

GCE Design and Technology: Product Design – Textiles Technology – Cross referencing

The textbook to refer to is: Textiles at the Cutting Edge, 2nd Edition – ISBN: 1899527176

Unit 2: Knowledge and Understanding of Product Design

2.1 Materials and components

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Sources, classification and structure of materials and components:</p> <p>Natural fibres</p> <ul style="list-style-type: none"> • Animal <ul style="list-style-type: none"> – wool – hair – silk. • Plant <ul style="list-style-type: none"> – cotton – linen. <p>Manufactured fibres</p> <ul style="list-style-type: none"> • Regenerated <ul style="list-style-type: none"> – viscose – modal – acetate. • Synthetic (including microfibres) <ul style="list-style-type: none"> – polyester – nylon (Tactel) – acrylic. • Synthetic <ul style="list-style-type: none"> – elastane – PVC. • Fibre blends. 	<p>P16 – 19, 52 – 69</p>
<p>Yarns</p> <ul style="list-style-type: none"> • Staple, filament yarns, singles and ply, S&Z twist, core yarns. • Textured, bulked yarns. 	<p>P18 – 19, 69 – 71</p>

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Woven fabrics</p> <ul style="list-style-type: none"> • Plain weave <ul style="list-style-type: none"> – calico – voile – Ripstop nylon. • Twill weave <ul style="list-style-type: none"> – 2+2 – denim – herringbone. • Satin weave and crêpe. • Pile <ul style="list-style-type: none"> – corduroy – towelling – velveteen. • Fabric mixtures, colour and weave effects. 	P21 – 22, 72 – 76
<p>Non-woven fabrics</p> <ul style="list-style-type: none"> • Felt, bonded fibre fabrics. 	P23, 76 – 78
<p>Knitted fabrics</p> <ul style="list-style-type: none"> • Warp knit <ul style="list-style-type: none"> – tricot – velour (fleece). • Weft knit <ul style="list-style-type: none"> – single jersey – rib – double jersey. 	P22, 79 – 82
<p>Standard fastening and components</p> <ul style="list-style-type: none"> • Fusible interlinings, linings, buttons, Velcro, zips, poppers, hooks and eyes. 	P27, 82

2.2 Working properties of materials

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Working properties and functions of fibres, yarns and fabric materials and blends relating to:</p> <ul style="list-style-type: none"> • aesthetic properties <ul style="list-style-type: none"> – absorbent – colourfast – crease recovery – handle – drape – texture – lustre – warmth – weight • functional properties <ul style="list-style-type: none"> – strong – aftercare – elastic – weight – durable – flammable – breathable – absorbent – thermoplastic – windproof – waterproof – static – resistant to heat – stains – abrasion. 	<p>P16 – 17, 23 – 24, 85 – 87, 92 – 93</p>

2.3 Hand and commercial processes

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Hand and commercial methods of preparing, processing, manipulating and combining materials and components to enhance their properties. This will include associated tools, machinery and equipment including CAD/CAM in relation to:</p> <ul style="list-style-type: none"> • fibre production <ul style="list-style-type: none"> – cotton – wool – viscose – synthetic fibre production • fabric production <ul style="list-style-type: none"> – weaving – non-woven <ul style="list-style-type: none"> – bonded web – felt • weft knitting <ul style="list-style-type: none"> – fully fashioned – garment length – piece goods (cut and sew) 	<p>P88 – 94, 168 – 169</p>
<ul style="list-style-type: none"> • CAD <ul style="list-style-type: none"> – 2-dimensional design to create and modify designs – 3-modelling for creating ‘virtual’ products 	<p>P113 –115, 177 – 187</p>
<ul style="list-style-type: none"> • 2D/3D modelling and prototyping 	<p>P14 – 15, 105</p>
<ul style="list-style-type: none"> • flat pattern drafting, standard blocks, toiles, industrial pattern cutting, grading and lay planning • fabric spreading and cutting, including the use of ICT 	<p>P33 – 35, 106 – 107, 201</p>
<ul style="list-style-type: none"> • joining and construction techniques <ul style="list-style-type: none"> – stitching – heat sealing – fusing – reinforcing 	<p>P36 – 37, 107 – 109</p>

Unit Content	Cross reference from new content to textbook – 2 nd edition
<ul style="list-style-type: none"> • CNC machining <ul style="list-style-type: none"> – knitting machines and looms – sewing and embroidery machines. 	P169, 197 – 200, 326
<p>Finishing processes</p> <p>Applied finishes to improve quality and enhance aesthetic or functional properties.</p> <ul style="list-style-type: none"> • Preparation <ul style="list-style-type: none"> – shrinking – bleaching – mercerising. • Dyeing <ul style="list-style-type: none"> – batik – batch/continuous dyeing – overdyeing – piece dyeing – garment dyeing – colour fastness. • Printing <ul style="list-style-type: none"> – digital – discharge – transfer printing – rotary screen printing – flat screen printing – batik printing. 	P25, 94 – 100, 194

Unit Content	Cross reference from new content to textbook – 2 nd edition
<ul style="list-style-type: none"> • Physical finishing <ul style="list-style-type: none"> – calendering – embossing – heat setting (thermoplastic) – raising. • Chemical finishing <ul style="list-style-type: none"> – coating – easy-care – flame-resist – stain-resist – water-repellent – permanent pleating (resin). 	P25, 100
<ul style="list-style-type: none"> • Aesthetic and functional finishing, decorative techniques <ul style="list-style-type: none"> – pressing – embroidery – self-finishing. 	P25, 38, 109 – 110

2.4 Product manufacture

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Scale of production</p> <p>How and why products are manufactured using:</p> <ul style="list-style-type: none"> • one-off production • batch production • high-volume (mass) production 	<p>P28 – 32, 202 – 203</p>
<p>Systems and control</p> <ul style="list-style-type: none"> • Just in time and stock control, including the use of ICT. • Production planning, including the use of ICT. 	<p>P147 – 149, 150, 312</p>
<p>Quality control in production</p> <ul style="list-style-type: none"> • Using quality assurance (QA), quality control (QC) and total quality management (TQM) systems. • Using patterns, standard blocks, standard fastenings, components, processes. • Modelling and creation of prototypes, toiles or samples. • Meeting specifications and tolerances. 	<p>P14 – 15, 40 – 44, 103 – 105, 111</p>
<p>Quality standards</p> <ul style="list-style-type: none"> • Meeting aesthetic, performance and price requirements. • Testing against external quality standards such as British, European and International Standards. • Meeting labelling requirements 	<p>P20 – 21, 111 – 113 P153</p>
<p>Health and safety procedures in production</p> <ul style="list-style-type: none"> • Principles of health and safety legislation <ul style="list-style-type: none"> – The Health and Safety at Work Act (1974). • Principles of health and safety at work <ul style="list-style-type: none"> – Health and Safety Executive (HSE) risk assessments. 	<p>P44 – 46</p>

2.5 Design in practice

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>The effects of design and technological changes on society</p> <ul style="list-style-type: none"> • Mass production and the consumer society. • The ‘new’ industrial age of high-technology production. • The global marketplace. • Issues related to local/global production. 	P118 – 133
<p>Influences on the development of products</p> <ul style="list-style-type: none"> • Aesthetics, balance, colour, decoration, design, form, function, line, scale, shape, styling, surface pattern, texture. • Design and culture, for example Arts and Crafts, Art Nouveau, Art Deco, Bauhaus, Memphis and modern design movements. • New materials, processes and technology <ul style="list-style-type: none"> – computers and design – eco-design – environmentally-friendly processes – miniaturisation – modern production techniques – ‘smart’ materials. 	P134 – 146
<p>The basic principles and application of anthropometrics and ergonomics</p> <ul style="list-style-type: none"> • Interacting with products, users, equipment and environments. • Applying anthropometric data, for example to clothing. • Ergonomic considerations for designs and models <ul style="list-style-type: none"> – standard sizes and dimensions. 	P160 – 163

Unit 3: Further Study of Product design

3.1 Modern technologies and materials

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>The creation and use by industry of modern and 'smart' materials</p> <ul style="list-style-type: none"> • Environmentally-friendly fibres <ul style="list-style-type: none"> – Tencel – Lyocell. • High-specification synthetic fibres <ul style="list-style-type: none"> – Kevlar – Nomex – PTFE – polypropylene. • Laminated fabrics <ul style="list-style-type: none"> – Gore-Tex – Tactel Aquator. • 3D fabric structures <ul style="list-style-type: none"> – knitted – woven – braided. • Composites <ul style="list-style-type: none"> – carbon fibres – ceramic – metallic – Kevlar. • Industrial, technical and performance textiles. • Mass-produced custom-fit garments. 	<p>P102, 213 – 229, 232 – 233</p>

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>The impact of modern technology and biotechnology on the development of innovative fibres, fabrics and finishing processes</p> <ul style="list-style-type: none"> • Improved plant varieties <ul style="list-style-type: none"> – ‘naturally’ grown coloured cotton. • Modified fibres, for example biopolymers and spider silk. • Fabric finishing processes <ul style="list-style-type: none"> – anti-bacterial – anti-static – coating (resins) – reflective textiles – shrink-resist (wool) – photochromic dyes. • Biological finishing processes <ul style="list-style-type: none"> – biostoning (denim) – biopolishing (anti-pill). • Use of biotechnology in dyeing and finishing processes to reduce pollution. • Biological security markers to aid fibre identification and for anti-counterfeiting. • Intelligent fabrics with new properties. • Recycled textiles. 	<p>P230 – 232, 234 – 243</p>

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Modification of properties of materials</p> <ul style="list-style-type: none"> • The creative potential and limitations of materials and techniques <ul style="list-style-type: none"> – spinning – weaving – knitting – crochet. • Experimental processes with materials through exploiting, combining, layering, brushing, felting, melting, distressing, finishing, painting, stencilling, spraying, printing to create enhanced aesthetic, functional, technical properties. • Decorative and stitch techniques to improve the aesthetic properties of materials <ul style="list-style-type: none"> – appliqué – inlay – embroidery – quilting – patchwork – mixed media – dyed – sculpted. 	P244 – 246

3.2 Product manufacture

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Uses of ICT in the manufacture of products</p> <p>The impact and advantages/disadvantages of ICT within the total manufacturing process:</p> <ul style="list-style-type: none"> • electronic communications <ul style="list-style-type: none"> – email – Electronic Data Interchange (EDI) – Integrated Services Data Network (ISDN) – Local Area Networks (LAN) – global networks (internet) – video conferencing – new communications technology • electronic information handling <ul style="list-style-type: none"> – market analysis – specification development • automated stock control <ul style="list-style-type: none"> – ‘just in time’ • production scheduling and production logistics • flexible manufacturing systems <ul style="list-style-type: none"> – quick response manufacturing (QRM) • production control, for example monitoring quality using digital camera • product marketing, distribution and retailing <ul style="list-style-type: none"> – electronic point of sale (EPOS) – internet marketing. 	<p>P39 – 40, 312 – 314, 343 – 358</p>

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Systems and control</p> <p>Computer-Aided Design, Manufacture and Testing (CADMAT), Computer-Integrated Manufacture (CIM), Flexible Manufacturing Systems (FMS) and their wider application in industry:</p> <ul style="list-style-type: none"> • creative and technical design • modelling and testing • production planning • materials handling, retrieval and storage • control of equipment, processes, quality and safety • control of complex manufacturing processes • integrated and concurrent manufacturing. <p>The advantages and disadvantages of automation and its impact on employment, both local and global.</p> <p>Complex automated systems using artificial intelligence (AI) and new technology.</p>	<p>P169 – 174, 309 – 311, 314 – 324, 329 – 333, 341 – 342</p>

3.3 Design in practice

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Values issues</p> <p>The impact of values issues on product design, development and manufacture:</p> <ul style="list-style-type: none"> • Life Cycle Assessment (LCA). <p>Responsibilities of 'developed' countries in relation to production and the environment:</p> <ul style="list-style-type: none"> • global sustainable development. 	<p>P247 – 249</p>
<p>Environmental implications of the industrial age:</p> <ul style="list-style-type: none"> • the use of non-renewable raw materials and fossil fuels during the manufacturing process • renewable sources of energy, energy conservation and the use of efficient manufacturing processes • new technology and environmentally-friendly manufacturing processes • importance of using sustainable technology • minimising waste production. 	<p>P293 – 305</p>
<p>Economics of production</p> <p>Economic factors in the production of one-off, batch and mass-produced manufactured products, relating to, for example:</p> <ul style="list-style-type: none"> • sources, availability and costs of materials • advantages of economies of scale of production • the relationship between design, planning and production costs • the material and manufacturing potential for a given design solution. 	<p>P253 – 265</p>

Unit Content	Cross reference from new content to textbook – 2 nd edition
<p>Advertising and marketing</p> <p>The role of the media, including film, television, radio, video, newspapers and magazines, the internet, in marketing products.</p> <p>The basic principles of marketing and associated concepts such as brand loyalty, competitive edge, consumer demand, lifestyle marketing, market pull, market share, price range, product proliferation, promotional gifts, target market groups.</p> <p>Organisations that provide guidance, discrimination and approval</p> <ul style="list-style-type: none"> • British Standards Institute (BSI) • Advertising Standards Authority (ASA) • consumer magazines/TV programmes. <p>Relevant legislation on the rights of the consumer when purchasing goods</p> <ul style="list-style-type: none"> • statutory rights. 	P266 – 276, 279 – 291