Designing for Manufacture (H)</i>	<i>1 credit (40 hours)</i>
<i>D128 12</i>	<i>Product Model (H)</i>	<i>0.5 credit (20 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 Craft and Design at Grade 1 or 2
- Standard Grade Art and Design at Grade 1 or 2
- Intermediate 2 Craft and Design, or equivalent

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#### Administrative Information

**Publication date:** December 1999

**Source:** Scottish Qualifications Authority

**Version:** 04

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## National Course Specification (cont)

**COURSE:** Craft and Design (Higher)

### CORE SKILLS

This course gives automatic certification of the following:

**Complete core skills for the course** Problem Solving H

**Additional core skills components for the course** None

For information about the automatic certification of core skills for any individual unit in this course, please refer to the general information section at the beginning of the unit.

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

## National Course Specification: course details (cont)

**COURSE:** Craft and Design (Higher)

### RATIONALE

The great majority of learners - whether pupils at school, students at universities, polytechnics or colleges, or adults still wanting to learn - are destined for a productive life of practical action. They are going to do things, design things, make things, organise things, for the most part in co-operation with other people. They need to improve their competence by the practice of skills and the use of knowledge; to cope better with their own lives and the problems that confront them in society; to develop their creative abilities; and, above all, to co-operate with other people.' ('Education for Capability', The Royal Society of Arts, 1986 Recognition Scheme.)

The pace of change is increasing in industry and society. New materials, new processes and practices, new techniques and ever newer technologies have had, and will continue to have, a major impact on work practices and society. To cope with and benefit from this fluid situation requires people who possess vision, initiative, communication skills, risk tolerance, flexibility and self-reliance. This course attempts to develop these attributes through studies which are both technological and creative.

The technological aspects derive mainly from active involvement in designing within the context of the industrial world where the technology for design, manufacture and marketing is explored.

Creative aspects are fostered by the diversity of acceptable solutions to design briefs. Creativity can be manifested in various ways such as sketching ideas, modelling by computer, and producing scale models and prototypes in appropriate materials.

The course is experiential: it focuses in turn on every stage of the process of design and manufacture, offering opportunities for participants to develop confidence and abilities which will serve them well in later life.

Candidates are encouraged to adopt a broad outlook to design and it is recognised that other subject departments may have a role to play in the input of relevant cross-curricular material.

The aims of the course are to:

- foster understanding of the process of designing in a commercial context and the factors which influence designs
- enhance knowledge of industrial manufacturing processes and materials
- increase awareness of economic considerations and the social implications of design and manufacture
- develop skills in designing related to the industrial context
- contribute to personal development, in particular to technological capability.

## **National Course Specification: course details (cont)**

### **COURSE**                      Craft and Design (Higher)

Technological capability, according to the Scottish CCC document, *Technological Education in Scottish Schools* (1996), consists of the four elements of technological perspective, technological confidence, technological sensitivity and technological creativity.

Standard Grade Craft and Design focuses on the school workshop and candidates designing and making something for themselves which can be crafted in its final form within the resources of the centre and the skills of each candidate. The course described here is set in the context of products for the market-place produced by commercial design and industrial manufacture. This distinction should be made at the beginning of the course. Those candidates progressing from Intermediate 2 Craft and Design will have experience of this context.

## National Course Specification: course details (cont)

**COURSE**                      Craft and Design (Higher)

### **COURSE CONTENT**

All of the course content will be subject to sampling in the external assessment with the exception of the practical work produced for the unit Product Model. The course consists of four units, two of 20 hours and two of 40 hours.

#### **Summary of units and outcomes**

##### ***Product Evaluation and Graphic Techniques (H)***

- 1 Carry out a consumer evaluation of a commercial product.
- 2 Apply graphic techniques in the context of designing.

##### ***Designing for People (H)***

- 1 Explain the factors which influence designing for people.
- 2 Describe how a commercial product is designed.
- 3 Produce a design specification.
- 4 Produce designs for people.

##### ***Designing for Manufacture (H)***

- 1 Identify the materials and manufacturing processes used in the manufacture of selected products.
- 2 Describe how modern materials and manufacturing processes influence design.
- 3 Investigate and develop ideas for the industrial/commercial manufacture of a proposed solution to a design specification.

##### ***Product Model (H)***

- 1 Plan the production of the prototype or presentation model of a proposed solution to a design specification.
- 2 Construct the prototype or presentation model of the proposed solution.

The course has been designed to allow the units to be taught sequentially in order to build up knowledge and experience. However, teachers and lecturers are encouraged to consider the combination of units as a holistic course which can be taught flexibly.

This may result in a sequence of learning outwith that suggested in the units, and integration across the units may be more the rule than the exception. Whatever structure is chosen, the requirement is to ensure that enough evidence is produced to allow for assessment of the outcomes and performance criteria stated in the units.

For external assessment of designing, a Design Assignment will be undertaken. This design assignment requires candidates to take a design from a brief through all the stages of development, including the product model in Unit 4. Completion of Unit 4 will allow a realistic evaluation to be made of the design proposal.

The Design Assignment should be different from the tasks undertaken for Unit 2 and Unit 3 and may require up to 20 hours of work within the additional 40 hours allocated to the course.

The integrative nature of the Design Assignment and the possibility of integration across units in progressing through the course is regarded as an added benefit for those candidates undertaking the course rather than studying discrete free-standing units.

## National Course Specification: course details (cont)

**COURSE** Craft and Design (Higher)

Full unit specifications are contained at the end of this document. What follows is a description of the content to be taught in each unit and an indication of where integration might be possible.

### ***Unit 1: Product Evaluation and Graphic Techniques (H)***

This is seen as the introductory unit and sets the distinction between the context of the Higher course and that of Standard Grade as indicated in the rationale.

The unit serves to introduce the candidate to a consideration of the design, manufacture and use of commercial products. Product evaluation will allow candidates to study the factors affecting commercial design; this study will be progressed in Units 2 and 3.

Communication skills in text and graphics are incorporated in a report on each product evaluation. Graphic skills are extended through illustrating the development of the designs for the products which are evaluated. These graphic skills may be further developed in Units 2 and 3.

### ***Carry out a consumer evaluation of a commercial product***

Content

Evaluation	Factors influencing design: fitness for purpose; choice of materials; finish; durability; value for money; ease of maintenance; aesthetics; ergonomics; environmental concerns; running costs and other appropriate criteria. Each factor should be considered. Some will have more impact than others. A means of evaluating each has to be decided.
Evaluation report	The report should specify the factors considered, give an explanation of how each was assessed by the candidate and display the results in an easily assimilated form. Any overall verdict must be confirmed by the evidence reported.

### ***Apply graphic techniques in the context of designing***

Content

Graphic techniques	Pictorial sketches. Line, tone, colour and rendering techniques are used to enhance presentation. Orthographic projection. Drawings to include details of sizes and materials. The place of each type of graphics in the design process should be explained.
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## National Course Specification: course details (cont)

**COURSE**                      Craft and Design (Higher)

### ***Unit 2: Designing for People (H)***

This unit deals with the factors which have to be considered when designing products to be used by people. The evaluation undertaken in Unit 1 introduced some of these factors from the viewpoint of a consumer. These factors are revisited, extended and considered from the viewpoint of a designer. Candidates gain practice in applying the factors to specific design situations.

### ***Explain the factors which influence designing for people***

Content

The factors considered in Unit 1 should be revisited and expanded from the viewpoint of the designer creating the designs rather than that of the customer using them.

Ergonomics	People/product interface. Applications in examples such as tools, domestic equipment, furniture, IT equipment, controls, workplaces, sports. Use of anthropometric and other ergonomic data. Physiology and psychology,
Aesthetics	Shape, form, proportion, texture and colour. Place of aesthetics in design and marketing.
Influences of fashion	How marketing can create acceptable fashions. How fashion influences choice.
Consumer demand	How consumer demand can bring products to the market-place and modify existing products.
Social expectations	Safety, reliability, value for money, design for the elderly, design for the disabled.
Environmental concerns	Recycling of materials, waste products from manufacturing, use of finite resources.

### ***Describe how a commercial product is designed***

Content

Product design	Product cycle from initial idea to market-place. Origin of idea, development to specification, idea generation and modelling, decision-making, manufacture, marketing, assessment of success.
Design team	Structure of a typical design team, contribution and responsibility of individual members.
Design considerations	Safety, commercial enterprise, economics, market opportunity, planned obsolescence.

## National Course Specification: course details (cont)

**COURSE** Craft and Design (Higher)

### *Produce a design specification*

Content

Design brief	Design briefs should be set which lead the candidates into an exploration of factors which have to be considered when designing for people. The brief is usually a simple statement of an opportunity, desire, need or problem.
Analysis of the brief	Exploration of the brief leads to the establishing of the design specification. Reference should be made to the design factors considered in the evaluation undertaken in Unit 1.
Writing a specification	Clear and detailed statement of the design specification. Care should be taken not to word a specification towards a predetermined solution but to leave it open to a variety of solutions, some of which might not even be imagined at this stage.

### *Produce designs for people*

Content

The factors considered in Unit 1 should be revisited and expanded from the viewpoint of the designer. The knowledge of the factors gained in Outcome 1 of this unit should be put into practice to consolidate learning and improve understanding.

Ergonomics	People/product interface. Tasks should give experience across a spread of applications.
Aesthetics	Effective application of shape, form, proportion, texture and colour.
Influences of fashion	Some examples should show consideration of some aspects of fashion.
Social expectations	Safety, reliability, value for money, design for the elderly, design for the disabled etc.
Production of design ideas	Such as morphological analysis and brain-storming.
Modelling	Modelling should be used to assist in the creation and development of ideas. This practice will assist in the choice of appropriate modelling techniques required in Unit 4.

## National Course Specification: course details (cont)

**COURSE** Craft and Design (Higher)

### ***Unit 3: Designing for Manufacture (H)***

This unit introduces the materials and processes available to the product designer. These should be much more varied than those experienced at Standard Grade and few would be amenable to working by hand. The requirements of mass-production volume and market competition dictate the application of leading-edge technology. Candidates are made aware of what is involved in designing for such practice. They should develop the ability to make informed decisions regarding the range of processes and appropriate materials available. Emphasis is on an appreciation/awareness of the possibilities of manufacture rather than the detail of each process.

Design tasks will give practice in consideration of these materials and processes in design situations.

A variety of examples of products, produced using each process, should be available.

***Identify the materials and manufacturing processes used in the manufacture of selected products.***

***Describe how modern materials and manufacturing processes to meet product requirements.***

Content (relates to both outcomes above)

### ***Manufacturing Processes***

Hand/bench	Built on experience from Standard Grade. Limited application in modern manufacture.
Machining	Awareness of the following machines and of the related types of work. Metal: lathe, mill, computer-aided manufacture (CAM). Wood: lathe, router, spindle moulder, saws, joint-cutting equipment. Examples of the type of work undertaken by such machines. Use and benefits of CAM. Candidate should gain hands-on experience of CAM wherever possible.
Die-casting	Principles of the process, similarity to injection-moulding, examples, accuracy, finish. Use of aluminium alloys and zinc.
Injection-moulding	Principles of the process, similarity to die-casting, examples, accuracy, finish. Use of plastics - forms of supply.
Extrusion	Principles of the process, examples, accuracy, finish. Use of plastics, brass, aluminium.
Laminating	Description of process, examples. Use of wood and plastics including glass-reinforced plastic.
Rotational moulding	Principles of the process, examples.
Pressing	Principles of the process, examples, similarity to laminating (applying pressure to shape). Use of metals.

## National Course Specification: course details (cont)

COURSE	Craft and Design (Higher)
Vacuum-forming	Principles of the process, examples, similarity to pressing, comparison with injection-moulded products. Use of plastics sheets of varying thickness.
Joining	Awareness of appropriate means of joining a range of materials. Permanent: spot welding, arc welding, riveting, adhesives, fitted joints. Non-permanent: bolts, screws, patent devices. Application to metals, plastics, timber and its derivatives.
Blow-moulding	Principles of the process, examples, comparison with vacuum-forming and injection-moulding.

### *Materials*

Metals	Stainless steel, high-speed steel (HSS), brass, bronze, duralumin. Aluminium, copper, tin, lead, zinc. Cast iron, mild steel, high carbon steel.
Plastics	Thermoplastics: polythene (high and low density), polyvinyl chloride, polystyrene, nylon, cellulose acetate, acrylic, polypropylene, ABS. Thermosets: epoxy resin, melamine formaldehyde, urea formaldehyde, polyester resin. Composites: glass-reinforced plastic, carbon-fibre plastics.
Timber	Hardwoods: beech, oak, ash, mahogany, teak, walnut, balsa. Softwoods: Scots pine, red cedar, parana pine, spruce.
Timber derivatives	Manufactured boards: medium density fibreboard, plywood, blockboard, chipboard, hardboard, veneer.

### *Investigate and develop ideas for the industrial/commercial manufacture of a proposed solution to a design specification.*

Content	
Investigation	Investigation of ideas for materials and processes to be used in the manufacture of a proposed solution to a design specification. The range of possibilities are evaluated and appropriate production methods and materials selected.
Production drawings	Using orthographic drawing, define the size of all major components and constructional details necessary for the industrial/commercial manufacture of the design proposal.

## National Course Specification: course details (cont)

**COURSE** Craft and Design (Higher)

### ***Unit 4: Product Model (H)***

The purpose of making a prototype or presentation model is to allow a design proposal to be evaluated.

The evaluation and photographs of this product model will be part of the Design Assignment folio for the external assessment.

See support notes for distinction between prototype and model.

### ***Plan the production of the prototype or presentation model of a proposed solution to a design specification.***

Content

Plan	Plan the sequence of operations to construct the prototype or model.
Prototype	A prototype must be an exact replica of the product to be manufactured (commercially). It must be the same material, dimensions, finish etc. in order to allow evaluation of all aspects of the product in use.
Model	Medium such as wood, metal, plastic which will allow a true representation of the manufactured product (commercial). Computer 3D modelling can serve as part of the presentation but a 3D model in resistant material must be produced.

### ***Construct the prototype or presentation model of the proposed solution.***

Content

Construction	Sound construction showing good quality of work.
Production features	This applies to models. Features such as join lines of separate parts, lids, buttons, switches etc.
Quality of finish	This should be the quality which will be on the final industrial/commercial product.

## National Course Specification: course details (cont)

**COURSE**                      Craft and Design (Higher)

### ASSESSMENT

To gain the award of the course, the candidate must pass all the unit assessments as well as the external assessment. External assessment will provide the basis for grading attainment in the course award.

Different design tasks could be undertaken for Unit 2 and Unit 3 or one task could be used to cover both units. The Design Assignment should be a fresh task.

When the units are taken as component parts of a course, candidates will have the opportunity to achieve at levels beyond that required to attain each of the unit outcomes. This attainment may, where appropriate, be recorded and used to contribute towards course estimates, and to provide evidence for appeals.

Further information on the key principles of assessment are provided in the paper *Assessment* (1998).

### DETAILS OF THE INSTRUMENTS OF ASSESSMENT FOR EXTERNAL ASSESSMENT

The external assessment consists of:

- 1 an examination paper
- 2 a Design Assignment.

This assignment will dictate the content of Unit 4.

The examination paper will be externally set and marked.

The Design Assignment will be externally marked.

#### External examination paper (80 marks)

A written paper to test knowledge and understanding of factors which should be considered in designing and manufacturing. This paper will be of 2½ hours' duration.

Candidates will be presented with questions which test knowledge and understanding related to the outcomes of the course. The marks allocated to each question will be shown. All questions should be attempted.

#### Design Assignment to test ability in designing (120 marks)

The Design Assignment will be externally marked.

Candidates will select a topic of interest to the satisfaction of the teacher/lecturer. This topic should be different from the tasks undertaken in Unit 2 and Unit 3. They will develop solutions through all stages of the design process to arrive at a solution which is fully represented in graphical form. This solution will be produced as a product prototype or model (Unit 4). The product will be evaluated against the design specification. The result of the evaluation will be recorded in the Design Assignment folio.

Detailed information on the marks allocated to the folio contents of the Design Assignment will be issued by the SQA. The overall balance will be as follows.

Designing	100
Graphic communication and presentation	20
	<b>Total 120 marks</b>

## National Course Specification: course details (cont)

### **COURSE**                      Craft and Design (Higher)

The Design Assignment folio will contain all the evidence used in generating and developing ideas, including modelling. Where mock-ups/models can be collapsed flat they may be included, otherwise photographs should be sent. Photographs of the product prototype or model (Unit 4) must be included in sufficient detail for the examiner to assess the candidate's evaluation.

It is suggested that a planning record proforma would be helpful to enable the teacher/lecturer to authenticate the candidate's progress through the Design Assignment.

### **GRADE DESCRIPTIONS**

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.

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 external examination paper and the assignment design folio. The descriptions below indicate the nature of the achievement which is required for the award of Grade C and Grade A in the course assessment.

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

- demonstrate a sound knowledge and understanding of the factors which contribute to designing and manufacturing
- demonstrate a good level of ability in applying the design process through the production of a design folio by the application of ideas, modelling and graphics, production of designs which show due consideration of the needs of the user and an appreciation of the use of appropriate materials and manufacturing processes. The folio will include:
  - problem evaluation
  - design specification
  - generation of ideas
  - development of ideas (including modelling)
  - synthesis of solution
  - planning for manufacture
  - an evaluation of the product model
  - appropriate graphics
  - presentation skills.

## National Course Specification: course details (cont)

### **COURSE**                      Craft and Design (Higher)

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

- demonstrate an extensive knowledge and understanding of the factors which should be considered in designing and manufacturing
- demonstrate a high level of ability in applying the design process through the production of a design folio by the application of creative design ideas, effective modelling and clear graphics, production of designs which show due consideration of the needs of the user and an effective application of appropriate materials and manufacturing processes. The folio will include:
  - problem evaluation
  - design specification
  - generation of ideas
  - development of ideas (including modelling)
  - synthesis of solution
  - planning for manufacture
  - an evaluation of the product model
  - appropriate graphics
  - presentation skills

### **APPROACHES TO LEARNING AND TEACHING**

Detailed subject guides give further advice and information on:

- support materials for each course
- appropriate learning and teaching approaches
- core skills as they relate to the subject
- assessment
- ensuring appropriate access for candidates with special educational needs

#### ***Unit 1: Product Evaluation and Graphic Techniques (H)***

The purpose of this unit is to progress study from Standard Grade, where the context of design was confined to products which the candidates could manufacture in the school workshop, to the context of commercially manufactured products generally available in the market-place. By evaluating and comparing simple products, candidates can become aware of the factors which are important in a particular design and of the need for a variety of acceptable solutions to suit the range of users. This can form an introduction to aesthetics, ergonomics, colour, shape, form, materials, costs, touch, reliability, market force, function, usability and the competitive market. These topics are formally expanded in Unit 2 but this introduction shows their relevance in overall design. Instruction in how to prepare and present a report on the findings establishes the need for recording and a logical approach to presentations.

## National Course Specification: course details (cont)

### COURSE                      Craft and Design (Higher)

As candidates analyse products they should be shown how at least one of the products evolved to its present state. This could be supported by a brief case-study showing the progression of the design, the factors which influenced the various apparent and less apparent changes and the range and purpose of the graphics involved. This would serve as a focus for learning new or extending present graphic skills. The products being analysed could provide components which the candidates could sketch and draw while being made aware of the purpose of such drawings in the scheme of things. Standards could be exemplified from the case-study. No new designing or re-designing need be involved at this stage. The case-study also serves to encourage candidates to use such resource material for themselves and to explore further as required. It is important that any further investigation which is set has the resources readily available in the school and preferably in the department. Practice should be given in reading drawings of a more complex nature. This is a skill which most people have to employ at some time, although they may never need to produce a formal drawing. Reading of drawings does require instruction and practice.

#### ***Unit 2: Designing for People (H)***

This unit leads on from Unit 1, where many of the factors influencing designs for people were met in the consumer evaluation of commercial products.

The study of ergonomics with its three areas anthropometrics, physiology and psychology, should stress the importance of the product/human interface. This applies to all products which require humans to make them function and all designs which have to accommodate the human form. Consideration of a wide range of products - domestic appliances, furniture, tools (readily available in the schools), sports equipment, IT equipment, work space, domestic environment etc - provide ample opportunity for candidates to evaluate specific aspects of the subject. Candidates should design or re-design items, focusing mainly on ergonomics, to consolidate learning and to use relevant available data. Evaluation of their efforts can be carried out by their peers against established criteria.

The aesthetic importance of shape, form and colour should be explored and some ground rules established regarding these, while accepting the right to like or not like the appearance of any object under discussion. The influences of marketing pressure to establish styles currently in vogue and the reasons why this is being done should form part of the discussion. Practice in aesthetic designing should consolidate the learning.

The influences of fashion, consumer demand, social expectations and impacts, and environmental concerns can be illustrated from case-studies. The influence of the manipulated market can be discussed with reference to the candidates' choice of product which they have bought or would buy, from the many available in the shops. The significance of market pull and market push can be illustrated. It is more difficult to show the effect of these influences through design folio evidence so written or oral assessment will be required.

The history of how a commercial product was brought from design brief to the market-place can be supported by a case-study tracing the product cycle of a common item. The case-study should indicate the origin of the idea or design, how the specification was established, the early development of ideas including techniques employed for the generation of ideas, use of CAD, the purpose and type of modelling, the structure of the design team, decision making, identifying the market, the marketing strategies and evaluation of the success or otherwise of the product. This could relate back to products examined in Unit 1.

## National Course Specification: course details (cont)

### COURSE                      Craft and Design (Higher)

Candidates could undertake a series of small design tasks in this unit. These tasks would have the emphasis on designing for people and be based largely on ergonomic and aesthetic thinking, to consolidate on-going study. The tasks should reflect any ground rules which have been established. Modelling should play an important part in developing and testing ideas. The candidates must continue to develop graphic skills.

#### ***Unit 3: Designing for Manufacture (H)***

The study of materials and processes is combined, as each influences the other in the context of design. The focus should be on the properties of materials which make them suited to particular applications, environments and processes, and examples of such applications should be given. Examples of the materials in various forms of supply should be available. Examples of real products to illustrate each material and process should be available, e.g. aluminium in the form of extrusions (curtain rail), castings (toys), pressings (box) etc. The properties of the materials, e.g. strength/ weight and corrosion resistance should be factors considered, as should a comparison of costs. Much of this should be available on a database and readily accessible. Simplified examples of such processes as extrusion and injection-moulding can be improvised and the industrial applications demonstrated from video or by industrial visits, of which the latter has many advantages.

The candidate should be exposed to situations which reflect the demands of designing for the marketplace. Extensive support material should be available to provide information on all the manufacturing situations, materials and related equipment covered in the unit.

Background knowledge can be provided in part through accessing case-studies which illustrate the industrial techniques employed to resolve design projects, describe the implications for design of materials and processes, and illustrate the assistance given by technology such as CAD and CAM. While the outcomes are listed separately, it is anticipated that these will be effectively integrated for learning and teaching and assessment.

The designing will focus on the consideration of suitable materials and processes and eventual justification for the ones selected. Some integration with previous units can occur if the designs developed for people in Unit 2 are carried over into this one. Otherwise sketches or models can be provided as the starting point or components could be designed from scratch. The investigations should be on-going, being fed from the study of materials and processes as teaching progresses.

The range of materials and processes should be considered and appropriate production methods and materials selected. The final proposal has to be capable of being manufactured for the commercial market. Sufficient production drawings have to be prepared to allow this to be considered. The production drawings should include dimensioned orthographic drawings of all the major components and sufficient constructional detail to inform the industrial/commercial manufacture of the design proposal. Manual and computer graphics are acceptable. Relevant graphic skills may need further development.

## National Course Specification: course details (cont)

**COURSE**                      Craft and Design (Higher)

### ***Unit 4: Product Model (H)***

This is the culmination of the externally assessed Design Assignment.

This develops from workshop skills gained at Standard Grade and modelling experience in earlier units. The candidate has to produce a prototype or presentation model of the proposed solution to the Design Assignment.

If a presentation model is required, its purpose should be clearly established to decide the best modelling technique. It must be borne in mind that the product will ultimately be manufactured so all modelling should be pertinent to this in the choice of modelling medium. Computer modelling may be utilised where computing capacity allows 3D modelling but can only contribute as a minor part of this unit. The majority of the models and prototypes must be three-dimensional and made from resistant materials.

### **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

**UNIT** Product Evaluation and Graphic Techniques (Higher)

**NUMBER** D125 12

**COURSE:** Craft and Design (Higher)

### SUMMARY

This is a component unit of Higher Craft and Design.

Candidates will conduct a consumer evaluation of a commercial product and also develop skills in graphic techniques.

### OUTCOMES

- 1 Carry out a consumer evaluation of a commercial product.
- 2 Apply graphic techniques in the context of designing.

### 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 Craft and Design at Grade 1 or 2
- Standard Grade Art and Design at Grade 1 or 2
- Intermediate 2 Craft and Design, or equivalent.

### CREDIT VALUE

0.5 credit at Higher.

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### Administrative Information

**Superclass:** JC

**Publication date:** December 1999

**Source:** Scottish Qualifications Authority

**Version:** 04

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## National Unit Specification: general information (cont)

**UNIT** Product Evaluation and Graphic Techniques (Higher)

### CORE SKILLS

This unit gives automatic certification of the following:

<b>Complete core skills for the unit</b>	None
<b>Core skills components for the unit</b>	Critical Thinking H
	Planning and Organising H

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**                      Product Evaluation and Graphic Techniques (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**

Carry out a consumer evaluation of a commercial product.

##### **Performance criteria**

- a) The design factors selected for the evaluation are sufficient, appropriate and justified for the product under scrutiny.
- b) The evaluations of the factors selected are thorough and objective.
- c) The report provides adequate valid evidence for the verdict reached.

##### **Note on range of this outcome**

Design factors: fitness for purpose; ease of maintenance; environment concerns; choice of materials; running costs; durability; aesthetics; value for money; ergonomics.

##### **Evidence requirements**

Written evidence within the report that the candidate has met the requirements of PCs (a) to (c).

#### **OUTCOME 2**

Apply graphic techniques in the context of designing.

##### **Performance criteria**

- a) Pictorial sketches clearly convey the required information at a level appropriate to the design stage at which they are applied.
- b) Orthographic drawings clearly convey the required information regarding shape and size.
- c) Line, tone, colour and rendering techniques are used effectively to give the required emphasis and realism to graphics.

##### **Evidence requirements**

Graphical evidence that the candidate can produce graphics as defined in PCs (a) to (c). This may be a constituent part of the report and/or a separate element.

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

### **UNIT**                      Product Evaluation and Graphic Techniques (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 20 hours.

#### **GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT**

Design factors must include: fitness for purpose; choice of materials; durability; safety; value for money; ease of maintenance; ergonomics; aesthetics; running costs and environmental concerns.

The purpose of this unit is develop evaluating skills from Standard Grade, where the context of design was largely confined to products which the candidates could manufacture in the school workshop, to the context of commercially manufactured products generally available in the market-place. By evaluating and comparing simple products candidates can become aware of the factors which are important in a particular design and of the need for a variety of acceptable solutions to suit the range of users. Such knowledge and experience can be applied to personal purchases many times over.

Whether for personal use or to communicate to others, clear, appropriate graphics can enhance the generation of design ideas, the development of these ideas and the presentation of subsequent solutions. The unit allows the candidate to sample a range of graphic techniques and to appreciate how and where they can be utilised to good effect. This work will include sketches and orthographic drawings of related views, with dimensions.

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

A candidate-centred, resource-based learning approach is recommended. Source material in the way of products can be kept small-scale and augmented by videos, case-studies, magazines, books, catalogues, personal experience, the home and visits.

Candidates are introduced to the world of product design through the evaluation of a commercial product. The communication tool of the designer, namely graphics, is further developed from those skills acquired at Standard Grade or Intermediate 2.

The evaluation identifies features which must also be considered when designing. These can be expanded in tasks which extend across all four units so that a broad front is progressed rather than a narrower unit-by-unit approach. Whichever strategy is employed, each factor should be given enough consideration to consolidate learning and allow the candidates to demonstrate competence.

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

Each candidate will compile a portfolio of the work undertaken by her/him in the course. This will comprise the individual folios containing the work of the various tasks set in each unit. This portfolio will provide evidence which should be used to assess the achievement of competences across all the units. Evaluation of products may appear more than once, while graphic skills will permeate all the work. This approach allows the teacher/lecturer to decide how well the candidate is performing or form the basis for reassessment of outcomes from this unit if required. Some outcomes may require additional written or oral questions to provide the evidence required for all the performance criteria.

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

### **UNIT**                      Product Evaluation and Graphic Techniques (Higher)

Candidates, as part of the unit work, have to produce an evaluation report. This will provide evidence for Outcome 1. It should also contain aspects of Outcome 2, as it will normally contain some elements of graphics. Any performance criteria of Outcome 2 not covered by the report will require separate evidence of competence.

### **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

**UNIT** Designing for People (Higher)

**NUMBER:** D126 12

**COURSE** Craft and Design (Higher)

### SUMMARY

This is a component unit of Higher Craft and Design.

Candidates will study a range of factors which have to be considered in producing designs for products which involve people.

### OUTCOMES

- 1 Explain the factors which influence designing for people.
- 2 Describe how a commercial product is designed.
- 3 Produce a design specification.
- 4 Produce designs for people.

### 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 Craft and Design at Grade 1 or 2
- Standard Grade Art and Design at Grade 1 or 2
- Intermediate 2 Craft and Design or equivalent

### CREDIT VALUE

1 credit at Higher.

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### Administrative Information

**Superclass:** JC

**Publication date:** December 1999

**Source:** Scottish Qualifications Authority

**Version:** 04

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## National Unit Specification: general information (cont)

**UNIT**                      Designing for People (Higher)

### CORE SKILLS

This unit gives automatic certification of the following:

<b>Complete core skills for the unit</b>	None
<b>Core skills components for the unit</b>	Critical Thinking                      H
	Planning and Organising            H

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**                      Designing for People (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**

Explain the factors which influence designing for people.

#### **Performance criteria**

- a) The importance of ergonomics in relation to the human/product interface is clearly explained.
- b) The influence of aesthetics in design is clearly explained with respect to shape, form, colour and contribution to sales appeal.
- c) The influences of fashion, consumer demand, social expectations and environmental concerns are clearly explained with references to commercial products.

#### **Evidence requirements**

Written evidence that the candidate can explain the influence of the factors defined in the PCs (a) to (c).

### **OUTCOME 2**

Describe how a commercial product is designed.

#### **Performance criteria**

- a) The salient stages in the evolution of a commercial product are fully described.
- b) The working of a typical design team is correctly described.
- c) Considerations of safety, commercial enterprise, economics, market opportunity, and planned obsolescence are correctly explained in relation to the designing of a commercial product.

#### **Evidence requirements**

Written evidence that the candidate can give the descriptions defined in PCs (a) to (c).

### **OUTCOME 3**

Produce a design specification.

#### **Performance criteria**

- a) The analysis of the brief is thorough and appropriate to the task.
- b) The design specification is clear and adequate for the purpose.

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

Thorough analysis: must address function and at least five other factors which influence designing.

#### **Evidence requirements**

Performance evidence from a design folio for PCs (a) and ( b).

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

**UNIT**                      Designing for People (Higher)

### **OUTCOME 4**

Produce designs for people.

#### **Performance criteria**

- a) The designs produced give due consideration to the factors affecting designing for people.
- b) The generation and development of ideas is sufficient for the task and is adequately supported by the production and use of appropriate models.
- c) Graphics for the illustration and presentation of the proposed solution are effective for their purpose.

#### **Evidence requirements**

Performance evidence from a design folio for PCs (a) to (c).

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

### **UNIT**                      Designing for People (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**

This unit provides experience of the various factors which must be considered when designing products which involve people as users, operators, observers etc. The main emphasis is on aspects of ergonomics and aesthetics.

Skills are enhanced in accessing documented information to assist with the construction of purposeful design specifications and the development of effective solutions.

Knowledge is gained on the co-operative and individual contributions made by the members of a design team and of the methods they employ to promote the commercial success of products.

This unit allows the candidate to explore a range of design considerations for commercial products. To ensure that the correct emphasis is promoted, a commercial designing context should be engendered in the work of the unit. Access to ergonomic data, safety regulations and other relevant information should be readily available.

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

A candidate-centred, resource-based learning approach is recommended. Source material in the way of products can be kept small-scale and augmented by videos, case-studies, magazines, books, catalogues, personal experience, the home and visits.

The factors met in the unit Product Evaluation and Graphic Techniques are studied in more detail and tasks set to give the candidate experience of considering these from the point of view of a designer. The tasks can focus on designing for people but include aspects of the unit Designing for Manufacture (Unit 3) and modelling which will be progressed in the unit Product Modelling (Unit 4). This broad front approach through progressively more difficult tasks is an alternative to the narrower unit-focused approach.

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

**UNIT**                      Designing for People (Higher)

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

Each candidate will compile a portfolio of the work undertaken by in the course. This will comprise the individual folios containing the work of the various tasks set in each unit. This portfolio will provide evidence which should be used to assess the achievement of competences across all the units. Aspects such as the evaluation of products may appear more than once, while graphic skills will permeate all the work.

This approach should provide the teacher/lecturer with enough evidence to decide the grade at which the candidate is performing. Some outcomes may require additional written or oral questions to assess knowledge and understanding.

When taught as a single unit the above reference to other units will not necessarily apply. The folio of work for this unit will provide performance evidence for Outcomes 3 and 4. Outcomes 1 and 2 will require written tests to check for competence. These tests can be conducted at any time, but if undertaken towards the end of the unit the candidates may have obtained a better understanding through the application to practical work.

### **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).

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## National Unit Specification: general information

**UNIT** Designing for Manufacture (Higher)

**NUMBER** D127 12

**COURSE** Craft and Design (Higher)

### SUMMARY

This is a component unit of Higher Craft and Design.

Select materials and manufacturing processes suited to design situations.

### OUTCOMES

- 1 Identify the materials and manufacturing processes used in the manufacture of selected products.
- 2 Describe how modern materials and manufacturing processes influence design.
- 3 Investigate and develop ideas for the industrial/commercial manufacture of a proposed solution to a design specification.

### 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 Craft and Design at Grade 1 or 2
- Standard Grade Art and Design at Grade 1 or 2
- Intermediate 2 Craft and Design, 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

**Superclass:** VF

**Publication date:** December 1999

**Source:** Scottish Qualifications Authority

**Version:** 04

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## National Unit Specification: general information (cont)

**UNIT**                      Designing for Manufacture (Higher)

### CORE SKILLS

This unit gives automatic certification of the following:

<b>Complete core skills for the unit</b>	None
<b>Core skills components for the unit</b>	Critical Thinking            H
	Planning and Organising    H

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**                      Designing for Manufacture (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**

Identify the materials and manufacturing processes used in the manufacture of selected products.

##### **Performance criteria**

- a) Manufacturing materials are identified correctly.
- b) The reasons given to confirm the identification of materials are valid.
- c) The processes used in the manufacture of selected products are identified correctly.
- d) The reasons given to confirm the identification of manufacturing processes are valid.

##### **Evidence requirements**

Written evidence that the candidate can identify correctly a minimum of 6 materials and processes used in the manufacture of selected products, with justification.

#### **OUTCOME 2**

Describe how modern materials and manufacturing processes influence design.

##### **Performance criteria**

- a) The materials are described correctly in terms of their implications for design.
- b) The methods of forming, shaping, joining and finishing materials are described correctly in terms of their implications for design.

##### **Evidence requirements**

Written evidence that the candidate can meet PCs (a) and (b) in describing a selection of materials and processes and their implications for design.

#### **OUTCOME 3**

Investigate and develop ideas for the industrial/commercial manufacture of a proposed solution to a design specification.

##### **Performance criteria**

- a) The investigation is thorough and appropriate to the task.
- b) The proposed materials and manufacturing processes are appropriate and justified in terms of the proposed solution.
- c) The production drawings clearly define the size of all major components and state the materials and processes to be used in the industrial/commercial manufacture of the proposed solution.

##### **Evidence requirements**

Performance evidence from the design folio for PCs (a) to (c).

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

### **UNIT**                      Designing for Manufacture (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**

Manufacturing processes: hand/bench; machining; CAM; die-casting; injection-moulding; blow-moulding; rotational moulding; extrusion; laminating; pressing; vacuum-forming; joining.

Materials (appropriate to the manufacturing processes above): metals; plastics; timber; timber derivatives.

This unit provides knowledge and experience of the properties of materials and manufacturing processes which make them suited to particular design applications.

It provides the candidate with an insight into and experience of the process of selecting materials and manufacturing processes which might be suited to design proposals and of the considerations which these then bring to the final design. Graphic skills will continue to develop and be extended to the rigour of preparing production drawings.

The identification of specific plastics can be rather difficult due to their similarity of appearance and texture. Tests which can be applied are cutting with a sharp knife, bending, placing in water, scratching with a fingernail. These can be inconclusive. More information can be gleaned from carrying out heating or burning tests which can usually provide the final clues. It is appreciated that an element of danger is present when conducting these tests and they should only be carried out in well ventilated areas under close supervision but it is recommended that where possible these tests are carried out.

The heating/burning tests will require the eventual disfiguration/destruction of the product being investigated. This will have to be accepted in the interests of the knowledge gained. Alternatively supplies of scraps of identical material can be provided for burning.

Tests for other materials will involve scraping and filing which, as well as the tests on plastics, will eventually ruin the product. Again the amount of damage done can be reduced by the candidates learning how to identify the range of materials from off-cuts/samples so that only the minimum time needs to be spent on the commercial products.

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

A candidate-centred, resource-based learning approach is recommended. Source material in the way of products can be kept small-scale and augmented by videos, case-studies, magazines, books, catalogues, personal experience, the home and visits. All designing work done in response to the taught topics should be retained in a portfolio. This should include all notes, sketches, drawings and models.

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

### **UNIT**                      Designing for Manufacture (Higher)

These studies can be integrated with those of Units 1 and 2 in taking design tasks from brief to solution, thus progressing all aspects on a broad front in a series of graded assignments. The proposals from Unit 2 can serve as the starting point for the investigation into appropriate materials and processes. Alternatively, design proposals can be provided by the centre. Consideration of appropriate materials and/or processes may suggest a modification to the proposed design. All suggestions must still meet the demands of the design specification.

For those candidates studying a single unit, the starting point for the unit will be provided by the teacher/lecturer. This will be in the form of a proposal for a solution to a design specification which is at the stage of requiring consideration to be given to the choice of appropriate materials and manufacturing processes.

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

Each candidate will compile a portfolio of the work undertaken by her/him in the course. This will comprise the individual folios containing the work of the various tasks set in each unit. This portfolio will provide evidence which should be used to assess the achievement of competences across all the units. Evaluation of products may appear more than once, while graphic skills will permeate all the work. This approach allows the teacher/lecturer to decide the grade at which the candidate is performing. Some outcomes may require additional written or oral questions to provide sufficient evidence.

When taught as a single unit the above reference to other units will not apply. The folio of work for this unit will provide performance evidence for Outcomes 2 and 3. Outcome 2 may require additional oral or written tests to cover the required range. Outcome 1 will require written or oral questions. The written or oral tests can be conducted at any time appropriate to the stages of learning.

### **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>	Product Model (Higher)
<b>NUMBER</b>	D128 12
<b>COURSE</b>	Craft and Design (Higher)

### SUMMARY

This is a component unit of Higher Craft and Design.

The external assessment of the course consists of a Design Assignment which allows the candidates to display competence in the learning which has taken place in the first three units of the course. To allow a full evaluation to be made of the candidate's proposal for a solution to the Design Assignment, a prototype or model has to be constructed.

### OUTCOMES

- 1 Plan the production of the prototype or presentation model of a proposed solution to a design specification.
- 2 Construct the prototype or presentation model of the proposed solution.

### 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 Craft and Design at Grade 1 or 2
- Standard Grade Art and Design at Grade 1 or 2
- Intermediate 2 Craft and Design, or equivalent

### CREDIT VALUE

0.5 credit at Higher.

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### Administrative Information

<b>Superclass:</b>	WA
<b>Publication date:</b>	December 1999
<b>Source:</b>	Scottish Qualifications Authority
<b>Version:</b>	04

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## National Unit Specification: general information (cont)

**UNIT** Product Model (Higher)

### CORE SKILLS

This unit gives automatic certification of the following:

**Complete core skills for the unit** None

**Core skills components for the unit** Planning and Organising H

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**                      Product Model (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**

Plan the production of the prototype or presentation model of a proposed solution to a design specification.

#### **Performance criteria**

- a) The plan is sufficiently detailed to allow the prototype or model to be completed.
- b) The choice of construction and materials is appropriate for the production of the prototype or model.

#### **Evidence requirements**

Written and graphical evidence that the candidate can plan for the production of the prototype or model as defined in PCs (a) and (b).

### **OUTCOME 2**

Construct the prototype or presentation model of the proposed solution.

#### **Performance criteria**

- a) The construction is sound and carefully executed.
- b) The prototype or model conforms in size and shape to the production drawings.
- c) The quality of finish reflects that of the commercial product.

#### **Evidence requirements**

Performance evidence that the candidate can construct the prototype or model to meet the PCs (a) to (c).

## National Unit Specification: support notes

### UNIT Product Model (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 20 hours.

#### **GUIDANCE ON THE CONTENT AND CONTEXT FOR THIS UNIT**

To provide experience of making a prototype or presentation model to allow an evaluation to be made of a design proposal.

The external assessment Design Assignment undertaken for course assessment should have produced a proposal for a solution prior to this stage. This unit is the required prototype or model of that solution which has to be constructed to allow a full evaluation to be made of the proposal.

Where the final product is capable of being made more or less to final commercial specification, a *prototype* can be made. The materials used should be those of the final product. While this will be built by hand, it must always be borne in mind that the final version has to be manufactured on an industrial/commercial basis utilising one or more of the processes covered in the course.

Where the solution employs materials or processes which cannot be undertaken within the skills of the candidate or the resources of the institution, e.g. injection-moulding in plastics, then a presentation *model* would be appropriate. The function of the model will depend on the product. It may be to test ergonomics, aesthetics or function but will usually test more than one. This will determine the form and the materials to be used. The presentation model will normally be full-size.

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

The external assessment Design Assignment can commence about halfway through the course but this will vary depending on the teaching and learning approaches adopted.

Candidates will bring craft skills from the Standard Grade course and will have experienced modelling in Unit 2 as well as in developing their designs to their final solutions. The type of work will have varied according to purpose and this experience can be applied to the final stage. It is possible that the final prototype or model will have been developing as the design progressed, rather than all being undertaken after the 'paperwork' is complete. This approach can assist the candidate in the preparation of the final manufacturing and presentation drawings and reflects industrial practice. Individual skills may require enhancing for some aspects of the work.

The prototype or model will allow the candidate to make an evaluation of her or his design. The findings of the evaluation should be recorded in the folio of the external assessment Design Assignment.

Examples of commercially produced models should be available to stimulate interest.

For those candidates studying the single unit, the starting point will be production drawings of a typical solution to a design brief at this level. These will be provided by the institution. The drawings will be for the manufacture of the final industrial/commercial product. The candidate has to interpret these, plan the production and construct a suitable prototype or model.

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

**UNIT**                      Product Model (Higher)

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

The plan for the construction of the prototype or model will provide performance evidence for Outcome 1. The prototype (fully crafted artefact) or presentation model produced will be retained and should be assessed against the performance criteria for Outcome 2.

Sufficient photographs will be required to accompany the external assessment Design Assignment folio for the external examiner to judge the worth of the candidate's evaluation.

### **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).