

Higher National Unit Specification

General information for centres

Unit title: Product Design: Materials and Manufacture

Unit code: DW7F 34

Unit purpose: In this Unit students will gain a knowledge and understanding of the variety of materials, processes and their applications in Product Design. On completion of this unit the Student will be able to demonstrate an understanding of the properties of materials, their selection, application and cost. The student will develop skills to identify and evaluate materials and processes.

On completion of the Unit candidates should be able to:

- 1 Identify and explain the properties of given materials.
- 2 Evaluate materials in relation to a given product.
- 3 Present evidence of an appropriate manufacturing process for a specified material.

Credit points and level: 1 HN Credit at SCQF level 7: (8 SCQF credit points at SCQF level 7*).

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Recommended prior knowledge and skills: It would be beneficial if candidates had completed an NQ Design based course or Higher Art and Design/Craft and Design or equivalent.

Core Skills: There are opportunities to develop the Core Skills of Communication and Problem Solving at SCQF level 6 in this Unit, although there is no automatic certification of Core Skills or Core Skills components. Further details are provided in the support notes.

Context for delivery: If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Assessment: The Unit may be assessed by a single instrument of assessment which would require candidates to produce a presentation or answer a number of questions on each of the different Outcomes. It would be possible to break this assessment down into three separate assessment events which each Outcome was assessed separately. Candidates must achieve the minimum evidence specified for each Outcome, or combination of Outcomes of for the Unit as a whole in order to pass the Unit.

Higher National Unit specification: statement of standards

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The sections of the Unit stating the Outcomes, knowledge and/or skills, and evidence requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the knowledge and/or skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Identify and explain the properties of given materials

Knowledge and/or skills

- ◆ Identification of different types of materials
- ◆ Explanation of material properties

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ describe selected materials
- ◆ identify and explain the different properties of each material

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. Each candidate will be required to produce evidence explaining the properties of at least two different types of materials for each given category: metals, ceramics, polymers, timber, composites. The sample should be derived from the presentation which covers all five material categories.

This evidence must be in the form of a written assignment of a minimum of 500 words or a presentation of five minutes in duration, or may be a response to specific questions.

This assessment would be undertaken under Open book conditions. Work produced out-with controlled conditions must be subject to authentication by the tutor.

Assessment guidelines

The assessment of this Outcome may be combined with Outcomes 2 and 3 as part of a single assessment for the Unit, or may be stand alone.

In the event of re-assessment, candidates should not be able to foresee what items they will be questioned about. A different sample of one from each category of five materials will be required each time the Outcome is assessed. Candidates must provide a response to all five categories.

Higher National Unit specification: statement of standards (cont)

Unit title: Product Design: Materials and Manufacture

Outcome 2

Evaluate materials in relation to the given product

Knowledge and/or skills

- ◆ Material selection
- ◆ Material costs

Evidence Requirements

Evidence for the knowledge and/or skills in this Outcome will be provided on a sample basis. Each candidate will be required to produce evidence evaluating the selection of at least one material for each given category: metals, ceramics, polymers, timber, composites.

This evidence must be in the form of a written assignment of a minimum of 500 words or a presentation five minutes in duration, or may be a response to specific questions.

This assessment would be undertaken under open book conditions. Work produced out-with controlled conditions must be subject to authentication by the tutor.

Assessment guidelines

The assessment of this Outcome can be combined with Outcomes 1 and 3 as part of a single assessment of the Unit, or may be stand alone.

Outcome 3

Present evidence of an appropriate manufacturing process for a specified material

Knowledge and/or skills

- ◆ Techniques involved in manufacturing process
- ◆ Manufacturing costs

Evidence Requirements

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can:

- ◆ demonstrate an understanding of one manufacturing process
- ◆ identify cost implications for one chosen manufacturing process

This evidence must be in the form of a written assignment of a minimum of 500 words or a presentation of five minutes in duration, or may be a response to specific questions.

This assessment would be undertaken under Open book conditions. Work produced out-with controlled conditions must be subject to authentication by the tutor.

Higher National Unit specification: statement of standards (cont)

Unit title: Product Design: Materials and Manufacture

Assessment guidelines

The assessment of this Outcome may be combined with Outcomes 1 and 2 as part of a single assessment for the Unit, or may be stand alone.

Administrative Information

Unit code:	DW7F 34
Unit title:	Product Design: Materials and Manufacture
Superclass category:	VF
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Higher National Unit specification: support notes

Unit title: Product Design: Materials and Manufacture

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

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

Guidance on the content and context for this Unit

The Unit is primarily intended to develop candidate's knowledge and understanding of the range of materials available to Product Designers and the manufacturing processes used to manipulate those materials. Candidates will learn how to analyse information against relevant criteria that may include: density, strength, cost, flexibility, surface finish, jointing techniques or environmental issues. This will allow the candidate to identify a selection of materials and manufacturing processes appropriate to a given product.

Outcome 1

Candidates should explore five core categories of materials used in Product design. These are: metals, ceramics, polymers, timber and composites.

Outcome 2

Candidates should learn different material applications and to evaluate how appropriate a material is for a given application.

Outcome 3

Candidates should demonstrate a knowledge of one type of manufacturing process from one of the five given material categories and show awareness of which is most appropriate for a given application.

Guidance on the delivery and assessment of this Unit

Outcomes may be delivered and assessed as stages in a single project covering the entire Unit. Delivery and assessment of this Unit can take the form of lectures, factory visits, seminars, presentations, groups/individual critique and peer review where appropriate.

Outcome 1

Candidates should explore five core categories of materials used in Product design. These are metals, ceramics, polymers, timber, composites.

Outcome 2

Candidates should learn different material applications and to evaluate how appropriate a material is for a given product.

Higher National Unit specification: support notes (cont)

Unit title: Product Design: Materials and Manufacture

Outcome3

Candidates should demonstrate a knowledge of one type of manufacturing process from one of the five given material categories and show awareness of which is most appropriate for a given application.

Opportunities for developing Core Skills

Candidates will be expected as they undertake the Unit to analyse and seek solutions to a range of theoretical and practical problems. They should identify and consider all components, including materials' properties, possible techniques and available resources, analysing the significance of each before recommending an appropriate manufacturing process for a specified material. Evaluation of all aspects of proposed design solutions and their potential and actual impact would be on-going, with assessor guidance as appropriate.

Candidates will be required to demonstrate communication skills by researching, and summarising appropriate information in presentations. Formative practice could develop skills and could be supported by assessor guidance.

Candidates should be encouraged to:

- ◆ research, select and analyse a range of relevant information
- ◆ collate, organise and structure information effectively
- ◆ use accurate language, register and style adapted for purpose
- ◆ signpost key points

In oral presentations candidates should:

- ◆ use non-verbal communication techniques, such as making eye contact and maintaining an interested expression
- ◆ be clear, audible and use an appropriate pace for listeners
- ◆ respond to any questions confidently and in a way that progresses communication

Written responses should use accurate spelling and punctuation.

Open learning

This Unit could be delivered through distance learning, particularly through the use of a Virtual Learning Environment. However, it would require planning by the centre to ensure the sufficiency and authenticity on candidate evidence was suitable.

For further information and advice please refer to Assessment and Quality Assurance for Open and Distance Learning (SQA, February 2001 —publication code A1030).

Higher National Unit specification: support notes (cont)

Unit title: Product Design: Materials and Manufacture

Candidates with disabilities and/or additional support needs

The additional support 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 Alternative Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs*, which is available on SQA's website: **www.sqa.org.uk**.

General information for candidates

Unit title: Product Design: Materials and Manufacture

In this Unit you will gain a knowledge and understanding of the variety of materials, processes and their applications in Product Design. On completion of this unit you will be able to demonstrate an understanding of the properties of materials, their selection, application and cost. You will develop skills to analyse and evaluate materials and processes.

On successful completion of the Unit you will be able to:

- 1 Identify and explain the properties of given materials
- 2 Evaluate materials in relation to a given product
- 3 Present evidence of an appropriate manufacturing process for a specified material

You will be required to identify and evaluate five categories of materials which are: metals, ceramics, polymers, timber, composites. You will identify the specific properties of these materials and explain the differences between them. You will then evaluate their suitability. For a chosen material you will identify a manufacturing process and cost implications appropriate to the given product.

You will then be required to present your findings in an appropriate manner. This may take the form of a written report or presentation.

In order to complete this Unit successfully you will be required to demonstrate you have achieved success in all three Outcomes.