BSSS
AUSTRALIAN CAPITAL TERRITORY

Robotics and Mechatronics

A - T - M - V

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Supporting Qualifications from **Information and Communications Technology Training Package** (refer to *training.gov.au*)

ICT20120 **Certificate II in Applied Digital Technologies**

ICT30120 **Certificate III in Information Technology**

Cover Art provided by Canberra College student Aidan Giddings

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The ACT Senior Secondary System

The ACT senior secondary system recognises a range of university, vocational or life skills pathways.

The system is based on the premise that teachers are experts in their area: they know their students and community and are thus best placed to develop curriculum and assess students according to their needs and interests. Students have ownership of their learning and are respected as young adults who have a voice.

A defining feature of the system is school-based curriculum and continuous assessment. School-based curriculum provides flexibility for teachers to address students' needs and interests. College teachers have an opportunity to develop courses for implementation across ACT schools. Based on the courses that have been accredited by the BSSS, college teachers are responsible for developing programs of learning. A program of learning is developed by individual colleges to implement the courses and units they are delivering.

Teachers must deliver all content descriptions; however, they do have flexibility to emphasise some content descriptions over others. It is at the discretion of the teacher to select the texts or materials to demonstrate the content descriptions. Teachers can choose to deliver course units in any order and teach additional (not listed) content provided it meets the specific unit goals.

School-based continuous assessment means that students are continually assessed throughout years 11 and 12, with both years contributing equally to senior secondary certification. Teachers and students are positioned to have ownership of senior secondary assessment. The system allows teachers to learn from each other and to refine their judgement and develop expertise.

Senior secondary teachers have the flexibility to assess students in a variety of ways. For example: multimedia presentation, inquiry-based project, test, essay, performance and/or practical demonstration may all have their place. College teachers are responsible for developing assessment instruments with task specific rubrics and providing feedback to students.

The integrity of the ACT Senior Secondary Certificate is upheld by a robust, collaborative and rigorous structured consensus-based peer reviewed moderation process. System moderation involves all year 11 and 12 teachers from public, non-government and international colleges delivering the ACT Senior Secondary Certificate.

Only students who desire a pathway to university are required to sit a general aptitude test, referred to as the ACT Scaling Test (AST), which moderates student scores across courses and colleges. Students are required to use critical and creative thinking skills across a range of disciplines to solve problems. They are also required to interpret a stimulus and write an extended response.

Senior secondary curriculum makes provision for student-centred teaching approaches, integrated and project-based learning inquiry, formative assessment and teacher autonomy. ACT Senior Secondary Curriculum makes provision for diverse learners and students with mild to moderate intellectual disabilities, so that all students can achieve an ACT Senior Secondary Certificate.

The ACT Board of Senior Secondary Studies (BSSS) leads senior secondary education. It is responsible for quality assurance in senior secondary curriculum, assessment and certification. The Board consists of nominees from colleges, professional bodies, universities, industry, parent/carer organisations and unions. The Office of the Board of Senior Secondary Studies (OBSSS) consists of professional and administrative staff who support the Board in achieving its objectives and functions.

ACT Senior Secondary Certificate

Courses of study for the ACT Senior Secondary Certificate:

- provide a variety of pathways, to meet different learning needs and encourage students to complete their secondary education
- enable students to develop the essential capabilities for twenty-first century learners
- empower students as active participants in their own learning
- engage students in contemporary issues relevant to their lives
- foster students' intellectual, social and ethical development
- nurture students' wellbeing, and physical and spiritual development
- enable effective and respectful participation in a diverse society.

Each course of study:

- comprises an integrated and interconnected set of knowledge, skills, behaviours and dispositions that students develop and use in their learning across the curriculum
- is based on a model of learning that integrates intended student outcomes, pedagogy and assessment
- outlines teaching strategies which are grounded in learning principles and encompass quality teaching
- promotes intellectual quality, establish a rich learning environment and generate relevant connections between learning and life experiences
- provides formal assessment and certification of students' achievements.

Vocational Education and Training in ACT Senior Secondary Schools

The Board of Senior Secondary Studies is responsible for the certification of senior secondary school studies in government and non-government schools in the ACT. Students can undertake Vocational Education and Training (VET) as part of a senior secondary certificate and completion by a student can provide credit towards both a recognised VET qualification and a Senior Secondary School Certificate.

The BSSS certificates VET qualifications and Statements of Attainment on behalf of ACT colleges and high schools that offer Australian VET Qualifications and are Registered Training Organisations (RTOs) or have a Third-Party Service Agreement (TPSA) with an RTO. The Board also recognises VET qualifications delivered by external RTOs and facilitates the allocation of credit towards the ACT Senior Secondary Certificate based on assessment and hours of training.

The BSSS is not an RTO and is not responsible for those aspects that relate to VET delivery in schools or externally that fall within the role of the RTO.

Vocational programs must be assessed in accordance with the *Standards for Registered Training Organisations 2015* and the guidelines outlined in the relevant training package. Students undertaking A, T and M accredited vocational programs will be assessed against the criteria and achievement standards referenced in the framework to produce A-E grades and scores. They will also be assessed against competency standards as described in the relevant training package.

The BSSS certificates VET that:

- is listed on the national training.gov.au website; and
- is delivered and assessed by an ACT college or high school, which is an RTO or has a Third-Party Service Agreement (TPSA) with an RTO that has scope from the Australian Skills Quality Authority (ASQA) to deliver specified qualifications
- is delivered and assessed in accordance with relevant Training Package requirements.

Vocational learning contributes to the ACT Senior Secondary Certificate in a variety of ways:

- BSSS accredited A, T, and M vocational courses with embedded competencies delivered by colleges are reported with A–E grades
- BSSS accredited C courses (competency-based assessment only) delivered and assessed by colleges are reported with the grade ‘P’ (Pass) where at least one competency is achieved by the student; or ‘Q?’ ‘Participated’ where no competencies are achieved but attendance requirements are met
- BSSS E courses recognising study at external RTOs are reported with the grade ‘P’ (Pass)
- Australian School Based Apprenticeships (ASBAs) are reported as E courses with the grade ‘P’ (Pass).

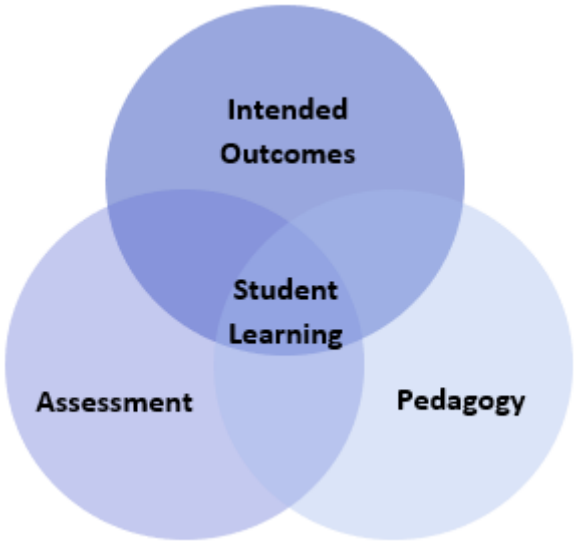
The BSSS credit arrangements recognise VET studies externally:

- through direct credit when the qualification or Units of Competence relate to a VET course that is being studied by the student
- towards the Senior Secondary Certificate, providing the VET does not duplicate content.

Implementing Vocational Education and Training Courses (Appendix F) provides further course information, including training package requirements, and should be read in conjunction with course documents.

Underpinning beliefs

- All students are able to learn.
- Learning is a partnership between students and teachers.
- Teachers are responsible for advancing student learning.



Learning Principles

1. Learning builds on existing knowledge, understandings and skills.
   (Prior knowledge)
2. When learning is organised around major concepts, principles and significant real world issues, within and across disciplines, it helps students make connections and build knowledge structures.
   (Deep knowledge and connectedness)
3. Learning is facilitated when students actively monitor their own learning and consciously develop ways of organising and applying knowledge within and across contexts.
   (Metacognition)
4. Learners' sense of self and motivation to learn affects learning.
   (Self-concept)
5. Learning needs to take place in a context of high expectations.
   (High expectations)
6. Learners learn in different ways and at different rates.
   (Individual differences)
7. Different cultural environments, including the use of language, shape learners' understandings and the way they learn.
   (Socio-cultural effects)
8. Learning is a social and collaborative function as well as an individual one.
   (Collaborative learning)
9. Learning is strengthened when learning outcomes and criteria for judging learning are made explicit and when students receive frequent feedback on their progress.
   (Explicit expectations and feedback)

General Capabilities

All courses of study for the ACT Senior Secondary Certificate should enable students to develop essential capabilities for twenty-first century learners. These 'capabilities' comprise an integrated and interconnected set of knowledge, skills, behaviours and dispositions that students develop and use in their learning across the curriculum.

The capabilities include:

- literacy
- numeracy
- information and communication technology (ICT)
- critical and creative thinking
- personal and social
- ethical understanding
- intercultural understanding

Courses of study for the ACT Senior Secondary Certificate should be both relevant to the lives of students and incorporate the contemporary issues they face. Hence, courses address the following three priorities. These priorities are:

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

Elaboration of these General Capabilities and priorities is available on the ACARA website at www.australiancurriculum.edu.au.

Literacy

Students develop literacy as they learn how to communicate ideas, concepts and proposals to a variety of audiences. They read and interpret detailed written instructions technologies, often including diagrams and procedural writings such as software user manuals and design briefs. Students interpret online documentation and tutorial materials that support coding, prepare software instructions and write reports, project outlines, proposals and evaluations. They use computer-generated images to communicate product or systems design ideas to suit particular contexts and audiences. Students understand and use terminology specific to design and technology, in both written and oral forms, to communicate ideas about product or systems design.

Numeracy

Robotics and Mechatronics gives students opportunities to interpret and use mathematical knowledge and skills in a range of real-life situations. Students use number to calculate and create algorithms; interpret and draw conclusions from data; measure and record; and develop, refine and test concepts using computational thinking in decision-making processes. Students examine the usefulness of results and prepare validation plans for calculating outputs of digital solutions. They use code that enables manipulation of numerical data in digital solutions and apply appropriate mathematical concepts and thinking in programming. Students may use graphs, spreadsheets, diagrams, codes, and statistics to communicate technical data or systems information.

Information and Communication Technology (ICT) Capability

Robotics and Mechatronics enables students to develop an understanding of the characteristics of data, digital systems, audiences, procedures and computational thinking. They apply this understanding when they investigate, communicate and create digital solutions. Students learn to formulate problems, logically organise and analyse data, and represent them in abstract forms. Students use ICT when they investigate and analyse information, evaluate design ideas and communicate and collaborate online. They develop design ideas, generate plans and system diagrams to communicate their designs, and produce solutions using digital technologies.

Critical and Creative Thinking

Students develop capability in critical and creative thinking as they imagine, generate, develop and critically evaluate ideas. They develop reasoning and the capacity for abstraction through challenging problems that do not have straightforward solutions. Students identify and deconstruct problems of interest, refine concepts and reflect on the decision-making process by engaging in systems, design and computational thinking. They identify, explore and clarify technologies information and use that knowledge in a range of situations. Students think critically and creatively about possible, probable and preferred futures. They consider how data, information, systems and tools (past and present) impact on our lives, and how these elements might be better designed and managed. They evaluate current systems and design of products. Experimenting, visualising possibilities, modelling and scoping solutions, designing and working with digital tools, equipment and software helps students to build their visual and spatial thinking, test hypotheses and to create solutions, products and services.

Personal and Social Capability

Students develop personal and social capability as they engage in project management and development in a collaborative workspace. They direct their own learning, plan and carry out investigations, and become independent learners who can apply design thinking, technologies understanding and skills when making decisions. Students develop social and employability skills through working cooperatively in teams, sharing and discussing ideas about problems, progress, and innovative solutions, listening to and respecting the perspectives of others. There are collaborative opportunities for sharing resources and processes, making group decisions, resolving conflict and showing leadership.

Ethical Understanding

Students develop the capacity to understand and apply ethical and socially responsible principles when collaborating with others and creating, sharing and using technologies. When engaged in systems thinking, students evaluate their findings against the criteria of legality, environmental sustainability, economic viability, health, social and emotional responsibility, and social awareness. Students learn about safe and ethical procedures for investigating and working with people, data and materials. They 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 in the school environment helps students to be ethical digital citizens.

Intercultural Understanding

Students consider how technologies are used in diverse communities at local, national, regional and global levels, including their impact and potential to transform people's lives. They explore ways in which past and present practices enable people to use technologies to interact with one another across cultural boundaries. Students investigate how cultural identities and traditions influence the function and form of solutions, products, services and environments designed to meet the needs of daily life now and in the future. In their interactions with others in online communities, students consider the dynamic and complex nature of cultures, including values, beliefs, practices and assumptions.

Cross-Curriculum Priorities

Aboriginal and Torres Strait Islander Histories and Cultures

The Aboriginal and Torres Strait Islander histories and cultures priority provides the opportunity for all young Australians to gain a deeper understanding and appreciation of Aboriginal and Torres Strait Islander histories and cultures, deep knowledge traditions and holistic world views. This knowledge and understanding will enrich all learners' ability to participate positively in the ongoing development of Australia through a deepening knowledge and connection with the world's oldest continuous living cultures.

Asia and Australia's Engagement with Asia

The Asia and Australia's engagement with Asia priority ensures that students learn about and recognise the diversity within and between the countries of the Asia region. They develop knowledge and understanding of Asian societies, cultures, beliefs and environments, and the connections between the peoples of Asia, Australia, and the rest of the world. Asia literacy provides students with the skills to communicate and engage with the peoples of Asia so they can effectively live, work and learn in the region. Students investigate a range of contexts that draw on Asia and Australia's engagement with Asia.

Sustainability

The Sustainability priority provides the opportunity for students to develop the knowledge, skills, values and world views necessary for them to act in ways that contribute to more sustainable patterns of living. This priority is futures-oriented, focusing on protecting environments and creating a more ecologically and socially just world through informed action. Actions that support more sustainable patterns of living require consideration of environmental, social, cultural and economic systems and their interdependence. Representations of data are critical to decision making in sustainability issues.

Robotics and Mechatronics

A - T - M - V

Rationale

This course explores automation and physical computing through the engineering disciplines of robotics and mechatronics. The course introduces fundamental principles of both electronics and mechatronics before investigating microcontrollers that can be programmed to drive electrical circuits and mechanical systems.

Students apply their knowledge to the design and construction of real systems, examining how these solutions address problems, needs and challenges faced by individuals and societies. They design and program control software for autonomous and manual interfaces, correcting for noise and unexpected variations in data inputs and processing.

Robotics and Mechatronics aims to build theoretical and practical knowledge to prepare students for technical pathways such as engineering, IT, electronics and science.

Goals

This course should enable students to:

- analyse problems or challenges to determine needs for solutions or products
- apply the process of design (investigate, design, plan, manage, create, evaluate solutions)
- use critical and creative thinking to design innovative solutions
- produce or create solutions or products to address a need, problem or challenge
- evaluate and use technologies in a range of contexts
- demonstrate problem solving skills
- communicate to different audiences using a range of methods
- engage confidently with and responsibly select and manipulate appropriate technologies – materials, data, systems, tools and equipment.

Unit Titles

- Building & Programming Circuits
- Digital & Analog Interactions
- Robotics & Mechatronic Systems
- Applications of Robotics
- Independent Study

Organisation of Content

Building & Programming Circuits

This unit of study provides opportunities for students to learn about the components of electronics and the design and construction of electronic systems. Students will use design methodologies to investigate, strategise, prototype, evaluate and critically analyse the construction of electronic systems being mindful of and practising Workplace Health and Safety compliance. Students will gain the skills and knowledge necessary to apply the design process using electronics to create innovative and sustainable systems.

Digital & Analog Interactions

This unit of study provides opportunities for students to learn to identify and respond to a real-world need and justify creation of a complex control system.

Students will investigate and program microcontrollers and control systems.

Students will apply the design process to design interface circuits, prototype and construct systems to receive input and collect data from sensors and provide meaningful output.

Robotics & Mechatronic Systems

This unit of study provides opportunities for students to investigate the development of robotics and mechatronic systems. Students critically analyse the effect that robotics and mechanised systems have on human society, built and natural environments and general well-being. Student will use the design process to create and control a product/ solution incorporating mechanical, electrical and control systems.

Applications of Robotics

This unit of study provides opportunities for student to investigate the role of robots and other intelligent machines, including artificial intelligence, machine learning, etc, and the design, construction and application of robotic systems. Students will use system architecture methodologies and the design process to complete a project; prototyping, constructing and evaluating an innovative system. Students will analyse their results and present their findings with justification.

Independent Study

An Independent Study unit has an important place in senior secondary courses. It is a valuable pedagogical approach that empowers students to make decisions about their own learning. An Independent Study unit can be proposed by an individual student for their own independent study and negotiated with their teacher. The program of learning for an Independent Study unit must meet the unit goals and content descriptions as they appear in the course.

Independent Study units are only available to individual students in Year 12. A student can only study a maximum of one Independent Study unit in each course. Students must have studied at least three standard 1.0 units from this course. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Assessment

The identification of criteria within the achievement standards and assessment task types and weightings provides a common and agreed basis for the collection of evidence of student achievement.

Assessment Criteria (the dimensions of quality that teachers look for in evaluating student work) provide a common and agreed basis for judgement of performance against unit and course goals, within and across colleges. Over a course, teachers must use all these criteria to assess students' performance but are not required to use all criteria on each task. Assessment criteria are to be used holistically on a given task and in determining the unit grade.

Assessment Tasks elicit responses that demonstrate the degree to which students have achieved the goals of a unit based on the assessment criteria. The Common Curriculum Elements (CCE) is a guide to developing assessment tasks that promote a range of thinking skills (see Appendix C). It is highly desirable that assessment tasks engage students in demonstrating higher order thinking.

Rubrics are constructed for individual tasks, informing the assessment criteria relevant for a particular task and can be used to assess a continuum that indicates levels of student performance against each criterion.

Assessment Criteria

Students will be assessed on the degree to which they demonstrate:

- knowledge and understanding
- skills.

Assessment Task Types

	Design Process	Design Solution(s)
	Suggested tasks: • design development • design documentation • essay • extended response • oral presentation • podcast • portfolio (design process) • project management • report • research task • return brief • review • seminar • short response • storyboard • web portfolio • workshop	**Suggested tasks:** • digital artefact • digital asset • major project • network • portfolio • product • prototyping • software application • storyboard • website
Weightings in A/V 1.0 and 0.5 units	30 - 70%	30 - 70%
Weightings in T/V 1.0 and 0.5 units	40 - 60%	40 - 60%
Weightings in M/V 1.0 and 0.5 units	30 - 70%	30 - 70%

Additional Assessment Information

- For a standard unit (1.0), students must complete a minimum of three assessment tasks and a maximum of five.
- For a half standard unit (0.5), students must complete a minimum of two and a maximum of three assessment tasks.
- Assessment tasks for a standard (1.0) or half-standard (0.5) unit must be informed by the Achievement Standards.
- Students should experience a variety of task types and different modes of communication to demonstrate the Achievement Standards.

Achievement Standards

Years 11 and 12 achievement standards are written for A-T courses. A single achievement standard is written for M courses.

A Year 12 student in any unit is assessed using the Year 12 achievement standards. A Year 11 student in any unit is assessed using the Year 11 achievement standards. Year 12 achievement standards reflect higher expectations of student achievement compared to the Year 11 achievement standards. Years 11 and 12 achievement standards are differentiated by cognitive demand, the number of dimensions and the depth of inquiry.

An achievement standard cannot be used as a rubric for an individual assessment task. Assessment is the responsibility of the college. Student tasks may be assessed using rubrics or marking schemes devised by the college. A teacher may use the achievement standards to inform development of rubrics. The verbs used in achievement standards may be reflected in the rubric. In the context of combined Years 11 and 12 classes, it is best practice to have a distinct rubric for Years 11 and 12. These rubrics should be available for students prior to completion of an assessment task so that success criteria are clear.

Achievement Standards Technologies A Course - Year 11

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Knowledge and understanding	• analyses the design process and explains decision making • analyses technology concepts and principles and explains the properties of materials or data or systems to address a need, problem or challenge • analyses technologies, explains ethical and sustainable application • thinks critically, drawing on data and information to solve complex problems and analyses opportunities for application of technology	• explains the design process and describes decision making • explains technology concepts and principles and describes the properties of materials or data or systems to address a need, problem or challenge • explains technologies, describes ethical and sustainable application • thinks critically, drawing on data and information to solve problems and explains opportunities for application of technology	• describes the design process with reference to decision making • describes technology concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • describes technologies with some reference to ethical and sustainable application • draws on data and information to solve problems and describes opportunities for application of technology	• identifies major features of the design process with little reference to decision making • identifies major technology concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • identifies major features of technologies with little reference to ethical and sustainable application • identifies some opportunities for application of technology with limited use of information and data	• identifies some features of the design process • identifies few technology concepts and principles with minimal reference to properties of materials or data or systems to address a need, problem or challenge • identifies some features of technologies with no reference to ethical and sustainable application • identifies some opportunities for application of technology with little evidence of use of information and data
Skills	• applies technology concepts, strategies and methodologies with control and precision demonstrating understanding of the historical and cultural context and its impact • creates innovative and high-quality design solutions/products using techniques and approaches and justifies ideas coherently • critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates complex ideas and insights effectively in a range of mediums and justifies ideas coherently using appropriate evidence, metalanguage and accurate referencing • reflects with insight on their own thinking and evaluates inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and its impact • creates innovative and high-quality design solutions/products using techniques and approaches and justifies ideas coherently • analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates ideas effectively in a range of mediums and justifies ideas coherently using appropriate evidence, metalanguage and referencing • reflects on their own thinking and analyses inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and its impact • creates design solutions/products using techniques and approaches and explains ideas • explains potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates ideas appropriately in mediums and explains ideas coherently using appropriate evidence, metalanguage and referencing • reflects on their own thinking and explains inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of its impact • creates design solutions/products using some techniques and approaches and describes ideas • describes analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates ideas in mediums and describes ideas with some use of appropriate evidence with minimal use metalanguage and referencing • reflects on their own thinking with some reference to planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with limited control demonstrating little evidence of understanding its impact • creates design solutions/products using some techniques and approaches and description of ideas • identifies potential prototypes and solutions with little or no reference to their appropriateness and effectiveness via iterative improvement and review • communicates basic ideas in few mediums and describes ideas with little or no use of appropriate evidence and referencing • reflects on their own thinking with little or no reference to planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively

Achievement Standards Technologies T Course - Year 11

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Knowledge and understanding	• critically analyses the design process and evaluates constraints and implications for decision making • synthesises technology theories, concepts and principles and evaluates the properties of materials or data or systems to address a need, problem or challenge • critically analyses technologies and evaluates ethical and sustainable application of technology • thinks critically and creatively, drawing on data and information to solve complex problems	• analyses the design process and explains constraints and implications for decision making • analyses technology theories, concepts and principles and explains the properties of materials or data or systems to address a need, problem or challenge • analyses technologies and explains ethical and sustainable application of technology • thinks critically, drawing on data and information to solve complex problems	• explains the design process and describes constraints and implications for decision making • explains technology theories, concepts and principles and describes the properties of materials or data or systems to address a need, problem or challenge • explains technologies and describes ethical and sustainable application of technology • thinks critically, drawing on data and information to solve problems	• describes the design process with some reference to constraints and implications for decision making • describes technology theories, concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • describes technologies with some reference to ethical and sustainable application of technology • draws on data and information to solve problems and describes opportunities	• identifies features of the design process with little or no reference to decision making • identifies technology theories, concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • identifies some features of technologies with little or no reference to ethical and sustainable application of technology • applying limited use of information and data
Skills	• applies technology concepts, strategies and methodologies with control and precision demonstrating understanding of the historical and cultural context and its impact • creates innovative and high quality design solutions/products using techniques and approaches and justifies ideas coherently • critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates complex ideas and insights effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage and accurate referencing • reflects with insight on their own thinking and that of others and evaluates inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively	• applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and its impact • creates innovative and quality design solutions/products using techniques and approaches and justifies ideas coherently • analyses potential prototypes and solutions explaining their appropriateness and effectiveness via iterative improvement and review • communicates ideas effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage and accurate referencing • reflects on their own thinking and analyses inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively	• applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and its impact • creates quality design solutions/ products using techniques and approaches and justifies ideas coherently • explains potential prototypes and solutions describing their appropriateness and effectiveness via iterative improvement and review • communicates ideas appropriately in a range of mediums to a variety of audiences using appropriate evidence, metalanguage and accurate referencing • reflects on their own thinking and explains inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively	• applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of its impact • creates design solutions/products using some techniques and approaches and explains ideas • describes potential prototypes and solutions with some reference to their appropriateness and effectiveness via iterative improvement and review • communicates ideas in mediums to a variety of audiences using some evidence, metalanguage and referencing • reflects on their own thinking with some reference to inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively	• applies technology concepts, strategies and methodologies with limited control demonstrating little evidence of understanding its impact • plans design solutions/products using some techniques and approaches and describes ideas • identifies potential prototypes and solutions with little or no reference to their appropriateness and effectiveness via iterative improvement and review • communicates basic ideas in mediums to a variety of audiences using minimal evidence, metalanguage and some referencing • reflects on their own thinking with little or no reference to planning, time management, use of appropriate techniques and strategies and capacity to work independently and collaboratively

Achievement Standards Technologies A Course - Year 12

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Knowledge and understanding	• analyses the design process and explains opportunities, constraints and implications for decision making • analyses technology theories, concepts and principles and explains the properties of materials or data or systems to address a need, problem or challenge • analyses technologies in a range of contexts and explains ethical and sustainable application • thinks critically, drawing on data and information to solve complex problems and analyses opportunities for application of technology	• explains the design process and describes opportunities, constraints and implications for decision making • explains technology theories, concepts and principles and describes the properties of materials or data or systems to address a need, problem or challenge • explains technologies in a range of contexts and describes ethical and sustainable application • thinks critically, drawing on data and information to solve problems and explains opportunities for application of technology	• describes the design process with reference to opportunities, constraints and implications for decision making • describes technology theories, concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • describes technologies in a range of contexts with some reference to ethical and sustainable application • draws on data and information to solve problems and describes opportunities for application of technology	• identifies major features of the design process with little reference to opportunities, constraints and implications for decision making • identifies major technology theories, concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • identifies major features of technologies with little reference to ethical and sustainable application • identifies some opportunities for application of technology with limited use of information and data	• identifies some features of the design process with minimal understanding of opportunities, constraints and implications • identifies few technology theories, concepts and principles with minimal reference to properties of materials or data or systems to address a need, problem or challenge • identifies some features of technologies with no reference to ethical and sustainable application • identifies some opportunities for application of technology with little evidence of use of information and data
Skills	• applies technology concepts, strategies and methodologies with control and precision demonstrating understanding of the historical and cultural context and its impact • creates innovative and high-quality design solutions/products using techniques and approaches and justifies ideas coherently • critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates complex ideas and insights effectively in a range of mediums and justifies ideas coherently using appropriate evidence, metalanguage and accurate referencing • reflects with insight on their own thinking and evaluates inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and its impact • creates quality design solutions/products using techniques and approaches and explains ideas coherently • analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates ideas effectively in a range of mediums and justifies ideas coherently using appropriate evidence, metalanguage and referencing • reflects on their own thinking and analyses inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and its impact • creates design solutions/products using some techniques and approaches and explains ideas • explains potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates ideas appropriately in mediums and explains ideas coherently using appropriate evidence, metalanguage and referencing • reflects on their own thinking explains inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of its impact • creates design solutions/products using some techniques and approaches and describes ideas • describes analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates ideas in mediums and describes ideas with some use of appropriate evidence with minimal use metalanguage and referencing • reflects on their own thinking with some reference to planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with limited control demonstrating little evidence of understanding its impact • creates design solutions/products using some techniques and approaches and description of ideas • identifies potential prototypes and solutions with little or no reference to their appropriateness and effectiveness via iterative improvement and review • communicates basic ideas in few mediums and describes ideas with little or no use of appropriate evidence and referencing • reflects on their own thinking with little or no reference to planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively

Achievement Standards Technologies T Course - Year 12

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Knowledge and understanding	• critically analyses the design process and evaluates opportunities, constraints and implications for decision making • critically analyses strategies, methodologies and procedures and evaluates their validity and reliability • synthesises technology theories, concepts and principles and evaluates the properties of material or data or systems to address a need, problem or challenge • critically analyses technologies in a range of contexts and evaluates ethical and sustainable application of technology • thinks critically and creatively, drawing on data and information to solve complex problems and evaluates opportunities for application of technology	• analyses the design process and explains opportunities, constraints and implications for decision making • analyses strategies, methodologies and procedures and explains their validity and reliability • analyses technology theories, concepts and principles and explains the properties of materials or data or systems to address a need, problem or challenge • analyses technologies in a range of contexts and explains ethical and sustainable application of technology • thinks critically, drawing on data and information to solve complex problems and analyses opportunities for application of technology	• explains the design process and describes opportunities, constraints and implications for decision making • explains strategies, methodologies and procedures and describes their validity and reliability • explains technology theories, concepts and principles and describes the properties of materials or data or systems to address a need, problem or challenge • explains technologies in a range of contexts and describes ethical and sustainable application of technology • thinks critically, drawing on data and information at times to solve problems and explains opportunities for application of technology	• describes the design process with some reference to opportunities, constraints and implications for decision making • describes strategies, methodologies and procedures with some reference to validity and reliability • describes technology theories, concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • describes technologies in a range of contexts with some reference to ethical and sustainable application of technology • draws on data and information at times to solve problems and describes opportunities for application of technology	• identifies features of the design process with little or no reference to decision making • identifies some strategies, methodologies and procedures with little reference to validity and reliability • identifies technology theories, concepts and principles with some reference to properties of materials or data or systems to address a need, problem or challenge • identifies some features of technologies in a range of contexts with little or no reference to ethical and sustainable application of technology • identifies some opportunities for application of technology with limited use of information and data
Skills	• applies technology concepts, strategies and methodologies demonstrating an understanding of the historical and cultural context and impact on individuals, groups, communities and society • creates innovative and high quality design solutions/products using techniques and approaches and justifies ideas coherently • critically analyses potential prototypes and solutions evaluating their appropriateness and effectiveness via iterative improvement and review • communicates complex ideas and insights effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage and accurate referencing • reflects with insight on their own thinking and that of others and evaluates inter and intrapersonal skills including planning, time management, use of appropriate techniques & strategies and capacity to work independently and collaboratively	• applies technology concepts, strategies and methodologies with control demonstrating understanding of the historical and cultural context and impact on individuals, groups, communities and society • creates innovative and quality design solutions/products using techniques and justifies ideas coherently • analyses potential prototypes and solutions explaining their appropriateness and effectiveness via iterative improvement and review • communicates ideas effectively in a range of mediums to a variety of audiences using appropriate evidence, metalanguage and accurate referencing • reflects on their own thinking and that of others and analyses inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with some control demonstrating understanding of context and the impact on individuals, groups, communities and society • creates quality design solutions/ products using techniques and justifies ideas coherently • explains potential prototypes and solutions describing their appropriateness and effectiveness via iterative improvement and review • communicates ideas appropriately in a range of mediums to a variety of audiences using appropriate evidence, metalanguage and accurate referencing • reflects on their own thinking and that of others and explains inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with minimal control demonstrating understanding of the impact on individuals, groups, communities and society • creates design solutions/products using some techniques and explains ideas • describes analyses potential prototypes and solutions with some reference to their appropriateness and effectiveness via iterative improvement and review • communicates ideas in mediums to a variety of audiences using some evidence, metalanguage and referencing • reflects on their own thinking with some reference to inter and intrapersonal skills including planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively	• applies technology concepts, strategies and methodologies with limited control demonstrating little evidence of understanding of the impact on individuals, groups, communities and society • plans design solutions/products using some techniques and describes ideas • identifies potential prototypes and solutions with little or no reference to their appropriateness and effectiveness via iterative improvement and review • communicates basic ideas in mediums to a variety of audiences using minimal evidence, metalanguage and some referencing • reflects on their own thinking with little or no reference to planning, time management, use of appropriate techniques and strategies and capacity to work both independently and collaboratively

Achievement Standards Technologies M Course - Years 11 and 12

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typically*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Knowledge and understanding	• describes and uses the design process and procedures with independence • describes practical techniques and materials required to address a need or solve a problem with independence	• describes and uses the design process and procedures with some assistance • describes practical techniques and materials required to address a need or solve a problem with some assistance	• recounts design procedures used with assistance • recounts practical techniques and materials used to solve a problem with assistance	• identifies design procedures with continuous guidance • uses practical techniques and materials required with continuous guidance	• identifies design procedures with direct instruction • identifies practical techniques and materials with direct instruction
Skills	• communicates ideas using appropriate terminology with independence • makes discerning choice of strategies and procedures to use technology with independence • demonstrates interpersonal and intrapersonal skills in a range of technology contexts with independence • plans and undertakes independent inquiries with independence • create design solutions/products with independence	• communicates ideas using appropriate terminology with some assistance • selects strategies and procedures to use technology with some assistance • demonstrates interpersonal and intrapersonal skills in a range of technology contexts with some assistance • plans and undertakes independent inquiries with some assistance • create design solutions/products with some assistance	• communicates ideas using appropriate, terminology with assistance • selects strategies and procedures to use technology with assistance • demonstrates interpersonal and intrapersonal skills in technology contexts with assistance • undertakes guided inquiries with assistance • create design solutions/products with assistance	• communicates ideas using appropriate, terminology with continuous guidance • selects strategies and procedures to use technology with continuous guidance • demonstrates interpersonal and intrapersonal skills in technology contexts with continuous guidance • undertakes guided inquiries with continuous guidance • create design solutions/products with continuous guidance	• communicates ideas using appropriate terminology with direct instruction • selects strategies and procedures to use technology with direct instruction • demonstrates interpersonal and intrapersonal skills in technology contexts with direct instruction • undertakes simple research on a topic with direct instruction • create design solutions/products with direct instruction

Building & Programming Circuits — Value: 1.0

Building & Programming Circuits a — **Value 0.5**

Building & Programming Circuits b — **Value 0.5**

Unit Description

This unit of study provides opportunities for students to learn about the components of electronics and the design and construction of electronic systems. They will use design methodologies to investigate, strategise, prototype, test and critically analyse the construction of electronic systems. Students will gain the skills and knowledge necessary to apply a design process using electronics to create innovative and sustainable systems.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse and use technologies in a range of contexts • produce or create solutions or products to address a need, problem or challenge	• evaluate and use technologies in a range of contexts • produce or create solutions or products to address a need, problem or challenge	• use technologies in a range of contexts • produce or create solutions or products to address a need, problem or challenge

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Design process		
• create an electronic circuit, for example, to run a LED • apply a design process to solve a problem or address a need • understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	• design and create an electronic circuit, for example, to run a LED • evaluate and apply a design process to solve a problem or address a need • understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	• apply the design processes to solve a problem or address a need • understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live

A Course	T Course	M Course
Strategies, methodologies and procedures		
• apply simple project management tools and apply WH&S procedures in work environments	• analyse and apply simple project management tools and apply WH&S procedures in work environments	• apply project management and WH&S concepts in work environments
• use design methodologies simulators and prototyping techniques to build and test a circuit using tools such as multimeters, oscilloscopes	• use design methodologies simulators and prototyping techniques to build and test a circuit using tools such as multimeters, oscilloscopes	• describe fundamental programming concepts used in microcontroller environments
• apply strategies to build and program circuits, for example, soldering, programming languages	• evaluate and apply strategies to build and program circuits, for example, soldering, programming languages	
• analyse features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment	• evaluate features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment	
• apply strategies, methodologies and procedures to produce an electrical circuit	• apply strategies, methodologies and procedures to produce an electrical circuit	• use existing circuit designs, simulation and construction of electronic systems
• analyse prototyping circuits using breadboards, connectivity, soldering, control system and its effectiveness to satisfy design brief	• evaluate prototyping circuits using breadboards, connectivity, soldering, control system and its effectiveness to satisfy design brief	• apply skills in soldering or prototyping electronics in physical or simulated environments
• understand there are design tools which can, like any other type tool, extend and improve our ability to accomplish goals	• understand there are design tools which can, like any other type tool, extend and improve our ability to accomplish goals	
Theories, concepts and materials		
• analyse theories on circuit design and control systems, for example, Kirchhoff ‘s current law	• critically analyse theories on circuit design and control systems, for example, Kirchhoff‘s current law	• examine electronic and electrical components, circuit design and control systems
• analyse materials used in electronic systems to construct an operational circuit	• evaluate materials used in electronic systems to construct an operational circuit	• describe digital and analog systems
• investigate models of energy systems and justify choices to support project construction	• investigate models of energy systems and justify choices to support project construction	

A Course	T Course	M Course
• understand ethical and legal implications when using pre-existing circuit designs and algorithms • understand that electronic sensors receive inputs, generate outputs, and work in tandem to achieve electronic control; inputs and outputs can interact in a feedback loop • apply programming concepts used in microcontroller platforms requiring input and output using components, for example: sensors, IR, microphone, thermometer, LEDs, buttons, data loggers etc	• understand ethical and legal implications when using pre-existing circuit designs and algorithms • understand that electronic sensors receive inputs, generate outputs, and work in tandem to achieve electronic control; inputs and outputs can interact in a feedback loop • apply programming concepts used in microcontroller platforms requiring input and output using components, for example: sensors, IR, microphone, thermometer, LEDs, buttons, data loggers etc	• implement a circuit incorporating sensors that that are programmed and controlled by a microcontroller
Contexts		
• investigate ethically sourced materials and their use in controlled and monitored systems, for example, copper • analyse ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility • analyse how components of electronic systems and used materials are constructed, recycled and disposed	• investigate ethically sourced materials and their use in controlled and monitored systems, for example, copper • evaluate ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility • critically analyse how components of electronic systems and used materials are constructed, recycled and disposed	• describe sustainability and ethical standards

A Course	T Course	M Course
Communication		
• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate ideas and justifies construction and design of a purpose-built system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate ideas and justifies construction and design of a purpose-built system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate ideas to others using technical terms, both orally and in writing • apply strategies for collaboration and solving problems in teams • communicate ideas and describe choices
Reflection		
• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • reflect on processes to design and test electronic circuits and measure against a criterion	• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • reflect on processes to design and test electronic circuits and measure against a criterion	• reflect on how to manage deadlines and improve own learning

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions.

A program of learning is what a college provides to implement the course for a subject meeting students' needs and interests. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content if it meets the specific unit goals.

For colleges wishing to deliver the VET qualification, there is flexibility for a teacher (provided the RTO has scope) to develop a program of learning aligned with the elements of the VET competencies and A-T-M content descriptions. The knowledge, skills and understandings within the competencies reflect the knowledge, skills and understandings of the BSSS course unit content descriptions.

Alternatively, a college may choose the course without the VET qualification. In delivering the course teachers write a program of learning aligned with students' needs and interests, meeting the A-T-M content descriptions.

Units of Competency

Competence must be demonstrated over time and in the full range of ICT contexts. Teachers must use this unit document in conjunction with the Units of Competence from the **ICT20120 Certificate II in Applied Digital Technologies** or **ICT30120 Certificate III in Information Technology**, which provide performance criteria, range statements and assessment contexts.

Teachers must address all content related to the competencies embedded in this unit. Reasonable adjustment may be made only to the mode of delivery, context and support provided according to individual student needs.

Competencies are attached to units and must be delivered in those units. However, ongoing assessment of competencies can occur while the student is enrolled as an ACT Senior Secondary student.

In order to be deemed competent to industry standard, assessment must provide authentic, valid, sufficient and current evidence as indicated in the relevant Training Package.

Certificate II in Applied Digital Technologies (Release 1)

The following **core** units must be delivered and assessed over the semester: (if applicable)

Code	Competency Title
BSBWHS211	**Contribute to the health and safety of self and others**
ICTICT215	**Operate digital media technology packages**

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTICT216	Design basic organisational documents using computing packages

Certificate III in Information Technology

The following **core** units must be delivered and assessed over the semester: (if applicable)

Code	Competency Title
BSBCRT301	**Develop and extend critical and creative thinking skills**
ICTPRG302	**Apply introductory programming techniques**

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTICT216	Design and create basic organisational documents
ICTWHS204	Follow work health and safety and environmental policy and procedures
ICTICT214	Operate application software packages

All units of competency are optional for students undertaking an M course.

It is essential to access training.gov.au for detailed up to date information relating to the above competencies.

Assessment

Refer to pages 10-12.

Digital & Analog Interactions — Value: 1.0

Digital & Analog Interactions a — **Value 0.5**

Digital & Analog Interactions b — **Value 0.5**

Unit Description

This unit of study provides opportunities for students to learn to respond to a real-world need and justify creation of a complex control system. Students will investigate and program microcontrollers and control systems. Students will apply a design process to design interface circuits, prototype, construct and test systems to receive input and collect data from sensors and provide meaningful output.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse and use technologies in a range of contexts	• evaluate and use technologies in a range of contexts	• use technologies in a range of contexts
• produce or create solutions or products to address a need, problem or challenge	• produce or create solutions or products to address a need, problem or challenge	• produce or create solutions or products to address a need, problem or challenge

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Design process		
• create electronic, mechanical interfaces with input and output systems making provision for interaction, for example, a light sensor and reactive motors	• design and create electronic, mechanical interfaces with input and output systems making provision for interaction, for example, a light sensor and reactive motors	
• apply a design process to solve a problem or address a need	• apply a design process to solve a problem or address a need	• apply the design process to solve a problem or address a need
• understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	• understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	• use design methodologies to plan and prototype control systems

A Course	T Course	M Course
Strategies, methodologies and procedures		
• analyse and apply project management tools and WH&S concepts in work environments	• analyse and apply project management tools and WH&S concepts in work environments	• apply WH&S concepts in work environments
• use design methodologies to build a controlled system that collects data and provides meaningful output	• use design methodologies to build a controlled system that collects data and provides meaningful output	• use a control system platform, for example, Raspberry Pi, Arduino
• investigate strategies to design interfaces for programmed circuits build and program circuits, for example, keyboard input, user control, data storage	• investigate strategies to design interfaces for programmed circuits build and program circuits, for example, keyboard input, user control, data storage	
• analyse features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment and security of data	• evaluate features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment and security of data	
• apply strategies, methodologies and procedures to produce a system that collects data that can be retrieved and interpreted	• apply strategies, methodologies and procedures to produce a system that collects data that can be retrieved and interpreted	
• analyse prototyping circuits and control systems using breadboards, connectivity, soldering, control system	• evaluating prototyping circuits and control systems using breadboards, connectivity, soldering, control system	• use prototyping electronics skills, for example, breadboards, connectivity, soldering
• understand there are design tools which can, like any other type tool, extend and improve our ability to accomplish goals	• understand there are design tools which can, like any other type tool, extend and improve our ability to accomplish goals	
Theories, concepts and materials		
• analyse theories on operation of machine control systems, for example, algorithms, programs, mechanical and other subsystems that make up a system	• critically analyse theories on operation of machine control systems, for example, algorithms, programs, mechanical and other subsystems that make up a system	• describe microcontrollers in everyday applications

A Course	T Course	M Course
• analyse digital and analogue materials used in electronic systems to construct an operational system	• evaluate digital and analogue materials used in electronic systems to construct an operational system	
• program algorithms to control systems choosing from relevant programming languages, for example, GUI, Python, C, C#, JS etc that collects data to provide meaningful information	• investigate and program algorithms to control systems choosing from relevant programming languages, for example, GUI, Python, C, C#, JS etc that collects data to provide meaningful information	• program given algorithms to control systems using relevant programming languages, for example, GUI, Python, C, C#, JS etc that collects data to provide meaningful information
• investigate and understand analog to digital conversion (ADC) and digital to analog conversion (DAC) technologies, for example, 8 bit/12 bit sampling rate	• investigate and understand analog to digital conversion (ADC) and digital to analog conversion (DAC) technologies, for example, 8 bit/12 bit sampling rate	
• apply programming concepts used in microcontroller platforms and tests security and reliability of the system	• apply programming concepts used in microcontroller platforms and tests security and reliability of the system	
• understand ethical and legal implications when using pre-existing circuit designs and algorithms	• critically analyse ethical and legal implications when using pre-existing circuit designs and algorithms	
• understand that electrical systems can be used efficiently and effectively to control and direct power	• understand that electrical systems can be used efficiently and effectively to control and direct power	
	• understand laws of physics; in any mechanical system, some energy is inevitably lost	
• apply programming concepts used in microcontroller platforms requiring input and output in real world scenarios	• apply programming concepts used in microcontroller platforms requiring input and output in real world scenarios	
Contexts		
• investigate ethically sourced materials and their use in controlled and monitored systems, for example, copper	• investigate ethically sourced materials and their use in controlled and monitored systems, for example, copper	• describe ethically sourced materials, for example, copper

A Course	T Course	M Course
• analyse ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility • analyse the social, historical and cultural effects that a simple mechatronic system has had on society	• critically analyse ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility • critically analyse the social, historical and cultural effects that a simple mechatronic system has had on society	
Communication		
• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate ideas and justifies construction and design of a purpose-built system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate ideas and justifies construction and design of a purpose-built system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate ideas to others using technical terms, both orally and in writing • apply strategies for collaboration and solving problems in teams • communicate ideas and describe choices
Reflection		
• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • reflect on processes to design electronic systems to collect data and measure against a criterion	• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • reflect on processes to design electronic systems to collect data and measure against a criterion	• reflect on how to manage deadlines and improve own learning

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

For colleges wishing to deliver the VET qualification, there is flexibility for a teacher (provided the RTO has scope) to develop a program of learning aligned with the elements of the VET competencies and A-T-M content descriptions. The knowledge, skills and understandings within the competencies reflect the knowledge, skills and understandings of the BSSS course unit content descriptions.

Alternatively, a college may choose the A-T-M course without the VET qualification. In delivering the course teachers will write a program of learning aligned with students' needs and interests, meeting the A-T-M content descriptions.

Units of Competency

Competence must be demonstrated over time and in the full range of ICT contexts. Teachers must use this unit document in conjunction with the Units of Competence from the ICT20120 Certificate II in Applied Digital Technologies (Release 1) or ICT30120 Certificate III in Information Technology, which provide performance criteria, range statements and assessment contexts.

Teachers must address all content related to the competencies embedded in this unit. Reasonable adjustment may be made only to the mode of delivery, context and support provided according to individual student needs.

Competencies are attached to units and must be delivered in those units. However, ongoing assessment of competencies can occur while the student is enrolled as an ACT Senior Secondary student.

In order to be deemed competent to industry standard, assessment must provide authentic, valid, sufficient and current evidence as indicated in the relevant Training Package.

Certificate II in Applied Digital Technologies

The following **core** units must be delivered and assessed over the semester (if applicable):

Code	Competency Title
ICTICT213	**Use computer operating systems and hardware**
ICTICT214	**Operate application software packages**

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTICT206	Install software applications
ICTICT207	Integrate commercial computing packages

Certificate III in Information Technology

The following **core** units must be delivered and assessed over the semester (if applicable):

Code	Competency Title
BSBXTW301	**Work in a team**
ICTICT313	**Identify IP, ethics and privacy policies in ICT environments**

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTICT309	Create ICT user documentation
ICTICT312	Use advanced features of applications
ICTPRG435	Write scripts for software applications

All units of competency are optional for students undertaking an M course.

It is essential to access training.gov.au for detailed up to date information relating to the above competencies.

Assessment

Refer to pages 10-12.

Robotics & Mechatronic Systems — Value: 1.0

Robotics & Mechatronic Systems a — **Value 0.5**

Robotics & Mechatronic Systems b — **Value 0.5**

Unit Description

This unit of study provides opportunities for students to investigate the development of robotics and mechatronic systems. Students critically analyse the effect that robotics and mechanised systems have on human society, built and natural environments and general well-being. Student will use the design process to create, test and control a product or solution incorporating mechanical, electrical and control systems.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse and use technologies in a range of contexts	• evaluate and use technologies in a range of contexts	• use technologies in a range of contexts
• produce or create solutions or products to address a need, problem or challenge	• produce or create solutions or products to address a need, problem or challenge	• produce or create solutions or products to address a need, problem or challenge

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Design process		
• create a mechatronic or robotic system using electronic and mechanical control system with input and output, for example, a lolly dispenser	• create a mechatronic or robotic system using electronic and mechanical control system with input and output, for example, a lolly dispenser	• create electronic, mechanical interfaces with input and output systems
• apply a design process to solve a problem or address a need	• apply a design process to solve a problem or address a need	• apply the design process to solve a problem or address a need
• understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	• understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	

A Course	T Course	M Course
Strategies, methodologies and procedures		
• analyse and apply project management tools and WH&S concepts in work environments • use design methodologies to prototype a mechatronic system • investigate strategies to program and control robotic or mechanised systems, for example, using sensors and components • analyse features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment • apply strategies, methodologies and procedures to produce a system that incorporates mechanical, electrical and control • create a prototype for a mechanical and electrical system using actuators, effectors, gears, motors, levers and control systems programmed to respond to input • understand that all real-world design solutions are created in a context of parameters and special considerations: most of these parameters concern a human element	• analyse and apply project management tools and WH&S concepts in work environments • use design methodologies to prototype a mechatronic system • investigate strategies to program and control robotic or mechanised systems, for example, using sensors and components • evaluate features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment • apply strategies, methodologies and procedures to produce a system that incorporates mechanical, electrical and control • create a prototype for a mechanical and electrical system using actuators, effectors, gears, motors, levers and control systems programmed to respond to input • understand that all real-world design solutions are created in a context of parameters and special considerations: most of these parameters concern a human element	• use simple design methodologies
Theories, concepts and materials		
• analyse theories on robotic construction and use, for example, Isaac Asimov's law of robotics	• critically analyse theories on robotic construction and use, including ethical issues for example, Isaac Asimov's law of robotics and how they apply to contrasting applications	• describe the fundamentals of machines and mechanisms

A Course	T Course	M Course
• evaluate materials used in electronic and mechanical systems to construct an operational system • investigate the principles of robotic and mechatronic movement, including force, velocity, acceleration, actuator, power systems and gearing • apply programming concepts used in microcontroller platforms and tests security and reliability of the system • understand ethical and legal implications when creating designs and products, for example, intellectual property, copyright • understand that robots can be designed and built using software systems that are capable of handling much more information than humans and at a far more rapid pace	• evaluate materials used in electronic and mechanical systems to construct an operational system • investigate the principles of robotic and mechatronic movement, including force, velocity, acceleration, actuator, power systems and gearing • apply programming concepts used in microcontroller platforms and tests security and reliability of the system • understand ethical and legal implications when creating designs and products, for example, intellectual property, copyright • understand that robots can be designed and built using software systems that are capable of handling much more information than humans and at a far more rapid pace • understand laws of physics: energy cannot be created, but its' form can be changed	• describe the principles of robotic and mechatronic movement
Contexts		
• investigate ethical use of systems and environmental implications of system construction and deconstruction • analyse ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility	• investigate ethical use of systems and environmental implications of system construction and deconstruction • analyse ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility	

A Course	T Course	M Course
• analyse the role and social implications of intelligent machines in society, for example, manufacturing, the military, civil society, service industries	• critically analyse the role and social implications of intelligent machines in society, for example, manufacturing, the military, civil society, service industries	• describe the role of intelligent machines in society
Communication		
• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate ideas and justifies construction and design of a purpose-built system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate ideas and justifies construction and design of a purpose-built system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate ideas to others using technical terms, both orally and in writing • apply strategies for collaboration and solving problems in teams • communicate ideas and describe choices
Reflection		
• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • present, communicate and reflect on processes to design electronic systems to collect data and measure against a criterion	• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • present, communicate and reflect on processes to design electronic systems to collect data and measure against a criterion	• reflect on how to manage deadlines and improve own learning

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

For colleges wishing to deliver the VET qualification, there is flexibility for a teacher (provided the RTO has scope) to develop a program of learning aligned with the elements of the VET competencies and A-T-M content descriptions. The knowledge, skills and understandings within the competencies reflect the knowledge, skills and understandings of the BSSS course unit content descriptions.

Alternatively, a college may choose the A-T-M course without the VET qualification. In delivering the course teachers will write a program of learning aligned with students' needs and interests, meeting the A-T-M content descriptions.

Units of Competency

Competence must be demonstrated over time and in the full range of ICT contexts. Teachers must use this unit document in conjunction with the Units of Competence from the **ICT20120 Certificate II in Applied Digital Technologies (Release 1) or ICT30120 Certificate III in Information Technology**, which provide performance criteria, range statements and assessment contexts.

Teachers must address **all content** related to the competencies embedded in this unit. Reasonable adjustment may be made only to the mode of delivery, context and support provided according to individual student needs.

Competencies are attached to units and must be delivered in those units. However, ongoing assessment of competencies can occur while the student is enrolled as an ACT Senior Secondary student.

In order to be deemed competent to industry standard, assessment must provide authentic, valid, sufficient and current evidence as indicated in the relevant Training Package.

Certificate II in Applied Digital Technologies

The following **core** units must be delivered and assessed over the semester (if applicable):

Code	Competency Title
BSBTEC202	**Use digital technologies to communicate in a work environment**

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTWEB306	Develop web presence using social media
ICTSAS203	Connect hardware peripherals

Certificate III in Information Technology

The following **core** units must be delivered and assessed over the semester (if applicable):

Code	Competency Title
BSBXCS303	**Securely manage personally identifiable information and workplace information**
ICTSAS305	**Provide ICT advice to clients**

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTICT211	Develop solutions for basic ICT malfunctions and problems
ICTICT311	Customise packaged software applications

All units of competency are optional for students undertaking an M course.

It is essential to access training.gov.au for detailed up to date information relating to the above competencies.

Assessment

Refer to pages 10-12.

Applications of Robotics — Value: 1.0

Applications of Robotics a — **Value 0.5**

Applications of Robotics b — **Value 0.5**

Unit Description

This unit of study provides opportunities for students to investigate the role of robots and other intelligent machines, including technologies such as, but not limited to: artificial intelligence, machine learning, neural networks etc. Students will investigate the design of a system, its' construction, and application of automated technologies. They will use a design process to complete a project; prototyping, testing, constructing and evaluating an innovative system. Students will analyse their results and present their findings with justification.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• analyse and use technologies in a range of contexts • produce or create solutions or products to address a need, problem or challenge	• evaluate and use technologies in a range of contexts • produce or create solutions or products to address a need, problem or challenge	• use technologies in a range of contexts • produce or create solutions or products to address a need, problem or challenge

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Design process		
• create electronic, mechanical interfaces with input and output systems to prototype a system or sub-system to meet a need, for example, a sorting robot • apply a design process to solve a problem or address a need • understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	• create electronic, mechanical interfaces with input and output systems to prototype a system or sub-system to meet a need, for example, a sorting robot • apply a design process to solve a problem or address a need • understand that a design process is a method that is used to solve technological challenges to change and improve products for the way we live	• create electronic, mechanical interfaces with input and output systems • apply the design process to solve a problem or address a need • use a given programming and circuitry design to construct a project

A Course	T Course	M Course
Strategies, methodologies and procedures		
• analyse and apply project management tools and WH&S concepts in work environments	• analyse and apply project management tools and WH&S concepts in work environments	
• use design methodologies to prototype and build a robotic system	• use design methodologies to prototype and build a robotic system	• use simple design methodologies to plan and prototype robotic systems
• investigate strategies to program and control robotic or mechanised systems for real world purpose, for example, household appliances, manufacturing robots	• investigate strategies to program and control robotic or mechanised systems for real world purpose, for example, household appliances, manufacturing robots	• replicate or prototype a system using software applications or a physical model construction
• analyse features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment	• evaluate features of the system by troubleshooting and providing contingencies features to ensure safety of life and natural environment	
• apply strategies, methodologies and procedures to produce an innovative system incorporating mechanical, electrical and control	• apply strategies, methodologies and procedures to produce an innovative system incorporating mechanical, electrical and control	
• create a protype for a complete functioning robotic system using a range of components and a control system	• create a protype for a complete functioning robotic system using a range of components and a control system	
• understand that a very large part of designing is re-designing: the first solution is rarely the best; improvements continue to suggest themselves	• understand that a very large part of designing is re-designing: the first solution is rarely the best; improvements continue to suggest themselves	

A Course	T Course	M Course
Theories, concepts and materials		
• analyse theories on robotic construction and use, for example, Stephen Hawking's concept of 'the Singularity' in the relation to development of artificial intelligence	• critically analyse theories on robotic construction and use, for example, Stephen Hawking's concept of 'the Singularity' in the relation to development of artificial intelligence	• describe machine intelligence, learning, vision, motion and other ways in which robots and machines interact with and navigate the world
• evaluate materials used in electronic and mechanical systems to construct a robotic system	• evaluate materials used in electronic and mechanical systems to construct a robotic system	
• investigate artificial intelligence concepts and solutions and related applications, for example, machine learning, computer vision, facial and voice recognition	• investigate artificial intelligence concepts and solutions and related applications, for example, machine learning, computer vision, facial and voice recognition	• describe artificial intelligence systems and applications
• apply programming concepts used in microcontroller platforms and tests security and reliability of the system	• apply programming concepts used in microcontroller platforms and tests security and reliability of the system	
• understand ethical and legal implications when creating designs and products, for example, intellectual property, copyright, creative commons	• understand ethical and legal implications when creating designs and products, for example, intellectual property, copyright, creative commons	
• understand that robots can be designed and built using software systems that are capable of handling much more information than humans and at a far more rapid pace, for example, adaptive technology, driverless cars, quantum computers	• understand that robots can be designed and built using software systems that are capable of handling much more information than humans and at a far more rapid pace, for example, adaptive technology, driverless cars, quantum computers	
	• understand laws of physics: in any mechanical system, some energy is inevitably lost	

A Course	T Course	M Course
Contexts		
• investigate and demonstrate ethical use of systems and environmental implications of system construction and deconstruction • analyse ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • analyse how culture influences the development of robotic and automated system • analyse the driving forces behind the development of robotic systems in society and the justification and impetus for innovation, for example, Boston Dynamics, NASA, JPL	• investigate and demonstrate ethical use of systems and environmental implications of system construction and deconstruction • evaluate ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • analyse how culture influences the development of robotic and automated system • analyse the driving forces behind the development of robotic systems in society and the justification and impetus for innovation, for example, Boston Dynamics, NASA, JPL	• describe basic electronics, control systems and mechanical systems
Communication		
• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate ideas and justifies construction and design of a purpose-built innovative system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • apply strategies for collaboration and solving problems in teams • communicate complex ideas and justifies construction and design of a purpose-built innovative system • justify ideas coherently using appropriate evidence and accurate referencing	• communicate ideas to others using technical terms, both orally and in writing • apply strategies for collaboration and solving problems in teams • communicate ideas and describe choices

A Course	T Course	M Course
Reflection		
• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • present, communicate and reflect on processes to design electronic systems to collect data and measure against a criterion	• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • present, communicate and reflect on processes to design electronic systems to collect data and measure against a criterion	• reflect on how to manage deadlines and improve own learning

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions.

A program of learning is what a college provides to implement the course for a subject meeting students' needs and interests. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content if it meets the specific unit goals.

For colleges wishing to deliver the VET qualification, there is flexibility for a teacher (provided the RTO has scope) to develop a program of learning aligned with the elements of the VET competencies and A-T-M content descriptions. The knowledge, skills and understandings within the competencies reflect the knowledge, skills and understandings of the BSSS course unit content descriptions.

Alternatively, a college may choose the A-T-M course without the VET qualification. In delivering the course teachers write a program of learning aligned with students' needs and interests, meeting the A-T-M content descriptions.

Units of Competency

Competence must be demonstrated over time and in the full range of ICT contexts. Teachers must use this unit document in conjunction with the Units of Competence from the **ICT20120 Certificate II in Applied Digital Technologies (Release 1) or ICT30120 Certificate III in Information Technology**, which provide performance criteria, range statements and assessment contexts.

Teachers must address **all content** related to the competencies embedded in this unit. Reasonable adjustment may be made only to the mode of delivery, context and support provided according to individual student needs.

Competencies are attached to units and must be delivered in those units. However, ongoing assessment of competencies can occur while the student is enrolled as an ACT Senior Secondary student.

In order to be deemed competent to industry standard, assessment must provide authentic, valid, sufficient and current evidence as indicated in the relevant Training Package.

Certificate II in Applied Digital Technologies

The following **core** units must be delivered and assessed over the semester (if applicable):

Code	Competency Title
BSBSUS211	**Participate in sustainable work practices**

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTICT219	Interact and resolve queries with ICT clients
ICTICT221	Identify and use specific industry standard technologies
ICTICT222	Research and share ICT solutions for Indigenous users
ICTSAS211	Develop solutions for basic ICT malfunctions and problems

Certificate III in Information Technology

The following **core** units must be delivered and assessed over the semester (if applicable):

Code	Competency Title
Nil required	

Any **elective** competencies selected to meet packaging rules from the list below may also be delivered:

Code	Competency Title
ICTPMG301	Contribute as part of an IT project management team

All units of competency are optional for students undertaking an M course.

It is essential to access training.gov.au for detailed up to date information relating to the above competencies.

Assessment

Refer to pages 10-12.

Independent Study — Value: 1.0

Independent Study a — **Value 0.5**

Independent Study b — **Value 0.5**

Prerequisites

Independent Study units are only available to individual students in Year 12. A student can only study a maximum of one Independent Study unit in each course. Students must have studied at least three standard 1.0 units from this course. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Unit Description

An Independent Study unit has an important place in senior secondary courses. It is a valuable pedagogical approach that empowers students to make decisions about their own learning. An Independent Study unit can be proposed by an individual student for their own independent study and negotiated with their teacher. The program of learning for an Independent Study unit must meet the unit goals and content descriptions as they appear in the course.

NOTE: There are **no VET competencies** attached to this unit. VET competencies may be assessed where relevant to the focus of the unit. The competencies selected will need to align with the requirements of the Training Package and to the competencies already completed during the course if students are to achieve the relevant qualifications.

Duplication of Content

Students must not duplicate topics, case studies or issues studied in this course.

Specific Unit Goals

This unit should enable students to:

A Course	T Course	M Course
• undertake a project using design methodologies to plan and develop a robotic or mechatronic system or subsystem that satisfies a need or solves a problem	• undertake a project using design methodologies to plan and develop a robotic or mechatronic system or subsystem that satisfies a need or solves a problem	• undertake a project using design methodologies to plan and develop a robotic or mechatronic system or subsystem that satisfies a need or solves a problem

Content Descriptions

All knowledge, understanding and skills below must be delivered:

A Course	T Course	M Course
Design process		
• design and create an independent project • apply a design process to solve a problem or address a need	• design and create an independent project • apply a design process to solve a problem or address a need	• design and create an independent project

A Course	T Course	M Course
• develop success criteria to measure project outcomes against	• develop success criteria to measure project outcomes against	
Strategies, methodologies and procedures		
• analyse and apply suitable project management methodology • use design methodologies to prototype and build a mechatronic or robotic system	• analyse and apply suitable project management methodology • use design methodologies to prototype and build a mechatronic or robotic system	• apply project management methodology • use design methodologies to prototype and build a mechatronic or robotic system
Theories, concepts and materials		
• analyse the theories and principles of robotics and/or mechatronics that contributed to your project	• critically analyse the theories and principles of robotics and or mechatronics that contributed to your project	• describe the theories and principles of robotics and/or mechatronics that contributed to your project
Contexts		
• investigate and demonstrate ethical use of systems and environmental implications of system construction and deconstruction • analyse ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility	• investigate and demonstrate ethical use of systems and environmental implications of system construction and deconstruction • evaluate ways a system could be improved with innovation incorporating sustainability and ethical standards to reduce e-waste • demonstrate cultural understanding, for example, interacting and empathising with others, reflecting on experiences and taking responsibility	• describe basic electronics, control systems and mechanical systems
Communication		
• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • communicate ideas and justifies construction and design of a purpose-built innovative system	• communicate accurately with others using correct terms in an appropriate format, both orally and in writing • communicate ideas and insights in a range of appropriate mediums to a variety of audiences • communicate complex ideas and justifies construction and design of a purpose-built innovative system	• communicate ideas to others using technical terms, both orally and in writing

A Course	T Course	M Course
• apply strategies for collaboration and solving problems in teams • justify ideas coherently using appropriate evidence and accurate referencing	• apply strategies for collaboration and solving problems in teams • justify ideas coherently using appropriate evidence and accurate referencing	• apply strategies for collaboration and solving problems in teams • communicate ideas and describe choices
Reflection		
• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • present, communicate and reflect on processes to a system and measure against a criterion	• reflect on own learning style and performance, including planning and time management, to develop strategies to improve own learning • present, communicate and reflect on processes to a system and measure against a criterion	• reflect on how to manage deadlines and improve own learning

A guide to reading and implementing content descriptions

Content descriptions specify the knowledge, understanding and skills that students are expected to learn and that teachers are expected to teach. Teachers are required to develop a program of learning that allows students to demonstrate all the content descriptions. The lens which the teacher uses to demonstrate the content descriptions may be either guided through provision of electives within each unit or determined by the teacher when developing their program of learning.

A program of learning is what a college provides to implement the course for a subject. It is at the discretion of the teacher to emphasis some content descriptions over others. The teacher may teach additional (not listed) content provided it meets the specific unit goals. This will be informed by the student needs and interests.

For colleges wishing to deliver the VET qualification, there is flexibility for a teacher (provided the RTO has scope) to develop a program of learning aligned with the elements of the VET competencies and A-T-M content descriptions. The knowledge, skills and understandings within the competencies reflect the knowledge, skills and understandings of the BSSS course unit content descriptions.

Alternatively, a college may choose the A-T-M course without the VET qualification. In delivering the course teachers will write a program of learning aligned with students' needs and interests, meeting the A-T-M content descriptions.

Assessment

Refer to pages 10-12.

Appendix A – Implementation Guidelines

Available course patterns

A standard 1.0 value unit is delivered over at least 55 hours. To be awarded a course, students must complete at least the minimum units over the whole minor, major, major/minor or double major course.

Course	Number of standard units to meet course requirements
Minor	Minimum of 2 units
Major	Minimum of 3.5 units

Units in this course can be delivered in any order.

Prerequisites for the course or units within the course

Students must have studied at least three standard 1.0 units from this course in order to access the Independent Study unit. An Independent Study unit requires the principal's written approval. Principal approval can also be sought by a student in Year 12 to enrol concurrently in an Independent Study unit and their third 1.0 unit in this course of study.

Arrangements for students continuing study in this course

Students who studied the previous course may undertake any units in this course provided there is no duplication of content.

Duplication of Content Rules

Students cannot be given credit towards the requirements for a Senior Secondary Certificate for a unit that significantly duplicates content in a unit studied in another course. The responsibility for preventing undesirable overlap of content studied by a student rests with the principal and the teacher delivering the course. While it is acceptable for a student to be given the opportunity to demonstrate competence in VET qualifications over more than one semester, substantial overlap of content is not permitted. Students will only be given credit for covering the content once.

Relationship to other courses

This course shares common competencies with other BSSS accredited courses:

- Data Science
- Digital Technologies
- Networking and Security
- Digital Products

New and/or updated Training Package

Training Packages are regularly updated through the mandatory continuous improvement cycle. This may result in updating of qualifications and a change in the composition of competencies within a qualification. Where qualifications from the new Training Package have been deemed to be equivalent, students may continue their study without interruption. Students will be granted direct credit for those competencies already achieved.

Where there are new competencies or updated competencies with significant change and these are deemed not equivalent, students may apply for Recognition of Prior Learning (RPL) for all or part of competencies. Granting of RPL for competencies does not equate to points towards the Senior Secondary Certificate.

Recognition of Prior Learning (RPL)

RPL is an assessment process that assesses an individual's formal, non-formal and informal learning to determine the extent to which that individual has achieved the required learning outcomes, competence outcomes, or standards for entry to, and/or partial or total completion of, a VET qualification.

Recognition of competence through the RPL process should be granted to students through gathering supplementary evidence against elements, skills and knowledge from the Training Package as well as through established assessment criteria. RPL may be granted for individual Units of Competence where the evidence is sufficient to do so.

A student having been granted RPL for one or more Units of Competence will still be required to fulfil the time-based component of units that contributes to points and A to E grading for the Senior Secondary Certificate.

To cater for this requirement, curriculum designers should design the course to be flexible enough to accommodate students who have gained some competencies through RPL.

Students may demonstrate the achievement of learning outcomes through challenge testing, interview or other means that the teacher deems reasonable. Full records of the RPL process and results must be stored by the college for perusal by the National VET Regulator upon request and should confirmation be required for VET certification. The college must be informed of the application of RPL before the start of the unit that includes the competency. For RPL to be awarded, the Units of Competency must be demonstrated in the Industry context.

Guidelines for Delivery

Program of Learning

A program of learning is what a school provides to implement the course for a subject. This meets the requirements for context, scope and sequence set out in the Board endorsed course. Students follow programs of learning in a college as part of their senior secondary studies. The detail, design and layout of a program of learning are a college decision.

The program of learning must be documented to show the planned learning activities and experiences that meet the needs of particular groups of students, taking into account their interests, prior knowledge, abilities and backgrounds. The program of learning is a record of the learning experiences that enable students to achieve the knowledge, understanding and skills of the content descriptions. There is no requirement to submit a program of learning to the OBSSS for approval. The Principal will need to sign off at the end of Year 12 that courses have been delivered as accredited.

Content Descriptions

Are all content descriptions of equal importance? No. It depends on the focus of study. Teachers can customise their program of learning to meet their own students' needs, adding additional content descriptions if desired or emphasising some over others. A teacher must balance student needs with their responsibility to teach all content descriptions. It is mandatory that teachers address all content descriptions and that students engage with all content descriptions.

Half standard 0.5 units

Half standard units appear on the course adoption form but are not explicitly documented in courses. It is at the discretion of the college principal to split a standard 1.0 unit into two half standard 0.5 units. Colleges are required to adopt the half standard 0.5 units. However, colleges are not required to submit explicit documentation outlining their half standard 0.5 units to the BSSS. Colleges must assess students using the half standard 0.5 assessment task weightings outlined in the framework. It is the responsibility of the college principal to ensure that all content is delivered in units approved by the Board.

Reasonable Adjustment

Units in this course are suitable for students requiring reasonable adjustment for delivery and assessment. However, standards of competency (outcomes) as dictated by National Training Packages **cannot be modified**. Students must demonstrate competence to the level required by industry in order to gain a Statement of Attainment or Vocational Certificate.

Moderation

Moderation is a system designed and implemented to:

- provide comparability in the system of school-based assessment
- form the basis for valid and reliable assessment in senior secondary schools
- involve the ACT Board of Senior Secondary Studies and colleges in cooperation and partnership
- maintain the quality of school-based assessment and the credibility, validity and acceptability of Board certificates.

Moderation commences within individual colleges. Teachers develop assessment programs and instruments, apply assessment criteria, and allocate Unit Grades, according to the relevant Course Framework. Teachers within course teaching groups conduct consensus discussions to moderate marking or grading of individual assessment instruments and unit grade decisions.

The Moderation Model

Moderation within the ACT encompasses structured, consensus-based peer review of Unit Grades for all accredited courses over two Moderation Days. In addition to Moderation Days, there is statistical moderation of course scores, including small group procedures, for T courses.

Moderation by Structured, Consensus-based Peer Review

Consensus-based peer review involves the review of student work against system wide criteria and standards and the validation of Unit Grades. This is done by matching student performance with the criteria and standards outlined in the Achievement Standards, as stated in the Framework. Advice is then given to colleges to assist teachers with, or confirm, their judgments. In addition, feedback is given on the construction of assessment instruments.

Preparation for Structured, Consensus-based Peer Review

Each year, teachers of Year 11 are asked to retain originals or copies of student work completed in Semester 2. Similarly, teachers of a Year 12 class should retain originals or copies of student work completed in Semester 1. Assessment and other documentation required by the Office of the Board of Senior Secondary Studies should also be kept. Year 11 work from Semester 2 of the previous year is presented for review at Moderation Day 1 in March, and Year 12 work from Semester 1 is presented for review at Moderation Day 2 in August.

In the lead up to Moderation Day, a College Course Presentation (comprised of a document folder and a set of student portfolios) is prepared for each A, T and M course/units offered by the school and is sent into the Office of the Board of Senior Secondary Studies.

The College Course Presentation

The package of materials (College Course Presentation) presented by a college for review on Moderation Days in each course area will comprise the following:

- a folder containing supporting documentation as requested by the Office of the Board through memoranda to colleges, including marking schemes and rubrics for each assessment item
- a set of student portfolios containing marked and/or graded written and non-written assessment responses and completed criteria and standards feedback forms. Evidence of all assessment responses on which the Unit Grade decision has been made is to be included in the student review portfolios.

Specific requirements for subject areas and types of evidence to be presented for each Moderation Day will be outlined by the Board Secretariat through the *Requirements for Moderation Memoranda* and Information Papers.

Visual evidence for judgements made about practical performances

It is a requirement that schools' judgements of standards to practical performances (A-T-M) be supported by visual evidence (still photos or video).

The photographic evidence submitted must be drawn from practical skills performed as part of the assessment process.

Teachers should consult the BSSS website for current information regarding all moderation requirements including subject specific and photographic evidence.

Appendix B – Course Developers

Name	College
Juliette Major	St Clare's College
Sanjay Sharma	Canberra College

Appendix C – Common Curriculum Elements

Common curriculum elements assist in the development of high-quality assessment tasks by encouraging breadth and depth and discrimination in levels of achievement.

Organisers	Elements	Examples
create, compose and apply	apply	ideas and procedures in unfamiliar situations, content and processes in non-routine settings
	compose	oral, written and multimodal texts, music, visual images, responses to complex topics, new outcomes
	represent	images, symbols or signs
	create	creative thinking to identify areas for change, growth and innovation, recognise opportunities, experiment to achieve innovative solutions, construct objects, imagine alternatives
	manipulate	images, text, data, points of view
analyse, synthesise and evaluate	justify	arguments, points of view, phenomena, choices
	hypothesise	statement/theory that can be tested by data
	extrapolate	trends, cause/effect, impact of a decision
	predict	data, trends, inferences
	evaluate	text, images, points of view, solutions, phenomenon, graphics
	test	validity of assumptions, ideas, procedures, strategies
	argue	trends, cause/effect, strengths and weaknesses
	reflect	on strengths and weaknesses
	synthesise	data and knowledge, points of view from several sources
	analyse	text, images, graphs, data, points of view
	examine	data, visual images, arguments, points of view
	investigate	issues, problems
organise, sequence and explain	sequence	text, data, relationships, arguments, patterns
	visualise	trends, futures, patterns, cause and effect
	compare/contrast	data, visual images, arguments, points of view
	discuss	issues, data, relationships, choices/options
	interpret	symbols, text, images, graphs
	explain	explicit/implicit assumptions, bias, themes/arguments, cause/effect, strengths/weaknesses
	translate	data, visual images, arguments, points of view
	assess	probabilities, choices/options
	select	main points, words, ideas in text
identify, summarise and plan	reproduce	information, data, words, images, graphics
	respond	data, visual images, arguments, points of view
	relate	events, processes, situations
	demonstrate	probabilities, choices/options
	describe	data, visual images, arguments, points of view
	plan	strategies, ideas in text, arguments
	classify	information, data, words, images
	identify	spatial relationships, patterns, interrelationships
	summarise	main points, words, ideas in text, review, draft and edit

Appendix D – Glossary of Verbs

Verbs	Definition
Analyse	Consider in detail for the purpose of finding meaning or relationships, and identifying patterns, similarities and differences
Apply	Use, utilise or employ in a particular situation
Argue	Give reasons for or against something
Assess	Make a Judgement about the value of
Classify	Arrange into named categories in order to sort, group or identify
Compare	Estimate, measure or note how things are similar or dissimilar
Compose	The activity that occurs when students produce written, spoken, or visual texts
Contrast	Compare in such a way as to emphasise differences
Create	Bring into existence, to originate
Demonstrate	Give a practical exhibition an explanation
Describe	Give an account of characteristics or features
Discuss	Talk or write about a topic, taking into account different issues or ideas
Evaluate	Examine and judge the merit or significance of something
Examine	Determine the nature or condition of
Explain	Provide additional information that demonstrates understanding of reasoning and /or application
Extrapolate	Infer from what is known
Hypothesise	Put forward a supposition or conjecture to account for certain facts and used as a basis for further investigation by which it may be proved or disproved
Identify	Recognise and name
Interpret	Draw meaning from
Investigate	Planning, inquiry into and drawing conclusions about
Justify	Show how argument or conclusion is right or reasonable
Manipulate	Adapt or change
Plan	Strategize, develop a series of steps, processes
Predict	Suggest what might happen in the future or as a consequence of something
Reflect	The thought process by which students develop an understanding and appreciation of their own learning. This process draws on both cognitive and affective experience
Relate	Tell or report about happenings, events or circumstances
Represent	Use words, images, symbols or signs to convey meaning
Reproduce	Copy or make close imitation
Respond	React to a person or text
Select	Choose in preference to another or others
Sequence	Arrange in order
Summarise	Give a brief statement of the main points
Synthesise	Combine elements (information/ideas/components) into a coherent whole
Test	Examine qualities or abilities
Translate	Express in another language or form, or in simpler terms
Visualise	The ability to decode, interpret, create, question, challenge and evaluate texts that communicate with visual images as well as, or rather than, words

Appendix E – Glossary for ACT Senior Secondary Curriculum

Courses will detail what teachers are expected to teach and students are expected to learn for year 11 and 12. They will describe the knowledge, understanding and skills that students will be expected to develop for each learning area across the years of schooling.

Learning areas are broad areas of the curriculum, including English, mathematics, science, the arts, languages, health and physical education.

A **subject** is a discrete area of study that is part of a learning area. There may be one or more subjects in a single learning area.

Frameworks are system documents for Years 11 and 12 which provide the basis for the development and accreditation of any course within a designated learning area. In addition, frameworks provide a common basis for assessment, moderation and reporting of student outcomes in courses based on the framework.

The **course** sets out the requirements for the implementation of a subject. Key elements of a course include the rationale, goals, content descriptions, assessment, and achievement standards as designated by the framework.

BSSS courses will be organised into units. A unit is a distinct focus of study within a course. A standard 1.0 unit is delivered for a minimum of 55 hours generally over one semester.

Core units are foundational units that provide students with the breadth of the subject.

Additional units are avenues of learning that cannot be provided for within the four core 1.0 standard units by an adjustment to the program of learning.

An **Independent Study unit** is a pedagogical approach that empowers students to make decisions about their own learning. Independent Study units can be proposed by a student and negotiated with their teacher but must meet the specific unit goals and content descriptions as they appear in the course.

An **elective** is a lens for demonstrating the content descriptions within a standard 1.0 or half standard 0.5 unit.

A **lens** is a particular focus or viewpoint within a broader study.

Content descriptions refer to the subject-based knowledge, understanding and skills to be taught and learned.

A **program of learning** is what a college develops to implement the course for a subject and to ensure that the content descriptions are taught and learned.

Achievement standards provide an indication of typical performance at five different levels (corresponding to grades A to E) following completion of study of senior secondary course content for units in a subject.

ACT senior secondary system **curriculum** comprises all BSSS approved courses of study.

Appendix F – Implementation of VET Qualifications

VET Qualifications

For **ICT20120 Certificate II in Applied Digital Technologies (Release 1)** the following packaging rules apply:

Total number of units = 12

6 core units plus

6 elective units

The elective units consist of:

- at least 3 must be from Group A *(Italicised)*

of the remaining electives:

- all may be from the electives listed below
- up to 2 may be from elsewhere in this or any other currently endorsed training package qualification or accredited course at AQF Level 1, 2 or 3.

This course, with listed competencies, meets these requirements at time of development. Colleges are advised to check current training package requirements before delivery.

If the full requirements of a Certificate are not met, students will be awarded a Statement of Attainment listing Units of Competence achieved according to Standard 3 of the Standards for Registered Training Organisations (RTOs) 2015.

ICT20120 Certificate II in Applied Digital Technologies

Code	Competency Title	Core/Elective
BSBSUS211	**Participate in sustainable work practices**	**Core**
BSBWHS211	**Contribute to the health and safety of self and others**	**Core**
ICTICT213	**Use computer operating systems and hardware**	**Core**
BSBTEC202	**Use digital technologies to communicate in a work environment**	**Core**
ICTICT214	**Operate application software packages**	**Core**
ICTICT215	**Operate digital media technology packages**	**Core**
ICTWEB306	Develop web presence using social media	Elective
ICTICT216	Design and create basic organisational documents	Elective
ICTICT206	Install software applications	Elective
ICTICT207	Integrate commercial computing packages	Elective
ICTICT219	Interact and resolve queries with ICT clients	Elective
ICTICT221	Identify and use specific industry standard technologies	Elective
ICTICT222	Research and share ICT solutions for Indigenous users	Elective
ICTICT211	Develop solutions for basic ICT malfunctions and problems	Elective
ICTSAS203	Connect hardware peripherals	Elective
ICTSAS214	Protect devices from spam and destructive software	Elective
ICTSAS215	Protect and secure information assets	Elective
ICTSAS217	Connect a home based local wireless network	Elective

If the full requirements of a Certificate are not met, students will be awarded a Statement of Attainment listing Units of Competence achieved according to Standard 3 of the Standards for Registered Training Organisations (RTOs) 2015.

ICT30120 Certificate III in Information Technology

For **ICT30120 Certificate III in Information Technology,** (Release 2) the following packaging rules apply:

Total number of units = 12

6 core units plus

6 elective units

The elective units consist of:

- at least 4 units must be selected from the elective units listed in elective groups A -J as specified in the packaging rules
- up to 2 units may be selected from the remaining listed elective units or from this or any other currently endorsed training package qualification or accredited course at Australian Qualifications Framework (AQF) Level 2, 3 or 4.

This course, with listed competencies, meets these requirements at time of development.

Colleges are advised to check current training package requirements before delivery.

If the full requirements of a Certificate are not met, students will be awarded a Statement of Attainment listing Units of Competence achieved according to Standard 3 of the Standards for Registered Training Organisations (RTOs) 2015.

Competencies for Certificate III in Information Technology

Note: The following competencies for Certificate III in Information Technology have been aligned to the Robotics and Mechatronics course from the training package.

Code	Competency Title	Core/Elective
BSBCRT301	**Develop and extend critical and creative thinking skills**	**Core**
BSBXCS303	**Securely manage personally identifiable information and workplace information**	**Core**
BSBXTW301	**Work in a team**	**Core**
ICTICT313	**Identify IP, ethics and privacy policies in ICT environments**	**Core**
ICTPRG302	**Apply introductory programming techniques**	**Core**
ICTSAS305	**Provide ICT advice to clients**	**Core**

Code	Competency Title	Elective
Group F - IT work ready skills		
ICTICT216	Design and create basic organisational documents	Elective
ICTICT309	Create ICT user documentation	Elective
ICTICT311	Customise packaged software applications	Elective
ICTICT312	Use advanced features of applications	Elective
ICTPMG301	Contribute as part of an IT project management team	Elective
ICTWHS204	Follow work health and safety and environmental policy and procedures	Elective
Group H - Programming		
ICTPRG435	Write scripts for software applications	Elective
Group I - Systems		
ICTICT214	Operate application software packages	Elective
ICTICT211	Develop solutions for basic ICT malfunctions and problems	Elective
ICTSAS304	Provide basic system administration	Elective
ICTSAS310	Install, configure and secure a small office or home office network	Elective

Imported Competencies (allowed in Training Package packaging rules)

Code	Competency Title	Imported from
Nil for this course		

VET Competencies Mapped to Course Units

Grouping of competencies within units may not be changed by individual colleges.

Competencies designated at the Certificate III level can only be delivered by schools that have scope to do so. Colleges must apply to have additional competencies at a higher level listed on their scope of registration.

Note: When selecting units, colleges must ensure that they follow packaging rules and meet the requirements for the Certificate level. In the event that full Certificate requirements are not met a Statement of Attainment will be issued.

All core competencies must be delivered in the relevant unit. The elective competencies delivered are dependent on the elective units chosen.

VET Implementation Summary

ICT20120 Certificate II in Applied Information Technologies (Release 1)

BSSS Unit Title	**Competencies**	
Building & Programming Circuits	**BSBWHS211**	**Contribute to the health and safety of self and others**
	ICTICT215	**Operate digital media technology packages**
	ICTICT216	**Design basic organisational documents using computing packages**
Digital & Analog Interactions	**ICTICT213**	**Use computer operating systems and hardware**
	ICTICT214	**Operate application software packages**
	ICTICT206	Install software applications
	ICTICT207	Integrate commercial computing packages
Robotics & Mechatronic Systems	**BSBTEC202**	**Use digital technologies to communicate in a work environment**
	ICTWEB306	Develop web presence using social media
	ICTSAS203	Connect hardware peripherals
Applications of Robotics	**BSBSUS211**	**Participate in sustainable work practices**
	ICTICT219	Interact and resolve queries with ICT clients
	ICTICT221	Identify and use specific industry standard technologies
	ICTICT222	Research and share ICT solutions for Indigenous users
	ICTSAS211	Develop solutions for basic ICT malfunctions and problems

ICT30120 Certificate III in Information Technology Competencies

BSSS Unit Title	**Competencies**	
Building & Programming Circuits	**BSBCRT301**	**Develop and extend critical and creative thinking skills**
	ICTPRG302	**Apply introductory programming techniques**
	ICTICT216	Design and create basic organisational documents
	ICTWHS204	Follow work health and safety and environmental policy and procedures
	ICTICT214	Operate application software packages
Digital & Analog Interactions	**BSBXTW301**	**Work in a team**
	ICTICT313	**Identify IP, ethics and privacy policies in ICT environments**
	ICTICT309	Create ICT user documentation
	ICTICT312	Use advanced features of applications
	ICTPRG435	Write scripts for software applications

Robotics & Mechatronic Systems	**BSBXCS303**	**Securely manage personally identifiable information and workplace information**
	ICTSAS30	**Provide ICT advice to clients**
	ICTICT311	Customise packaged software applications
	ICTICT211	Develop solutions for basic ICT malfunctions and problems
Applications of Robotics	ICTPMG301	Contribute as part of an IT project management team

Competency Based Assessment

The assessment of competence must focus on the competency standards and the associated elements as identified in the Training Package. Assessors must develop assessment strategies that enable them to obtain sufficient evidence to deem students competent. Competence to industry standard requires a student to be able to demonstrate the relevant skills and knowledge in a variety of industry contexts on repeated occasions. Assessment must be designed to collect evidence against the four dimensions of competency.

- **Task skills** – undertaking specific workplace task(s)
- **Task management skills** – managing a number of different tasks to complete a whole work activity
- **Contingency management skills** – responding to problems and irregularities when undertaking a work activity, such as: breakdowns, changes in routine, unexpected or atypical results, difficult or dissatisfied clients
- **Job/role environment skills** – dealing with the responsibilities and expectations of the work environment when undertaking a work activity, such as: working with others, interacting with clients and suppliers, complying with standard operating procedures or observing enterprise policy and procedures.

The most appropriate method of assessing workplace competence is on-the-job in an industry setting under normal working conditions. This includes using industry standard tools, equipment and job aids and working with trade colleagues. Where this is not available, a simulated workplace environment that mirrors the industry setting will be used. The following general principles and strategies apply:

- assessment is competency based
- assessment is criterion-referenced.

Quality outcomes can only be assured through the assessment process. The strategy for assessment is based on an integration of the workplace competencies for the learning modules into a holistic activity. The awarding of vocational qualifications is dependent on successful demonstration of the learning outcomes within the modules through the integrated competency assessment that meets the Training Package rules and requirements.

The integrated assessment activity will require the learner to:

- use the appropriate key competencies
- apply the skills and knowledge which underpin the process required to demonstrate competency in the workplace
- integrate the most critical aspects of the competencies for which workplace competency must be demonstrated
- provide evidence for grades and or scores for the Board course component of the assessment process.

Standards for Registered Training Organisations 2015

These Standards form part of the VET Quality Framework, a system which ensures the integrity of nationally recognised qualifications.

RTOs are required to comply with these Standards and with the:

- National Vocational Education and Training Regulator Act 2011
- VET Quality Framework.

The purpose of these Standards is to:

- set out the requirements that an organisation must meet in order to be an RTO
- ensure that training products delivered by RTOs meet the requirements of training packages or VET accredited courses, and have integrity for employment and further study
- ensure RTOs operate ethically with due consideration of learners' and enterprises' needs.

To access the standards, refer to:
https://www.legislation.gov.au/Details/F2017C00663

To access The Users' Guide to the Standards refer to:
https://www.asqa.gov.au/standards

Guidelines for Colleges Seeking Scope

Colleges must apply to have their scope of registration extended for each new qualification they seek to issue. There is no system-level process. Each college must demonstrate capacity to fulfil the requirements outlined in the Training Package. Applications for extension of scope are lodged through the Australian Skills Quality Authority (ASQA).

Assessment of Certificate III Units of Competence

Colleges delivering any Units of Competence from Certificate III (apart from those competencies allowed in training package rules) will need to have them listed on their scope **or** negotiate a Third Party Agreement with a scoped training partner. This document must be kept on record by the college as the RTO.

Appendix G – Course Adoption

Condition of Adoption

The course and units of this course are consistent with the philosophy and goals of the college and the adopting college has the human and physical resources to implement the course.

Adoption Process

Course adoption must be initiated electronically by an email to bssscertification@ed.act.edu.au by the principal or their nominated delegate.

The email will include the **Conditions of Adoption** statement above, and the table below adding the **College** name, and **A** and/or **T** and/or **M** and/or **V** to the **Classification/s** section of the table.

College:				
Course Title:	**Robotics and Mechatronics**			
Classification/s:	**A** **T** **M**			
Framework:	**Technologies Framework 2018**			
Dates of Course Accreditation:	**From**	2020	**to**	2024