# Pre-approved Learning and Assessment Plan

Stage 2 Systems and Control Products (Context: 3D Computer-aided Design)

Pre-approved learning and assessment plans are for *school use only*.

* Teachers may make changes to the plan, retaining alignment with the subject outline.
* The principal or delegate endorses the use of the plan, and any changes made to it, including use of an addendum.
* The plan does not need to be submitted to the SACE Board for approval.

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| --- | --- | --- | --- |
| School |  | Teacher(s) |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |
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| SACE school code | | |  | Year |  | Enrolment code | | | | |  | Program variant code (A–W) |
| Stage | Subject code | | | No. of credits (10 or 20) |
|  |  |  |  | **2** | **S** | **S** | **A** | **20** |  |

Addendum – changes made to the pre-approved learning and assessment plan

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| Describe any changes made to the pre-approved learning and assessment plan to support students to be successful in meeting the requirements of the subject. In your description, please explain:  what changes have been made to the plan   * the rationale for making the changes * whether these changes have been made for all students, or for individuals within the student group. |

Endorsement

The use of the learning and assessment plan is approved for use in the school. Any changes made to the plan support student achievement of the performance standards and retain alignment with the subject outline.

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| Signature of principal or delegate |  | Date |  |

# Assessment overview

Stage 2 Systems and Control Products – 20 credits

The table below provides details of the planned tasks and shows where students have the opportunity to provide evidence for each of the specific features of all of the assessment design criteria.

Assessment Type 1: Skills and Applications Tasks – weighting 20%

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Assessment details | Assessment design criteria | | | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| I | Pl | Pr | E |
| Specialised Skills Application 1  (Chess Piece)  Students design, produce and test a chess piece by controlling both a 3D printer and CNC Mill with rotary as specified by the teacher.  This task assesses the students’ level of skills in designing, producing, and testing a prototype based on a concept given by the teacher. Students are expected to correctly simulate their design using CAD software and convert their design into a .stl file to test it.  All stages of the task need to be documented. | 2,3 | 2,3 | 1,2 | 2,3 | Each student has 9 x 80 minute lessons to complete this task. |
| Specialised Skills Application 2  (Photo Frame)  Use CAD software (Inventor) and drawing software (Illustrator) to create, model and assemble a given photo frame layout and then produce using the laser cutter, assemble and test functionality.  This task assesses the students’ skills related to the use of CAD and drawing software in creating a prototype layout and designing a unique face which is then manufactured to form a satisfactorily product.  All stages of the task need to be documented. | 3 | 1,2 | 2,3 | 1 | Each student has 6 x 80 minute lessons to complete this task. |
| Materials Investigation  Investigation of possible material components  Students investigate and evaluate the types and properties of two or more material components for use in their assignments (negotiated with teacher). Components could include materials, manufacturing machine settings or other negotiated components. The investigation involves practical testing, comparative evaluation and a summative evaluation. Testing is to include both qualitative and quantitative measures. There should also be some information from secondary sources identifying impact on environment, society and/or individuals.  In negotiation with the teacher, students may select to present their findings in the form of tables, comparative examples, annotated displays, multimedia presentations or written reports.  Testing may involve collaboration, of no more than 2 students, however all investigative and reporting will be done individually | 1,3,4,5 | 2 |  | 3,4 | Students have 3 x 80 minute lessons to complete this task. Students negotiate their method of presentation.  If written, a maximum of 800 words or 5 minutes of recorded multimedia material |

Assessment Type 2: Product – weighting 50%

| Assessment details | Assessment design criteria | | | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| --- | --- | --- | --- | --- | --- |
| I | Pl | Pr | E |
| Minor Product: Water Sprinkler  Students investigate, design and produce a 3D printed water sprinkler capable of covering an area 5m2.  Students are required to follow the design process to produce throughout.  Students produce a manufacturing schedule that allows for the 3D printer to efficiently produce a product.  The students maintain a product record which may include, as appropriate, evidence related to:   * development of any skills not included in Assessment Type 1 * selection and use of appropriate components, specialised processes, or production techniques * application of knowledge and understanding to create the product * the specifications of a prepared design brief * 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. | 2,3,5 | 1,2,3 | 1,2,3 | 1,2,3,4 | 12 x 80 minute of lesson time.  Independent work in class.  Assignment of performance standards is informed by correct use of software and manufacturing devices and quality and skill in transferring the manufacturing schedule and designs to the various devices to test its real-life operation. |
| Major Product  Students produce the final product (design, produce and assemble a negotiated object), managing time and resources, and maintaining throughout the production, a product record of the stages of producing for assessment and moderation purposes.  The product record may include, as appropriate, evidence related to:   * development of any skills not included in Assessment Type 1 * selection and use of appropriate components, specialised processes, or production techniques * application of knowledge and understanding to create the product * the specifications of a prepared design brief * 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. |  | 1 | 1,2,3 | 3 | 18 x 80 minute of lesson time.  Independent work in class.  Assignment of performance standards is based on correct device operation, quality and skill in assembly techniques and a working demonstration in a model designed by the student. |

Assessment Type 3: Folio – weighting 30%

| Assessment details | Assessment design criteria | | | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) | |
| --- | --- | --- | --- | --- | --- | --- |
| I | Pl | Pr | E |
| External Assessment (two assessment for the folio)  *Product design (documentation and analysis)*  *Students create a design brief and analyse their investigation and planning for their major product, based on the skills and activities outlined in the section ‘The Design Process’ section of the Learning Scope and Requirements .* The design brief should include a statement of intent, functional outcomes, aesthetic considerations, and constraints. It can be presented in dot point form.  The investigating part of the design process should include an investigation into the impact on individuals, society, and/or the environment of technological practices related to the type of product that the student is designing. The analysis involved in investigation can be included in the product design documentation or in the product evaluation.  *Product evaluation:*  *Students evaluate their producing skills, using evidence from the major product record in Assessment Type 2, and evaluate their realised major product.* The evaluation should include:   * a critical comparison of the realised product with the requirements of the design brief, and an explanation of and justification for any changes made * a review of criteria, standards, reliability, safety, quality, and cost-effectiveness * reflection on outcomes, with recommendations for possible improvement or redevelopment of designs or procedures * analysis of the impact of the product on individuals, society, and/or the environment (if not part of product design documentation) * evaluative observations about the student’s own skills development.   Evidence of development, with supporting written or oral summaries that explain, analyse, and evaluate the process and product, could take the form of:   * all or sections of the product record * photographic or electronic or digitally generated materials * audiovisual evidence * materials * products * models * sketches, diagrams, or annotations.   Oral summaries may emerge from teacher-led discussion questions. | 1,2,3,  4,5 | 1,2,3 |  | 1,2,3,4 | The combined evidence should be a maximum of 2000 words if written, or a maximum of 12 minutes recorded oral documentation, analysis, and evaluation, or the equivalent in multimodal form. |

*Seven or eight assessments.**Please refer to the Stage 2 Design and Technology subject outline.*