

DESIGN IN TECHNOLOGY: KNOWLEDGE OF DESIGN

Knowledge of design focuses on understanding the way informed, creative and critical development of new ideas is achieved and how these are realised into feasible outcomes.

Initially students learn basic concepts relating to ‘What is design?’ and how or why something may be described as a ‘good’ or ‘bad’ design. Students progress to advanced concepts relating to sustainable design and innovation as currently understood, and to complex concepts relating to future focused themes, principles of good design, and making judgements of a design’s quality in the context of its use.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Demonstrate understanding of basic concepts in design</i>	<i>Demonstrate understanding of advanced concepts in design</i>	<i>Demonstrate understanding of complex concepts in design</i>
TEACHER GUIDANCE	<p>To support students to develop understandings about the basic concepts in design at level 6, teachers could:</p> <ul style="list-style-type: none"> • Guide students to recognise that ‘design’ can be understood both as a verb and a noun. • Provide opportunity for students to explore/debate different definitions of ‘design’ in order to understand what design is. • Provide opportunity for students to explore how designing pulls together subjective and objective considerations to take human ideas into ‘made’ outcomes. Subjective considerations are those linked to aesthetics (where aesthetics is understood as it relates to all human senses/sensibilities). Objective considerations are those that can be established in a quantifiable sense. • Provide opportunity for students to explore differing opinions about the value of particular designs and how these arise due to differences in how subjective and objective considerations are prioritised. • Guide students to understand that designs can be evaluated as ‘good’ or ‘bad’ in terms of how they bring together form, function, cost and contextual understandings. 	<p>To support students to develop understandings about the advanced concepts in design at level 7, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to understand what ‘designing for lifecycle’ means and what additional considerations are required when designing for lifecycle (eg, those related to accessing materials/ongoing maintenance and disposal). • Provide opportunity for students to explore implications of additional considerations on how any design can be judged as ‘good’ or ‘bad’. • Provide opportunity for students to debate the nature of innovative designing. • Guide students to determine the types of things that can inspire innovative ideas through analysing historical and contemporary innovations to identify inspirational drivers, for example previous designs (within a similar and dissimilar range of outcomes), art, nature, literature, attitudes, needs/desires/constraints/ opportunities. • Guide students to determine aspects that support innovative designing, for example, acceptance of risk taking, collaboration, freedom to explore diverse design ideas, appropriate resourcing, opportunity for free and frank debate, application of ‘feasibility filters’ – timing and ‘depth’. 	<p>To support students to develop understandings about the complex concepts in design at level 8, teachers could:</p> <ul style="list-style-type: none"> • Provide opportunity for students to explore innovative designing for sustainable futures. • Guide students to examine a range of models of design as recognised by design professionals and organisations. • Provide opportunity for students to develop a contemporary understanding of the ‘principles of good design’. • Provide students with an opportunity to debate possible and probable future scenarios, the reliability of projections based on uncertainty, and the role of design principles in responding to uncertainty and the mitigation of risk. • Provide opportunity for students to apply the principles of good design to make informed judgements about the quality of a design. • Provide opportunity for students to debate how the principles of good design may have impacted on the design decision-making undertaken during the development of a variety of technological outcomes.
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • explain the elements that underpin design within a specified context • explain considerations used to determine the quality of a design within a specified context • discuss the quality of a design in relation to design elements and considerations of the specific context in which the design is situated. 	<p>Students can:</p> <ul style="list-style-type: none"> • explain the relationship between lifecycle design, innovation and sustainability • explain how lifecycle analysis is undertaken and how this determines the focus for design intervention • discuss the competing priorities and compromises made as a result of lifecycle analysis when developing a sustainable technology. 	<p>Students can:</p> <ul style="list-style-type: none"> • evaluate the quality of the design of a technological outcome using contemporary design judgement criteria • discuss the impact of contemporary judgement criteria on design decision making • justify the evaluation of a technological outcome’s design.
AS	<p>AS91053 Generic Technology 1.10 <i>Demonstrate understanding of design elements</i></p>	<p>AS91363 Generic Technology 2.10 <i>Demonstrate understanding of sustainability in design</i></p>	<p>AS91617 Generic Technology 3.10 <i>Undertake a critique of a technological outcome’s design</i></p>
	Level 1 Generic Technology standards & assessment resources	Level 2 Generic Technology standards & assessment resources	Level 3 Technology achievement standards & assessment resources DRAFT

DESIGN IN TECHNOLOGY: HUMAN FACTORS IN DESIGN

Human factors in design refers to ergonomic and aesthetic factors that influence the design of products, systems and environments. These factors are supported by the use of anthropometric, psychological and sensory data gathering and analysis techniques. Understanding spatial relationships between people, objects and their environments is important when considering human factors in design.

Initially students learn about human factors that need to be considered when designing a product, system or environment. This should progress to students learning about the relationship between anthropometric data, user preference and ergonomic fit in a product, system or environment; as well as how customisation is undertaken to address personal preference and obtain ergonomic fit.

	LEVEL 6	LEVEL 7	LEVEL 8
LO	<i>Demonstrate understanding of basic concepts and techniques related to human factors in design</i>	<i>Demonstrate understanding of advanced concepts and techniques related to human factors in design</i>	
TEACHER GUIDANCE	<p>To support students to develop understandings about the basic concepts related to human factors in design, at level 6 teachers could:</p> <ul style="list-style-type: none"> • Guide students to understand human factors that need to be considered when designing products, systems and environments • Guide students to understand what the terms personal preference, style, and fashion refer to, how they differ from each other and can impact on the design of products, systems and environments • Guide students to explore why ergonomics and aesthetics needed to be considered in the design of a range of products, systems and/or environments • Provide opportunities for students to explore data gathering, including: anthropometrics, psychological and sensory data, and analysis techniques that were used inform the design of products, systems and environments. Discuss why they were used and their suitability. 	<p>To support students to develop understandings about advanced concepts related to human factors in design, at level 7 teachers could:</p> <ul style="list-style-type: none"> • Provide opportunities for students to explore the role of statistics and probability in establishing guiding ratios and ergonomic aids • Guide students to consider ethical and economic parameters as human factors • Support students to explore how socio-cultural considerations impact on personal preference, style and fashion. • Support students to understand how customisation techniques are used to address user preferences. These include: using dressmakers mannequins, patterns, and ergonomics; using data from anthropometric, psychological and sensory data, focus groups and test subjects; using investigation and stimuli to establish personal preferences; and using functional modelling and prototypes • Support students to understand the relationships between anthropometric data, user preference and ergonomic fit across a range of products, systems and environments • Support students to identify the customisation undertaken to address personal preference and obtain ergonomic fit across a range of products, systems and environments. 	<p>LEARNING OBJECTIVE PROGRESSES TO: <i>Demonstrate understanding of complex concepts in design</i> See previous page</p>
INDICATORS	<p>Students can:</p> <ul style="list-style-type: none"> • describe the human factors that need to be considered when designing products, systems and environments • explain how personal preference, group preferences, style and trends may impact on the design of products, systems and/or environments • explain how data gathering and analysis techniques may be used in the design of products, systems and environments • discuss why human factors identified for the design of a product, system and/or environment need to be considered • discuss the suitability of data gathering and analysis techniques that may be used in the design of a product, system and/or environment. 	<p>Students can:</p> <ul style="list-style-type: none"> • explain how statistics and probability are used to establish guiding ratios for anthropometric data and ergonomic aids • explain how anthropometric data, user preference and ergonomic fit in a product, system or environment • discuss the relationship between anthropometric data, user preference and ergonomic fit in a product, system or environment • discuss customisation undertaken to address user preference and obtain ergonomic fit in a product, system or environment. 	
AS	<p>AS91054 Generic Technology 1.11 <i>Demonstrate understanding of basic human factors in design</i></p> <p>Level 1 Generic Technology standards & assessment resources</p>	<p>AS91363 Generic Technology 2.11 <i>Demonstrate understanding of advanced concepts related to human factors in design</i></p> <p>Level 2 Generic Technology standards & assessment resources</p>	