

CRAFT AND DESIGN
Intermediate 2

Third edition – published December 1999

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

COURSE TITLE: Craft and Design (Intermediate 2)

COURSE NUMBER: C024 11

National Course Specification

Course details: Core skills statements expanded

National Unit Specification:

All Units: Core skills statements expanded

National Course Specification

CRAFT AND DESIGN (INTERMEDIATE 2)

COURSE NUMBER C024 11

COURSE STRUCTURE

This course has four mandatory units as follows:

<i>D125 11</i>	<i>Product Evaluation and Graphic Techniques (Int 2)</i>	<i>0.5 credit (20 hours)</i>
<i>D126 11</i>	<i>Designing for People (Int 2)</i>	<i>1 credit (40 hours)</i>
<i>D127 11</i>	<i>Designing for Manufacture (Int 2)</i>	<i>1 credit (40 hours)</i>
<i>D128 11</i>	<i>Product Model (Int 2)</i>	<i>0.5 credit (20 hours)</i>

In common with all courses, this course includes 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. This time is an important element of the course and advice on its use is included in the course details.

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 grades 3 or 4 or equivalent
- Standard Grade Graphic Communication at grades 3 or 4 or equivalent
- Standard Grade Art and Design at grades 3 or 4 or equivalent

Administrative Information

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National Course Specification: course details

COURSE Craft and Design (Intermediate 2)

CORE SKILLS

This course gives automatic certification of the following:

Complete core skills for the course	None
Core skills components for the course	Critical Thinking Int 2 Planning and Organising Int 2

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

COURSE Craft and Design (Intermediate 2)

RATIONALE

All the products which a consumer purchases have been designed, manufactured and marketed. Alternative designs abound for almost every product. The quality of the design can affect how well it works, how long it lasts, how easy it is to use, how safe it is, how it looks and its value for money. Consumers have to make decisions regarding the suitability of the products and the merits of one against the other before making a choice. Candidates are introduced to this course by such an exercise. Through being made aware of the features which should be considered when evaluating products as consumers, they are led into the world of the designer and the manufacturer.

Features considered important by the consumer may be viewed differently by the designers, who must consider profitability in a competitive market. Through the study of both perspectives, candidates will be better placed to make judgements and better informed of what is involved in bringing a product to the market-place. They will become aware of some of the procedures undertaken by designers, the consideration given to materials and manufacturing processes and the decisions which have to be made. They will learn that communication of information between all those concerned in design and manufacture varies from quick outline sketches and notes of ideas to precise, detailed and unambiguous drawings and instructions for manufacture. This knowledge will be consolidated through practical experience of designing, where all aspects of the process from initial design brief to the creation of a prototype may be covered.

Using graphics and diagrams, selecting and maintaining products for the home or workplace and engaging in problem solving are all transferable skills acquired in this course which can be used in other curricular areas and life in general. Participation in the course will contribute strongly to the technological capability of each candidate.

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.

The course aims to:

- introduce basic considerations which have to be addressed when designing commercial products
- develop skills in accessing documented information relevant to product design
- promote consideration of the needs of the end-user
- raise awareness of the uses of communication techniques in commercial design
- prepare for further in-depth study of product design and manufacture.

The units of the course have the same titles, the same duration and address broadly the same areas of study as Higher Craft and Design. The content and activities aim to equip candidates with knowledge and skills to achieve a meaningful and successful transition to Higher Craft and Design or equivalent.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

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 Product Model unit. The course consists of four units, two of 20 hours and two of 40 hours.

Summary of units and outcomes

Unit 1: Product Evaluation and Graphic Techniques (Int 2)

- carry out a product evaluation
- produce graphics relating to specific design situations

Unit 2: Designing for People (Int 2)

- demonstrate knowledge of aesthetic factors through their application to specified design situations
- demonstrate knowledge and understanding of the ergonomic factors which influence designing for people
- prepare a design specification
- design a solution to a given situation

Unit 3: Designing for Manufacture (Int 2)

- identify materials and manufacturing processes for specified products
- investigate and develop ideas for the production of a proposed solution to a design specification
- produce working drawings for the realisation of a proposed solution to a design brief

Unit 4: Product Model (Int 2)

- produce a prototype or presentation model of the proposed solution to a design specification

Units can be taught sequentially, though it would be an advantage to adopt an integrated approach with elements of different units being assessed during a specific task. Indeed, course assessment of designing will require the candidate to provide evidence of such integration, indicating the ability to apply knowledge and skills in a context which spans the unit contents. Part of the additional 40 hours is available for this purpose.

The following indicates the required content of each unit. Full listings of the performance criteria for each unit are shown in the unit specifications.

Unit 1: Product Evaluation and Graphic Techniques (Int 2)

This unit gives opportunities to gain introductory skills in selecting and evaluating design factors which are appropriate for a product evaluation.

Production of graphics, in the context of the above product or its components, allows candidates to develop basic communication techniques and appreciate how graphics contribute to the design and manufacture of products.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

Content

Carry out a product evaluation

Select design factors	Fitness for purpose, choice of materials, durability, value for money, ease of maintenance, running costs, aesthetics, ergonomics, environmental concerns.
Evaluate factors	Prioritise factors and set criteria for the evaluation of each factor.
Present findings	Presentation should be clear and easily assimilated, using computer software where possible.
Conclusions	Results should be justified and should derive from the evidence. (Data evidence may contradict the personal preference of the consumer.)

Produce graphics relating to specific design situations

Sketches	Pictorial and orthographic. Use of grids, tracings or other aids are to be encouraged for quick and clear delivery of ideas.
Drawings	Orthographic drawings, including dimensions generated manually or by computer.
Rendering	Colour, shading, basic reflections, textured effects. Pre-prepared or self-generated sheets may be used for practice.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

Unit 2: Designing for People (Int 2)

This unit introduces candidates to the need to incorporate people's preferences and requirements as part of the design process. The way in which these preferences and requirements contribute to the design specification and subsequent solutions, the relationships with 'materials' in Unit 3 and the features considered in the analysis and evaluation of products in Unit 1 can all be addressed.

Content

Demonstrate knowledge of aesthetic factors through their application to specified design situations

Target groups	The appeal to specific groups of people, e.g. by age or social standing.
Surroundings	How the product relates to its environment.
Form	Proportion and the compromise between function and appearance.
Colour	Colours which are accepted as suitable for particular situations.
Finish	Appearance and touch.

Demonstrate knowledge and understanding of the ergonomic factors which influence designing for people

Dimensions	In relation to handling, seeing, recognising and working. Use of anthropometric data.
Comfort	Both at work and leisure.
Function	Efficient and safe operation by users.
Environment	Including suitable lighting, temperature and sound levels. Safety considerations, e.g. fire exits and power isolation buttons.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

Prepare a design specification

Brief to specification	How a specification is developed from a brief.
Considerations	Identifying 'client' needs, desires or problems and what is required to satisfy them.

Design a solution to a given situation

Interpreting the specification	Investigate the various aspects of the specification.
Generating ideas	Identifying possible ideas for development via brainstorming, personal interests, scrutiny of existing items.
Developing ideas	Developing potentially successful idea(s) by sketches and modelling.
Presenting a solution	Producing a folio of work culminating in drawings and/or models with enough detail to make an evaluation of the proposal against the design specification. Rendered pictorials.

Unit 3: Designing for Manufacture (Int 2)

Candidates should be aware of commercial design and manufacture as a key aspect of this course. Basic knowledge and understanding of manufacturing processes and properties of materials are gained in this unit and these can be developed in later studies.

The evaluation task in Unit 1 provides a means of introducing consideration of materials and processes which then interact with design work throughout the course. Candidates are expected to make informed choices in selecting suitable materials to meet specifications and to suggest appropriate manufacturing techniques for the production of design solutions which they have developed. Most of this information should be contained in a database to which the candidates have ready access.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

The specification and researched criteria which are outcomes of Unit 2 can be further developed here in a design task. Working drawings should be produced for the realisation of a proposed solution to the design task.

Designing for Manufacture (Int 2) (cont)

Content

Identify materials and manufacturing processes for specified products

Materials	Metals, plastics and wood.
Metals	Stainless steel, high-speed steel (HSS), brass, aluminium, copper, tin, lead, cast iron, mild steel.
Plastics	Thermoplastics: polythene (high and low density), polyvinyl chloride, polystyrene, nylon, acrylic, polypropylene, ABS. Thermosets: epoxy resin, melamine formaldehyde, urea formaldehyde, polyester resin.
Timber	Hardwoods: beech, oak, ash, mahogany, teak, balsa Softwoods: Scots pine, red cedar, spruce.
Timber derivatives	Manufactured boards: medium density fibreboard, plywood, blockboard, chipboard, hardboard.
Metal processes	Casting, turning, shearing, riveting, welding, press-tool work, mechanical fastenings, adhesives.
Plastics processes	Injection moulding, vacuum forming, blow moulding.
Wood processes	Turning; routing; bending; jointing.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

Investigate and develop ideas for the production of a proposed solution to a design specification

Investigate and develop ideas	Ideas for production should be developed, resolved and recorded.
Materials	Considered and resolved to meet the design specification.
Processes	Considered and resolved to meet the design specification.

Produce working drawings for the realisation of a proposed solution to a design brief

Working drawings	Drawings should be of sufficient clarity and detail to allow the construction of the proposed design.
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Unit 4: Product Model (Int 2)

The production of a prototype or presentation model allows a more comprehensive evaluation of a product design solution than is possible from drawings and sketches alone. For course requirements the candidates should identify the purposes which will be served by the model/prototype. After production they should carry out an evaluation against the design specification and present the results. The solution developed in the Design Assignment will be produced as a prototype or presentation model in this unit of the course.

Content

Produce a prototype or presentation model of the proposed solution to a design specification

Planning	Establishing suitable materials and equipment, skills and techniques required and finish.
Presentation model	Materials selected will be those best suited to the purpose of the model.
Prototype	Materials selected will be those of the finished product.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

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.

Candidates will have the opportunity to achieve at levels beyond that required to attain each of the unit outcomes. When the units are taken as component parts of a course, 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*, published in May 1996.

Internal assessment of units

Internal assessment has to satisfy the requirements set out in each unit specification. All outcomes need to be achieved.

Where outcomes and performance criteria involve designing or graphic work, this should be retained and collated into a portfolio to provide evidence for assessment. It is recommended that a separate folio of work is produced for each unit 1, 2 and 3.

Where units are taught as part of a course, the tasks undertaken by candidates may offer opportunities to gather evidence for the achievement of outcomes from a number of units. It should be possible to extract such evidence from candidates' portfolios.

Any outcomes or performance criteria which cannot be satisfied by the contents of the portfolio can be covered by discrete activities, eg short design tasks to satisfy evidence requirements. Candidates may be assessed more than once in relation to any outcome or performance criterion which they have not attained. 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.)

DETAILS OF THE INSTRUMENTS FOR EXTERNAL ASSESSMENT

The external assessment consists of:

- 1 an examination paper.
- 2 a Design Assignment.

The course award will be graded A to C and will be based on the total score achieved in the external examination paper and the Design Assignment.

External examination paper (60 marks)

A written question paper of 2 hours duration will be set to test knowledge and understanding of the course content.

Marks allocation: 60 marks.

All questions should be attempted.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

Design Assignment (90 marks)

The time allocated should be a maximum of 15 hours.

Candidates may be presented with an assignment topic early in the course. Alternatively, candidates may select a topic of their own choice, for approval by the teacher/lecturer. This topic should be different from the tasks undertaken in Unit 2 and Unit 3. Candidates will develop a solution through each stage of the design process and present it in detailed drawings in a design folio. This solution will form the focus for the prototype or presentation model in Unit 4.

The assignment will be ongoing and developed as candidates gain knowledge and skills in the areas of study within units. The end product will allow for evaluation of the solution against the design specification. The results of the evaluation will be recorded in the Design Assignment folio.

Detailed information on the marks allocation for assessment of the Design Assignment will be issued by SQA. The overall balance will be as follows:

Designing	75 marks
Graphic communication and presentation	15 marks
	Total 90 marks

The Design Assignment will be internally set and monitored. It will be marked externally.

GRADE DESCRIPTIONS

The descriptions overleaf are of expected performances at Grade C and at Grade A. They are intended to assist candidates, teachers, lecturers and users of the certificate and to help establish standards when question papers are being set. The grade of the award will be based on the total score obtained in the examination.

Grade C

The candidate can demonstrate a basic knowledge and understanding of the factors which contribute to commercial product design and manufacture and can demonstrate ability in applying the design process through the production of appropriate graphics, a moderate range of ideas, adequate investigation, appropriate modelling and an evaluation.

Grade A

The candidate can demonstrate detailed knowledge and understanding of the factors which contribute to commercial product design and manufacture and can demonstrate sound ability in applying the design process through the production of clear, appropriate graphics, a wide range of ideas, a thorough investigation, appropriate modelling and an objective evaluation.

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

APPROACHES TO LEARNING AND TEACHING

Detailed 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 education needs

Where appropriate, arrangements should be made to ensure that there will be no artificial barriers to learning and assessment. The nature of a candidate's special needs should be taken into account when planning learning experiences and selecting assessment instruments. Alternative arrangements can be made as necessary.

Short tasks in Units 2 and 3 will develop and reinforce the knowledge and skills imparted in the units. Candidates will then be equipped to apply these to integrated activities.

The prototype or presentation model produced in Unit 4 should be a culmination of the work undertaken to satisfy the course assessment for designing, the Design Assignment. The task set for this purpose should allow candidates to display abilities in addressing many elements of the course.

At all stages of the course, sufficient resource reference material and appropriate technical information should be available for candidates to access. This would include: safety regulations; ergonomic and anthropometric data; basic properties of materials; relevant details of manufacturing processes; basic colour theory.

Candidates should also be exposed to as many commercial context scenarios as possible in the form of case studies, industrial visits, manufacturers' catalogues, internet and video presentations, CD-ROM and relevant publications.

The additional 40 hours allocated for work on the course can be utilised for induction, the additional requirements of the course assessment (see 'Design Assignment'), and preparation for the external examination.

Preparation for the external examination can be achieved through class tests. These should reflect appropriate integration of the work of the course.

Induction

One to two hours, taken from the additional 40, will give opportunities to introduce candidates to topics such as:

- the structure of the course
- outline contents of the units
- general assessment requirements of the units and course
- how the course relates to previous experiences
- progression to Higher level

National Course Specification: course details (cont)

COURSE Craft and Design (Intermediate 2)

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 documents has been produced by the Higher Still Development Unit (HSDU) in partnership with the Scottish Consultative Council on the Curriculum (SCCC) and the 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 (Intermediate 2)
NUMBER	D125 11
COURSE	Craft and Design (Intermediate 2)

SUMMARY

This is a component unit of Intermediate 2: Craft and Design.

Candidates will learn how to conduct a product evaluation and consider design features. They will be introduced to graphic techniques used in product design.

OUTCOMES

- 1 Carry out a product evaluation.
- 2 Produce graphics relating to specific design situations.

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 grades 3 or 4 or equivalent
- Standard Grade Graphic Communication at grades 3 or 4 or equivalent
- Standard Grade Art and Design at grades 3 or 4 or equivalent

Administrative Information

Superclass:	JC
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National Unit Specification: statement of standards

UNIT Product Evaluation and Graphic Techniques (Intermediate 2)

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 product evaluation.

Performance criteria

- (a) The design factors selected are sufficient and appropriate for the evaluation.
- (b) The evaluation of the factors is communicated clearly.
- (c) The validity of the results of the evaluation is justified.

Note on range for the outcome

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

Evidence requirements

Written and/or graphical evidence within the report for PCs (a) to (c). Consideration of five of the design factors listed in the range.

OUTCOME 2

Produce graphics relating to specific design situations.

Performance criteria

- (a) Sketches and drawings are appropriate for their purpose in terms of accuracy and detail.
- (b) Rendering techniques used are appropriate and effective.

Note on range for the outcome

Sketches: pictorial, orthographic

Drawings: orthographic with dimensions

Rendering techniques: colour, shading, basic reflections, texture effects.

Evidence requirements

Graphical evidence for PCs (a) and (b), using at least three of the rendering techniques specified.

National Unit Specification: support notes

UNIT Product Evaluation and Graphic Techniques (Intermediate 2)

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

While the time allocated to this unit is at the discretion of the centre, the notional design length is 20 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

This unit gives opportunities to gain introductory skills in selecting criteria for evaluating the performance of commercial products. The features which should be selected for consideration should include: appearance; function; handling; safety; construction and any other appropriate criteria.

Alternatively, candidates may carry out a comparison of two similar products.

Production of graphics, using the context of the above products or their components, allows candidates to develop basic communication techniques and appreciate the areas where graphics contribute to the design and manufacture of products.

Sketches: pictorial, orthographic.

Drawings: orthographic with dimensions.

Rendering techniques: colour, shading, basic reflections, texture effects.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

This unit introduces the candidate to the factors which influence design and which will be the focus for much of the ensuing course study. It should focus on everyday objects and be interactive and experience-based. Suggestions for teaching are contained in the course specification, which also indicates how integration with other units of the course might be achieved.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Each candidate will compile a portfolio of the work undertaken 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 units. Evaluation/comparison 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.

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.

National Unit Specification: support notes (cont)

UNIT Product Evaluation and Graphic Techniques (Intermediate 2)

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 (Intermediate 2)
NUMBER	D126 11
COURSE	Craft and Design (Intermediate 2)

SUMMARY

This is a component unit of Intermediate 2: Craft and Design.

Candidates will acquire knowledge of the factors which have to be considered when developing designs for products which are to be used by people. This knowledge will be applied in practical design situations.

OUTCOMES

- 1 Demonstrate knowledge of aesthetic factors through their application to specified design situations.
- 2 Demonstrate knowledge and understanding of the ergonomic factors which influence designing for people.
- 3 Prepare a design specification.
- 4 Design a solution to a given situation.

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 grades 3 or 4 or equivalent
- Standard Grade Graphic Communication at grades 3 or 4 or equivalent
- Standard Grade Art and Design at grades 3 or 4 or equivalent

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National Unit Specification: general information (cont)

UNIT Designing for People (Intermediate 2)

CREDIT VALUE

1 credit at Intermediate 2.

CORE SKILLS

This unit gives automatic certification of the following:

Complete core skills for the unit	None
Core skills components for the unit	Critical Thinking Int 2 Planning and Organising Int 2

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 (Intermediate 2)

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

Demonstrate knowledge of aesthetic factors through their application to specified design situations.

Performance criteria

- (a) Descriptions of aesthetic factors such as surroundings, form, colour and finish are clear and correct for the target group.
- (b) Aesthetic factors selected are appropriate for the situations to which they are applied.
- (c) Design ideas produced display appropriate application of aesthetic factors.

Evidence requirements

Written and graphical evidence from the portfolio for PCs (a) to (c).

OUTCOME 2

Demonstrate knowledge and understanding of the ergonomic factors which influence designing for people.

Performance criteria

- (a) Ergonomic factors, such as dimensions, comfort, function and environment, are described correctly in their application to the design solution of a commercial product.
- (b) Ergonomic factors are utilised correctly in design activities.
- (c) Anthropometric dimensions selected for specified situations are appropriate.

Evidence requirements

Written and graphical evidence from the portfolio for PCs (a) to (c).

OUTCOME 3

Prepare a design specification.

Performance criteria

- (a) The analysis of a design brief is appropriate.
- (b) The design specification produced is clear and adequate for the purpose.

Evidence requirements

Written and graphical evidence from the portfolio for PCs (a) and (b).

National Unit Specification: statement of standards (cont)

UNIT Designing for People (Intermediate 2)

OUTCOME 4

Design a solution to a given situation.

Performance criteria

- (a) The design criteria investigated are appropriate with respect to the particular situation.
- (b) The solution reflects clearly the outcomes of the investigation of the criteria.
- (c) Effective use of modelling is demonstrated in evolving the solution.
- (d) Graphics for the illustration and presentation of the proposed solution are effective for their purpose.

Evidence requirements

Performance evidence that the candidate can investigate and apply criteria relating to a design situation as defined in the performance criteria.

National Unit Specification: support notes

UNIT Designing for People (Intermediate 2)

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

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

This unit gives candidates an introduction to the necessity for including factors relevant to the product/human interface when designing.

The users' opinions can influence the design of commercial products, both before the designer embarks on a project and after a proposed solution has been produced.

Exploring the design of existing products and their performances makes an important contribution to new designs or re-designs. (This can be integrated with Unit 1).

Addressing considerations such as aesthetics and ergonomics when constructing a design specification and developing a solution gives candidates fundamental knowledge of the requirements of products designed for people.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The commercial products used for the activities in the unit should be readily available in physical or graphic form (stores / shopping catalogues / brochures) and should integrate with the introduction in Unit 1. Access to anthropometric data and relevant technical information should be readily available to the candidates. Investigations can be carried out either in the centre (peers, teachers/lecturers etc.) or in other locations if necessary or desirable.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

Each candidate will compile a folio of the work undertaken in the unit. This will comprise the work of the various tasks set. Some outcomes may require additional written or oral questions. The folio of work for this unit will provide performance evidence for all Outcomes.

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 Manufacture (Intermediate 2)
NUMBER	D127 11
COURSE	Craft and Design (Intermediate 2)

SUMMARY

This is a component unit of Intermediate 2: Craft and Design.

Candidates will study the properties of materials and related manufacturing processes in relation to their application in, and influence on, designing.

OUTCOMES

- 1 Identify materials and manufacturing processes for specified products.
- 2 Investigate and develop ideas for the production of a proposed solution to a design specification.
- 3 Produce working drawings for the realisation of a proposed solution to a design brief.

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 grades 3 or 4 or equivalent
- Standard Grade Graphic Communication at grades 3 or 4 or equivalent
- Standard Grade Art and Design at grades 3 or 4 or equivalent

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National Unit Specification: general information (cont)

UNIT Designing for Manufacture (Intermediate 2)

CREDIT VALUE

1 credit at Intermediate 2.

CORE SKILLS

This unit gives automatic certification of the following:

Complete core skills for the unit	None
Core skills components for the unit	Critical Thinking Int 2 Planning and Organising Int 2

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 (Intermediate 2)

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 materials and manufacturing processes for specified products.

Performance criteria

- (a) Materials for specified products are identified correctly.
- (b) Manufacturing processes for specified products are identified correctly.

Evidence requirements

Written or oral evidence that the candidate can identify correctly a minimum of **five** materials and **five** processes used in the manufacture of specified products. Valid reasons are required for the selection of **three** of the materials and **three** of the processes.

OUTCOME 2

Investigate and develop ideas for the production of a proposed solution to a design specification.

Performance criteria

- (a) Investigation of relevant criteria regarding materials and processes is clearly evident from annotated graphics.
- (b) The proposed solution is justified clearly in terms of meeting the criteria in the design specification.

Evidence requirements

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

OUTCOME 3

Produce working drawings for the realisation of a proposed solution to a design brief.

Performance criteria

- (a) Drawings show clearly the main features of the product.
- (b) Positioning of views is in accordance with drawing conventions.
- (c) Functional dimensions are clear and unambiguous in terms of their positioning and statement of size.
- (d) Drawings are clean, neat and tidy.

Evidence requirements

Performance evidence from the design portfolio for PCs (a) to (d).

National Unit Specification: support notes

UNIT Designing for Manufacture (Intermediate 2)

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

While the time allocated to this unit is at the discretion of the centre, the notional design length is 40 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

Materials: metals; plastics; wood.

Manufacturing processes:

- metals: casting; turning; shearing; press-tool work; riveting; welding; mechanical fastenings; adhesives
- plastics: injection moulding; vacuum forming; blow moulding
- wood: turning; routing; bending; jointing

Candidate awareness of commercial design and manufacture is a prime aspect of this unit. Basic understanding of manufacturing processes and material properties is gained, providing background knowledge which can be developed in later studies. Candidates are expected to make informed choices when selecting suitable materials to meet specifications and to suggest appropriate manufacturing techniques for the production of personally developed design solutions.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

Samples of the materials and processes should be on display, illustrated where possible in everyday objects to which candidates can relate. Some of these materials/processes may not be provided in school or college workshops but candidates should be encouraged to consider the implications of producing designs which might involve them. The use of a database of materials and processes which provides information about their properties and applications should be used rather than the candidate being expected to memorise such data. Where possible, manufacturing processes should be witnessed in industry but where this is impractical the use of video and multimedia is to be encouraged. More detailed suggestions for integrated teaching are contained in the course specification.

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 units. Aspects such as the evaluation of products, for example, may appear more than once, while graphic skills will permeate all the work. This approach should allow the teacher/lecturer to decide how well the candidate is performing. Some outcomes may require additional written or oral questions to provide sufficient evidence.

National Unit Specification: support notes (cont)

UNIT Designing for Manufacture (Intermediate 2)

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 2 and 3. Outcome 1 will require written or oral questions to cover the content, though some aspects could be covered by the candidates having hands-on experience of actual products. 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

UNIT	Product Model (Intermediate 2)
NUMBER	D128 11
COURSE	Craft and Design (Intermediate 2)

SUMMARY

This is a component unit of Intermediate 2: Craft and Design.

A prototype or presentation model will be constructed in accordance with a given set of plans.

OUTCOME

Produce a prototype or presentation model of the 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 grades 3 or 4 or equivalent
- Standard Grade Graphic Communication at grades 3 or 4 or equivalent
- Standard Grade Art and Design at grades 3 or 4 or equivalent

CREDIT VALUE

0.5 credit at Intermediate 2.

Administrative Information

Superclass:	WA
Publication date:	December 1999
Source:	Scottish Qualifications Authority
Version:	03

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Additional copies of this unit specification can be purchased from the Scottish Qualifications Authority. The cost for each unit specification is £2.50 (minimum order £5).

National Unit Specification: general information (cont)

UNIT Product Model (Intermediate 2)

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 Int 2

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 (Intermediate 2)

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

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

Performance criteria

- (a) Planning for the production of the prototype or presentation model is clear and comprehensive.
- (b) The quality of the completed prototype or presentation model is appropriate to its established purpose.

Evidence requirements

Performance evidence that the candidate can plan and produce a prototype or presentation model to meet PCs (a) and (b).

National Unit Specification: support notes

UNIT Product Model (Intermediate 2)

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

While the time allocated to this unit is at the discretion of the centre, the notional design length is 20 hours.

GUIDANCE ON CONTENT AND CONTEXT FOR THIS UNIT

The production of a prototype or presentation model allows a more comprehensive evaluation of a product design solution than can be made from drawings and sketches alone.

The purposes that a prototype or presentation model have to serve determine the level of quality, the materials used in construction and the finish applied.

In industrial product design a prototype or presentation model will help explain ideas to colleagues in a team situation or to show a client how a project is progressing and allow judgements to be made on various aspects of the solution.

GUIDANCE ON LEARNING AND TEACHING APPROACHES FOR THIS UNIT

The approach to be adopted is explained in the course specification. Some development of personal practical skills may be required, depending on the complexity of the task and the candidate's previous experience. Some time for this can be obtained from the additional flexible 40 hours, course time. The complexity of the construction should only be that required by the function of the prototype or presentation model. In certain cases a fully crafted artefact can be constructed as part of this unit. The standard of work in terms of craftsmanship, accuracy of shaping, construction, surface preparation and finish will be assessed.

GUIDANCE ON APPROACHES TO ASSESSMENT FOR THIS UNIT

The plan of the stages of construction and the completed prototype or presentation model will provide performance evidence for the assessment of this unit.

The plan should show the stages of construction, the processes to be employed and the materials to be used.

The prototype, fully crafted artefact or presentation model produced will be retained and should be assessed against the performance criteria, with particular emphasis on craftsmanship, accuracy of shaping, construction, surface preparation and finish.

National Unit Specification: support notes (cont)

UNIT Product Model (Intermediate 2)

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).