A- Level Design Engineering Keywords

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| **Circular economy** | A circular economy is an alternative to a traditional linear economy (make, use, dispose) in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life. It aims to keep products, components and materials at their highest utility and value at all times. |
| **Context** | Circumstances that form a setting, surroundings, people, places, events that all form a setting for us to design within. |
| **Creativity** | Creativity is a phenomenon whereby something new and valuable is formed. The ability to transcend traditional ideas, rules, patterns, relationships, or the like to create meaningful new ideas, forms, methods, interpretations, etc. originality, progressiveness, or imagination. |
| **Critique** | Critique is a method of disciplined, systematic analysis of a written or oral discourse. Although critique is commonly understood as fault finding and negative judgment, it can also involve merit recognition, and in the philosophical tradition it also means a methodical practice of doubt. It is detailed evaluation. |
| **Design optimisation** | Product design and development requires that engineers consider trade-offs between product attributes in the areas of cost, weight, manufacturability, quality and performance. It is about determining how to arrive at the best overall design, making the right compromises and not sacrificing critical attributes like safety. |
| **Design solution** | A design solution is a generic term that can be used to outline any existing products or systems, or any design development that is offered as an answer to needs, wants and requirements. This can be a fully drawn up solution or a prototype one. |
| **Digital design** | Digital design is the use of computers, graphics tablets and other electronic devices to create graphics and designs for the web, television, print and portable electronic devices. Digital designers use creativity and computer skills to design visuals associated with electronic technology. |
| **Disruptive technology** | Disruptive technology is a new emerging technology that unexpectedly displaces an established one. Recent examples of disruptive technologies include smart phones and e-commerce retailing. Clayton Christensen popularised the idea of disruptive technologies in the book "The Innovator's Dilemma" in 1997. |
| **Disassembly** | To disconnect the pieces of (something), to take things apart into smaller pieces. Used within Design and Technology to analyse and test products. |
| **Enterprise** | Relating to a progressive approach that demonstrates initiative, resourcefulness and willingness to undertake new and challenging projects. |
| **Fixation** | The state of being unable to stop thinking about something, or an unnaturally strong interest in something. We talk about this in terms of design fixation, i.e. being fixated with an idea. |

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| **Global sustainable development** | Sustainable development relates to the principle of sustaining finite resources that are necessary to provide for the needs of future generations of life on the planet. |
| **Incremental Innovation** | A series of small improvements to an existing product or product line that aims to improve its competitive position over time. Incremental innovation is regularly used within high-tech businesses to ensure products include new features that are desired by consumers. |
| **Innovation** | Innovation in the context of this qualification refers to learners considering new methods or ideas to improve and refine their design solutions and meet the needs of their intended market and/or primary user. |
| **Iterative design** | Iterative design is a design methodology based on a cyclic process of prototyping, testing, analysing and refining a product or process. Within the context of this specification we refine these processes to explore/create/evaluate. In iterative design, interaction with the product or system is used as a form of investigation for informing and evolving a project. Based on the results of testing the most recent iteration of a design, changes and refinements are made. |
| **Just-in-time (JIT)** | Just-in-time (JIT) manufacturing, also known as just-in-time production or the Toyota production system (TPS), is a methodology aimed primarily at reducing flow times within production as well as response times from suppliers and to customers. A strategy companies employ to increase efficiency and decrease waste by receiving goods only as they are needed in the production process, thereby reducing inventory costs. |
| **Lean manufacturing** | Lean manufacturing or lean production, often simply "lean", is a systematic method for the elimination of waste within a manufacturing system. |
| **Lifecycle assessment (LCA)** | Lifecycle assessment (LCA), also known as lifecycle analysis, eco-balance, and cradle-to-grave analysis is a technique to assess environmental impacts associated with all the stages of a product's life from cradle-to-grave (from raw material extraction through materials processing, manufacture, distribution, use during its life, repair and maintenance and end of life disposal or recycling). |
| **Need** | A need is a thing that is necessary for someone to live a healthy, safe and fulfilled life. A need can imply a want, a lack, or a demand, which must be filled. |
| **Ongoing dialogue** | An exchange of ideas or opinions on a particular issue, with a view to reaching an amicable agreement or settlement. |
| **Practical activities** | Practical activities enable the student to put into practice the theory and/or skills they are studying, in a practical environment. This will involve all stages of designing and making, but also investigative, testing and analytical activities. |
| **Primary user** | The primary user is that person or group of people that are intended to practically use a product or system in their lives. Many products may have primary users that use the same product in different ways or with different purposes. |

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| **Prototype** | In the context of this qualification, the term 'prototype' refers to a functioning design outcome. A final prototype could be a highly finished product, made as proof of concept prior to manufacture, or working scale models of a system where a full-size product would be impractical. |
| **Real-time evidence** | Evidence that demonstrates design activity as it happens through whatever medium it is recorded in. Real-time evidence is gathered chronologically to tell a real story. |
| **Requirement** | In product development a requirement is a singular physical and functional need that a particular design, product or process must be able to perform. It is a statement that identifies a necessary attribute, capability, characteristic, or quality of a system for it to have value to a customer, user, or other stakeholder. |
| **Sketch modelling** | Sketch modelling enables you to study, visualise and understand the space in 3D because it looks more real than pen and paper sketches. It can involve modelling using cheap materials and help you work out your design ideas or sketching of parts to explore the parts of a design. |
| **Social footprint** | Social footprint is linked to the carbon footprint, implying that all human actions leave a trace and sometimes our lifestyle choices have negative consequences on the environment. |
| **Solution** | A solution is a way to solve a problem or resolve a bad situation. |
| **Stakeholder** | A stakeholder is a person, group or organisation with an interest in a project; for example, parents/schools when designing products for children; the manufacturer or retailer that has an interest in a product; a regulator who needs to ensure products meet required regulations within a jurisdiction. |
| **Systems thinking** | 'Systems thinking' is a holistic approach to analysis that focuses on the way that a system's constituent parts interrelate and how systems work over time and within the context of larger systems. |
| **Technical textiles** | Technical textiles are materials meeting high technical and quality requirements, e.g. mechanical, thermal, electrical, durability etc., this gives them the ability to offer technical functions. |
| **Upcycling** | Upcycling, also known as creative reuse, is the process of transforming by-products, waste materials, useless and/or unwanted products into new materials or products of better quality or for better environmental value. |
| **User-centred design** | User-centred design (UCD) is a framework of processes (not restricted to interfaces or technologies) in which the needs, wants and limitations of end users of a product, service or process are given extensive attention at the stage of the design process. |