# Pre-approved Learning and Assessment Plan

Stage 2 Systems and Control Products (Context: Electronic Systems)

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%

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| --- | --- | --- | --- | --- | --- |
| Assessment details | Assessment design criteria | | | | Assessment conditions  (e.g. task type, word length, time allocated, supervision) |
| I | Pl | Pr | E |
| Specialised Skills Application 1  (breadboard circuit)  Students produce and test a breadboard electronic system controlled by a PICAXETM program as specified by the teacher.  This task assesses the students’ level of skills in designing, producing, and testing a PICAXETM simulated program based on a circuit concept given by the teacher. Students are expected to correctly simulate their design on a breadboard and download their program into a PICAXETM microcontroller to test it. | 4 | 1,3 | 1,2,3 |  | Each student has 3 x 45 minute lessons to complete this task. |
| Specialised Skills Application 2  (printed circuit board)  Using CAD software students draw a printed circuit board layout for the circuit tested in Skills Applications 1.  This task assesses the students’ skills related to the use of CAD software in designing a printed circuit board layout which is then manufactured to form a satisfactorily operating circuit. | 3,4 | 1,3 | 1,2,3 |  | Each student has 3 x 45 minute lessons in which to complete this task. |
| Materials investigation  Investigation of different security components  Students investigate and evaluate the types and properties of two or more components for a home security system. Components could include sensors, output systems, power systems, or other negotiated components The investigation involves practical testing, comparative evaluation and a summative evaluation. There should also be some information from secondary sources.  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. | 1,3 |  |  | 2,3 | 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  Construct a digital keypad assembly controlled by a PICAXETM program, to be used as an interface in a home security system  Students produce a digital keypad from a circuit diagram provided by the teacher. They are required to design and produce the printed circuit board on which to mount the components.  Students produce a PICAXETM program that controls the digital keypad, so that it can be used as an interface in the home security system that is their major product.  Students construct a product record and demonstrate meeting the specifications of a prepared design brief. The product record is used to provide evidence of modification and planning, production, and/or evaluation aspects of the design process that occur during the creation of the product. |  | 3 | 1,2,3 | 2,3 | Unstructured in supervised laboratory. Three weeks of lesson time spread over 6 weeks.  Independent work in class.  Assignment of performance standards is informed by correct circuit operation and quality and skill in transferring the data to the microcontroller to test its real-life operation.  Time line: 2 weeks. |
| Major Product Students produce the product as designed and documented in their Design Folio.  Students produce the final product (design, produce and assemble a printed circuit board), managing time and resources, and maintaining throughout the production, a visual record of the stages of producing for assessment and moderation purposes.  The visual 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 * on-going reflection on ideas and procedures. |  | 3 | 1,2,3 | 2,3 | Unstructured in supervised laboratory. Six weeks of lesson time spread over 6 weeks.  Assignment of performance standards is based on correct electronic operation, quality and skill in assembly techniques and a working demonstration in a model designed by the student. |

Assessment Type 3: Folio – weighting 30%

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| 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.*