A2 Product Design - Unit 3 Content

**Design & Manufacture**

This unit provides details of the subject content to be covered by candidates at A2 level.

The content has been divided into three sections:

• Section A: Materials and Components

• Section B: Design and Market Influences

• Section C: Processes and Manufacture

**Section A: Materials and Components**

 *All* the **AS** Content (see **pink** bordered sheet)

**Section B: Design and Market Influences**

**Major developments in technology**

* Developments in material technology and processing equipment which affect application, material properties and manufacturing processes. To include the history of style and product evolution.

**A study of manufactured products and systems**

* Appraisal of functional, aesthetic, technical and economic considerations in the design and manufacture of products, considering aspects of their physical surroundings as shaped by designers, craftsmen and technologists

**Product life cycle**

* To include design introduction, evolution, growth, maturity, decline and replacement

**The influence of design and technology in society**

* Awareness and understanding of the work of designers and technologists
* Human needs and the effects of products and systems on society. Including aspects of the use and conservation of energy in relation to both the manufacture and performance of products

**Role of the designer**

* The interface between client/designer/manufacturer/user
* Moral, economic, social and environmental responsibilities

**The marketing function**

* Satisfying customer requirements
* Profitability through identifying/anticipating needs
* Promotion, demographic trends, socio-economic groups

**Design methods**

* Ways in which designing may be undertaken from the intuitive and informal to those requiring a more systematic approach
* Recognition of real and artificial needs, client-centred and task analysis through mind mapping
* Innovative and creative processes

**Design processes**

* Processes which may be used in the field of design, illustration techniques, planning for production, methods of communication, data storage and collection, modelling, testing and evaluation

**Safety**

* A recognition of the application of risk assessment to the design and manufacture of products and the relationship between the user and the product

**Safety Legislation**

* Understand the implications of Health and Safety as an element of design activity and safety standards imposed by BSI and other regulatory bodies. Apply relevant legal requirements.

**Communication methods**

* The means by which the detail and form of products, environments and systems are communicated so that they may be manufactured
* Identify and use appropriate means to communicate ideas, design proposals and evaluations to a range of audiences including clients and potential users of the product.

**Illustration, selection and use of appropriate 2D/3D techniques**

* Sketching, drawing, use of mixed media etc.

**Enhancement**

* Rendering – use of line/tone/colour/form
* Texture – to represent materials and surface finishes
* Presentation – two-dimensional and three-dimensional products

**Information drawing**

* Quantitative – graphs, pie charts, bar charts, pictograms
* Organisational and topological – flow charts, sequential, schematic etc.

**Modelling**

* Using 3D forms, mock ups, prototypes, scale models etc.

**Use of ICT in Design**

* Selection and use of CAD, word processing, DTP

**Development**

* Spreadsheets, databases and modelling software

**Human needs**

* Specific to various groups of people – consumers; young, old, disabled, workers
* To meet physical and psychological needs

**Human factors**

* Ergonomics and anthropometrics – the relationship between people, products and the environment. Working triangle, colour

**Quality assurance and quality control**

* During the stages of design, development and manufacturing “right first time” use of specifications, product testing, continuous improvement

**The work of past and present designers**

* As related to consumer products in particular, but also to include design movements and the inherent influences of socio-economic changes

**Copyright protection**

* To include patenting and its importance to the designer and manufacturer

**Design Methods**

* Develop and use specifications which suit the requirements of potential clients in terms of price, quality and marketability

**The Influence of Design and Technology in Society**

* Design and Technology awareness and understanding. The influence of designers and technologists

**Product development and improvement**

* Critical assessment of products in everyday use, whether hand or machine made, according to relevant criteria, practical and aesthetic
* Examination of alternative designs and redesigning existing products

**Communication methods – detail and form of products, environments and system so that they may be manufactured**

* Identify and use appropriate means to communicate ideas, design proposals and evaluations to a range of audiences, which includes clients and potential users of the product

**Design in the Human Context**

* Human needs and the effects of products and systems on society

**Sustainability and Environmental Concerns**

* Use of natural resources, materials utilisation, conservation, waste disposal/management, pollution, recycling
* Green technology, environmental problems, planned obsolescence
* Suitability for intended environment

**Section C: Processes and Manufacture**

**ICT applications**

* Appreciation and understanding of the use of CAM for industrial production
* Use of ICT in manufacturing data control (EDI)
* CAA (computer aided administration)
* CAD (computer aided design) product modelling
* PPC (production planning and control) networking
* CIM (computer integrated manufacture)
* Flexible manufacturing systems

**Manufacturing systems**

* Planning production procedures, methods. Craft to industrial, one-off to mass production
* The implications of these methods for the product, the designer, the maker and user

**Product development/improvement**

* Critical assessment of products in everyday use, whether hand or machine made, according to relevant criteria, practical and aesthetic. Examination of alternative designs and redesigning existing products

**Manufacturing systems**

* Volume of production – one-off, batch, team and mass-production techniques

**Safety**

* Candidates should be aware of the possible hazards found in a manufacturing environment.
* Safe procedures and working practices

**Systems and Control**

* An understanding of simple control systems and their application including mechanical systems; energy sources, forms, storage conversion, transmission and efficient use. These may be related to either the function or manufacture of a product.
* Systems diagrams – input, process, output
* Importance of feedback and control
* Application of control systems and sub-systems both within the manufacture and functioning of a range of products