Preliminary Technologies Stage 4

LEVEL PRE	0 TCE CREDIT POINTS
COURSE CODE	PRT005419
COURSE SPAN	2019 — 2023
READING AND WRITING STANDARD	NO
MATHEMATICS STANDARD	NO
COMPUTERS AND INTERNET STANDARD	NO

This course was delivered in 2021. Use A-Z Courses to find the current version (if available).

Preliminary Technologies is designed to assist learners to develop basic knowledge and skills for living and vocational pathways

Using a practical skills-based approach, this course is designed to encourage learners to develop a range of skills in the safe use of equipment and digital systems around the home and other learning environments. It also assists in building independent living skills.

Course Description

Preliminary Technologies is designed to assist learners to develop basic knowledge and skills for living and vocational pathways. Using a practical skills-based approach, this course is designed to encourage learners to develop a range of skills in the safe use of equipment and digital systems around the home and other learning environments. It also assists in building independent living skills.

Learners will develop their personal skills in decision-making based on their own or community-identified needs and preferences. They will begin to develop an understanding of design thinking in the creation of designed solutions within everyday contexts.

This course is organised into four sequential stages. Each stage includes a learning focus statement and examples of student learning. Each stage is designed to accommodate a learner's level of readiness and reflects their stage of development. It is possible that a learner may engage in only one stage of learning in their study of this course.

The learning program focuses on ideas, skills, techniques and processes. It includes engagement in concepts that emerge from a range of starting points and stimuli. Learners explore experiences, ideas, feelings and understandings through using, responding and making.

Introduction to Preliminary to Level 1 courses

This course has been accredited under Section 55ZI of the Office of Tasmanian Assessment, Standards and Certification Act 2003 - Other education. 'Other education' is defined by the Act as including 'education specifically designed for a person with a disability'.

Section 55ZM of the Act requires that providers of this course issue qualifications to learners who achieve a Preliminary Achievement (PA) award or higher at any stage or size value. For further information and examples, see the Supporting Documents section of this course.

In addition to provider-issued qualifications, course providers may report learner results to the Office of TASC in late November each year using prescribed methods. Reported results will be used by TASC for inclusion on students' Qualification Certificates (QCs) and may form part of the evidence base for a Tasmanian Certificate of Educational Achievement (TCEA) for eligible learners.

Achievement in courses Preliminary to Level 1 does not contribute to the Tasmanian Certificate of Education (TCE). This allows for greater flexibility in regard to learner movement between stages and their learning time (reflected in variable size values for this course) than are available in Level 1 and higher senior secondary courses.

Learners

The Preliminary to Level 1 suite of courses are designed for learners whose circumstances significantly impact their learning in an ongoing manner or for extended periods of time.

These learners include:

- learners with disability as defined by the Disability Discrimination Act (DDA) 1992, whose disability requires educational adjustments to support access and participation in learning
- learners whose circumstances have significantly impacted their ability to attend school for extended periods of time or engage in courses with higher levels of complexity
- learners who require significant support for learning English as an additional language or dialect.

Course Relationship to Australian Curriculum

This Preliminary to Level 1 course is aligned to Australian Curriculum: Technologies, which describes two distinct but related subjects:

- Design and Technologies, in which learners use design thinking and technologies to generate and produce designed solutions to meet authentic needs and opportunities.
- Digital Technologies, in which learners use computational thinking and information systems to define, design and implement digital solutions.

The strands and sub-strands of *Preliminary Technologies* are closely aligned to those in the Australian Curriculum: Technologies subjects, as shown in the table below.

Table 1: Australian Curriculum Technologies subjects, strands and sub-strands

Subject	Strand	Sub-Strand
Design and Technologies	Knowledge and understanding	Technologies and society
		Technologies contexts
	Processes and production skills	Creating designed solutions
Digital Technologies	Knowledge and understanding	Digital systems
		Representation of data
	Processes and production skills	Collect, manage and analyse data
		Creating digital solutions

Table 2: *Preliminary Technologies* subjects, strands and sub-strands

Subject	Strand	Sub-Strand
Design and Technologies	Knowledge and understanding	Technologies and society
		Technologies contexts
	Processes and production skills	Creating designed solutions
Digital Technologies	Knowledge and understanding	Digital systems and society

		Representation of data
	Processes and production skills	Creating digital solutions

Rationale

Preliminary Technologies is one of a suite of courses designed to provide basic skills to learners with high needs, many of whom have a learning difficulty or disability. Some learners may need the full suite of courses for study in both Years 11 and 12, some may need it for only part of their course load, and other learners may need only some courses in Year 11 before moving to other programs for Year 12.

The study of technologies involves learners using technologies to create innovative solutions that meet current and future needs. Learners are encouraged to make decisions about the development and use of technologies, considering the impacts of technological change and how technologies may contribute to a sustainable future. This course provides practical opportunities for learners to be users, designers and producers of new technologies.

In *Preliminary Technologies*, learners are beginning to use design thinking and technologies to generate and produce designed solutions. Learners use computational thinking and information systems to design and develop digital solutions.

Through the practical application of technologies, learners may develop dexterity and coordination. This course offers learners a broad range of learning experiences, readily transferable to their home, life, leisure activities, the wider community, and to work.

Preliminary Technologies caters for learners who require flexible and individualised programs. Learning experiences in this course are designed to move learners from an emergent level of responding to a level where the response indicates intention. *Preliminary Technologies* aims to offer better outcomes in all aspects of learners' lives, and assist learners' access to achievable pathways to further education, training and/ or employment outcomes.

Aims

With coactive support *Preliminary Technologies* aims to develop learners:

- ability to take into account the ethical, legal, aesthetic and functional factors that inform the design processes
- skills to use technologies to meet an identified need
- understanding and application of protocols and practices that support safe use of tools, equipment and digital technologies.

Additionally, learners may:

- develop a sense of pride, satisfaction and enjoyment from their ability to create innovative designed solutions.

Learning Outcomes

On successful completion of this course, learners will be able to:

1. recognise that technology impacts on everyday life
2. safely use technologies, including materials, tools, equipment and digital systems
3. identify design challenges in practical situations
4. use design processes in practical situations.

Stages of Learning at Preliminary to Level 1

This course focuses on progressing learners from an emergent to early intentional state. It encourages learners to develop their independence as they explore, participate and engage in the world around them. Curriculum expectations for learner achievement are set at four stages. These stages are not associated with any set age or year level that links chronological age to cognitive progress. As learners progress through these stages the level of support decreases as they proceed towards becoming independent learners. The stages focus largely on foundational literacy and numeracy skills and the development of physical, personal and social capacities.

This document is **Stage 4** in four Stages of the course *Preliminary Technologies*.

STAGE 1
At this stage learners experience a range of learning activities that will assist them to attend to and explore the world around them with as much independence as possible. Experiences are designed to move learners from an emergent level of responding to a level where the response indicates beginning intention. Learners will need high levels of coactive support and focused attention from the teacher to help them initiate and refine their responses. Learners demonstrate some awareness and recognition of familiar people and routine activities.

STAGE 2

Learners at this level become less reliant on high levels of coactive support and become more reliant on verbal prompts and gestures to facilitate their learning. They begin to explore their world independently and engage in simple cause-and-effect activities. Learners are able to focus on structured learning activities for short periods of time. They respond to familiar people and events and begin to use 'yes/no' responses.

STAGE 3

Learners at this level are less dependent on coactive support and respond more consistently to prompts and simple clear directions from the teacher to support them in their learning. They are displaying the first signs of independence and becoming more peer focused. Learners participate in structured learning activities with others and they begin to use pictures, photos and objects to communicate personal interests and experiences. They start to use and link some familiar words and images to form a meaningful communication.

STAGE 4

With teacher support and curriculum scaffolding, learners at this level participate cooperatively in group learning activities. They express their feelings, needs and choices in increasingly appropriate ways and combine and sequence key words and images to communicate personal interests and to recount significant experiences. They indicate beginning understanding of social rules and expectations and are beginning to reflect on their own behaviour.

Access

Learners can enter the course at any of the four stages depending upon their level of readiness or ability. Providers will determine the entry point for learners based on each learner's level of readiness.

All learners have a right to an education that meets their needs through full participation and engagement with learning. Providers enhance the quality of all students' learning through responsive and planned learning programs that optimise achievement using inclusive practices.

Learners will have access to appropriate resources such as professional support staff (; or adult assistance), and equipment such as assistive technology or modified facilities, as required. The Disability Standards for Education, 2005 outline the obligations that educational providers must meet in supporting the needs of learners with disability through reasonable adjustments.

Adjustments include a range of supports and accommodations including but not limited to:

- supportive learning environments
- tailored delivery models
- visual and organisational supports
- multimodal learning and assessment opportunities
- varying levels of prompting and adult assistance
- access to appropriate technology.

'Adjustment' does not mean the lowering or removal of standards but rather it means allowing learners appropriate means to demonstrate their learning and achievement against standards.

In the instance of online, distance or flexible delivery, adjustments may be made in the delivery of the courses by providers to suit the individual student's learning environment. This may involve differentiation to reflect the resources readily available to the learner within their home or community.

Pathways

This course is preparatory to several Level 1 TASC Technologies courses:

- Workshop Techniques – Introduction, Level 1
- Food and Cooking Essentials, Level 1
- Basic Computing, Level 1.

Resource Requirements

Learners will need access to a range of digital technologies (hardware and software) which includes but is not limited to their personal assistive technologies. Technologies could include: tablet computers, digital cameras, mobile phones, desktop computers with input devices such as a keyboard, mouse and/or, graphics tablet. Output devices could include monitors and printers.

Each elective unit has its own requirements to provide appropriate learning spaces for the technologies contexts selected:

- food specialisations – access to a domestic kitchen or wet area
- food and fibre production – access to growing facilities such as garden beds or pots, and/or facilities suitable for animals
- materials and technologies specialisations – tools and environment appropriate to the chosen material(s), for example: wood; paper; metal; textiles; or composite materials
- engineering principles and systems – a range of age-appropriate models, malleable materials and construction equipment such as building blocks.

Course Size And Complexity

This course has a complexity Preliminary to Level 1.

Each stage of the course has a size value of 5 or 10 or 15 depending upon learners' needs. A learner will undertake a minimum of 50 hours study in this course, through to a maximum of 150 hours dependent on learner needs.

There are many possible ways of combining the Stages of learning and the size value of 5 or 10 or 15 depending upon learners' needs.

For example:

- A learner might study Preliminary to Level 1, Stage 3 of the course and complete it in 50 hours. This learner might then study Preliminary to Level 1, Stage 4 of the course and require 100 hours to achieve this. After successful completion, this learner might then undertake Food and Cooking Essentials Level 1 in the following year.
- In one year a learner might study Preliminary to Level 1, Stage 2 of the course and complete it in 50 hours. This learner might then also study Preliminary to Level 1, Stage 3 of the course and require 100 hours to achieve this.
- A learner may study Preliminary to Level 1 Stage 1 in 150 hours.

Course Structure

This course is organised into four sequential stages. Learners can enter the course at any of the four stages depending upon their level of readiness or ability. Providers will determine the entry point for learners.

Course Delivery

The sequence of delivery is at the discretion of the provider. A personalised learning program will be developed for each learner, dependent on their needs. Not all learners will achieve all stages of the course content.

The Design and Technologies sub-strands of Technologies and society, Technologies contexts and Creating designed solutions; are inter-related, and the learning of one often supports and extends learning of the others. Similarly the Digital Technologies sub-strands of Digital Systems, Representation of data and Creating digital solutions are inter-related, and the learning of one often supports and extends learning of the others. In addition, Digital Technologies strands can be inter-related with Design and Technologies strands. The personalised learning program will acknowledge the incorporation of the strands in both an integrated and interdependent way.

There are many possible ways to plan a learning program around the units. There may be advantages in teaching some units concurrently with others in an integrated way, rather than as discrete units.

Course Requirements

In each stage of Preliminary Technologies, there are six units, two compulsory units and four elective units, of which two must be completed.

The units are:

	Unit Number	Unit Name
COMPULSORY UNITS	Unit 1	Technologies and Society
	Unit 2	Digital Technologies
ELECTIVE UNITS (choose two)	Unit 3	Food Specialisations
	Unit 4	Food and Fibre Production
	Unit 5	Materials and Technologies Specialisations
	Unit 6	Engineering Principles and Systems

In each stage, learners need to complete Units 1 and 2 and two other elective units.

Course Content

STAGE 4: (50, 100 AND 150 HOURS)

This stage course has a size value of 5, 10 or, 15.

Learners must complete Units 1 and 2 and TWO elective units .

UNIT 1: TECHNOLOGIES AND SOCIETY – Compulsory unit

Technologies and society focuses on how people use and develop technologies to meet identified needs. It takes into account economic, environmental, ethical, legal, aesthetic and functional factors, and the impact of technologies on individuals, families, local, regional and global communities, and the environment.

In Stage 4, learners explore technologies, including its purpose and how technologies meet personal and social needs within local settings. Learners explore the characteristics and properties of familiar designed solutions from digital systems and two of the technologies contexts:

- engineering principles and systems
- food and fibre production
- food specialisations
- materials and technologies specialisations.

Content

Learners explore how people create familiar designed solutions and identify their ability to meet personal and local community needs. For example:

- make design decisions in everyday activities, for example, what should we cook today and why?
- explore what technologies they use in their daily life, for example, 'what tools and equipment do we need to grow vegetables?'

UNIT 2: DIGITAL TECHNOLOGIES – Compulsory unit

In Stage 4, learners are building their independence and participating cooperatively in group learning activities. They combine and sequence key words and images to communicate personal interest and significant experiences and are beginning to reflect on their own behaviour and learning. They have opportunities to create a range of digital solutions through guided activities and integrated learning, such as using remote control cars or recording information with software applications.

Learners begin to try different ways of carrying out common functions with digital systems and recognise patterns that exist within data they collect. Learners explore ways to collate, represent, save and present this data, including numerical, categorical, text, image still and moving) and audio data.

Learners complete significant steps involved in using devices and software. They begin to identify and follow sequences of steps for carrying out instructions, such as activating an ipad.

Through discussion with teachers, learners learn to apply safe and ethical practices to protect themselves and others when using digital systems for learning.

Content

<u>Digital Systems</u>

Learners carry out some key functions on digital systems (hardware and software components) to meet a purpose. For example:

- identify and use different techniques to carry out an instruction, for example a control key or mouse to close a file, or a mouse or hand movement to resize and image, or a stylus for selecting an existing object to create a shape
- use icons to operate familiar software features such as Save, Favourites, Home.

<u>Representation of Data</u>

Learners collect, sort and recognise, with assistance, different types of patterns in data, and use digital systems to represent data as pictures, symbols and diagrams. For example:

- collect, sort and display data in a personally meaningful way, for example collecting leaves, sorting them into groups based on size, shape or colour and using a drawing program to represent the findings

- use common software to present ideas creatively, for example creating a slideshow, poster, drawing or image about a wishful holiday destination.

Creating Digital Solutions

Learners follow and represent steps needed to solve a simple problem. For example:

- take and use photos to represent the sequence of events, for example placing in order photos of buildings/rooms that need to be passed when getting from the classroom to the front school gate
- view a familiar multi-level game (up to 5 levels) and list the number of levels within it.

UNIT 3: FOOD SPECIALISATIONS – Elective unit

Food specialisations explores the application of nutrition principles and the characteristics and properties of food, food selection and preparation, and contemporary food issues. Learners come to understand the importance of eating a variety of foods, food preparation skills and food safety.

In Stage 4, learners explore the characteristics and properties of familiar designed solutions from the context of food specialisations. Learners communicate simple design ideas and begin to compare designed solutions based on personal preferences.

Learners begin to plan their design idea, and follow simple steps and directions to complete their own or group design ideas or projects.

Content

Learners explore and communicate the characteristics and properties of familiar designed solutions in the context of food specialisations. For example:

- use tools and equipment safely and hygienically to prepare simple, healthy food.

Learners explore and communicate how designed solutions are created and produced safely to meet needs. For example:

- use a common testing method and record results, for example, taste-testing comparison of food products and recording results
- gather and use ingredients, utensils and equipment to make a designed solution, for example, a batch of muffins.

UNIT 4: FOOD AND FIBRE PRODUCTION – Elective unit

Food and fibre production focuses on food and fibre as human-produced or harvested resources, and how food and fibre are produced in managed environments such as farms or plantations, or harvested from wild stocks. Learners develop an understanding of the challenges involved in managing these resources within sustainable agricultural systems. They develop their knowledge and understanding about the managed systems that produce food and fibre through creating designed solutions.

In Stage 4, learners explore the characteristics and properties of familiar designed solutions from the context of food and fibre production.

Learners communicate simple design ideas and begin to compare designed solutions based on personal preferences.

Learners begin to plan their design idea, and follow simple steps and directions to complete their own or group design ideas or projects.

Content

Learners explore and communicate the characteristics and properties of familiar designed solutions in the context of food and fibre, for example:

- explore the safe use of tools in the care and use of plants and/or animals

Learners explore and communicate how designed solutions are created and produced safely to meet needs, for example:

- gather and use materials and equipment to make a designed solution, for example, an animal feeder or garden bed.

UNIT 5: MATERIALS AND TECHNOLOGIES SPECIALISATIONS – Elective unit

Materials and technologies specialisations explores a broad range of traditional, contemporary and emerging materials, and specialist areas that involve an extensive use of technologies. Students learn to make ethical and sustainable decisions about designed solutions and processes by learning about and working with materials and production processes.

In Stage 4, learners explore the characteristics and properties of familiar designed solutions from the context of materials and technologies specialisations, for example, wood, paper, metal, composite materials.

Learners communicate simple design ideas and begin to compare designed solutions based on personal preferences.

Learners begin to plan their design idea, and follow simple steps and directions to complete their own or group design ideas or projects.

Content

Learners explore and communicate the characteristics and properties of familiar designed solutions in the context of materials and technologies specialisations

- explore the safe use of tools in a workshop environment
- discover uses for materials and components, for example how household packaging can be used for other purposes.

Learners explore and communicate how designed solutions are created and produced safely to meet needs, for example:

- know their roles and know other people have different roles when completing a group task
- gather and use materials, tools and equipment to make a designed solution.

UNIT 6: ENGINEERING PRINCIPLES AND SYSTEMS – Elective unit

Engineering principles and systems explores how forces can be used to create light, sound, heat, movement, control or support in systems. Learners develop an understanding of how forces and the properties of materials affect the behaviour and performance of designed engineering solutions.

In Stage 4, learners explore the characteristics and properties of familiar designed solutions from the context of engineering principles and systems.

Learners communicate simple design ideas and begin to compare designed solutions based on personal preferences.

Learners are supported to plan their design idea, and follow simple steps and directions to complete their own or group design ideas or projects.

Content

Learners explore and communicate the characteristics and properties of familiar designed solutions in the context of engineering principles and systems:

- experiment with materials and techniques to make or stop movement, for example, to stop an item from rolling away
- discover uses for materials and components, for example, re-purposing household items

Learners explore and communicate how designed solutions are created and produced safely to meet needs:

- know their roles and know other people have different roles when completing a group task
- follow steps to assemble a system and check that it functions as planned, for example, following instructions to build an item such as a cardboard box, or a ramp to get from one level to another.

Assessment

Criterion-based assessment is a form of outcomes assessment that identifies the extent of learner achievement at an appropriate end-point of study. Although assessment – as part of the learning program – is continuous, much of it is formative, and is done to help learners identify what they need to do to attain the maximum benefit from their study of the course.

The standard of achievement each learner attains on each criterion is recorded as a rating of 'C' (satisfactory standard) according to the outcomes specified in the standards section of the course document.

A 't' notation must be used where a learner demonstrates any achievement against a criterion less than the standard specified for the 'C' rating. The 't' notation is not described in course standards.

A 'z' notation is to be used where a learner provides no evidence of achievement at all.

Internal assessment of all criteria will be made by the provider. Assessment processes must gather evidence that clearly shows the match between individual learner performance, the standards of the course and the learner's award.

NOTATION ON EVIDENCE OF LEARNING

Some of the criteria standard elements use the terms reacting, responding and recognising.

In the context of this preliminary level course reacting/responding might be defined as:

- an intentional repeatable and observable behaviour that can be interpreted simply, objectively and conclusively.

In the context of this preliminary level course recognising might be defined as:

- intentionally signalling identification of (someone or something) through gesture, facial expression or sound from having encountered them before.

Quality Assurance Process

Each provider is responsible for ensuring the integrity and validity of their assessment results against the requirements of the course, including standards, and for maintaining records and documentation that will demonstrate the integrity, accuracy and validity of the award decisions they make each year.
Under Section 55ZN of the Office of Tasmanian Assessment, Standards and Certification Act 2003, TASC may give a provider written direction regarding the provision and assessment of an accredited other education course.

Criteria

The assessment of *Preliminary Technologies* Stage 4 will be based on whether the learner can:

1. respond to designed solutions to meet personal and community needs
2. create designed solutions
3. create digital solutions to meet personal needs

Standards

Criterion 1: respond to designed solutions to meet personal and community needs

The learner:

Rating C
identifies at least one need met by familiar designed solutions
uses designed solutions and identifies at least one significant feature
uses at least one key function of a familiar designed solution, and identifies its purpose.

Criterion 2: create designed solutions

The learner:

Rating C
uses step by step processes to solve a simple problem
creates at least one designed solution and communicates at least one design decision when creating a design solution
selects materials based on their properties and characteristics
uses at least one familiar tool and piece of equipment safely when producing a designed solution.

Criterion 3: create digital solutions to meet personal needs

The learner:

Rating C
collects and sorts data, and recognises trends in data
uses at least one digital system to display sorted data results with pictures and symbols.

Qualifications Available

Preliminary Technologies Preliminary to Level 1: Stage 1, 2, 3 or 4 (with the award of):

SATISFACTORY ACHIEVEMENT

PRELIMINARY ACHIEVEMENT.

Award Requirements

The final award for *Preliminary Technologies* Stage 4 will be determined by the provider from three (3) ratings.

The minimum requirements for an award in each Stage of this course are as follows:

Satisfactory Achievement (SA)

3 'C' ratings

Preliminary Achievement (PA)
1 'C' rating

Course Evaluation

The Department of Education's Curriculum Services will develop and regularly revise the curriculum. This evaluation will be informed by the experience of the course's implementation, delivery and assessment.

In addition, stakeholders may request Curriculum Services to review a particular aspect of an accredited course.

Requests for amendments to an accredited course will be forward by Curriculum Services to the Office of TASC for formal consideration.

Such requests for amendment will be considered in terms of the likely improvements to the outcomes for learners, possible consequences for delivery and assessment of the course, and alignment with Australian Curriculum materials.

A course is formally analysed prior to the expiry of its accreditation as part of the process to develop specifications to guide the development of any replacement course.

Course Developer

The Department of Education acknowledges the significant leadership of Janine Bowes in the development of this course.

Accreditation

The accreditation period for this course is from 1 January 2019 until 31 December 2023.

During the accreditation period required amendments can be considered via established processes.

Should outcomes of the Years 9-12 Review process find this course unsuitable for inclusion in the Tasmanian curriculum, its accreditation may be cancelled. Any such cancellation would not occur during an academic year.

Version History

Version 1.0 - This course was accredited on 4 December 2018 for use from 1 January 2019 until 31 December 2023.

Appendix 1

Appendix 1 - Glossary of verbs

choose	Decide or select the most suitable from a number of different options.
create	Make something.
describe	In the context of this course, 'describing' might be done via methods such as • an oral description • a written description (e.g. a word list of characteristics) • a series of actions a series of images with simple written notations.
experience	Be exposed, observe others' participation, or be immersed in.
explore	Investigate, search for.
identify	Recognise and name or indicate who or what someone or something is. In the context of this course, identification might be done via methods such as • correctly selecting from a given list • correctly selecting from a set of images • correctly naming from memory or after consulting a source such as the internet. 'Selecting' might be done by methods such as: pointing,; nodding circling with a pen; or matching (e.g. a picture with a corresponding name card).
label	Identify by placing a name or word used to describe the object or thing.
react	A reaction or response is a deliberate, repeatable and observable behaviour that can be interpreted simply, objectively and conclusively'.
recognise	Be aware of or acknowledge.
represent	Use words, images, symbols or signs to convey meaning.
respond to	Provide an answer; reply.
select	Choose from alternative options. 'Selecting' might be done by methods such as: pointing,; nodding circling with a pen; or matching (e.g. a picture with a corresponding name card).
sequence	Identify by placing a name or word used to describe the object or thing.
show	Give information; illustrate.

understand	Perceive what is meant, grasp an idea, and to be thoroughly familiar with.

Appendix 2

Glossary

(AC) indicates that the definition comes from the Australian Curriculum.

abstraction	Abstraction is a key concept in digital technologies. Abstraction involves hiding details of an idea, problem or solution that are not relevant, to focus on a manageable number of aspects. Abstraction is a natural part of communication: people rarely communicate every detail. The idea of abstraction can be acquired from an early age or stage of development. For example, when learners are asked how to make toast they do not mention all steps explicitly, assuming the listener is able to implement the abstract instructions. “Place bread in toaster” may not require the detail of “get a piece of bread from the pantry”. Central to managing the complexity of information systems is the ability to ‘temporarily ignore’ the internal details of larger specifications, algorithms, systems or interactions. In digital systems, everything must be broken down into simple instructions.
algorithm	Sequence of steps used to solve a problem. The sequence may involve decisions and/or repetition.
characteristics (AC)	A set of distinguishing aspects (including attributes and behaviours) of an object, material, living thing, system or event. In Design and Technologies, the qualities of a material or object usually detected and recognised by human senses such as its colour, taste, texture, sound (for example, crunch of bread) and smell. The term also may relate to the form of a material, for example, ‘corrugated’ cardboard. These qualities are used by humans to select suitable materials for specific uses, for example, because they are appealing or suitable for their purpose. The characteristics of materials usually determine the way people work with the materials. Also see properties. In Digital Technologies, for example, the characteristics of a stored digital graphic may be the colour depth (maximum number of colours represented), the resolution (number of pixels per area, or height and width) and the compression used.
community	For this course, community means beyond groups of other people beyond self, for example, immediate family, school community, the local community or wider community.
components (AC)	Parts or elements that make up a system or whole object and perform specific functions. For example, the major components of a car include: a chassis (holds everything on it); an engine (to convert energy to make a car move); a transmission (including controlling the speed and output from the engine and to rotate the wheels); a steering system (to control the direction of movement); a brake system (to slow down or stop); a fuel delivery system (to supply fuel to

	the cylinders); an exhaust system (to get rid of gases) and an electrical system (for operating wipers, air conditioning, etc.). Similarly, the components of a computer system may be a central processing unit (chips that follow instructions to control other components and move data); memory chips and a hard disk (for storing data and instructions); a keyboard, a mouse, a camera and a microphone (to input instructions and data for the central processing unit); a screen, a printer and speakers (to output data); USB and ethernet cards (to communicate with other systems or components). Also see digital systems.
data (AC)	In Digital Technologies, discrete representation of information using number codes. *Data* may include: • characters (for example, alphabetic letters, numbers and symbols) • images, sounds and/or • instructions that, when represented by number codes, can be manipulated, stored and communicated by digital systems. For example, characters may be represented using *ASCII* code or images may be represented by a bit map of numbers representing each 'dot' or pixel.
data collection, representation and interpretation	Data collection, representation and interpretation are key concepts in Digital Technologies. The data concepts focus on the properties of data, how they are collected and represented and how they are interpreted to produce information. • Data collection describes the numerical, categorical and textual facts measured, collected or calculated as the basis for creating information and its binary representation in digital systems. • Data representation describes how data are represented and structured symbolically for storage and communication, by people and digital systems. • Data interpretation describes the processes of extracting meaning from data. These concepts in Digital Technologies build on a corresponding Statistics and Probability strand in the Mathematics curriculum.
designing (AC)	In Design and Technologies, a process that typically involves investigating and defining; generating; producing and implementing; evaluating; and collaborating and managing to create a designed solution. In Digital Technologies, one step in a four-stage process of defining, designing, implementing and evaluating to create a digital solution.
designed solution	A tool, product, process or system that has been designed for a specific

<table>
<tr><td></td><td>purpose or to solve a problem. Examples in different technologies contexts include

<table><tr><th>Digital Technologies</th><th>Food specialisations</th><th>Food and Fibre Production</th><th>Materials Specialisations</th><th>Engineering principles and systems</th></tr><tr><td>- Phones

- Printers

- Cameras

- Multimedia presentations

- Digital tablets

- Digital games

- Microphone

- jelly bean switch</td><td>- Sandwich

- Fruit salad

- Kitchen utensils</td><td>- Food products from the garden

- Garden tools

- Procedure for watering and mulching a garden</td><td>- Designing a birthday card</td><td>- toys

- familiar objects

- parks, gardens, playgrounds</td></tr></table></td></tr>
<tr><td>digital system (AC)</td><td>Digital hardware and software components (internal and external) used to transform data into a digital solution. When digital systems are connected, they form a network. For example:

• a smartphone is a digital system that has software (apps, an operating system), input components (for example, touch screen, keyboard, camera and microphone), output components (for example, screen and speakers), memory components (for example, silicon chips, solid state drives), communication components (for example, SIM card, Wi-Fi, bluetooth or mobile network antennas), and a processor made up of one or more silicon chips.

• a desktop computer with specific software and hardware components for dairy farming. The computer is connected via cables to milking equipment and via Wi-Fi to sensors that read tags on the cows. Through these hardware components the software records how much milk each cow provides. Such systems can also algorithmically control attaching milking equipment to each cow, providing feed and opening gates.</td></tr>
<tr><td>equipment (AC)</td><td>Items needed for carrying out specific jobs, activities, functions or processes.</td></tr>
</table>

	For example, a bench hook is used to hold a piece of wood when making a straight cut across it; a tailor's chalk is used to make marks on fabric to show details of the location and type of construction; a soldering iron is used to solder components to a printed circuit board; scales are used to accurately weigh ingredients for a cake or feed for domestic animals.
environment (AC)	One of the outputs of technologies processes and/or a place or space in which technologies processes operate. An environment may be natural, managed, constructed or digital.
familiar	Previously encountered in prior learning activities.
features (AC)	In Design and Technologies, distinctive attributes, characteristics, properties and qualities of an object, material, living thing, system or event.
fibre (AC)	In food and fibre production, plant- or animal-based materials that can be used for clothing or construction. Fibre includes materials from forestry. Animal-based (protein) fibres include wool and silk. Plant-based (cellulosic) fibres include cotton, bamboo, hemp, timber and wood chip.
food and fibre production (AC)	A process of producing food or fibre as natural materials for the design and development of a range of products.
healthy eating (AC)	Dietary patterns that aim to promote health and wellbeing, including types and amounts of foods and food groups that reduce the risk of diet-related conditions and chronic disease (National Health and Medical Research Council 2013).
home	For the purposes of this course "home" can refer to (for example) a private residence, a shared residence, a student hostel, supported living accommodation or a group home.
producing (AC)	Actively realising (making) designed solutions, using appropriate resources and means of production.
product (AC)	One of the outputs of technologies processes, the end result of processes and production. Products are the tangible end results of natural, human, mechanical, manufacturing, electronic or digital processes to meet a need or want.
resources (AC)	In Design and Technologies, this includes technologies, energy, time, finance and human input.
sustainable (AC)	Supporting the needs of the present without compromising the ability of future generations to support their needs.
system (AC)	A structure, properties, behaviour and interactivity of people and components (inputs, processes and outputs) within and between natural, managed,

	constructed and digital environments.
technologies (AC)	Materials, data, systems, components, tools and equipment used to create solutions for identified needs and opportunities, and the knowledge, understanding and skills used by people involved in the selection and use of these.

Appendix 3

APPENDIX 3 – COURSE RELATIONSHIP TO THE AUSTRALIAN CURRICULUM GENERAL CAPABILITIES

Literacy

This course provides many opportunities to develop literacy. Learners may experience and learn vocabulary specific to technologies, interact with a variety of visual and multimodal texts to develop understanding through listening, reading and viewing. Learners may also begin to compose texts through speaking, drawing and creating with or without assistive technologies.

Numeracy

This course provides opportunities for learners to experience and start to develop underpinning concepts for all six of the elements of the Numeracy general capability.

While creating designed solutions, learners develop skills and understanding in the concepts underpinning the numeracy elements of:

- estimating and calculating with whole numbers
- using measurement
- using fractions
- using spatial reasoning.

When creating digital solutions, learners collect, sort and represent data which lays foundations for the numeracy elements of:

- estimating and calculating with whole numbers
- recognising and using patterns and relationships
- interpreting statistical information.

ICT

Preliminary Technologies builds on the Australian Curriculum ICT general capability. The ICT capability is about being able to use ICT effectively and know which ICTs to select for specific tasks. It also involves learning about safe and effective use. The ICT capability is developed through the learning areas, including technologies. In Design and Technologies, the ICT capability is developed through learners
Digital Technologies is about understanding how those ICTs actually work, learning a literacy in coding which underpins being able to create technology and learning about digital systems: hardware and software. It also emphasises a way of thinking that is important to creating solutions.

Critical and Creative Thinking
Preliminary Technologies offers opportunities to develop this capability through design processes: investigating and defining; generating and designing ideas, possibilities and actions; identifying exploring and organising information and ideas; reflecting on processes; and evaluating designed solutions including digital solutions.

Personal and Social Capability

Personal and social capability elements of self-management, self-awareness, social management and social awareness may be developed through the *Preliminary Technologies* sub-strand of Technologies and society, and through the design processes when working with others.

Intercultural Understanding

Preliminary technologies offers opportunities to develop this capability through experiencing technologies from other cultures. Learners may recognise other cultures, develop respect, and interact and empathise with others. Aboriginal and Torres Strait Islander cultures are a natural source of focus as are other cultures represented within the cohort. In particular, the elective units that focus on specific technologies contexts, offer specific opportunities that include but are not limited to:

- food specialisations – experiencing foods from Aboriginal and Torres Strait Islander cultures, Asian and other cultures
- food and fibre production – growing herbs and vegetables used in Asian cooking; producing fibres used by Aboriginal and Torres Strait Islander cultures, for example, kelp
- materials specialisations and technologies – experiencing day to day utensils and tools used in Aboriginal and Torres Strait Islander, Asian and other cultures, and the design and production processes involved in making them
- engineering principles and systems – experiencing everyday objects from Aboriginal, Torres Strait Islander, Asian and other cultures and how movement, light or sound are made with them.

Appendix 4

APPENDIX 4 – COURSE RELATIONSHIP TO THE AUSTRALIAN CURRICULUM CROSS CURRICULUM PRIORITIES

Aboriginal and Torres Strait Islander histories and cultures

Preliminary Technologies provides opportunities for Aboriginal and Torres Strait Islander learners to celebrate their identities and cultures by learning with materials and technologies that are commonly used in their culture. The inclusion of materials and technologies from Aboriginal and Torres Strait Islander cultures may assist all learners to engage in reconciliation, respect and recognition of the world's oldest continuous living cultures. Refer to specific examples provided above for the Intercultural Understanding general capability.

Asia and Australia's engagement with Asia

Preliminary Technologies provides learners with opportunities to learn about and recognise the diversity within and between the countries of the Asian region. The technologies contexts of Food specialisations and Food and Fibre production, offer many opportunities to learn about the contribution Asian cultures to the food grown, prepared, cooked and consumed in Australia. In the technology context of materials specialisations, Asian designed solutions and their production could be part of learners' range of learning experiences, for example origami objects, a range of fans, chopsticks.

Sustainability

Preliminary Technologies is rich in opportunities to begin to develop the key concepts of sustainability – systems, world views and futures. Learners can experience and help design systems such as composting, worm farming or watering systems. Learners can experience a diversity of views and values when co-actively considering design decisions. Learners can learn to re-use and recycle materials when designing solutions, beginning to understand the finiteness of resources and considering the future.

Line Of Sight

Learning Outcome	Criterion	Content	Criterion and elements
recognise that technology impacts in everyday life	Criterion 1 Respond to designed solutions to meet personal and community needs	Stage 1 Unit 1 Stage 2 Unit 1 Stage 3 Unit 1 Stage 4 Unit 1	C1 all elements
safely use technologies, including tools, equipment and digital systems	Criterion 1 Respond to designed solutions to meet personal and community needs Criterion 2 Create designed solutions	Stage 1 all units Stage 2 all units Stage 3 all units Stage 4 all units	C1 all elements C2 element 4 C3 element 2
identify design challenges in practical situations	Criterion 2 Create designed solutions.	Stage 1 Unit 2 Stage 2 Unit 2 Stage 3 Unit 2 Stage 4 Unit 2	C2 all elements
use design processes in practical situations	Criterion 2 Create designed solutions Criterion 3 Create digital solutions to meet personal needs	Stage 1 Units 3-6 Stage 2 Units 3-6 Stage 3 Units 3-6 Stage 4 Units 3-6	C2 all elements C3 all elements

Supporting documents including external assessment material

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