# N5 Design and Manufacture
# Course Assessment Information

The overall marks (180 marks) for the course are shown below:

| Component | Marks | Duration |
|---|---|---|
| Component 1: question paper | 80 | 1 hour and 45 minutes |
| Component 2: assignment — design | 55 | See course assessment section |
| Component 3: assignment — practical | 45 | See course assessment section |

## Question Paper

**80 marks**

**Command words:** state, select, outline, identify, describe or explain.

This gives you the opportunity to demonstrate knowledge and understanding relating to:

- design (30 marks)
- workshop-based manufacture (30 marks)
- commercial manufacture (20 marks)

The question paper has two sections:

**Section 1:**

- 60 marks
- Assesses design and workshop- based manufacture
- 6- 7 questions

**Section 2:**

- 20 marks
- Assesses commercial manufacture
- 4-5 questions

Exam

**14th May 2020 at 1:30- 3:15**

## Assignment

**100 marks**

There are two linked assignments: design (**55** marks) and practical (**45** marks).

**Design**

This assessed the application of design skills to develop a proposal to a set brief.

- analysing a brief (8 marks)
- generating ideas (9 marks)
- developing ideas (20 marks)
- using models (6 marks)
- using graphics (6 marks)
- planning for manufacture (6 marks)

**Practical**

This assesses the application of practical skills to manufacture the proposal developed in the design assignment.

- measuring and marking out (9 marks)
- using hand and machine tools (18 marks)
- assembling components (5 marks)
- finishing (9 marks)
- evaluating (4 marks)

https://www.bbc.com/bitesize/subjects/z6xpb9q
http://www.technologystudent.com/
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# N5 Skills, knowledge and understanding
# Design and Manufacture

| Assignments | | Question paper | |
|---|---|---|---|
| **Skill** | **Candidates are required to demonstrate ability to:** | **Knowledge and understanding** | **Candidates are required to demonstrate knowledge and understanding of:** |
| Analysing a brief | ♦ carry out research<br>♦ incorporate research findings into a specification | Analysis of a brief | ♦ gathering data<br>♦ the key stages of the following research techniques:<br>— questionnaires<br>— user trips<br>♦ reasons for the selection of research techniques<br>♦ the role of the product specification in the design process |
| Generating ideas | ♦ generate ideas | Idea-generation techniques | ♦ appropriate use of idea-generation techniques<br>♦ the key stages of the following idea-generation techniques:<br>— morphological analysis<br>— brainstorming |
| Use of modelling | ♦ apply modelling techniques to develop a design proposal | Modelling in the design process | ♦ the use of modelling in the design process to:<br>— generate and explore<br>— test and refine<br>— communicate<br>♦ the advantages of using modelling in the design process<br>♦ reasons for selection of types of models:<br>— sketch<br>— scale<br>— block<br>— computer-generated |
| Use of graphics | ♦ use appropriate graphics to develop a design proposal | Graphics in the design process | ♦ the use of graphics in the design process to:<br>— generate and explore<br>— test and refine<br>— communicate<br>♦ the advantages of using graphics in the design process<br>♦ reasons for the selection of types of graphic techniques |
| Developing ideas | ♦ explore ideas towards a proposal<br>♦ refine ideas towards a proposal<br>♦ apply knowledge and understanding of design<br>♦ apply knowledge and understanding of materials and manufacture | Function | ♦ the influence of function on the design of products<br>♦ primary and secondary function |
| | | Performance | ♦ the influence of performance on the design of products<br>♦ maintenance issues associated with products<br>♦ the influence of a product's life expectancy on design, manufacture, and the environment<br>♦ fitness-for-purpose of products<br>♦ safety issues associated with products |
| | | Market | ♦ the influence of the target market on the design of products<br>♦ marketing techniques to influence sales<br>♦ the benefits of branding<br>♦ technology push and market pull |

| Assignments | | Question paper | |
|---|---|---|---|
| **Skill** | **Candidates are required to demonstrate ability to:** | **Knowledge and understanding** | **Candidates are required to demonstrate knowledge and understanding of:** |
| | | Aesthetics | ♦ the aesthetics of products<br>♦ influences on the aesthetics of products |
| | | Ergonomics | ♦ the influence of ergonomics on the design of products:<br>— safety<br>— comfort<br>— ease of use<br>♦ the use of anthropometric data |
| | | Uses of common materials | ♦ properties and appropriate use of:<br>— hardwoods: beech, ash, mahogany, and oak<br>— softwoods: red pine and spruce<br>— manufactured boards: plywood, flexi-ply, MDF, chipboard, and hardboard<br>— non-ferrous metals/alloys: aluminium, copper, and brass<br>— ferrous metals/alloys: iron, mild steel, high-carbon steel, and stainless steel<br>— thermoplastics: ABS, acrylic, polypropylene, and polystyrene<br>— thermosetting plastics: urea formaldehyde and melamine formaldehyde |
| | | People who influence design | ♦ the role of people who influence the design of products:<br>— designers<br>— manufacturers<br>— marketing teams<br>— consumers<br>— retailers |
| | | Commercial manufacture | ♦ vacuum forming: uses, identifying features, and patterns<br>♦ sand casting: uses, identifying features, and patterns<br>♦ injection moulding: uses and identifying features<br>♦ rotational moulding: uses and identifying features<br>♦ die casting: uses and identifying features<br>♦ computer-aided manufacture (CAM): benefits and drawbacks<br>♦ laser cutter: uses, benefits, and drawbacks<br>♦ 3D printer: uses, benefits, and drawbacks<br>♦ the use of standard components and knock-down fittings<br>♦ types of manufacturing systems: mass and one-off |
| | | Impact of design and manufacturing technologies | ♦ the impact of design and manufacturing technologies on society and the environment:<br>— supply of affordable and accessible products<br>— changes to workforce<br>— energy consumption<br>— pollution<br>♦ methods to support sustainability |
| Planning for manufacture | ♦ produce a sequence of operations | Planning for manufacture | ♦ sequence of operations:<br>— steps and order<br>— tools and machines<br>— safety<br>♦ working drawings<br>♦ cutting lists |
| Evaluating | ♦ evaluate the design proposal | Evaluation of products | ♦ methods to evaluate products:<br>— comparison to other products<br>— user trials<br>— comparison against specification<br>♦ questionnaires |

| Assignments | | Question paper | |
|---|---|---|---|
| **Skill** | **Candidates are required to demonstrate ability to:** | **Knowledge and understanding** | **Candidates are required to demonstrate knowledge and understanding of:** |
| Measuring and marking out | ♦ use a range of measuring and marking-out tools | Tools for measuring and marking out | ♦ the **use** of measuring and marking-out tools **(there is no requirement for candidates to describe the tool or its component parts):**<br>— callipers: outside and odd-leg<br>— rule<br>— dividers<br>— gauges: marking and mortise<br>— centre punch<br>— scriber<br>— squares: try and engineer's |
| Using machine and hand tools | ♦ use a range of machine and hand tools | Machine and hand tools for cutting and forming materials | ♦ the **use** of hand tools **(there is no requirement for candidates to describe the tools or their component parts)**:<br>— saws: coping, tenon, hacksaw, and junior hacksaw<br>— chisels: mortise and bevel-edged<br>— hammers: ball-pein, cross-pein, and claw<br>— mallets: wooden and hide<br>— planes: jack, smoothing, rebate, and plough<br>— drill bits: twist, Forstner, countersink, and centre<br>— files<br>— hand router<br>— pliers<br>— pop-rivet gun<br>— screwdrivers<br>— tin snips<br>— bending bars<br>— taps and dies<br>— nail punch<br>— bradawl<br>♦ the **use** of machine **tools (there is no requirement for candidates to describe the machines or their component parts):**<br>— sander: disc and belt<br>— pillar drill: setting-up and depth stop<br>— scroll/fret saw<br>— centre lathe: setting-up, parallel and step turning, taper turning, drilling, and knurling<br>— wood lathe: setting-up, preparing material, parting off, parallel turning, and finishing<br>— mortise machine: setting-up and depth stop<br>— fluidiser<br>— oven<br>— strip heater |
| Assembling components | ♦ prepare components for assembly<br>♦ assemble components | Assembling | ♦ the use of joining methods:<br>— adhesives<br>— screws, nails, nuts and bolts<br>— woodwork joints: mortise and tenon, lap, rub, halvings, dowel, rebate, and housings<br>— pop-riveting<br>— welding<br>♦ the **use** of tools for holding and clamping **(there is no requirement for candidates to describe the tool or its component part):**<br>— vices and guards: machine, bench, hand, engineer's<br>— G-clamp<br>— sash cramps<br>♦ the use of formers and jigs |

| Assignments | | Question paper | |
|---|---|---|---|
| **Skill** | **Candidates are required to demonstrate ability to:** | **Knowledge and understanding** | **Candidates are required to demonstrate knowledge and understanding of:** |
| Finishing | ♦ prepare surfaces for finishing<br>♦ apply finish skilfully | Surface finishing | ♦ surface finishing techniques:<br>— sanding/abrading<br>— polishing<br>— varnishing<br>— oiling<br>— staining<br>— waxing<br>— painting/lacquering<br>— dip-coating |