



Advanced Higher  
Course  
Specification



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# Advanced Higher Design and Manufacture Course Specification

**Valid from August 2015**

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Please refer to the note of changes at the end of this Course Specification for details of changes from previous version (where applicable).

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## Course outline

**Course title:** Advanced Higher Design and Manufacture

**SCQF:** level 7 (32 SCQF credit points)

**Course code:** to be advised

### Mandatory Units

<b>Product Analysis (Advanced Higher)</b>	<b>8 SCQF credit points</b>
<b>Product Development (Advanced Higher)</b>	<b>8 SCQF credit points</b>
<b>Product Evolution (Advanced Higher)</b>	<b>8 SCQF credit points</b>

**Course assessment** **8 SCQF credit points**

This Course includes eight SCQF credit points to allow preparation for Course assessment. The Course assessment covers the added value of the Course. Further information on the Course assessment is provided in the Assessment section.

### Recommended entry

Entry to this Course is at the discretion of the centre. However, learners would normally be expected to have attained the skills, knowledge and understanding required by the following or equivalent qualifications and/or experience:

- ◆ Higher Design and Manufacture

### Progression

This Course or its Units may provide progression to:

- ◆ a range of design and/or manufacturing-related Higher National Diplomas (HNDs)
- ◆ degrees in design and/or manufacturing-related disciplines
- ◆ careers in design and/or manufacturing design fields

Further details are provided in the *Course Support Notes*.

### Equality and inclusion

This Course Specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence. For further information, please refer to the *Course Support Notes* and the *Course Assessment Specification*.

## **Rationale**

All new and revised National Courses reflect Curriculum for Excellence values, purposes and principles. They offer flexibility, provide more time for learning, more focus on skills and applying learning, and scope for personalisation and choice.

In this Course, and its component Units, there will be an emphasis on skills development and the application of those skills. Assessment approaches will be proportionate, fit for purpose and will promote best practice, enabling learners to achieve the highest standards they can.

This Course provides learners with opportunities to continue to acquire and develop the attributes and capabilities of the four capacities, as well as skills for learning, skills for life and skills for work.

All Courses provide opportunities for learners to develop breadth, challenge and application, but the focus and balance of the assessment will be appropriate for the subject area.

## **Relationship between the Course and Curriculum for Excellence values, purposes and principles**

The Advanced Higher Design and Manufacture Course will allow learners to explore the multi-faceted world of product design and manufacturing in an increasingly commercial and industrialised context.

The Course focuses on creativity and innovation in the contexts of product design and manufacture. Learners will have opportunities to make good use of their knowledge and skills already obtained across their learning experiences, for example drawing on numeracy and science when considering technical details and operational principles, and on aspects of social sciences when considering aspects of environmentalism and ethics, as well as other areas of the curriculum, personal experiences and interests. It is in this integrative quality that the Course demonstrates broad options, possibilities and flexibilities in supporting personal growth.

The challenges and activities for learning in the Course encourage learners to become successful, responsible and creative in their use of design and manufacturing skills and technologies, and to continue to acquire and develop the attributes and capabilities of the four capacities, including: creativity, flexibility and adaptability; enthusiasm and a willingness to learn; perseverance, independence and resilience; responsibility and reliability; and confidence and enterprise. In addition, a course of this nature should prepare the learner to be able to understand the effects of design and manufacturing decisions, and promote self-awareness and responsibilities in environmental stewardship. Through these challenges and activities, learners should find learning an enjoyable and engaging experience.

The Course provides progression from the Higher Design and Manufacture Course.

## **Purposes and aims of the Course**

The Course provides a broad and practical experience in design and manufacturing and builds on the experience, knowledge and skills which learners will have acquired in the Higher Design and Manufacture Course, as well as utilising aspects of their broader education and experiences.

The aims of the Course are to enable learners to:

- ◆ develop understanding and skills in the processes of designing for the manufacture of products in commercial and industrial contexts
- ◆ develop and apply an understanding of the factors which influence thinking for product design and manufacturing activities
- ◆ develop a critical and visual awareness associated with requirements for user interface and product detailing
- ◆ develop independence in learning and enquiry skills in the context of problem solving in designing and manufacturing
- ◆ develop economic, social and environmental awareness of the implications of a product's design through its life cycle

The Course stresses the integration of designing and manufacturing as a connected activity and that design is an iterative process. The Course highlights the close relationship between designing, making, modelling, testing, and refining and presenting design ideas.

The Course will build on the knowledge, understanding and skills developed by the learner in the Higher Design and Manufacture Course and will provide a useful bridge towards further study of related disciplines in higher education. The Course allows learners to consider the various factors that impact on a product's design. It will consider the life cycle of a product from its inception through design, manufacture, use, re-use and the impacts and consequences of the product's disposal.

As creative industries strive to compete in a global design and manufacturing marketplace and build commercial partnerships across the world, it is important that they continue to build capacity and nurture forward thinking, innovative, talented, and informed designers and manufacturers. Advanced Higher Design and Manufacture provides experiences which support these qualities.

## **Information about typical learners who might do the Course**

The Course is designed for all learners who can respond to a level of challenge including, but not limited to, those considering further study or a career in design and manufacturing-related disciplines. It provides sufficient breadth, flexibility and choice to meet the needs of all learners.

The Course will support learners with a deep interest in designing and manufacturing and those who are likely to progress to further study or employment-related fields.

Learners will develop a deeper understanding of the broad roles and contributions of those working in a design and manufacturing environments to analyse, problem solve, present, innovate and create solutions to specific design and manufacturing needs and requirements. In the Course, learners are encouraged to exercise imagination, innovation, creativity, ethical and environmental awareness, and logical thinking in

realistic, contemporary and, where practical, partnership situations. The Course is therefore also useful for those with a general or specific interest in the creative industries.

Course activities also provide opportunities to enhance generic and transferable skills in planning and organising, working independently and in teams, critical thinking and decision making, research, communication and self- and peer-evaluation, in a product design and manufacturing context. In addition, learners may make valuable learning contacts through design and manufacturing businesses.

On completion of this Course, learners could progress to:

- ◆ further studies in product designing or manufacturing-related disciplines
- ◆ careers in product design, product design engineering, industrial design, the manufacturing industries and sectors, production and planning, and model making

# Course structure and conditions of award

## Course structure

The Course enables learners to develop and extend a range of product design and manufacture skills, including skills in product analysis, research, problem solving, graphic design, the use of equipment, materials and design software, and skills in testing and evaluating.

The Course also enables learners to develop and extend knowledge and understanding of key design and manufacture concepts and processes, and the ability to apply these to a variety of problems; and an awareness of the impact of design and manufacturing activities on society and the environment.

Skills are developed in design and manufacture as they apply in commercial and industrial contexts.

Units are statements of standards for assessment and not programmes of learning and teaching. They can be delivered in a variety of ways.

The Course consists of three mandatory Units and Course assessment. The Course assessment will consist of a project and a question paper.

### Product Analysis (Advanced Higher)

This Unit will require learners to carry out an analysis of the performance and production of a product or suitable item. Learners should consider the design and record its functional requirements, operation and use. Learners will consider the relationships between form and function, and the impact of the design in terms of environment, aesthetics, user interface, and socio-economic factors. Alongside this, learners will explore the materials, manufacturing techniques and assembly procedures.

### Product Development (Advanced Higher)

This Unit allows learners to critically explore and consider design and manufacturing aspects of a commercial product, identifying perceived improvements that might be made and hence create a design opportunity. Learners may consider a range of modifications including the various requirements of clients, users, manufacturers, environmental audits, market response, technical, technological and material science advances, competition, user interface, aesthetics, form, and product detailing. In developing and presenting a proposal for improvement, learners will engage in research and development activities. Learners will use a variety of visualisation techniques throughout the Unit in modelling and presenting their ideas.

### Product Evolution (Advanced Higher)

The Unit allows learners to explore a product in terms of its development and evolution through a focused study. This is, for the most part, a reflective activity. Learners will select a product and identify the key and critical stages of its development, considering the influences which have affected the design decisions taken and changes over time. These may include influences such as sociological, scientific and technical knowledge, materials development, environmentalism, sustainability, economic constraints, or advances in manufacturing technologies. The Unit will require learners to demonstrate skills in research and enquiry, using evidence, and foresight in suggesting future developments.

## **Conditions of award**

To gain the award of the Course, the learner must pass all of the Units as well as the Course assessment. The required Units are shown in the Course outline section. Course assessment will provide the basis for grading attainment in the Course award.

## Skills, knowledge and understanding

Further information on the assessment of skills, knowledge and understanding for the Course is given in the *Course Assessment Specification*. A broad overview of the mandatory subject skills, knowledge and understanding that will be assessed in the Course is given in this section.

This covers:

- ◆ analysing often complex aspects and activities which surround and support commercial product design and manufacture in developing, synthesising and presenting effective proposals
- ◆ exploring contemporary techniques for three-dimensional visualisation of solutions in product design and manufacturing activities
- ◆ applying a range of techniques for visualising, modelling, testing and evaluating design proposals
- ◆ developing skills, techniques and strategies for communicating ideas appropriate to a range of audiences and users
- ◆ developing knowledge and understanding of the role of product design and manufacturing in contributing to a global economy
- ◆ developing a critical understanding of factors which influence and support commercial product development — past, present and future
- ◆ applying ethical, social, and environmental considerations in the decision making process of product design and development
- ◆ planning, managing and undertaking a significant design and manufacture project

Skills, knowledge and understanding to be included in the Course will be appropriate to the SCQF level of the Course. The SCQF level descriptors give further information on characteristics and expected performance at each SCQF level ([www.sqa.org.uk/scqf](http://www.sqa.org.uk/scqf)).



# Assessment

Information about assessment for the Course is included in the *Course Assessment Specification*, which provides full details including advice on how a learner's overall attainment for the Course will be determined.

## Unit assessment

All Units are internally assessed against the requirements shown in the *Unit Specification*.

They can be assessed on a Unit-by-Unit basis or by combined assessment.

They will be assessed on a pass/fail basis within centres. SQA will provide rigorous external quality assurance, including external verification, to ensure assessment judgments are consistent and meet national standards.

The assessment of the Units in this Course will be as follows.

### Product Analysis (Advanced Higher)

For this Unit, learners will be required to provide evidence of:

- ◆ critical analysis of the aspects, activities and factors which surround and support the design, development and manufacture of commercial products
- ◆ knowledge and understanding of the contributory role of product design and manufacturing in a global economy

### Product Development (Advanced Higher)

For this Unit, learners will be required to provide evidence of:

- ◆ effective analysis, leading to development, synthesis and presentation of design proposals
- ◆ informed application of ethical, social and environmental considerations in making design decisions
- ◆ effective selection and application of contemporary visualisation techniques appropriate to ranges of purpose and audience

### Product Evolution (Advanced Higher)

For this Unit, learners will be required to:

- ◆ provide evidence of knowledge and critical understanding of the key historical, technological, social and environmental developments and thinking which have influenced designed and manufactured products, drawing conclusions for future research and product development opportunities and activities

Exemplification of possible assessment approaches for these Units is provided in the *National Assessment Resource*.

## Course assessment

Courses from National 4 to Advanced Higher include assessment of [added value](#)<sup>1</sup>. At National 5, Higher and Advanced Higher, the added value will be assessed in the Course assessment. The added value for the Course must address the key purposes and aims of the Course, as defined in the Course rationale. It will do this by addressing one or more of breadth, challenge or application.

In this Course, added value will focus on breadth, challenge and application.

The learner will draw on and apply the skills, knowledge and understanding they have developed during the Course. These will be assessed through a combination of a [project](#)<sup>2</sup> and a [question paper](#)<sup>3</sup>.

The product design project adds value by requiring challenge and application. Learners will apply knowledge and skills from the Units to propose, implement and evaluate a solution to a challenging design and manufacture problem.

The question paper introduces breadth to the assessment. It requires depth of understanding and application of knowledge from the Units.

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<sup>1</sup> Definitions can be found here: <http://www.sqa.org.uk/sqa/58409.html>

<sup>2</sup> See link above for definition.

<sup>3</sup> See link above for definition.

# Development of skills for learning, skills for life and skills for work

It is expected that learners will develop broad, generic skills through this Course. The skills that learners will be expected to improve on and develop through the Course are based on SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work* and drawn from the main skills areas listed below. These must be built into the Course where there are appropriate opportunities.

## **2 Numeracy**

- 2.2 Money, time and measurement
- 2.3 Information handling

## **4 Employability, enterprise and citizenship**

- 4.2 Information and communication technology (ICT)

## **5 Thinking skills**

- 5.4 Analysing and evaluating
- 5.5 Creating

Amplification of these skills is given in SQA's *Skills Framework: Skills for Learning, Skills for Life and Skills for Work*. The level of these skills will be appropriate to the level of the Course. Further information on building in skills for learning, skills for life and skills for work for the Course is given in the *Course Support Notes*.

# Administrative information

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## History of changes to National Course Specification

Course details	Version	Description of change	Authorised by	Date

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Note: You are advised to check SQA's website ([www.sqa.org.uk](http://www.sqa.org.uk)) to ensure you are using the most up-to-date version of the Course Specification.

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