Digital Technologies

LEVEL 2	15 TCE CREDIT POINTS
COURSE CODE	DGT215124
COURSE SPAN	2024 — 2028
READING AND WRITING STANDARD	NO
MATHEMATICS STANDARD	NO
COMPUTERS AND INTERNET STANDARD	YES

This course is current for 2024.

The Digital Technologies Level 2 course introduces learners to digital systems, security, user design and programming.

Course Description

The Digital Technologies Level 2 course introduces learners to digital systems, security, user design and programming. There is a focus on the interactions and impacts of digital technology in today's world.

In this course learners will: develop programming skills in making apps or games or in programming machines such as robots and drones; undertake a project or a series of small projects focused on user design; develop skills in critical, creative, computational and algorithmic thinking; work individually and collaboratively to solve problems; use real-world project management and problem-solving skills; learn how to apply 'safe by design' principles; apply science, technology, engineering and mathematics (STEM) knowledge and competencies to investigate an existing challenge or need; investigate ethical issues such as privacy and security in the digital world.

Digital Technologies Level 2 is a foundation course suitable for learners with an interest in technology. This course builds highly desirable digital skills, knowledge and understanding that can be applied in a wide range of future learning and workplace contexts. It also provides the foundation for those interested in pursuing vocational education or Level 3 courses in Technology fields.

Focus Area

Transdisciplinary projects courses require learners to integrate, transfer and reflect on their prior knowledge, skills, attitudes and values in transdisciplinary ways. Learners will engage critically and creatively to integrate the learning and ways of working from multiple disciplines. Learners will produce outcomes that are only possible through the intersection between disciplines. Learners will share the outcomes of Transdisciplinary projects as appropriate to their methodology and their exhibition of work will form a major element of their assessment. Learners will reflect upon their learning by evaluating their project outputs, the effectiveness of their methodology and the implications of their work on the pre-existing body of knowledge.

Transdisciplinary projects courses have three key features that guide teaching and learning:

- engage and ideate
- connect and apply
- exhibit and reflect.

Figure 1: Transdisciplinary project cycle of learning adapted from OECD Learning Compass 2030

In this course learners will do this by:

- practically exploring digital technologies and connecting theory to preferred futures (visions for the future enabled by considered design decisions taking into account diversity; ethics; and economic, environmental and social sustainability factors)
- developing transdisciplinary science, technology, engineering and mathematics (STEM) skills as they problem solve and create digital solutions
- communicating project processes and outcomes in a variety of ways and demonstrating enterprise skills and innovation.

Rationale

Digital technology skills are essential for life, study and work. In a world that is becoming more digitised and automated, it is critical to be able to ethically engage with information systems.

Technology courses help learners to understand and become innovative creators of digital solutions. This course supports Tasmanian learners to develop digital skills and dispositions needed for success in the 21st Century. *Digital Technologies* Level 2 empowers learners to:

- build a broad range of digital skills and knowledge
- use digital systems and services
- take part in life and work
- be ethical innovators and creators.

Digital Technologies Level 2 utilises project-based learning, making relevant cross-curricular connections. Learners can apply these to everyday life and in preparation for work or further study. The course takes a transdisciplinary STEM approach to practical inquiry. Learners implement programs and modify them using a high-level programming language. These contexts contribute to learners developing:

- an ability to develop, model, analyse, find and improve solutions to solve real-world problems
- practical skills in creative, critical, computational and algorithmic thinking and problem solving
- an awareness of the range of digital technology systems used in today's world
- skills to explore networking, data management and cyber security
- an understanding of how digital technology systems are used productively, creatively and safely
- skills to investigate legal, ethical, social, economic and environmental implications.

Digital Technologies Level 2 builds on the mandatory F-8 Australian Curriculum: Technologies: Digital Technologies. This course supports learners to build desirable digital skills for workplaces or further learning. *Digital Technologies* Level 2 also provides a base for more complex software development in preparation for Level 3 Technologies courses.

The purpose of Years 9 to 12 Education is to enable all learners to achieve their potential through Years 9–12 and beyond in further study, training or employment.

Years 9–12 Education enables personal empowerment, cultural transmission, preparation for citizenship and preparation for work.

This course is built on the principles of access, agency, excellence, balance, support and achievement as part of a range of programs that enables learners to access a diverse and flexible range of learning opportunities suited to their level of readiness, interests and aspirations.

Learning Outcomes

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

1. apply knowledge and understanding of networked digital systems
2. apply computational thinking to identify and analyse relationships in data sets
3. decompose real world problems and evaluate existing solutions to inform the development or modification of digital solutions
4. communicate digital technology processes and concepts
5. use functions and features of digital tools to plan, collaborate on and manage agile projects
6. describe how digital systems manage, control and secure access to data including protection of user information and identify cyber security threats
7. design, validate and implement algorithms
8. design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability and aesthetics

Pathways

Digital Technologies Level 2 is designed as a foundational computing course that builds on learners' prior knowledge and skills from Years F-8 in the Australian Curriculum: Technologies – Digital Technologies.

The study of *Digital Technologies* Level 2 may provide the background and support for vocational programs within training packages where some digital technologies knowledge and experience is of benefit. This course builds foundational knowledge and skills that may be appropriate for entry to Vocational Education and Training (VET) programs, traineeships and apprenticeships. This course also provides pathways to Level 3 Office of TASC-accredited Technologies courses.

Digital Technologies Level 2 complements study in a range of disciplines across the curriculum including Science, Technology, Engineering, Mathematics and Business.

Integration of General Capabilities and Cross-curriculum Priorities

The general capabilities addressed specifically in this course are:

- Critical and creative thinking
- Digital literacy
- Ethical understanding
- Numeracy
- Personal and social capability.

The cross-curriculum priorities enabled through this course are:

- Sustainability.

Course Size And Complexity

This course has a complexity level of 2.

For a full description of courses at a complexity level of 2, please refer to the Levels of Complexity - Tasmanian Senior Secondary Education document.

This course has a size value of 15. Upon successful completion of this course (i.e., a Preliminary Achievement (PA) award or higher), a learner will gain 15 credit points at Level 2 towards the Participation Standard of the Tasmanian Certificate of Education (TCE).

Course Structure

This course consists of three 50-hour modules.

Module 1: Digital systems and security

Module 2: User design and programming

Module 3: Interactions and impacts.

Course Delivery

There is no specific recommended delivery sequence for the modules.

Access

This course requires learners to collaborate, which could include collaboration with peers, community members and industry professionals.

This course prescribes general-purpose programming, also known as text-based programming. Providers may select a single programming language for course delivery or expose learners to various programming languages to purpose-design digital solutions to solve specific problems. Examples of general-purpose languages include Python, JavaScript, C#, C++, Java, Ruby and Visual Basic. The selected programming language or languages must enable learners to meet the learning outcomes and standards outlined in the course.

Previously submitted work cannot be used in meeting the requirements of *Digital Technologies* Level 2. Therefore, a learner cannot use work including, but not limited to, an independent study, folio, project or assignment that has already been presented for assessment for a previously or concurrently studied Office of TASC-accredited or recognised senior secondary course.

Resource requirements

Learners require access to the following resources to be able to demonstrate the outcomes:

- appropriate internet connected laptop, notebook or desktop computers
- a range of peripheral devices, including printers, scanners, cameras, microphones and speakers
- a range of software tools to enable the provider to address the outcomes of the course, this may include:
    - spreadsheet software
    - word processing software
    - presentation software
    - multimedia software
    - personal communication software
    - collaborative management software
    - browser software
    - web authoring software.

Module 1: Digital systems and security

Learners will strengthen their understanding of networked digital systems enabling them to gain skills as users and developers of digital technologies. They will develop capabilities such as critical and creative thinking, collaboration, problem-solving and ethical decision making. This occurs alongside skill development in digital literacy, innovation and design thinking as they undertake inquiry-based processes and projects. Learners will use real-world problem-solving applying contemporary STEM skills to investigate an existing challenge or need. This practical approach of applying skills to projects and processes forms the way of working throughout this course.

Module 1 learning outcomes

The following learning outcomes are a focus for this module:

1. apply knowledge and understanding of networked digital systems
2. apply computational thinking to identify and analyse relationships in data sets
3. decompose real world problems and evaluate existing solutions to inform the development or modification of digital solutions
4. communicate digital technology processes and concepts
5. use functions and features of digital tools to plan, collaborate on and manage agile projects
6. describe how digital systems manage, control and secure access to data including protection of user information and identify cyber security threats.

Module 1 content

Learners understand that data is information stored in digital form. It is also a driver of innovation and technologies, such as artificial intelligence (AI). They will understand the role of data in digital information systems and the importance of safeguarding data against threats and risks. Learners consider data security from personal and organisational perspectives. They will use data to inform decision making, using basic data science processes to collect, clean, analyse, model and visualise data.

Key knowledge and skills

Digital Technologies 2 is an applied course and the acquisition of knowledge and skills are highly interrelated. Learners will apply a practical and project-based approach to their learning. They will explore the following topics to develop understanding and skills related to concepts in digital technologies:

Digital systems

- use software programs suitable for the task; for example, word processing, spreadsheets, databases, desktop publishing and presentation software
- identify and use appropriate hardware
- identify components of networked digital systems and their functions
- develop understanding of basic cloud computing concepts

Data

- define and compare data with information
- describe characteristics of quality data and information
- understand data:

    - sources and types
    - representation
    - transmission and storage
- understand and apply basic techniques and methodologies for collecting, acquiring, managing and analysing data including using spreadsheets and databases.

Privacy and security

- understand basic concepts of:
    - ethical and legal implications surrounding the collection, storage, use and security of data
    - ethical hacking
    - digital citizenship
    - cyber security and privacy principles

Process and production

- understand and apply:
    - digital literacy skills to research ideas and consider alternatives
    - mathematical skills to extract, interpret and model data sets
    - numeracy skills to identify patterns and trends; for example, social, economic, environmental and scientific
    - design thinking: empathise and understand needs, opportunities and problems; generate, iterate and represent innovative, user-centred ideas; and analyse those ideas
    - technologies process and production skills to safely create solutions for a range of purposes:
        - investigating and defining
        - generating and designing
        - producing and implementing
        - evaluating
- collaborating and managing
    - skills to communicate ideas, processes and solutions including the use of correct terminology relating to digital systems, security and problem-solving processes

Project management, enterprise and innovation

- understand and apply:
    - basic agile project management techniques to efficiently plan, manage and complete projects to meet identified design criteria
    - basic enterprise skills and innovation to identify opportunities to take action and create change; follow through on initiatives; and generate new ideas, processes and solutions

Designing for safety and equity

- understand and apply:
    - ethical practices:
        - socially responsible principles when collaborating with others and creating, sharing and using technologies
        - safe and ethical procedures for investigating and working with people and data
        - rights and responsibilities of others and their responsibilities in using sustainable practices that protect the planet and its life forms

    - consider their own roles and responsibilities as discerning citizens and learn to detect bias and inaccuracies
    - understanding the protection of data, intellectual property and individual privacy helps learners to be respectful creators

Module 1 work requirements summary

This module includes the following work requirements:

- one multimodal short response on privacy and security
- one extended response regarding networked digital systems
- one project about data solutions.

See Appendix 3 for the full specifications of the work requirements of this course.

Module 1 assessment

This module has a focus on criteria 1, 2, 3, 4, 5 and 6.

Module 2: User design and programming

Learners explore iterative software development processes to gain an understanding of computer coding pathways. They develop programming skills using a general-purpose programming language to explore problems and investigate possible solutions. Learners will make apps or games or program machines, such as robots and drones. They consider their responsibilities as software designers and act creatively, safely and ethically when responding to authentic learning challenges.

Module 2 learning outcomes

The following learning outcomes are a focus for this module:

1. apply knowledge and understanding of networked digital systems
2. apply computational thinking to identify and analyse relationships in data sets
3. decompose real world problems and evaluate existing solutions to inform the development or modification of digital solutions
4. communicate digital technology processes and concepts
5. use functions and features of digital tools to plan, collaborate on and manage agile projects
7. design, validate and implement algorithms.

Module 2 content

Learners develop the computational skills to decompose problems and design possible solutions using algorithms. They will represent algorithms as flowcharts and in pseudocode. Learners will then implement their algorithms using a suitable programming language. They will also be introduced to the way programs are constructed to develop fluency when using a general programming language.

Key knowledge and skills

Digital Technologies 2 is an applied course and the acquisition of knowledge and skills are highly interrelated. Learners will apply a practical and project-based approach to their learning. They will explore the following topics to develop understanding and skills related to concepts in process and production:

Process and production: investigating and defining

- define and decompose real-world problems with design criteria
- identify the factors that impact problem solving, such as functional and non-functional requirements
- use computational thinking processes: decomposition, pattern recognition, abstraction and algorithms
- use algorithmic thinking: describe and follow a sequence of steps and decisions needed to solve problems

Process and production: generating and designing

- design algorithms involving logical operators and represent them as flowcharts and pseudocode
- validate simple algorithms and programs by comparing their output against a range of test cases
- interview stakeholders to create user stories
- design and prototype the user experience of a digital system

Process and production: producing and implementing
Learners will understand and apply:

- basic programming concepts and documentation:
  - input, process and output
  - functions
  - assignment statements
  - variables
  - constants
- the basic function of an appropriate programming language
- understand basic features and elements of a graphical user interface (GUI)
- how data is represented and structured for storage and communication by people and in digital systems; for example, text, binary, images and audio data
- code algorithms using a given language syntax
- implement, modify and debug simple programs, applying selected algorithms and data structures
- concepts of user interface (UI) and user experience (UX)

Privacy and security

- understand basic cryptography and modern encryption methods for transmitting data securely
- encode data using simple cyphers
- use public and private key cryptography concepts to simulate the encryption and decryption of data

Module 2 work requirements summary

This module includes the following work requirements:

- one collection of short responses on algorithms
- one folio documenting programming solutions.

See Appendix 3 for the full specifications of the work requirements of this course.

Module 2 assessment

This module has a focus on criteria 1, 2, 3, 4, 5 and 7.

Module 3: Interactions and impacts

Learners further develop their computational thinking, problem solving, design thinking, programming and data analysis skills through structured projects. Learners think systematically about the interactions and interconnections between people and components. This includes the inputs, processes and outputs within and between natural, managed, constructed and digital environments.

Module 3 learning outcomes

The following learning outcomes are a focus for this module:

1. apply knowledge and understanding of networked digital systems
2. apply computational thinking to identify and analyse relationships in data sets
3. decompose real world problems and evaluate existing solutions to inform the development or modification of digital solutions
4. communicate digital technology processes and concepts
5. use functions and features of digital tools to plan, collaborate on and manage agile projects
8. design the user experience of a digital system by evaluating alternative designs against criteria including functionality, accessibility, usability and aesthetics.

Module 3 content

Learners continue to develop their skill set with a focus on user-centred design. They explore existing, new and emerging technologies to consider the global social impacts associated with digital technologies and solutions. This includes a focus on economic, environmental and social sustainability, as well as purposeful and inclusive design.

Key knowledge and skills

Digital Technologies 2 is an applied course and the acquisition of knowledge and skills are highly interrelated. Learners will apply a practical and project-based approach. They will explore the following topics to develop understanding and skills related to concepts on safety, process and production and project management:

Designing for safety and equity

- learn and apply Safety by Design principles†
- learn and apply Universal Design concepts‡
- understanding of design for the life cycle
- demonstrate ethical, responsible, inclusive and safe design processes
- demonstrate appropriate use of technology, including digital citizenship, etiquette and literacy
- understand implications of copyright and intellectual property and apply academic integrity

† The Safety by Design Vision for Young People is available from the Australian Government eSafety Commissioner website.
‡ Universal Design information is available from the Centre for Universal Design Australia website.

Process and production: investigating, generating and designing

- understand and apply iterative problem-solving and design processes

- understand user-centred design (UCD) including usability, visual design and accessibility that includes:
    - a clear understanding of user and task requirements
    - incorporation of user feedback in development, testing and evaluation
    - iterative design processes.
- use UCD tools including personas, scenarios and use cases
- understand digital user experience (DUX) including design, navigability, performance and efficiency

Process and production: producing and implementing

- design and prototype the user experience of a simple digital system
- use design tools that will inform design choices; for example, include diagrams, graphical tools, mood boards, narratives, wireframes, storyboards, videos and pseudocode

Process and production: evaluating

- understand methods for evaluating a digital solution including peer, self and target audience
- evaluate existing and learner solutions against design criteria, user stories, possible future impact and opportunities for enterprise
- investigate past, new and emerging digital technologies and identify the legal, ethical, social, economic and environmental impacts

Project management, enterprise and innovation

- develop innovation and enterprise skills and mindsets relating to digital solutions
- understand basic contemporary project management strategies, including tools to plan and manage individual and collaborative agile projects, accounting for risks and
- responsibilities
- use collaborative practices such as online and face-to-face
- investigate concepts of branding and digital marketing
- select and use emerging digital tools to create and communicate interactive content for a diverse audience.

Module 3 work requirements summary

This module includes the following work requirements:

- one extended response on the impact of digital technologies on individuals and society
- one product and presentation on user-centred design.

See Appendix 3 for the full specifications of the work requirements of this course.

Module 3 assessment

This module has a focus on criteria 1, 2, 3, 4, 5 and 8.

Assessment

Criterion-based assessment is a form of outcomes assessment that identifies the extent of learner achievement at an appropriate endpoint 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. Therefore, assessment for summative reporting to the Office of TASC will focus on what both teacher and learner understand to reflect endpoint achievement.

The standard of achievement each learner attains on each criterion is recorded as a rating 'A', 'B', or 'C', according to the outcomes specified in the standards section of the course.

A 't' notation must be used where a learner demonstrates any achievement against a criterion less than the standard specified for the 'C' rating.

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

Assessment of all criteria will be made by the provider. Providers will report the learner's rating for each criterion to the Office of TASC.

Quality Assurance Process

Each provider will submit bodies of learners' work sufficient to allow an assessment against a nominated range of criteria and the overall award to an annual review meeting organised by the Office of TASC. The work, while not necessarily be fully resolved, will be assessed by the provider against the range of nominated assessment criteria and the overall award. The Office of TASC will give each provider guidance regarding the selection of learners and the nominated criteria.

Each body of work that providers submit to the meeting will include sufficient and appropriate material for judgements to be made about the learner's standard of literacy skills. The review meeting will give advice regarding the provider's interpretation and application of the selected criteria's standards to the evidence of student work. Providers are expected to act on this advice.

The Office of TASC may require providers to supply further samples of individual learners' work to determine that standards have been applied appropriately and/or undertake audits. The nature and scope of such requirements will be risk-based.

Additionally, the Office of TASC may select to undertake scheduled audits of this course (Provider Standards 1, 2, 3 & 4), and of work requirements.

Criteria

The assessment for *Digital Technologies* Level 2 will be based on the degree to which the learner can:

1. describe and use common computer software and hardware
2. collect, analyse and model data for a defined purpose
3. design, create and assess digital solutions to meet an identified need
4. communicate knowledge and information about digital technologies
5. use digital tools to create content, plan, collaborate and manage projects
6. describe how privacy and security issues are mitigated in digital systems
7. apply basic programming skills to create a digital solution
8. design and create digital solutions that consider user experience.

	Module 1	**Module 2**	**Module 3**
Criteria focus	1,2,3,4,5,6	1,2,3,4,5,7	1,2,3,4,5,8

Standards

Criterion 1: describe and use common computer software and hardware

Criterion elements	Rating A	Rating B	Rating C
E01 – Hardware	selects and explains functions of hardware components for specific purposes	selects and describes functions of hardware components for a purpose	identifies and describes functions of hardware components
E02 – Software	selects and uses a range of appropriate computer software to complete tasks	selects from a given range and uses computer software to complete tasks	uses a given range of computer software as directed to complete tasks
E03 – Data integrity and availability	describes and applies data management strategies ǂ	identifies and applies data management strategies ǂ	uses given data management strategies ǂ
E04 – Networks	explains how hardware and software manage, control and secure access to data in networked digital systems.	describes how hardware and software manage, control and secure access to data in networked digital systems.	identifies how hardware and software manage, control and secure access to data in networked digital systems.

ǂ data management strategies may include backing up data, removing duplicate data, access controls and an audit trail such as using version control.

Criterion 2: collect, analyse and model data for a defined purpose

Criterion elements	Rating A	Rating B	Rating C
E1 – Acquire data	selects and applies a range of basic and some more complex data collection techniques	selects and applies a range of basic data collection techniques	selects and applies a limited range of basic data collection techniques
E2 – Data and information	explains factors affecting the quality of data information	describes factors affecting the quality of data information	identifies characteristics of quality information and data
E3 – Visualise data	selects and applies a range of appropriate data visualisation methods	selects and applies a range of basic data visualisation methods	selects and applies a limited range of basic data visualisation methods
E4 – Analyse data	selects and applies a range of appropriate data analysis techniques.	selects and applies a range of basic data analysis techniques.	selects and applies a limited range of basic data analysis techniques

Criterion 3: design, create and assess digital solutions to meet an identified need

Criterion elements	Rating A	Rating B	Rating C
E1 – Investigate and define	selects and uses a range of targeted user-centred research techniques to identify needs and constraints in response to a problem or challenge	selects and uses a range of simple user-centred research techniques to identify needs and constraints in response to a problem or challenge	uses simple research techniques as directed, to identify a limited range of needs and constraints in response to a problem or challenge
E2 – Generate and design	applies critical and creative thinking strategies to generate and document ideas and present possible solutions that effectively meet most of the identified requirements for a digital solution to a problem	applies critical and creative thinking strategies to generate and document ideas and present possible solutions that meet some of the identified requirements for a digital solution to a problem	applies given critical and creative thinking strategies to generate and document ideas and possible digital solutions to a problem
E3 – Produce and implement	produces, tests and refines a prototype that could solve a relevant problem and meets most of the identified requirements for a digital solution to a problem	produces, tests and modifies a prototype that could solve a relevant problem and meets some of the identified requirements for a digital solution to a problem	produces and tests a prototype that could solve a relevant problem
E4 – Evaluate	assesses the suitability and appropriateness of a solution using design criteria and describes suggestions for future improvement.	describes the suitability and appropriateness of a solution using design criteria.	identifies the suitability and appropriateness of a solution using design criteria.

Criterion 4: communicate knowledge and information about digital technologies

Criterion elements	Rating A	Rating B	Rating C
E1 – Documents ideas and solutions	clearly and effectively communicates ideas and information using a logical structure, in multimodal format, using selected digital technologies to support, elaborate and enhance meaning	clearly communicates ideas and information using a logical structure, in multimodal format, using selected digital technologies to support, elaborate or enhance meaning	communicates ideas and information in multimodal format, using provided digital technologies to support, elaborate or enhance meaning
E2 – Academic integrity	selects and uses appropriate referencing and citation methods to identify sources correctly	selects and uses referencing and citation methods to identify sources: there may be errors	uses given referencing and citation methods as directed: there may be errors
E3 – Reflective skills	reflects† on learning and performance, including planning and time management, suggests and makes modifications for improvement.	reflects† on learning and performance, including planning and time management, suggests and makes minor modifications for improvement.	reflects† on learning and performance, including planning and time management and makes minor modifications as directed.

† reflects: encompasses work presented orally, or in writing, or both

Criterion 5: use digital tools to create content, plan, collaborate and manage projects

Criterion elements	Rating A	Rating B	Rating C
E1 – Organisational skills	uses a range of planning and self-management strategies to enable the effective completion of tasks within agreed timeframes	uses planning strategies to facilitate successful completion of tasks within agreed timeframes	uses given planning strategies to facilitate completion of elements in tasks within agreed timeframes
E2 – Collaborative tools	connects, communicates and collaborates with others using a wide range of digital tools	connects, communicates and collaborates with others using a range of digital tools	connects, communicates and collaborates with others as directed
E3 – Project management	selects and uses a range of project management tools to manage agile projects accounting for relevant risks and responsibilities.	selects and uses from a given range of simple project management tools to manage agile projects accounting for risks and responsibilities.	uses given simple project management tools to manage agile projects as directed.

Criterion 6: describe how privacy and security issues are mitigated in digital systems

Criterion elements	Rating A	Rating B	Rating C
E1 – Digital citizenship	explains and applies strategies to mitigate potential negative impacts of digital and/or online activity	describes and applies strategies to mitigate potential negative impacts of digital and/or online activity	identifies strategies to mitigate potential negative impacts of digital and/or online activity
E2 – Cybersecurity	explains types of cybersecurity threats and describes protective strategies	describes types of cybersecurity threats and identifies protective strategies	identifies, from a given range, common types of cybersecurity threats and vulnerabilities
E3 – Protection of user information	explains how user information should be protected referring to privacy principles	describes how user information should be protected referring to privacy principles	identifies how user information should be protected referring to privacy principles
E4 – Legal and ethical considerations	explains a range of legal and ethical issues associated with big data.	identifies and describes a range of legal and ethical issues associated with big data.	identifies a limited range of legal and ethical issues associated with big data.

Criterion 7: apply basic programming skills to create a digital solution

Criterion elements	Rating A	Rating B	Rating C
E1 – Computational thinking	explains and applies computational thinking skills to explore complex problems and possible solutions	describes and applies computational thinking skills to explore problems and possible solutions	identifies and applies computational thinking skills to explore problems and possible solutions
E2 – Designing algorithms	designs algorithms involving nested control structures using flowcharts and/or pseudocode	designs algorithms involving branching and iteration using flowcharts and/or pseudocode	designs algorithms involving logical operators using flow charts and/or pseudocode
E3 – Testing algorithms	tests and traces algorithms and short programs applying simple error handling techniques to explain and correct errors	tests and traces simple algorithms and short programs to describe and correct errors	traces simple algorithms to predict output for a given input and to identify errors
E4 – Programming fundamentals	implements programs with a combination of functions and control structures that process structured data	implements programs or functions with control structures that generate or process sequenced data	creates program fragments involving conditions and branching that generate or process data
E5 – Programming application	designs and implements a complete program to solve a problem.	adds new functionality to an existing program to solve a problem.	modifies an existing program to solve a problem.

Criterion 8: design and create digital solutions that consider user experience

Criterion elements	Rating A	Rating B	Rating C
E1 – Existing, new and emerging technologies	explains the impact of using existing, new and emerging digital technologies on society	describes the impact of using existing, new and emerging digital technologies on society	identifies the impact of using existing, new and emerging digital technologies on society
E2 – User-experience (UX)	explains and effectively applies principles of UX design when developing digital solutions	describes and applies principles of UX design when developing digital solutions	identifies and applies given principles of UX design when developing digital solutions
E3 – Safe by design	explains and applies safe by design principles when developing digital solutions	describes and applies safe by design principles when developing digital solutions	identifies and applies safe by design principles when developing digital solutions
E4 – Creation of content	selects and uses emerging digital tools and advanced features to create and communicate interactive content for a diverse audience.	selects and uses emerging digital tools to create and communicate interactive content for a diverse audience.	uses basic features of emerging digital tools to create and communicate interactive content for a specific audience.

Qualifications Available

Digital Technologies Level 2 (with the award of):

EXCEPTIONAL ACHIEVEMENT

HIGH ACHIEVEMENT

COMMENDABLE ACHIEVEMENT

SATISFACTORY ACHIEVEMENT

PRELIMINARY ACHIEVEMENT

Award Requirements

The final award will be determined by the Office of TASC from 8 ratings.

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

EXCEPTIONAL ACHIEVEMENT (EA)
6 'A' ratings, 2 'B' ratings

HIGH ACHIEVEMENT (HA)
3 'A' ratings, 4 'B' ratings, 1 'C' rating

COMMENDABLE ACHIEVEMENT (CA)
4 'B' ratings, 3 'C' ratings

SATISFACTORY ACHIEVEMENT (SA)
6 'C' ratings

PRELIMINARY ACHIEVEMENT (PA)
4 'C' ratings

A learner who otherwise achieves the ratings for an SA (Satisfactory Achievement) award but who fails to show any evidence of achievement in one or more criteria ('z' notation) will be issued with a PA (Preliminary Achievement) award.

Course Evaluation

Years 9-12 Learning will develop and regularly review and revise the curriculum. Course evaluation is informed by the experience of the course's implementation, delivery and assessment. More information about course evaluation can be found on the Years 11 & 12 website.

Course Developer

This course has been developed by the Department for Education, Children and Young People's Years 9-12 Learning Unit in collaboration with Catholic Education Tasmania and Independent Schools Tasmania.

Accreditation

Accredited on 13 December 2022 for use from 1 January 2024 to 31 December 2028.

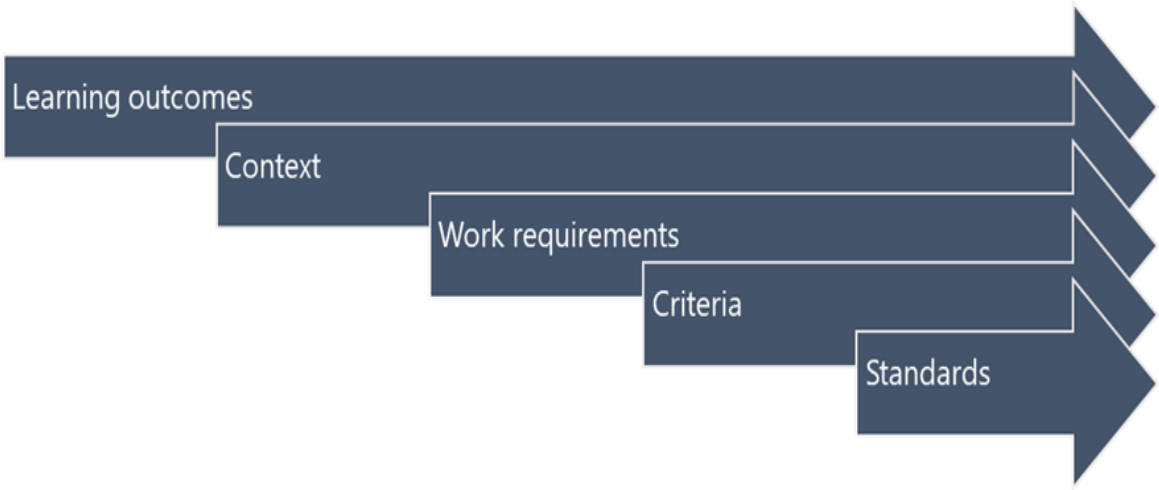
Version History

Version 1

Accredited on 13 December 2022 for use from 1 January 2024 to 31 December 2028.

Appendix 1 – Line of sight

Line of sight



Learning outcomes	Course content: module	Work requirements: module	Criterion	Criterion elements	General capabilities
1. **apply knowledge and understanding of networked digital systems**	1, 2, 3	1, 2, 3	1	1, 2, 3, 4	Critical and Creative Thinking; Digital Literacy; Ethical Understanding; Intercultural Understanding; Literacy; Numeracy; Personal and Social capability
2. **apply computational thinking to identify and analyse relationships in data sets**	1, 2, 3	1, 3	2	1, 2, 3, 4	Critical and Creative Thinking; Digital Literacy; Numeracy
3. **decompose real world problems and evaluate existing solutions to inform the**	1, 2, 3	1, 3	3	1, 2, 3, 4	Critical and Creative Thinking; Digital Literacy; Ethical Understanding; Numeracy

development or modification of digital solutions					
4. **communicate digital technology processes and concepts**	1, 2, 3	1, 2, 3	4	1, 2, 3	Critical and Creative Thinking; Digital Literacy; Ethical Understanding
5. **use functions and features of digital tools to plan, collaborate on and manage agile projects**	1, 2, 3	1, 2, 3	5	1, 2, 3	Critical and Creative Thinking; Digital Literacy; Personal and Social capability
6. **describe how digital systems manage, control and secure access to data including protection of user information and identify cyber security threats**	1	1, 3	6	1, 2, 3, 4	Critical and Creative Thinking; Digital Literacy; Ethical Understanding; Numeracy
7. **design, validate and implement algorithms**	2	2	7	1, 2, 3, 4, 5	Critical and Creative Thinking; Digital Literacy; Numeracy
8. **design the user experience of a digital system by evaluating alternative designs**	3	3	8	1, 2, 3, 4	Critical and Creative Thinking; Digital Literacy; Ethical Understanding; Intercultural Understanding;

against criteria including functionality, accessibility, usability and aesthetics					Personal and Social capability

Appendix 2 – Alignment to curriculum frameworks

Alignment to curriculum frameworks

- *Digital Technologies* Level 2 aligns with the *Draft of the Digital Literacy Skills Framework (April 2020)* at Level 3 in the following ways:
  - 3.12 Active awareness of self as a digital user in a range of familiar and some unfamiliar contexts
  - 3.13 Applies and experiments with digital tools and software in a range of familiar and some unfamiliar contexts.
- *Digital Technologies* Level 2 builds on Version 9 of the Australian Curriculum in:
  - Technologies: Years 9-10
  - General Capabilities - Digital Literacy Continuum
    - Practising digital safety and wellbeing
    - Investigating
    - Creating and exchanging
    - Managing and operating.

Work requirements

The work requirements of a course are processes, products or performances that provide a significant demonstration of achievement that is measurable against the course's standards. Work requirements are generally not the sole form of assessment for a module.

Module 1 work requirements specifications

Work requirement 1 of 3

Title of work requirement: Privacy and security

Mode or format: multimodal short response

Description: Learners investigate privacy and security and communicate key messages for reducing risk using a simulated social media story. Learners will create stories using a combination of images, text, recorded audio, video, animation or music, to create visually powerful, simple and impactful messages. Task requirements:

Target audience:

- teenagers
- mainly aged between 15 to 17
- primarily for Australians.

Content:

- cyberbullying
- digital footprint
- staying safe online.

Learners must plan and document their story. This must include:

- text, quotes or messages for each story slide
- images for each slide
- a short introduction for the story to use on the first post.

To produce their simulated posts, learners may use templates from a graphic design platform or use templates within presentation software such as Microsoft PowerPoint.

Size: a story of 5 simulated posts, 10 to 15 seconds each

Timing: approximately 3 hours of class time for research, planning and production

Relevant criteria:

- Criterion 1
- Criterion 3
- Criterion 4
- Criterion 5
- Criterion 6

Work requirement 2 of 3

Title of work requirement: Networked digital systems

Mode or format: extended response

Description: Learners investigate and explain the control and management of networked digital systems and the security implications of the interaction between hardware, software and users. Learners must compare two different networks. They identify and describe the purpose and components of the two different networks and select one and create a network topology for it. Learners describe the security features operating on the network and explain how data (text, image and audio) is kept secure. They describe possible upgrades that would improve the overall level of security and describe the implications of minimal or no security on the network and its devices.

Size: 250 to 500 words or multimodal equivalent

Relevant criteria:

- Criterion 1
- Criterion 4
- Criterion 5
- Criterion 6

Work requirement 3 of 3

Title of work requirement: Data solutions

Mode or format: project

Description: Given a scenario and access to relevant data sets, learners follow an inquiry process to acquire, store, organise and interpret data to answer provided questions and other learner initiated relevant questions of interest. Providers will supply relevant scenarios, data sets and initial questions. Question prompts maybe provided to scaffold learner developed questions.

Learners must:

- use relevant techniques to clean up data
- save, store and use CSV files
- use spreadsheeting software to sort and filter data, use conditional formatting, COUNTIF function and average function to help answer inquiry questions
- visualise data, that is charts, graphs and maps using appropriate software
- analyse data and look for patterns.

Learners must:

- document inquiry processes
- present data in an infographic
- summarise findings and recommendations.

Size: documentation of inquiry process: recommended maximum of 300 words or 2 minutes of recorded oral communication or equivalent in multimodal form

infographic: one single sided A3 page

Relevant criteria:

- Criterion 1
- Criterion 2
- Criterion 3
- Criterion 4
- Criterion 5

Module 2 work requirements specifications

Work requirement 1 of 2

Title of work requirement: Algorithms

Mode or format: short responses

Description: Learners will complete a series of connected short responses to investigate specific problems, opportunities or needs. Within the series of responses learners will demonstrate decomposition, pattern recognition, abstraction, modelling and simulation, algorithms and evaluation. This should include writing pseudocode, debugging teacher-provided pseudocode and creating test data for pseudocode.

Size: 4 to 6 hours of class time

Relevant criteria:

- Criterion 4
- Criterion 5
- Criterion 7

Work requirement 2 of 2

Title of work requirement: Programming solutions

Mode or format: folio

Description: Learners develop a series of small software solutions with accompanying explanations of specific aspects of the selected programming language.
Learners develop software solutions that demonstrate the use of:

- design tools, such as data dictionaries, mock-ups and pseudocode to design a software solution in response to a case study
- basic programming including:
    - input, process and output
    - functions
    - assignment statements
    - variables
    - constants
- data structures such as arrays and records and a description of the differences
- processing features of classes, functions, instructions, methods and control structures.

Learners identify and describe a range of techniques for evaluating a software solution in terms of whether it is efficient or effective.

The emphasis is on good programming practice, where students adhere to standards including good variable names, internal documentation and indenting.

Size: folio should contain between 5 and 8 small tasks with appropriate documentation

Timing: folio is developed throughout the 50-hour module

Relevant criteria:

- Criterion 1
- Criterion 4
- Criterion 5
- Criterion 7

Module 3 work requirements specifications

Work requirement 1 of 2

Title of work requirement: Impact of digital technologies on individuals and society

Mode or format: extended response

Description: Discuss the economic, environmental and social impacts, ethical, cultural and legal considerations and opportunities for organisational innovation relating to the proliferation of digital technologies in society.

Topics could include but are not limited to:

- artificial intelligence (AI)
- machine learning
- cloud computing
- internet of things (IoT)
- quantum computing
- blockchain
- data mining
- cryptocurrency.

Size: recommended maximum of 500 words or 3 minutes if oral or multimodal equivalent

Relevant criteria:

- Criterion 1
- Criterion 4
- Criterion 5
- Criterion 6
- Criterion 8

Work requirement 2 of 2

Title of work requirement: User-centred design

Mode or format: product and presentation

Description: Learners independently or collaboratively solve a simple problem. They use design and computational thinking skills and strategies to understand the requirements of the end-user, collect and analyse data, apply programming and program design skills and use a digital system to transform data into information.

The solution may be a product, prototype, or proof of concept. Where a prototype is produced, there should be enough programming present to clearly explain how the solution will produce an output.

The problem should be chosen by, and be of interest to, the learners in consultation with the provider.

The digital solution may include:

- a website
- a program
- an application
- wearable technology.

Learners evaluate the digital solution. The evaluation must include discussion about:

- a feature or features that could be considered innovative
- the effectiveness of the solution against design criteria
- issues with processes, production or management that impacted the effectiveness of the solution
- suggestions for further improvements

The digital solution may be undertaken individually or collaboratively. If working collaboratively, each learner presents an individual evaluation, including evidence of their contribution to the project and how they applied their collaborative skills.

The digital solution should be presented in digital or multimodal form and the evaluation should be presented in multimodal, oral or written form. The teacher may provide a template with guiding questions to support the learner to structure their evaluation.

Size: the evaluation should be a maximum of 3 minutes if oral, 500 words if written, or the equivalent if multimodal.

Relevant criteria:

- Criterion 1
- Criterion 2
- Criterion 3
- Criterion 4
- Criterion 5
- Criterion 8

General capabilities and cross-curriculum priorities

Learning across the curriculum content, including the cross-curriculum priorities and general capabilities, assists students to achieve the broad learning outcomes defined in the *Alice Springs (Mparntwe) Education Declaration (December 2019)*.

General capabilities

The general capabilities play a significant role in the Australian Curriculum in equipping young Australians to live and work successfully in the twenty-first century.

In the Australian Curriculum, capability encompasses knowledge, skills, behaviours and dispositions. Students develop capability when they apply knowledge and skills confidently, effectively and appropriately in complex and changing circumstances, in their learning at school and in their lives outside school.

The general capabilities include:

- Critical and creative thinking
- Digital literacy
- Ethical understanding
- Intercultural understanding
- Literacy
- Numeracy
- Personal and social capability.

Cross-curriculum priorities

Cross-curriculum priorities enable students to develop understanding about and address the contemporary issues they face, for their own benefit and for the benefit of Australia as a whole. The priorities provide national, regional and global dimensions which will enrich the curriculum through development of considered and focused content that fits naturally within learning areas. Incorporation of the priorities will encourage conversations between students, teachers and the wider community.

The cross-curriculum priorities include:

- Aboriginal and Torres Strait Islander histories and cultures
- Asia and Australia’s engagement with Asia
- Sustainability.

Glossary

Refer to the Australian Curriculum Technologies glossary (Version 8.4)

Advanced features

Functions and peripherals that exploit the capabilities of digital tools (hardware and software); for example, using a style sheet to automate formatting and a drone to capture field data.

Agile projects

An approach to completing projects that takes an iterative path rather than a linear one. It involves incremental improvement and continual evaluation and feedback from the users.

Big data

Big data is a term used to describe extremely large data sets that traditional database applications cannot deal with. Big data sets are often defined in terms of:

- Volume - refers to the amount of data
- Variety - refers to the number of types of data
- Velocity - refers to the speed of data processing as the incoming rate can be extremely high.

Cloud computing

The delivery of computing services—including servers, storage, databases, networking, software, analytics and intelligence—over the Internet or “the cloud”, to offer faster innovation, flexible resources and economies of scale.

Cybersecurity Principles

In Australia, guidance on best practice for cyber security is informed by the cyber security principles. These principles provide strategic guidance on how individuals and organisations can protect their systems and data from cyber threats. The cybersecurity principles are grouped into four key activities: govern, protect, detect and respond.

For more information about the cybersecurity principles visit the Australian Cyber Security Centre.

Debug

A systematic process that involves finding existing errors in a program such as identifying error messages in lines of code, fixing them and validating if the changes made are correct.

Ethical hacking

Ethical hacking is the practice of testing a computer system, network or application to find security vulnerabilities that could be exploited by malicious hackers.

Flowcharts

A diagrammatic representation of an algorithm. Steps and decisions are represented by specific-shaped symbols and arrows indicate sequence.

Networked digital systems

Digital systems connected via the internet or Bluetooth devices that allow data to be transmitted. The connection can be established via cables (wired) or without the use of cables (wireless).

Australian Privacy Principles

In Australia, guidance on best practice for privacy is informed by the Australian Privacy Principles, the cornerstone of the privacy protection framework in the Privacy Act 1988. For more information on Australian Privacy Principles visit the Office of the Australian Information Commissioner.

Project management tools

Software that supports the planning and tracking of projects. Project management tools provide visualisations of the workflow, timeframe and resources involved in completing a project.

Pseudocode

English language statements that describe the steps in an algorithm in a clear, unambiguous way. It can be easily translated into code using a programming language.

Real world problems

Problems that exist; they are authentic and not hypothetical or do not happen in fiction. They draw on actual events or situations and can possibly be solved through computation.

Test

A set of one or more test cases.

Test cases

Sets of specifications or conditions and expected results used to systematically test if software solutions satisfy design criteria.

Trace

The process of following an algorithm precisely to confirm it produces the expected output for a given input; for example, a trace table allows for the manual checking of any logical errors.

User Experience (UX)

A user's emotions and attitudes about a product, including how they interact and experience the product.

Visualise data

Process of presenting data in a summarised form to help with communication and analysis; for example, sorting and presenting data as a chart showing spending trends to help make financial decisions.