

**STAGE 1 DESIGN, TECHNOLOGY AND ENGINEERING**

**MATERIAL SOLUTIONS 1**

**Course Information:**

This Semester you have chosen to undertake a Stage 1 SACE course (Materials Solutions).

The course work involved will involve the following tasks:

**1. Skills and Application Task 1**

Complete a set of skills that demonstrate processes and techniques that are developed and presented with a brief evaluation.

Processes and techniques may include welding, timber jointing or machining skills that build techniques which will be applied in their major products. E.g., (square butt joints, lap joints, T joints, welding flat to round, pipe ends) or machining (cutting threads – external and internal, knurling, cutting tapers, shoulders, facing) Solid timber jointing techniques.

**(Evaluation 100 words)**

**2. Materials application Task**

Students test at least two materials they may use in their major project. They prepare a report detailing functional characteristics and properties of those materials, with a recommendation for their project. They outline any possible modifications to improve ideas or procedures. The report format may be negotiated with the teacher and can be in the form of charts, annotated diagrams or pictures, oral, multimedia or written.

**Task 1 & 2 Assessment Weighting: 20% (Word count 400 words maximum)**

**3. Investigation, Planning and Evaluation of product**

Students produce a folio comprising of three pieces of evidence of the design process for their product.

**Document 1: Investigation**

Students identify a need, problem or challenge. They create an initial design brief. They investigate the functional characteristics and properties of a range of existing products, materials and processes they are considering using in the creation of their product. Students also investigate an issue related to the product, with a focus on products or processes related to the fabrication of the product.

**Document 2: Planning**

Students use the knowledge they have from their investigation to create a range of individual designs for their product. They communicate their designs in the form of sketches, concept drawings, and formal plans. Appropriate technical language should be used which conforms to the technology chosen. There should be reference to testing carried out in the materials applications task.

**Document 3: Evaluation**

Students reflect on improvements to their product and how their product:

• Addresses the design brief requirements

• How further modifications could improve the product

• What impact the product will have on the environment

**(Maximum of 800 words)**

**Assessment Weighting 20%**

**4. Product**

Students produce the product designed in the folio.

**Product record**

Students demonstrate the application of skills, processes, procedures, and techniques to make articles of a chosen standard and specification. They demonstrate proficiency in the use of a range of materials, components, techniques, and equipment to implement schemes or plans safely and accurately during product realisation. They outline any solutions to problems encountered. They evaluate the effectiveness of the product realisation process.

**(Word Count for written evidence 600 words)**

**Assessment Weighting 60%**

**Performance Standards for Stage 1 Design, Technology, and Engineering**

| - | Investigation and Analysis | Design Development and Planning | Production | Evaluation |
| --- | --- | --- | --- | --- |
| A | Comprehensive and thoughtful review of the design features of products, processes, materials, systems, and/or production techniques.  Planned and thorough research and discussion of ethical, legal, economic, and/or sustainability issues related to a solution. | Polished and comprehensive communication of design concepts, using relevant technical language.  Insightful planning and development of design concepts and procedures. | Highly proficient application of skills, processes, procedures, and techniques to create a solution.  Comprehensive development of solutions to technical problems that arise during the solution realisation. | Comprehensive and insightful evaluation of the solution features, realisation process, and/or response to issues. |
| B | Logical and well-considered review of the design features of products, processes, materials, systems, and/or production techniques.  Detailed and considered research and discussion of ethical, legal, economic, and/or sustainability issues related to a solution. | Thoughtful and well-considered communication of design concepts, using relevant technical language.  Well-considered planning and development of design concepts and procedures. | Proficient application of skills, processes, procedures, and techniques to create a solution.  Thoughtful development of solutions to technical problems that arise during the solution realisation. | Well-informed and detailed evaluation of the solution features, realisation process, and/or response to issues. |
| C | Informed review of the design features of products, processes, materials, systems, and/or production techniques.  Research and discussion of ethical, legal, economic and/or sustainability issues related to a solution. | Clear communication of design concepts using technical language.  Competent planning and development of design concepts and procedures. | Competent application of skills, processes, procedures and techniques to create a solution.  Development of solutions to technical problems that arise during the solution realisation. | Considered evaluation of the solution features, realisation process, and/or response to issues. |
| D | Identification of the design features of products, processes, materials, systems, and/or production techniques.  Some description of information about ethical, legal, economic, and/or sustainability issues related to a solution. | Basic communication of design concepts, using some technical language.  Some planning and development of design concepts and/or procedures. | Basic application of some skills, processes, procedures, and techniques to create a solution.  Some endeavour to develop solutions to technical problems that arise during the solution realisation. | Some description of the solution features, realisation process, and/or response to issues. |
| E | Attempted identification of the design features of products, processes, materials, systems, and/or production techniques.  Some accessing of information about ethical, legal, economic, and/or sustainability issues related to a solution. | 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, realisation process, and/or response to issues. |