**Stage 2 Industry and Entrepreneurial Solutions**

**(Product design using metal)**

**Design, Technology and Engineering**

School Assessment

**Assessment Type 2: Design Process and Solution**

Purpose

Students produce up to three tasks in the design process and solution assessment type that together provide evidence of the stages of the Design Realisation Process.

Students create a design brief that provides the basis for the development of potential solutions. The importance of the design process as a preliminary to the realisation process is emphasised, as is ongoing evaluation of the solution. Students investigate, plan then create a solution.

A solution in this subject is an outcome of the design and realisation process in relation to the chosen context. A solution could be fully realised or a model, prototype, system, part, process (i.e. procedures to output a product) or product.

Description of task

Design and create a product using metal for a particular purpose and audience

**Part 1; Design brief with evidence of investigation and analysis**

The design brief should include a statement of intent, identification of a problem or opportunity, functional outcomes, aesthetic considerations, and constraints. It can be presented in dot point form. Students define criteria to evaluate how well the finished product meets the requirements of the design brief.

Students select one strategy below for investigating an aspect or aspects related to their design brief that will inform their design development;

* analysing existing product or system characteristics and features to inform the design and realisation process
* collecting and analysing data from a target audience e.g. survey, questionnaire
* researching and analysing information from different contexts such as the manufacturing sector or emerging advanced technologies
* researching historical design or period influences or different cultural traditions
* conducting peer review and feedback about the design brief
* critically analysing sources of information for reliability and validity

**Part 2; Design development and planning**

Students document their design ideas and make plans to use the available resources such as time, materials and technologies to realise the product or system. They test, adapt and validate the design prior to product realisation.

Students create working drawings, concept sketches, prototypes, story boards, flow charts, simulation or 3D modelling to show their design.

Students then select one strategy below to show design development and planning required:

* work collaboratively face to face or online to develop imaginative, innovative, and enterprising outcomes e.g. with peers, industry, tertiary education or community
* apply interdisciplinary concepts e.g. artistic, scientific, mathematical and engineering skills appropriate to the planning and designing of the product or system
* prepare timelines and procedures using visual organisers such as Gantt charts and tables showing sequencing
* create a table, chart or diagram to define product specifications e.g. measurement, materials to be used, processes required

**Task 3; Product realisation and evaluation**

Students produce the product/ solution that they designed. Students must showcase and evaluate the solution or product in the form of a video or photographic record. Evidence required needs to focus on:

* development of skills
* selection and use of appropriate components, specialised processes, and production techniques
* application of knowledge and understanding to create the product
* safe and accurate use of appropriate equipment and processes
* modification of the design brief as a result of technical problems that arise
* use of materials with appropriate characteristics and properties
* ongoing reflection on ideas and procedures

The evaluation should include:

* a critical comparison of the realised product with the criteria specified in the design brief, and an explanation of and justification for any changes made
* a review of criteria, standards, reliability, safety, quality, and cost-effectiveness of product
* reflection on outcomes, with recommendations for possible improvement or redevelopment of designs or procedures
* evaluative observations about the student’s own skill development

Assessment conditions

Provide evidence of the above three sections, using a document of a maximum 3000 words, or 18 minutes of multi-modal presentation

For this assessment type, students provide evidence of their learning in relation to the following assessment design criteria:

* Investigating and Analysis (I1 & I2)
* Design Development and Planning (D1)
* Production ( P1 & P2)
* Evaluation ( E1)

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| Investigations and Analysis | Design Development and Planning | Production | Evaluation |
| A | Comprehensive and insightful analysis of the design features of products, processes, materials, systems and/or production techniquesPurposeful research and critical analysis of ethical, legal, economic and/or sustainability issues | Insightful and comprehensive communication of design concepts using relevant technical language and visual representationsInsightful and thorough planning, development, testing and validation of design concepts and procedures | Highly proficient application of skills, processes, procedures and techniques to create a solutionComprehensive development of solutions to technical problems that arise during the solution realisation | Comprehensive and insightful evaluation of the solution features and realisation process |
| B | Thoughtful and well-considered analysis of the design features of products, processes, materials, systems and/or production techniquesDetailed research and well-considered discussion of ethical, legal, economic and/or sustainability issues | Thoughtful and well-considered communication of design concepts using relevant technical language and visual representationsWell-considered planning, development, testing and validation of design concepts and procedures  | Proficient application of skills, processes, procedures and techniques to create a solutionThoughtful development of solutions to technical problems that arise during the solution realisation | Well-informed and detailed evaluation of the solution features and realisation process |
| C | Considered analysis of the design features of products, processes, materials, systems and/or production techniquesResearch and some analysis of ethical, legal, economic and/or sustainability issues | Clear communication of design concepts using technical language and some visual representationsCompetent planning, development, testing and validation of some design concepts and procedures  | Competent application of skills, processes, procedures and techniques to create a solutionDevelopment of solutions to technical problems that arise during the solution realisation | Considered evaluation of the solution features and realisation process |
| D | Identification of the design features of products, processes, materials, systems and/or production techniquesSome description of information about ethical, legal, economic and/or sustainability issues | Basic communication of design concepts using some technical languageSome planning and development of design concepts and/or procedures | Basic application of some skills, processes, procedures and techniques to create a solutionSome endeavour to develop solutions to technical problems that arise during the solution realisation | Some description of the solution features and realisation process |
| E | Attempted identification of the design features of products, processes, materials, systems and/or production techniquesSome accessing of information about ethical, legal, economic and/or sustainability issues | Superficial and simplistic communication of design concepts Limited use of information to plan design concepts  | Limited application of emerging skills Attempted development of a solution to a technical problem  | Emerging recognition of the solution features and realisation process |

Teacher comment: