

## Higher National Unit Specification

### General information for centres

**Unit title:** Model Making: Prototyping

**Unit code:** F0MY 35

**Unit purpose:** This Unit is designed to develop the candidates' understanding of the production of prototype models. Candidates will develop their knowledge of the processes and techniques that are required for the production of prototype models.

On completion of the Unit the candidate will be able to:

- 1 Identify and evaluate manufactured prototypes.
- 2 Produce machined components.
- 3 Use pattern making and vacuum forming techniques.
- 4 Demonstrate and use internal detailing techniques.
- 5 Demonstrate and use simulated surface finishes.

**Credit points and level:** 2 HN Credits at SCQF level 8: (16 SCQF credit points at SCQF level 8\*)

*\*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:** Access to this Unit is at the discretion of the centre. However, it is recommended that candidates have an understanding of model making materials, processes and terminology. This could be demonstrated by the possession of HN Units in Model Making or similar qualifications or experience.

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

**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:** Evidence for this Unit will be generated by practical and presentation assessments. The Outcomes may be assessed on an individual basis or a combined assessment can be used to cover all five Outcomes.

## **Higher National Unit specification: statement of standards**

**Unit title:** Model Making: Prototyping

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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 evaluate manufactured prototypes

#### **Knowledge and/or skills**

- ◆ Functions
- ◆ Materials
- ◆ Suitability

#### **Evidence Requirements**

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

- ◆ identify and evaluate the function of prototypes
- ◆ identify and evaluate the use of materials in prototypes
- ◆ evaluate the suitability of prototypes for their intended purpose

Candidates should produce an illustrated written report or an oral presentation that clearly identifies and evaluates a range of manufactured prototypes.

#### **Assessment guidelines**

This Outcome could be assessed individually or holistically on completion of all Outcomes.

An illustrated written/oral presentation should be used to evidence this Outcome. This could take the form of a folder/sketchbook of illustrations with annotations or a series of examples that are correctly identified and then evaluated for their suitability.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Model Making: Prototyping

### **Outcome 2**

Produce machined components

#### **Knowledge and/or skills**

- ◆ Material selection
- ◆ Machining
- ◆ Health and safety procedures

#### **Evidence Requirements**

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by, producing a range of components using several techniques and/or materials, showing that they can:

- ◆ Select appropriate materials
- ◆ Machine the materials
- ◆ Comply with current health and safety procedures and legislation

#### **Assessment guidelines**

This Outcome could be assessed individually or holistically on completion of all Outcomes.

An observation checklist may be used to ensure the candidate has addressed all the knowledge and skills requirements.

### **Outcome 3**

Use pattern making and vacuum forming techniques

#### **Knowledge and/or skills**

- ◆ Pattern making
- ◆ Vacuum forming
- ◆ Vacuum preparation
- ◆ Health and safety procedures

#### **Evidence Requirements**

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

- ◆ demonstrate the processes involved in pattern making and vacuum forming
- ◆ produce a pattern
- ◆ produce a vacuum form
- ◆ remove and trim a vacuum form
- ◆ comply with health and safety procedures

## **Higher National Unit specification: statement of standards (cont)**

### **Unit title:** Model Making: Prototyping

The vacuum form produced must be of a standard that can be used as part of a finished prototype model.

#### **Assessment guidelines**

This Outcome could be assessed individually or holistically on completion of all Outcomes.

An illustrated written/oral presentation could be used to assess the description of processes. This could take the form of a folder of illustrations with annotations or a series of examples that are orally described.

An observation checklist should be used for the practical elements to ensure the candidate has addressed all the knowledge and skills requirements.

### **Outcome 4**

Demonstrate and use internal detailing techniques

#### **Knowledge and/or skills**

- ◆ Internal detailing
- ◆ Methods of manipulation
- ◆ Vacuum forming
- ◆ Methods of application
- ◆ Health and safety procedures

#### **Evidence Requirements**

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

- ◆ manipulate materials in the production of detailing
- ◆ apply details to vacuum formed component(s)
- ◆ comply with current health and safety procedures

Details must be of a standard that can be used as part of a finished prototype model.

#### **Assessment guidelines**

This Outcome could be assessed individually or holistically on completion of all Outcomes.

An illustrated written/oral presentation could be used to assess the identification of types of detailing. This could take the form of a folder of illustrations with annotations or a series of examples that are orally described.

An observation checklist should be used for the practical elements to ensure the candidate has addressed all the knowledge and skills requirements.

## **Higher National Unit specification: statement of standards (cont)**

**Unit title:** Model Making: Prototyping

### **Outcome 5**

Demonstrate and use simulated surface finishes

#### **Knowledge and/or skills**

- ◆ Demonstrate and use skills
- ◆ Simulated surfaces
- ◆ Surface finishes
- ◆ Health and safety procedures

#### **Evidence Requirements**

Candidates will need to provide evidence to demonstrate their knowledge and/or skills by showing that they can, with reference to a particular task:

- ◆ use types of simulated surfaces
- ◆ analyse types of simulated surfaces
- ◆ develop surface finishes
- ◆ apply surface finishes
- ◆ comply with current health and safety procedures

The simulated surface finishes produced must be of a standard that can be used as part of a finished prototype model.

#### **Assessment guidelines**

This Outcome could be assessed individually or holistically on completion of all Outcomes.

An illustrated written/oral presentation that shows evidence of use could be used to assess this Outcome. This could take the form of a folder of illustrations with annotations or a series of examples that are orally described.

An observation checklist should be used for the practical elements to ensure the candidate has addressed all the knowledge and skills requirements.

## Administrative Information

**Unit code:** F0MY 35  
**Unit title:** Model Making: Prototyping  
**Superclass category:** VF  
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### History of Changes:

Version	Description of change	Date

**Source:** SQA

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## **Higher National Unit specification: support notes**

### **Unit title:** Model Making: Prototyping

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 80 hours.

### **Guidance on the content and context for this Unit**

The purpose of the Unit is to enable the candidates to explore the processes involved in the planning and production of a prototype model. The context for this Unit is to enable candidates to work to an industry standard in the field of prototype model making. Prototype model making is a specialised area within the industry which requires a high degree of precision and quality of finish.

This Unit will give candidates an insight into the importance of planning, processing, and implementing the production of a prototype model. It will also give the candidate an opportunity to reflect and evaluate the role and function of existing prototypes. There will also be an emphasis on the use of equipment, in particular rapid prototyping technology.

### **Guidance on the delivery and assessment of this Unit**

This Unit has been developed as part of the HND 3D Design Group Award. It is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Opportunities may be taken to link or integrate with other aspects of the course and a thematic approach adopted for both delivery and assessment.

This Unit should be delivered when candidates have already developed an understanding of the range of tools, equipment, materials and techniques available to them within their own specialist area. This could be a project based Unit with candidates working independently when researching ideas and developing solutions or as exercise based Unit with the candidates producing individual samples for each Outcome.

Lectures with exemplars and class discussion, along with appropriate industrial visits, could be used to provide a stimulating visual launch to this Unit. Ongoing discussion and Tutorials should be used to give candidates the chance to verbally justify and explain the development of their work in preparation for summative assessment.

A large portion of time in this two-credit Unit should be allocated to the production of the finished model or samples, reflecting the industry standard of work that is required.

It may be possible to integrate this Unit with another Unit on the HND 3D Design: Model Making Group Award framework.

Holistic delivery and assessment is recommended. An existing, preferably industry-led, prototyping project could be used as a case study, supported by professional references. Through open questions and group discussion the project could be de-constructed exploring all the processes involved in production process. There may be an opportunity to collaborate with a real or simulated client in this project providing that the Evidence Requirements can be met.

## Higher National Unit specification: support notes (cont)

### Unit title: Model Making: Prototyping

Key deadlines for stages of the process should be set by the Tutor allowing candidates to develop time management skills.

Candidates should be encouraged to keep a photographic record of all their work, in particular any work produced outwith the centre.

Candidates should present practical work by a given timeline. This work should show:

- ◆ clean, sharp and accurate construction with minimum waste of materials
- ◆ surfaces free of blemishes and imperfections
- ◆ sturdy assembly of components
- ◆ careful application of detailing and support materials

Candidates should observe current health and safety guidelines for safe working practices at all times.

#### *Opportunities for developing Core Skills*

All elements of the Core Skill of Problem Solving that is, planning and organising, critical thinking, and reviewing and evaluating, should be naturally developed and enhanced as the Unit is completed. Candidates will examine and study prototypes and produce machined components. Analysing and assessing the importance of all factors influencing and affecting the processes involved in production, including health and safety legislation and procedures, will develop skills in planning and critical thinking. Selecting materials and applying practical skills to produce machined components, using pattern making, vacuum forming and internal detailing techniques will encourage and develop creative thinking. Critical reflection and consideration of the success of the work undertaken could reinforce analytical and evaluative approaches to problem solving in working practice.

Although skills in written and/or oral communication are not formally assessed candidates should express essential ideas and information accurately and coherently, presenting reports to industry standards. Candidates could be supported in the development of techniques for accessing, interpreting and evaluating a range of complex sources of current information on industry issues and information.

#### **Open learning**

Due to the practical nature of this Unit, delivery by Open learning is not recommended. Although the Unit could be delivered by distance learning, it would require a considerable degree of planning by the centre to ensure the sufficiency and authenticity of candidate evidence.

For further information and advice please refer to the SQA document *Assessment and Quality Assurance for Open and Distance Learning* which is available on SQA's website: [www.sqa.org.uk](http://www.sqa.org.uk).



## **Higher National Unit specification: support notes (cont)**

**Unit title:** Model Making: Prototyping

### **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. Further advice can be found in the SQA document *Guidance on Assessment Arrangements for Candidates with Disabilities and/or Additional Support Needs* ([www.sqa.org.uk](http://www.sqa.org.uk)).

## **General information for candidates**

### **Unit title: Model Making: Prototyping**

This Unit will allow you to develop the knowledge and skills required to work professionally, and to an industry standard, in the field of prototyping model making.

In this Unit you will:

- ◆ Identify and evaluate manufactured prototypes, look at their functions and the materials used in their production and their suitability for purpose.
- ◆ Produce machined components for a model, using of a range of machining materials/techniques.
- ◆ Use pattern making and vacuum forming techniques. You will describe the processes involved in pattern making and vacuum forming, then go on to produce a pattern, produce a vacuum form and remove and trim a vacuum form.
- ◆ Demonstrate and use internal detailing techniques. You will identify types of internal detailing before going on to manipulate materials in the production of detailing and apply details to vacuum formed components.
- ◆ Demonstrate and use simulated surface finishes. Firstly researching and analysing types of simulated surfaces then developing and applying surface finishes.

At all times you will comply with current health and safety procedures and legislation whilst in the workshop.