The Ellesmere Port C of E College

Design Technology

Part of the Frank Field Education Trust

KS5 Curriculum Plan 2025-26

Year 12

	LP1	LP2	LP3	LP4	LP5
TOPIC	***2. Learning from existing products and practice; 5. Materials and component considerations Product Study: Iterative hand-held product.***	***4. Design thinking & communication; 5. Materials and component considerations 6. Technical understanding Product Study: Iterative hand-held product.***	***1. Identifying requirements 7. Manufacturing Processes and techniques. Exploring a context: Lamp design & make project.***	***7. Manufacturing processes and techniques. 8. Viability of design solutions; Responding to a context: Lamp design & make.***	***3. Implications of wider issues. 9. Health & safety NEA: The Iterative Design Project***
	To know the factors that influence material selection. To know all physical and mechanical material properties. To know all classifications of each material group. To know primary processing of materials into stock forms. To know material types, properties & uses - timber, polymer, metals. To know the environmental impact of material processing – biodiversity. To know the factors used to analyse & evaluate existing products. To know the factors that contribute to usability (ergonomics, anthropometrics). To know new & emerging technologies and their impact. To know the processes and materials used to make iterative models.	To know material types, properties & uses - fibres & fabrics, composites. To know the purpose, types and applications of material surface finishes. To know types and applications of modern materials. To know types and applications of smart materials. To know the advantages and disadvantages of approaches to design – Iterative design process. To know the methods of graphical communication techniques in 2D & 3D. To know the purpose, types and applications of digital design tools through the design process.	To know how to explore contexts using the 5Ws strategy. To know the methods of investigating stakeholder requirements - User centred design (UCD), SWOT analysis, focus groups, market research, forecasting. To know the purpose of non-technical specifications. To know the processes and materials used to make iterative models. To know the manufacturing processes to make final prototypes from polymers, metals and timbers. To know the manufacturing processes to make commercial products from polymers, metals and timbers.	To know the characteristics of different scales of production. To know types of the automated handling systems in manufacturing and distribution. To understand quality control, quality assurance, Total Quality Management (TQM), British and European Standards. Intellectual property, ethics, economy and globalisation. To know the methods of testing design solutions and how designers test the feasibility of getting products to market. To know the standards met in design solutions (ISO, BSI). To know physical testing is required to meet technical specifications.	To know the purpose and stages of Lifecycle assessments (LCAs), the ecological footprint of material sourcing and the depletion of natural resources. To know how planned obsolescence impacts buying trends. To know the purpose of Design for manufacture (DFM), how product lifecycles are extended. To know the purpose and features of risk assessments. To know health & safety legislation. To know about the requirements of the Health & Safety at Work Act. To know about the control of substances hazardous to health. To know product labelling legislation.
Skills	•Formulate design requirements/ criteria. •Present annotated sketching. •Iterative design process to develop and improve a hand-held device. •Sketch modelling. •Record iterative design process – testing & evaluation. •Apply the use of digital design tools – CAD 3D Sketch Up. •Present iterative sketch & CAD models to peers. •Evaluate opportunities for future development of concepts. •Investigate, record and analyse stakeholder requirements. •Investigate, record and analyse technical data. •Determine design requirements for non-technical specification. •Present bedside tidy designs to meet primary user needs/ wants. •Manufacture bedside tidy applying CAD/CAM •Identifying design problems. •Exploring contexts using the 5W strategy. •Exploring needs of potential stakeholders. •Investigating project feasibility. •Present feasibility studies. •Presenting a design brief. •NEA skills – present investigation of the needs and wants of stakeholders, interviews, surveys, focus groups. •Exploring existing products. •Materials testing and research. •Technical research – dimensions / sizes of appropriate essential considerations. •Ergonomics and anthropometric research.				
Key Vocab	Analyse, evaluate, usability, ergonomics, anthropometrics, form, function, iterative design, user centred design, block model, new and emerging technologies, product marketing lifecycle. natural woods, manufactured boards, hardwood, softwood, ferrous, non ferrous, alloys, thermoplastic polymers, thermosetting polymers.	Natural, synthetic, fabric, woven, knitted, bonded, composites, matrix, reinforcement, modern, smart, chromic materials, shape memory alloys, surface finishes, corrosion, computer aided design, mathematical modelling, simulation.	SWOT analysis, focus group, market research, qualitative observations, technical detail, dimensions, non-technical specification, wastage, subtraction process, commercial manufacturing, vacuum forming, injection, blow, extrusion, rotational, compression moulding, milling, casting, bending, rolling, stamping, wood turning, CNC router, steam bending, laminating.	One-off/ bespoke, batch, high volume, modular, just-in-time, lean manufacturing, templates, jigs, formers, moulds, accuracy, feasibility, commercial viability, supply and demand, quality standards, ISO international Standards, British standards, physical testing.	Sustainability, life cycle assessment, Design for manufacture (DFM), obsolescence, intellectual property, ethics, globalisation, risk assessments, hazards, prevention, legislation, HASAW, COSHH.

Year 13

	LP1	LP2	LP3	LP4	LP5
TOPIC	***NEA: ITERATIVE DESIGN PROJECT Non-technical specification Initiation of ideas 2. Learning from existing products and practice 4. Design thinking & communication.***	***NEA: ITERATIVE DESIGN PROJECT Iterative development process 3. The implication of wider Issues 4. Design thinking & communication 5. Materials and component considerations.***	***NEA: ITERATIVE DESIGN PROJECT Iterative development process & final design solution 6. Technical understanding. 7. Manufacturing Processes and techniques. 8. Viability of design solutions 9. Health & Safety***	***NEA: ITERATIVE DESIGN PROJECT Final solution, manufacturing methods and evaluation Principles of product design & problem solving Revision***	
Knowledge	To know how to analyse & evaluate existing products – factors to consider – context, materials, construction/ manufacture, ease of use, inclusivity, impact on users lives, effects of trends, effects of marketing and branding. To know the factors that contribute to usability when analysing stakeholder requirements for the NEA. To know the approaches when developing designs - iterative design, UCD, circular economy, systems thinking. To know the strategies to support design development e.g. collaboration, project management, six sigma, scrum.	To know the implications of wider issues on the designing, development and manufacture of products. To know the methods used to communicate design developments in industry. To know how to review ideas against user requirements. To know how to iteratively develop design ideas to meet user requirements. To know how to create iterative models using digital and physical prototyping. To know how to select appropriate materials for NEA ideas.	To know how to specify appropriate manufacturing methods for different materials. To know how to project manage the manufacturing stages of the NEA. To know the methods of testing feasibility of getting products to market. viability of design solutions. To know the standards that must be met in design solutions (ISO, BSI). To know the physical testing methods to meet technical specifications. To know how to assess and minimise risk during manufacturing.	To know how to use primary user and stakeholder feedback to test the viability of NEA product. To know the importance of testing products in context. To revise all content in preparation for the Principles of Product Design & Problem Solving external examination papers.	
Skills	•Finalise stakeholder need/wants. •Present a non-technical specification. •Apply graphical presentation techniques to present initial ideas. •Annotate sketches – key functional features, usability, materials. •Create initial idea review/ evaluation. •Apply iterative design approach to development – sketch/ block modelling. •Test/ evaluate/ record iterations and present on NEA. •Iterate designs into a final solution. •Utilise CAD to communicate final developments. •Annotate key functional features and evaluate against non-technical specification. •Present a final solution and CAD exploded view in 3D. •Present an orthographic projection in 2D Design. •Finalise the manufacture of the final porotype. •Test and evaluate final prototype. •Justify suggested improvements.				
Key Vocab	Market research, specification, iterative design, user-centred design, circular economy, enterprise, systems thinking, prototypes, collaboration, sigma six.	Review, evaluate, design iterations, prototyping, simulation, computational fluid dynamics CFD, Finite element analysis (FEA), Mould flow analysis (MFA).	Viability, feasibility, commercial viability, supply and demand, quality standards, ISO international Standards, British standards, physical testing.	Testing, critical evaluation, modifications, design optimisation.	