

Data Science and Digital Solutions

LEVEL 3	15 TCE CREDIT POINTS
COURSE CODE	DSD315124
COURSE SPAN	2024 — 2028
READING AND WRITING STANDARD	NO
MATHEMATICS STANDARD	NO
COMPUTERS AND INTERNET STANDARD	YES

This course was delivered in 2024. Use [A-Z Courses](#) to find the current version (if available).

Data Science and Digital Solutions Level 3 provides learners with the opportunity to explore the connections between people, data and digital systems.

Course Description

This course is designed for learners who are interested in the wider implications of the use technology to individuals and to workplace environments.

Learners will apply a professional approach to:

- explore methods of data collection, management and analysis
- understand and apply project management techniques
- collaborate with others to identify a need or opportunity and to evaluate processes and products
- investigate digital system weaknesses in terms of ethical data management, privacy and cyber security
- apply a safe by design approach to development of digital solutions
- undertake a real-world case study that uses data to design a solution to user problems.

Data Science and Digital Solutions Level 3 provides learners with the opportunity to develop industry-based skills in data science and the creation of digital solutions which are highly advantageous across a range of careers. It also supports further study for those interested in vocational and university courses in STEM[†] and business-related pathways.

[†]STEM is an approach to learning and development that integrates the discipline areas of science, technology, engineering and mathematics.

Focus Area

Courses aligned to the [Years 9 to 12 Curriculum Framework](#) belong to one of the five focus areas of Discipline-based study, Transdisciplinary projects, Professional studies, Work-based learning and Personal futures.

Data Science and Digital Solutions Level 3 is a Professional studies course.

Professional studies bridge academic courses and career-related study to provide learners with a combination of academic and practical knowledge, skills and understanding to pursue a particular pathway of interest. Courses integrate exposure to professional environments, processes and practice through inquiry-based learning. Professional studies reflect professional processes and standards and provide learners with an equivalent experience to that of someone working within that profession. Professional studies enhance learners' cognitive capacity, efficacy, creativity and craftsmanship in readiness for higher education, internships, apprenticeships, or work in a designated field of interest. Professional studies courses connect with recognised professional study pathways and contextually align with key Tasmanian industry sectors.

Professional studies courses have three key features that guide teaching and learning:

- exposure to professional practice
- ideation, research, discovery and integrated learning
- production and sharing replicating a professional paradigm.

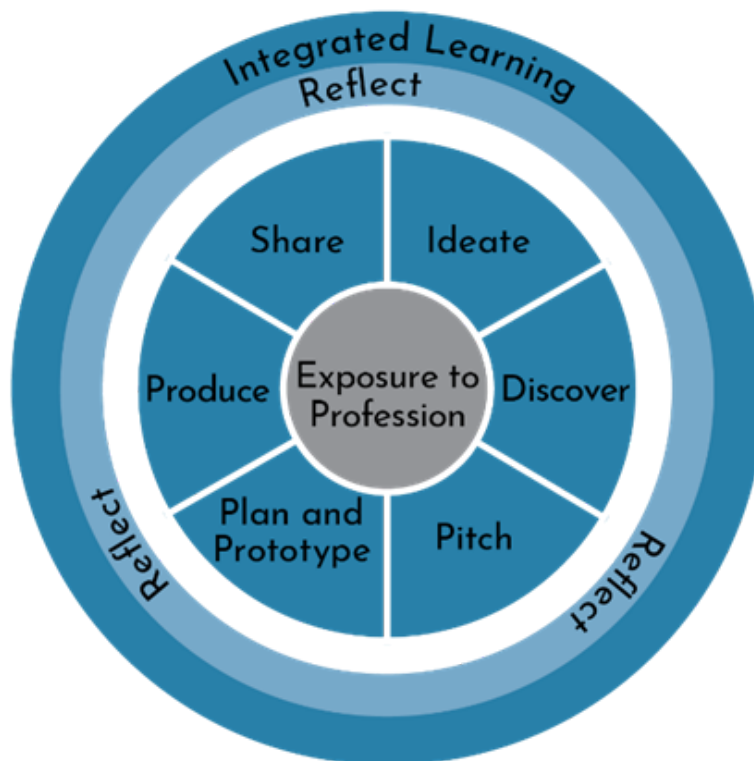


Figure 1: Professional studies diagram (developed by Years 9-12 Learning)

In this course learners will do this by:

- developing an understanding of how organisations manage, use and organise data to solve a range of information problems
- using systems development processes along with contemporary and agile project management strategies
- working individually and collaboratively with others, responding to client-driven briefs, conducting user-centred research and communicating using professional standards.

Rationale

The technology landscape is dynamic and evolving with information systems playing a critical role in organisations and businesses. Technology courses help learners to understand and become innovative creators of digital solutions. Data Science and Digital Solutions Level 3 provides opportunities for innovative and enterprising individuals to respond to emerging digital transformation through the analysis, creation, implementation, testing and management of information systems.

Data Science and Digital Solutions Level 3 as a Professional studies course will connect learners to industry by enabling them to be well-informed, analytical consumers of digital information and technology and to become confident creators of systems solutions. This course focuses on two technologies-based skill sets:

- Data science: which combines techniques and concepts from many learning areas including mathematics, computer science, psychology, art and ethics.
- Digital solutions: which are a result of transforming data to meet a need or opportunity.

Through studies in Data Science and Digital Solutions Level 3, learners will:

- develop an understanding of the importance of data and information
- understand how data is processed and communicated through hardware and software applications to solve a range of information problems
- investigate information systems past, current and emerging
- engage in an exploration of the Information Technology (IT) profession
- explore the wide-ranging career opportunities that exist both within this and other sectors such as public health, energy, defence, food and agribusiness, advanced manufacturing, community organisations, building and construction and the cultural and tourism industry.

Through authentic project work using a systems development process, learners studying Data Science and Digital Solutions Level 3 will gain a broad range of skills including project management, collaboration, communication and critical and creative thinking. Learners consider organisational or business needs and opportunities through the lens of both human-human and human-computer interactions. They evaluate solutions from the perspective of user experience, considering security, social context, legal and ethical requirements and sustainability.

The study of Data Science and Digital Solutions Level 3 enables learners to develop an understanding of the impact of digital transformation on society both locally and globally. It also provides opportunities for learners to develop skills that will prepare them for a variety of post-school opportunities. Skills in data science and digital solutions are highly sought-after and will be an asset to learners transitioning to further study. This course supports learners on a wide range of tertiary and vocational pathways as well as being complimentary to a range of STEM[†] careers and studies.

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.

[†]STEM is an approach to learning and development that integrates the discipline areas of science, technology, engineering and mathematics.

Learning Outcomes

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

1. analyse and apply a digital problem-solving process in response to a need or opportunity
2. appraise and employ components of information systems to achieve digital solutions
3. select and apply data interpretation techniques to inform the design of user-centred solutions
4. communicate ideas, concepts and design solutions using a range of communication strategies and conventions
5. initiate, implement and monitor personal and project management strategies
6. analyse the role digital technologies and innovation play in societal and organisational change
7. analyse the role of information security in an organisation and identify ways to manage cyber security risks
8. analyse the social, ethical, legal and sustainability issues related to the design and implementation of digital solutions

Pathways

Pathways into the Data Science and Digital Solutions 3 course enable learning continuity from Digital Technologies Level 2. It is suitable for learners who have completed the Years 9-10 band of the Australian Curriculum: Technologies – Digital Technologies. It may also suit those who have prior digital technologies experience.

Complementary courses in Years 11 and 12 include those in the areas of computer science, accounting, business studies, economics, legal studies and appropriate courses from the learning areas of English, mathematics and science.

Data Science and Digital Solutions Level 3 provides a useful background to learners considering a wide range of future pathways including tertiary and vocational studies. Examples of possible future areas of study or employment include, but are not limited to, information technology, business, health, law, commerce, engineering, education, arts and sciences.

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 3.

For a full description of courses at a complexity level of 3, 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 3 towards the Participation Standard of the Tasmanian Certificate of Education (TCE).

Course Structure

This course consists of three 50-hour modules.

Module 1: People, data and digital systems

Module 2: Data-driven design

Module 3: From problem to solution

Course Delivery

The three modules should be delivered in order 1, 2 and 3.

Course Requirements

Access

Learners undertaking this course must be able to interact confidently with a contemporary personal computer system in an appropriate learning environment.

This course requires learners to collaborate with others. Collaborators could include peers, community members, teachers or industry professionals.

Previously submitted work cannot be used in meeting the requirements of Data Science and Digital Solutions Level 3. 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 TASC accredited or recognised senior secondary course.

Resource requirements

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

- appropriate laptop, notebook or desktop computer
- a printer
- internet access
- a range of software tools that may include database software, local web servers, content management systems and developer tools.

In many cases the actual software will be identified by the learner as part of their learning. In some cases, this may require:

- learners to have the technical ability and permission to install software onto a computer
- separate computing environment such as dedicated devices, virtual machines or cloud computing services. This computing environment may need to operate under a modified network security policy.

Course Content: Module 1

Module 1: People, data and digital systems

Learners explore digital transformation and how data-driven innovation is challenging and changing society, business and industry. They will explore innovation and enterprise, disruptive technologies and new and emerging digital careers. Learners will develop confidence in collecting, storing, processing, analysing and communicating data.

Module 1 learning outcomes

The following learning outcomes are a focus for this module:

1. analyse and apply a problem-solving process in response to a need or opportunity
2. appraise and employ components of information systems to achieve digital solutions
3. select and apply data interpretation techniques to inform the design of user centred solutions
4. communicate ideas, concepts and design solutions using a range of communication strategies and conventions
5. initiate, implement and monitor personal and project management strategies
6. analyse the role digital technologies and innovation play in societal and organisational change.

Module 1 content

Data is any information in a form capable of being communicated, analysed or processed, whether by an individual or by computer or other automated means. As such, data is an important driver of growth in modern economies. Learners will develop techniques for data collection, management, analysis and visualisation and develop strategies for agile and contemporary project management.

Key knowledge

Data Science

Learners will develop an understanding of:

- the components of networked digital systems
- the nature, function and interrelationship of data, hardware and software systems
- the difference between data and information
- the difference between qualitative and quantitative data
- the fundamental techniques for data analysis and visualisation
- the factors that affect the quality of information
- the characteristics of data and information and the need for organisation and manipulation to facilitate its effective use
- the importance and process of collecting, storing and communicating data and information
- the procedures for backup and data storage and best practice, that is 3-2-1 backup strategy
- spreadsheet and database concepts
- data management, including relational database concepts and Structured Query Language (SQL):
 - data modelling and documentation
 - data integrity and factors influencing data integrity
 - data organisation
 - database creation and manipulation.

Innovation, Digital Technologies and Transformation in Organisations

Learners will undertake:

- exploration of the societal and ethical issues associated with the use of data analytics
- identification of the challenges and impacts of data science on society and business; for example:
 - sport, manufacturing
 - healthcare
 - education
 - banking, e-business and finance
 - news and media
 - family and home entertainment and news
 - government and politics
- investigations into:
 - the role of innovation and enterprise in driving the development of new solutions or product ideas
 - the impact of current and emerging technologies, such as automation
 - cyberbullying and the decline of physical human interactions and interpersonal skills
- exploration of emerging trends in digital and information systems and the importance of innovation to organisations
- investigations into the role of disruptive technologies in digital transformation; for example:
 - Artificial Intelligence (AI)
 - machine learning
 - blockchain
 - quantum computing
 - virtual reality (VR)

- augmented reality (AR)
- exploration of new opportunities for industry, businesses and organisations enabled by emerging technologies
- identification of the impact of digital technologies on employment in areas such as new jobs, the changing nature of work, retraining or reskilling
- exploration of occupations with digital roles, including the roles and the responsibilities of people working within these occupations
- exploration of trends relating to digital careers and emerging opportunities.

Key skills

Learners will be able to:

- select and use appropriate hardware and software tools when developing information systems solutions
- implement occupational health and safety practices
- use techniques for collecting data to determine user needs and requirements, such as interviews and surveys
- use strategies to process data to locate key patterns and predictions using data analytical tools
- apply a range of data processing techniques to analyse and extract information to be effectively used for data driven decision-making in organisations
- design, maintain, adapt and produce relational databases and digital solution
- create information through the use and analysis of data
- conduct research
- work collaboratively.

Module 1 work requirements summary

This module includes the following work requirements:

- one product consisting of a multimodal presentation examining a topic relating to the role digital technologies play in societal or organisational change
- one project using a problem-solving process when responding to a problem or identified need.

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.

Course Content: Module 2

Module 2: Data-driven design

Learners will build on the knowledge and skills covered in module 1. The focus centres on solving user problems through the analysis of data and application of a problem-solving process. Additionally, learners explore information security in organisations and how cyber security risks can be managed. They will consider how data and networked systems can be protected from digital attacks. Explore the common types of security threats within an organisation and how people, processes and technology work together to create an effective defence.

Module 2 learning outcomes

The following learning outcomes are a focus for this module:

1. analyse and apply a problem-solving process in response to a need or opportunity
2. appraise and employ components of information systems to achieve digital solutions
3. select and apply data interpretation techniques to inform the design of user centred solutions
4. communicate ideas, concepts and design solutions using a range of communication strategies and conventions
5. initiate, implement and monitor personal and project management strategies
7. analyse the role of information security in an organisation and identify ways to manage cyber security risks.

Module 2 content

Learners will review the components and characteristics of information systems. They will investigate existing, new and emerging technologies to evaluate the suitability of the components for particular tasks. Learners will consider system weaknesses and begin to explore system development by unpacking a simplified systems development process. They will apply the knowledge and skills required to:

- problem solve
- understand and create digital solutions
- effectively project manage
- identify the intra-personal and inter-personal competences needed to effectively collaborate.

Learners will begin formulating an approach to the final project to ensure that they have 40 hours of project time for module 3 work requirement 1 prior to submission of the external assessment.

Key knowledge

Learners will develop an understanding of digital systems, information and cybersecurity and how to design digital solutions in the following ways:

Digital systems:

- the components, characteristics and functions of information systems, including hardware, software and communication, that allow effective solutions to be achieved
- how existing, new and emerging technologies are used to develop hardware and software solutions
- the role of information and data in contemporary organisations including an understanding of big data.

Information and cyber security:

- foundational cyber security concepts, such as information privacy and security, web application security, risk management
- the CIA triad information security model: confidentiality, integrity and availability
- fundamentals of computer networking including:
 - communication models and protocols underpinning the transfer of data in local networks and the internet
 - role of components at different layers
 - network topology for security and performance
 - bandwidth
 - performance management
- internal and external network threats and security solutions to network threats
 - external network threats:
 - social engineering (phishing)
 - denial of service, including distributed denial of service
 - back door
 - Internet Protocol (IP) spoofing
 - SQL injection
 - man-in-the-middle
 - cross-site scripting
 - types of malware
 - physical network threats
 - zero-day vulnerabilities
 - internal network threats:
 - lost or stolen devices
 - misuse by employees
 - security solutions to network threats:

- analysis of log files
 - anti-malware
 - firewall filtering
 - access control lists
 - intrusion prevention systems
 - virtual private networks
 - user training
 - Information and Communications Technology (ICT) code of conduct
 - physical security
- cryptography
- ethical hacking
- ethical issues arising from data and information security practices
- an awareness of the Australian Privacy Principles accessed from the Australian Government, Office of the Australian Information Commissioner (Oaic).

Designing digital solutions:

- processes for iterative problem-solving; for example, a simplified systems development cycle being:
 - understanding the problem
 - planning
 - designing
 - implementation
 - testing, evaluating and strategies for maintaining
- strategies to collaborate with others.

Key skills

Learners will develop, consolidate and apply skills related to digital systems, information and cybersecurity and design of digital solutions in the following ways:

Digital Systems:

- use of digital technologies for a range of purposes
- investigate and analyse a problem and produce a specification
- use data management skills.

Information and Cyber security:

- compare the characteristics of a local area network (LAN), a wide area network (WAN) and a virtual private network (VPN)
- compare the characteristics and purpose of intranets and the internet
- interpret and create network diagrams
- assess cyber security issues within a digital environment to apply appropriate responses.

Designing Digital Solutions:

- communicate with end users and others including peers
- design an effective solution
- select and use appropriate application software
- test and implement an effective ICT related system
- use effective project management strategies including agile use design tools and techniques to document specifications and solution development
- select and use appropriate project management software
- evaluate the development, implementation and management of projects
- evaluate solutions and their own performance.

Module 2 work requirements summary

This module includes the following work requirements:

- one extended response on information and cyber security
- one product consisting of a data-driven design solution or prototype pitch.
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.

Course Content: Module 3

Module 3: From problem to solution

Learners will apply theoretical knowledge and practically demonstrate critical and creative thinking. This builds on learning and skills developed in modules 1 and 2, as they respond innovatively to a real-world case study. The case study will emphasise a professional approach, requiring learners to exhibit collaboration, communication and project management skills and account for ethical frameworks, privacy and information security. Project based work requirements in this module are developed in conjunction with the delivery of key knowledge and skills and contribute to a folio of work.

Module 3 learning outcomes

The following learning outcomes are a focus for this module:

1. analyse and apply a problem-solving process in response to a need or opportunity
2. appraise and employ components of information systems to achieve digital solutions
3. select and apply data interpretation techniques to inform the design of user centred solutions
4. communicate ideas, concepts and design solutions using a range of communication strategies and conventions
5. initiate, implement and monitor personal and project management strategies
8. analyse the social, ethical, legal and sustainability issues related to the design and implementation of digital solutions.

Module 3 content

Learners will ideate to identify a problem, need, opportunity or situation that has an achievable innovative solution and create a design specification. They will replicate a professional paradigm by identifying other people to collaborate with. This may include clients, potential end-users, industry professionals and people with relevant specialised knowledge. Learners will communicate with others and manage their projects in ways that align to professionally accepted practices.

Learners will pitch their concept before undertaking a systems design process to create and evaluate a data informed digital solution.

Key knowledge

Learners will consolidate and extend their understanding of:

- functions and capabilities of digital systems used by individuals and organisations
- functional and non-functional requirements of solutions, constraints and scope
- ethical, legal and environmental consideration and impacts
- principles for ethical design, including Safety by Design principles[†] and Universal Design principles[‡]
- strategic planning in a professional and socially responsible manner
- interrelationships between the development and use of digital solutions, for individuals and societies in relation to the legal and ethical implications of software design, data management and cyber threats.

Key skills

Learners will consolidate and enhance their skills by:

- investigating a problem, need or opportunity and identify potential users and purpose
- developing user stories
- proposing a range of methods to collect data for analysis
- analysing and document solution requirements to develop an innovative solution
- applying Universal Design principles[‡]
- applying relevant Universal Design concepts[‡] including inclusive design, personalisation and cultural appropriateness
- selecting and use appropriate design tools for generating solution designs
- developing an innovative solution using appropriate digital systems
- documenting the development of the solutions
- identifying and discuss potential legal and ethical issues affecting the development of an innovative solution
- applying evaluation criteria and evaluate the efficiency and effectiveness of an innovative solution to meet a need or opportunity
- documenting, monitoring and modifying project plans
- demonstrating the ability to work independently and collaboratively with others in both physical and virtual environments.

[†] The Safety by Design Vision for Young People is available at: www.esafety.gov.au/about-us/safety-by-design/principles-and-background

[‡] Universal Design Australia <https://universaldesignaustralia.net.au/>

Module 3 work requirements

This module includes the following work requirement:

- one folio consisting of an extended digital solutions project, including a:
 - project proposal (internally assessed)
 - reflective journal (internally assessed)
 - learner project (externally assessed).

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.

Providers offering this course must participate in quality assurance processes specified by the Office of TASC to ensure provider validity and comparability of standards across all awards. To learn more, see the Office of TASC's quality assurance processes and assessment information.

Internal 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.

The Office of TASC will supervise the external assessment of designated criteria which will be indicated by an asterisk (*). The ratings obtained from the external assessments will be used in addition to internal ratings from the provider to determine the final award.

Quality Assurance Process

The following processes will be facilitated by the Office of TASC to ensure there is:

- a match between the standards of achievement specified in the course and the skills and knowledge demonstrated by learners
- community confidence in the integrity and meaning of the qualification.

Process

The Office of TASC gives course providers feedback about any systematic differences in the relationship of their internal and external assessments and, where appropriate, seeks further evidence through audit and requires corrective action in the future.

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

External Assessment Requirements

The external assessment for this course will comprise:

- one folio assessing criteria 1, 2, 3, 4 and 8.

For further information, see the current external assessment specifications and guidelines for this course available in the Supporting documents below.

Criteria

The assessment for Data Science and Digital Solutions Level 3 will be based on the degree to which the learner can:

1. apply a systematic process to analyse problems and produce a digital solution*
2. explain and apply knowledge and understanding of information systems to provide effective digital solutions*
3. select and apply data interpretation techniques to inform the design of user centred solutions*
4. communicates for technical and non-technical audiences*
5. apply and monitor personal and project management processes skills
6. explain the interrelationships between innovation, digital technologies and transformation in organisations
7. explain the role of information security in an organisation
8. explain the ethical, legal and sustainability considerations that impact the design and implementation of digital solutions*.

*denotes criteria that are both internally and externally assessed.

	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: apply a systematic process to analyse problems and produce a digital solution

This criterion is both internally and externally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - Conduct a systems analysis in response to a design brief or user story	precisely define and decompose real-world problems, analysing functional and non-functional requirements and constraints [†] referring to relevant data and information	define and decompose real-world problems explaining functional requirements and constraints [†] referring to data and information	identify and define problems referring to functional requirements and data
E02 - Create design specifications	creates a comprehensive design specification in response to data, including targeted design criteria and specified design constraints	creates a detailed design specification in response to data, including targeted design criteria and specified design constraints	creates a basic design specification in response to data, including design criteria
E03 - Develop digital solutions or prototypes	applies a range of relevant technical concepts to create an appropriate digital solution or prototype that adheres to accepted standards and conventions	applies a range of technical concepts to create a feasible digital solution or prototype that adheres to most accepted standards and conventions	applies a limited range of technical concepts to create a digital solution or prototype: may not adhere to all accepted standards and conventions
E04 - Testing of digital solutions or prototypes	explains testing and makes improvements using an iterative process	describes testing and makes some improvements using an iterative process	identifies some improvements based on testing
E05 - Evaluation of digital solutions or prototypes	evaluates the suitability and appropriateness of the solution or prototype using design criteria, justifying all design decisions.	analyses the suitability and appropriateness of the solution or prototype using design criteria, justifying some design decisions.	discusses the suitability and appropriateness of the solution or prototype using design criteria, explaining design decisions.

[†]constraints may include consideration of economic, environmental, social, technical and usability factors.

Criterion 2: explain and apply knowledge and understanding of information systems to provide effective digital solutions

This criterion is both internally and externally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - Components of digital systems	analyses the components of systems and their interconnectedness in order to rebuild, redesign and create systems solutions	explains the components of systems and their interconnectedness in order to rebuild, redesign and create systems solutions	describe the components of systems and their interconnectedness in order to rebuild, redesign and create systems solutions
E02 - Quality data and information	analyses the factors affecting the quality of data and information, including the impact of diminished data integrity	explains the factors affecting the quality of data and information	describes the characteristics of quality information and data
E03 - Data communication and networking	analyses fundamental concepts of data communications and networking	explains fundamental concepts of data communications and networking	describes fundamental concepts of data communications and networking
E04 - Network and design and performance	explains network design decisions including consideration of network performance issues and network threats	describes network design decisions including the consideration of network performance issues	identifies network design decisions that have an effect on performance issues
E05 - Application of technical skills to solve problems	applies a range of technical skills and processes to develop highly	applies a range of technical skills and processes to develop efficient and	applies a range of technical skills and processes to develop efficient solutions to simple problems.

	efficient and logical solutions to complex problems.	logical solutions to some simple and more complex problems.	
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Criterion 3: select and apply data interpretation techniques to inform the design of user-centred solutions

This criterion is both internally and externally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - Techniques and tools for data analytics	select and use techniques and tools [†] to support data analytics with detailed and relevant justification	select and use techniques and tools [†] to support data analytics with limited justification	select and use techniques and tools [†] to support data analytics
E02 - Collect and access data from a variety of sources	explain and apply techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources	describe and apply techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources	identify and apply techniques for acquiring, storing and validating quantitative and qualitative data from a range of sources
E03 - Analyses data to draw conclusions and predictions	analyse and visualise data interactively using a range of software, including spreadsheets and databases, to draw logical conclusions and make predictions by identifying trends and outliers	analyse and visualise data using a range of software, including spreadsheets and databases, to draw logical conclusions and make predictions by identifying trends	interprets data identifying relationships and trends to draw simple conclusions and predictions
E04 - Secure data	analyse how hardware, software and technical protocols are used to manage, control and secure access to data in networked digital systems.	explain how hardware, software and technical protocols are used to manage, control and secure access to data in networked digital systems.	describe how hardware and software are used to manage, control and secure access to data in networked digital systems.

[†]tools for representing databases, spreadsheets and data visualisations, including data dictionaries, tables, charts, input forms, queries and reports.

Criterion 4: communicates for technical and non-technical audiences

This criterion is both internally and externally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - Conceptual communication	clearly communicates complex concepts, effectively using specialised terminology, naming conventions and technical information, to meet the needs and context of the audience	clearly communicates concepts, appropriately using specialised terminology, naming conventions and technical information, to meet the needs and context of the audience	communicates concepts, using specialised terminology, naming conventions and technical information, to meet the needs and context of the audience
E02 - Communicating process	critically analyses the design process and evaluates opportunities, constraints and implications for proposing solutions	analyses the design process and explains opportunities, constraints and implications for proposing solutions	explains the design process and describes opportunities, constraints and implications for proposing solutions
E03 - Documenting digital solutions	produces detailed and logically structured project documentation across a range of appropriate mediums [†] for the identified purpose and audience	produces logically structured project documentation using a range of appropriate mediums [†] for the identified purpose and audience	produces project documentation appropriate for purpose and audience
E04 - Academic integrity	follows and correctly applies all referencing conventions and methodologies to accurately identify sources of information [†]	follows and correctly applies most referencing conventions and methodologies to identify sources of information [†]	applies aspects of referencing conventions and methodologies to identify sources of information [†]
E05 - Referencing	identifies all sources used in structured reference lists that align to all referencing conventions.	identifies all sources used in appropriately structured reference lists: may not align to all referencing conventions.	identifies most sources used in reference lists: the list may contain structural errors.

[†]mediums; for example, project reports, production journals, proposals, project management plans, reflective journals, folio.

[‡]sources of information include the information, images, words and ideas of others.

Criterion 5: apply and monitor personal and project management processes skills

This criterion is only internally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - Agile principles of project management	analyses and effectively applies a range of agile project management [†] strategies, methodologies and procedures	explains and applies a range of agile project management [†] strategies, methodologies and procedures	describes and applies a limited range of agile project management [†] strategies, methodologies and procedures
E02 - Individual goals	Identifies S.M.A.R.T. [‡] goals and appropriate resources to effectively address barriers to achieving personal goals	identifies realistic, attainable personal goals and appropriate resources to address barriers to achieving them	identifies personal goals and appropriate resources to address key barriers to achieving them
E03 - Collaborative professional relationships	establishes, manages and negotiates contact with appropriate people [§] to solve problems, propose solutions and justify ideas	establishes and maintains contact with a range of appropriate people [§] with whom to collaborate to explore ideas	identifies and establishes contact with appropriate people [§] with whom to collaborate
E04 - Reflection on performance	evaluates own performance in realising digital solutions, demonstrating a clear understanding of own strengths and weaknesses.	analyses own performance in realising digital solutions, demonstrating understanding of own strengths and weaknesses.	explains own performance in realising digital solutions, demonstrating a limited understanding of strengths and weaknesses.

[†] project management approaches may include time scheduling, resource scheduling and tracking documents.

[‡] S.M.A.R.T. goals – Specific, Measurable, Attainable, Realistic, Timebound.

[§] appropriate people to collaborate with may include associated industry professionals, mentors, subject experts, end-users, peers and targeted community groups.

Criterion 6: explain the interrelationship between innovation, digital technologies and transformation in organisations

This criterion is only internally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - Current and emerging systems	analyses how historical developments have contributed to current and emerging systems solutions in organisations	explains how historical developments have contributed to current and emerging systems solutions in organisations	describes how historical developments have contributed to current and emerging systems solutions in organisations
E02 - Innovation and enterprise	analyses how innovation and enterprise drive the development of new solutions or product ideas enabling organisations to adapt and establish a competitive advantage	explains how innovation and enterprise drive the development of new solutions or product ideas enabling organisations to adapt and establish a competitive advantage	describes how innovation and enterprise drive the development of new solutions or product ideas enabling organisations to adapt and establish a competitive advantage
E03 - Digital transformation	analyses how disruptive technologies enable digital transformation in organisations	explains the concept of digital transformation in organisations including the role of disruptive technologies	describes the concept of digital transformation in organisations including the role of disruptive technologies
E04 - Digital careers	evaluates the nature of digital careers, including roles and responsibilities of people working in these occupations.	analyses the nature of digital careers, including roles and the responsibilities of people working within these occupations.	describes the nature of digital careers including the roles and the responsibilities of people working within these occupations.

Criterion 7: explain the role of information security in an organisation

This criterion is only internally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - Threat landscape	analyses and models organisational threat landscapes [†] describing appropriate security solutions	explains and models organisational threat landscapes [†] identifying security solutions	describes and models common organisational threat landscapes [†]
E02 - Data security	analyses how digital information is protected from unauthorised access, corruption, or loss throughout its entire lifecycle	explains how digital information is protected from unauthorised access, corruption, or loss throughout its entire lifecycle	describes how digital information is protected from unauthorised access, corruption, or loss throughout its entire lifecycle
E03 - Network security	identifies and evaluates threats to the security of data and information moving through networked and cloud-based systems	identifies and analyses threats to the security of data and information moving through a networked system	identifies and explains threats to the security of data and information moving through a networked system
E04 - Privacy principles	applies privacy principles to analyse and manage the digital footprint that existing systems and student solutions collect.	applies privacy principles to explain and manage the digital footprint that existing systems and student solutions collect.	applies privacy principles to describe and manage the digital footprint that existing systems and student solutions collect.

[†]Threat landscape, all potential and identified cyber threats, which may include:

- external threats, that is, social engineering, malicious code, denial of service
- internal threats, that is, human error, lost or stolen devices.

Criterion 8: explain the ethical, legal and sustainability considerations that impact the design and implementation of digital solutions

This criterion is both internally and externally assessed.

Standard Element	Rating A	Rating B	Rating C
E01 - User-centred solutions	analyses functional and non-functional requirements of solutions, constraints and scope to inform design decisions	explains functional and non-functional requirements of solutions, constraints and scope to inform design decisions	describes functional and non-functional requirements of solutions, constraints and scope to inform design decisions
E02 - Legal and ethical considerations	analyses legal and ethical, considerations associated with the development of digital solutions to assess implications, inform design decisions and ensure compliance	explains legal and ethical considerations associated with the development of digital solutions to identify implications, inform design decisions and ensure compliance	describes legal and ethical considerations associated with the development of digital solutions to inform design decisions
E03 - Sustainably designed solutions	analyses economic, environmental and social impacts associated with the development of digital solutions to inform design decisions.	explains economic, environmental and social impacts associated with the development of digital solutions to inform design decisions.	describes economic, environmental and social impacts associated with the development of digital solutions to inform design decisions.

Qualifications Available

Data Science and Digital Solutions Level 3 (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 13 ratings (8 from the internal assessment, 5 from external assessment).

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

EXCEPTIONAL ACHIEVEMENT (EA)

10 'A' ratings, 3 'B' ratings (3 'A' ratings, 2 'B' rating from external assessment)

HIGH ACHIEVEMENT (HA)

5 'A' ratings, 5 'B' ratings, 3 'C' ratings (1 'A' ratings, 3 'B' ratings, 1 'C' rating from external assessment)

COMMENDABLE ACHIEVEMENT (CA)

6 'B' ratings, 6 'C' ratings (2 'B' ratings, 3 'C' ratings from external assessment)

SATISFACTORY ACHIEVEMENT (SA)

11 'C' ratings (3 'C' ratings from external assessment)

PRELIMINARY ACHIEVEMENT (PA)

6 'C' ratings

A learner who otherwise achieves the ratings for a CA (Commendable Achievement) or 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 9-12 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

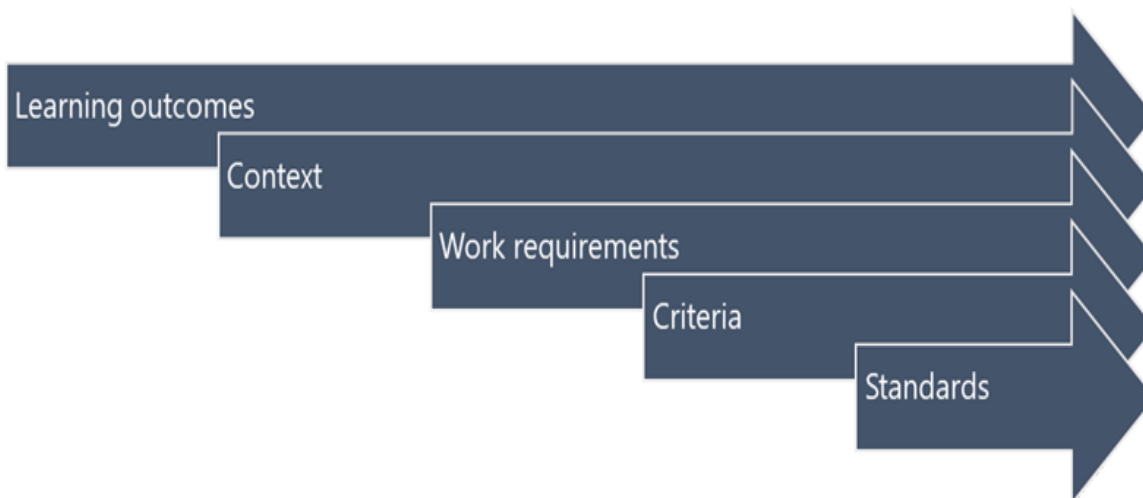
Accredited on 3 March 2023 for use from 1 January 2024 to 31 December 2028.

Version History

Version 1

Accredited on 3 March 2023 for use from 1 January 2024 to 31 December 2028. This course replaces Information Systems and Digital Technologies (ITS315118) which expires on 31 December 2023.

Appendix 1 – Line of sight



Learning outcomes	Course content: module	Work requirements: module	Criterion	Criterion elements	General capabilities
1. analyse and apply a problem-solving process in response to a need or opportunity	1, 2, 3	1, 2, 3	1	1, 2, 3, 4, 5	Critical and creative thinking; Digital literacy; Ethical understanding; Personal and social capability
2. appraise and employ components or information systems to achieve digital solutions	1, 2, 3	1, 2, 3	2	1, 2, 3, 4, 5	Critical and creative thinking; Digital literacy; Ethical understanding
3. select and apply data interpretation techniques to inform the design of user-centred solutions	1, 2, 3	1, 2, 3	3	1, 2, 3, 4	Critical and creative thinking; Digital literacy; Ethical understanding; Numeracy
4. communicate ideas, concepts and design solutions using a range of communication strategies and conventions	1, 2, 3	1, 2, 3	4	1, 2, 3, 4, 5	Critical and creative thinking; Digital literacy; Ethical understanding; Numeracy
5. initiate, implement and monitor personal and project management strategies	1, 2, 3	1, 2, 3	5	1, 2, 3, 4	Critical and creative thinking; Digital literacy; Ethical understanding; Numeracy; Personal and social capability
6. analyse the role of digital technologies and innovation play in societal and organisational change	1	1	6	1, 2, 3, 4	Critical and creative thinking; Digital literacy; Ethical understanding; Personal and social capability
7. analyse the role of information security in an organisation and identify ways to manage cyber security risks	2	2	7	1, 2, 3, 4	Critical and creative thinking; Digital literacy; Ethical understanding; Personal and social capability
8. analyse the social, ethical, legal and sustainability issues related to the design and implementation of digital solutions	3	3	8	1, 2, 3	Critical and creative thinking; Digital literacy; Ethical understanding; Personal and social capability

Appendix 2 – Alignment to curriculum frameworks

Data Science and Digital Solutions Level 3 aligns with the ACSF Level 4 Learning core skills in the following ways:

- Support: works independently and initiates and uses support from a range of established resources.
- Context: range of contexts; including some that are unfamiliar and/or unpredictable; some specialisation in less familiar/known contexts
- Text complexity: complex texts; embedded information; includes specialised vocabulary; includes abstraction and symbolism.
- Task complexity: complex task organisation and analysis involving the application of a number of steps; processes include extracting, extrapolating, inferencing, reflecting and abstracting.

Data Science and Digital Solutions Level 3 also is a progression from the F-10 Australian Curriculum: Technologies.

This course continues to develop learner understanding and skills across the two strands of the F-10 Australian Curriculum: Technologies drawing from the Digital Technologies content:

- knowledge and understanding
- process and production.

Note: The Australian Curriculum: Technologies is written on the basis that all learners will study the Digital Technologies from Foundation to the end of Year 8.

Mathematical skills expected of learners studying Data Science and Digital Solutions

This course component requires learners to use the mathematical skills they developed through the F-10 Australian Curriculum: Mathematics.

Digital Literacy Skills Framework (Department of Education, Skills and Employment)

This course meets and exceeds the performance features identified at Level 3.

Appendix 3 – 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 need not be the sole form of assessment for a module.

Module 1 work requirements specifications

Work requirement 1 of 2

Title of work requirement: Digital transformation

Mode or format: research investigation

Description: Learners will discuss:

- the role of information and data in contemporary organisation
- trends relating to digital careers and emerging opportunities
- new opportunities for industry, businesses and organisations enabled by emerging technologies
- the impact of digital transformation within a nominated industry or organisation.

Opportunities for excursions or incursions to communicate with people working in relevant information technology roles are encouraged to connect learners with real-life contexts.

Size: multimodal presentation of 4 – 7 minutes with script

Timing: none specified

Relevant criteria: 4, 5 and 6

Work requirement 2 of 2

Title of work requirement: Data problem solving cycle

Mode or format: project

Description: Learners experience a systematic problem-solving process by responding to simple problems or identified needs provided by the teacher.

Learners respond to a real-world scenario including solution requirements, constraints, scope and designs that will enable them to:

- acquire and reference data from primary and secondary sources
- analyse the data
- develop digital solutions using spreadsheet, database and data visualisation software tools
- present findings in a format specified by or negotiated with, the teacher.

The given scenario should indicate the data libraries that learners are required to acquire and analyse data.

Size: recommend maximum of 10 hours on task

Timing: Learners may have the opportunity to undertake multiple minor projects throughout module 1.

Relevant criteria: 1, 2, 3, 4 and 5

Module 2 work requirements specifications

Work requirement 1 of 2

Title of work requirement: Information and cyber security

Mode or format: extended response

Description: Learners discuss data and organisational security challenges and solutions. Learners will:

- discuss the data security threats organisations face and identify strategies organisations can use to mitigate risk
- include an overview of the impact of cloud computing.

Size: a written response such as a report or essay will be between 800 – 1 200 words in total or a multimodal presentation of 4 – 7 minutes

External agencies: Opportunities for excursions or incursions to communicate with people working in relevant information technology (IT) roles are encouraged. This will enable learners to connect with real-life contexts.

Relevant criteria: 2, 3, 4 and 7

Work requirement 2 of 2

Title of work requirement: Data-driven systems solution and journal

Mode or format: folio: product and journal

Description Learners will use and document a systematic problem-solving process to design and develop a working solution. The systems task should be small, enable learners to analyse data and assess security risks and be of interest to the learner.

Learners will maintain a production journal detailing their problem-solving and project management processes to accompany their designed solution.

Size: recommend maximum of 15 hours on task

External agencies: opportunities for industry excursion or incursion to connect to others with specialist knowledge or expertise

Relevant criteria: 1, 2, 3, 4, 5 and 7

Module 3 work requirements specifications

Work requirement 1 of 1

Title of work requirement: Digital solutions project

Mode or format

Part 1: Project proposal (internal only)

Part 2: Project folio (external)

Part 3: Reflective journal (internal only)

Description: Learners individually undertake a project that requires them to relate conceptual knowledge and skills acquired from the study of all modules. Learners must be encouraged to select an extended digital solutions project topic that links with an area of genuine interest to them. Learners must submit a proposal to be signed off by the provider before commencing the extended project.

The provider must discuss the proposed focus of the task with the learner, considering the requirements of the assessment and the ability and interests of the individual learner. The provider must be satisfied that the suggested focus has the potential for the individual learner to:

- analyse the problem and derive a design specification
- develop and test a prototype
- develop, realise and test a final physical system
- evaluate the final system against the design specification and suggest improvements.

PART 1: Project proposal (internally assessed)

The project proposal must include:

- an identified research problem – the problem should be manageable and have sufficient complexity to enable the student to achieve at the highest level.
- background research to inform problem analysis
- an outline of the different aspects of project management that will be undertaken; for example, risk management plan or risk register, Gantt chart, critical path analysis diagrams, PERT charts, communication plan, testing plan
- a stakeholder engagement plan
- a pitch or give a presentation.

PART 2: Project folio (internally and externally assessed)

Documentation of iterative systems development process including:

- a research essay of 1500 - 2000 words in length, addressing:
 - feasibility study
 - systems analysis of the systems development process.

PART 3: Reflective journal (internally assessed)

The reflective journal serves an important function, it assists with ongoing support and supervision and is a formal record enabling authentication of the learner's work.

The journal should be maintained in electronic form. All items in the journal must be dated and legible.

The reflective journal will demonstrate how the learner:

- monitored the effectiveness of the plans for their inquiry using appropriate strategies; for example, developing criteria to measure effective implementation, checking progress according to a timeline, providing progress reports on action taken and decisions made during the process
- addressed problems encountered
- analysed how perspectives were shaped by the sources of information they used
- evaluated the effectiveness of the collaborative strategies they used in planning and implementing their inquiry
- evaluated the effectiveness of the inquiry including their research sources, methods, findings and plans and by revising their plans as problems arose.

Size: Folio maximum of 40 A4 equivalent pages. This includes research, the research essay, evidence of planning, concept sketches with annotations, photographs, charts and diagrams. It will be no larger than 500 megabytes in total size.

Timing: Approximately 40 hours of dedicated class time including internal and external components. Learners should be advised to rein in the scope of their project rather than choosing expansive and overly ambitious topics. It is vital that learners are advised to produce a fully resolved digital solution such that each stage of the problem-solving process is fully addressed for the context of the project.

External agencies: opportunities for industry excursion or incursion to connect to others with specialist knowledge or expertise

Relevant criteria:

Internally: 1, 2, 3, 4, 5 and 8

Externally: 1, 2, 3, 4 and 8

Relationship to external assessment: this work requirement has an externally assessed component. This is comprised of Part 2: Project folio, as outlined in the description. This folio must be completed to meet TASC's published external assessment submission dates.

Appendix 4 – 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.

Appendix 5 – Glossary

Refer to the [Australian Curriculum Technologies glossary \(Version 8.4\)](#)

Supporting documents including external assessment material

-  [DSD315124 Data Science and Digital Solutions - External Assessment Specifications.pdf](#) (2024-01-24 09:52am AEDT)
-  [TASC Student Folio Declaration Forms Information Sheet.pdf](#) (2024-01-31 10:50am AEDT)
-  [2024 DSD315124 TASC Student Folio Declaration Form.pdf](#) (2024-10-11 08:21am AEDT)



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