Design and Technology

Design and Technology

Course Framework

2007 Edition

For courses accredited from 2008

B S S S
AUSTRALIAN CAPITAL TERRITORY

DESIGN AND TECHNOLOGY

COURSE FRAMEWORK

INTRODUCTION

All programs of study for the ACT Year 12 Certificate should enable students to become:

- creative and critical thinkers
- enterprising problem-solvers
- skilled and empathetic communicators
- informed and ethical decision-makers
- environmentally and culturally aware citizens
- confident and capable users of technologies
- independent and self-managing learners
- collaborative team members

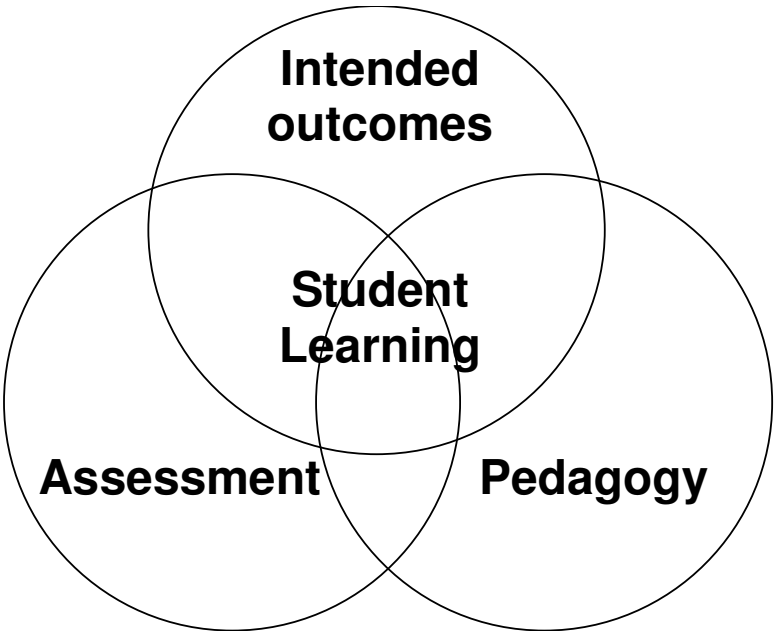
and provide students with:

- a comprehensive body of specific knowledge, principles and concepts
- a basis for self-directed and lifelong learning
- personal attributes enabling effective participation in society

Examples of these student capabilities are provided at Appendix C.

COURSE FRAMEWORKS

Course Frameworks provide the basis for the development and accreditation of any course within a broad subject area and provide a common basis for the assessment, moderation and reporting of student outcomes in courses based on the Framework. Course Frameworks support a model of learning that integrates intended student outcomes, pedagogy and assessment. This model is underpinned by a set of beliefs and a set of learning principles.



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)

RATIONALE

Design and Technology influences all aspects of our constructed world and the products people use for purpose and pleasure.

Design plays an important critical role in determining our future as it impacts on all areas of society, culture and the environment and may be critical in how we cope with challenges facing us through climate change. The study of Design and Technology affords an opportunity to gain understanding of our influence as users and consumers and can equip students with the skills and knowledge to make positive contributions to the future of the societies and the environments in which we live.

Design and Technology based courses offer students a context in which to acquire the knowledge and skills needed to understand design practice and to develop an awareness of the economic, environmental and ecological impacts of design practice and technological change. The study of Design and Technology allows students to become critical and discerning, recognising that all decisions about the use of design and technology have eventual consequences for the individual, community and the environment.

Through Design and Technology courses, students will have the opportunity to research, analyse and evaluate existing ideas, products, processes and solutions to problems. Students will learn to generate imaginative and creative solutions of their own. They will communicate their ideas within the parameters and requirements of design based tasks whilst gaining and applying knowledge of industry standards of design, manufacture and safety. Students will learn to use technology to test and evaluate their products, systems and solutions and identify and articulate further areas for improvement and development.

The study of Design and Technology encourages students to become aware of factors that influence innovation and enterprise and the subsequent success or failure of a product. The study of Design and Technology also allows students to make informed decisions regarding some professional and vocational pathways as well as developing an appreciation of design and technology as a recreational activity.

GOALS

Course Framework Goals focus on the essential things that students should know and be able to do as a result of studying any course in this subject area. They are **intended student outcomes**. All courses based on this Course Framework should enable students to:

- apply appropriate and enterprising design and problem solving skills in the production of solutions
- apply quality procedures to the appropriate use of materials and systems
- use broadly based practical skills relevant to a variety of materials and processes
- demonstrate communication skills using oral, written or graphical techniques to enhance their design and technological capacity
- work independently and collaboratively in accordance with occupational health and safety principles and industry standards
- demonstrate ethical decision making and environmental awareness
- demonstrate an awareness of existing and emerging technologies, career pathways and industry standards

GUIDE TO THE SELECTION OF CONTENT

Courses developed under this Framework will provide details of course content through the component units of the course. While this content will differ according to the particular course classification (A, T or M, including vocational programs), all content will be chosen to enable students to work towards the achievement of the common and agreed goals of the Framework.

Essential Concepts and Skills

All courses developed under this Framework will be based on the essential concepts and skills of the subject area, as outlined below.

Concepts

- the design process (brief, specification, research and analysis, communication and development of ideas)
- role of the designer
- relationship of designer, manufacturer and client/user
- production and consumption of resources
- environmental and ethical issues in design and manufacture
- innovation and enterprise

Skills

- appropriate technical skills
- ability to use tools and materials appropriately and safely
- planning and organisational skills
- problem solving and decision-making

- research, critical analysis and evaluation skills
- generation, experimentation and synthesis of ideas
- ability to work independently and collaboratively
- communication skills: oral, written and visual

Recommended content

- elements of design (form and function)
- ergonomics and useability
- scale of production (one, batch, mass)
- green design and technologies

Vocational Courses

Colleges with Registered Training Organisation status (RTO) are eligible to deliver units of competence from Training Packages, or alternatively, they may develop vocational courses, classified as A or T based on the Training Packages, under the relevant Course Framework as appropriate training packages become available.

PEDAGOGY

Teaching strategies

Teaching strategies that are particularly relevant and effective in Design and Technology include:

- in class exercises and class discussions
- quizzes
- individual and group demonstrations
- individual tutorials
- regular and meaningful feedback
- open-ended design tasks
- research assignments
- experimentation with materials and processes
- use of information and communication technologies
- questionnaires
- practical projects
- industry visits
- guest speakers

ASSESSMENT

The purpose of including assessment task types (with examples of tasks) and assessment criteria in Course Frameworks is to provide a common and agreed basis for the collection of evidence of student achievement. This collection of evidence enables a comparison of achievement within and across colleges, through moderation processes. This enables valid, fair and equitable reporting of student achievement on the Year 12 Certificate.

Assessment Tasks elicit responses that demonstrate the degree to which students have achieved the goals of a unit (and the course as a whole).

Assessment Task Types (with **weightings**) group assessment tasks in ways that reflect agreed shared practice in the subject area and facilitate the comparison of student work across different assessment tasks.

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 use all of these criteria to assess students' performance, but do not necessarily use all criteria on each task. Assessment criteria are to be used holistically on a given task and in determining the unit grade.

Assessment Rubrics draw on the general course framework criteria to develop assessment criteria for a task type and a continuum that indicates levels of student **performance** against each criterion.

Assessment Task Types	**Design and Problem Solving**	**Technology Skills**	**Knowledge and Understanding**
Task Types	Design brief for a client Process folio Portfolio	Practical project Practical test Model Design rationale or evaluation	Multimedia presentation with speakers' notes Research report Seminar presentation Test Written task
Weighting **A**	10-40%	40-60%	10-30%
Weighting **T**	25-50%	20-50%	25-50%

***Please note** that the criterion that heads each column is the main assessment focus of the grouped assessment task types below

Recommendations for differentiating between A and T course assessment

It is understood that teachers commonly teach both A and T courses concurrently and provide the same tasks for each group of students. It is recommended that, within the scope of any courses written under this framework, that the tasks set will differ in expectation and difficulty across the three assessment criteria between A and T. Examples may include:

- shorter essays and verbal presentations for A Students
- more design ideas generation for a design brief for T Students
- more complex and in-depth responses to visual problems for T Students
- narrower focus of research and documentation for A Students
- smaller and less technical construction projects for A Students
- longer and more difficult tests for T students or purely practical test for A Students

Assessment Criteria

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

Design and problem solving (These can be assessed by the design folio content)

- ability to identify and investigate a design problem and specify the requirements for an effective solution
- ability to conceptualise a range of ideas and to develop and detail the most appropriate solution
- ability to evaluate, receive and provide feedback and respond to critical analysis of solutions

Technology skills (These can be assessed by the design practical project)

- application of Australian Industry Standards in the production of practical projects
- competence and proficiency in practical skills development
- evidence of effective planning, documentation and communication of information
- application of appropriate materials, processes and systems in the completion of projects
- proficiency in working individually and collaboratively in a shared environment
- use of ICT skills in the design, manufacture and analysis of project work

Knowledge and understanding (These can be assessed by an exam and evidence throughout the design folio)

- knowledge of subject content
- knowledge of industry standards and practices
- knowledge of the impact of technology and technological innovation on society and the environment.

Assessment rubrics have been developed for all of the Task Types.
These are included at Appendix A.

Additional Assessment Advice

The Board recommends 4 - 6 assessment tasks across a full semester unit and 2 - 3 assessment tasks for a 0.5 unit. These should not be a compilation of a number of small discrete tasks (eg mini-tests) but may include a portfolio that provides coherent evidence of the depth of student learning.

Tests for both Design and Technology and Graphic Communication units

- practical questions looking at tools and their usage
- impact of particular technologies and design practices on the environment.
- accepted safety practices
- production methods in industry
- problem solving questions
- graphic communication
- production methods in industry
- communication methods (industry standards) orthographic, isometric perspective sketching
- rendering techniques

Relating Assessment Task Types and Assessment Criteria to the Course Framework Goals.

The congruence between goals, assessment task types (the evidence) and the assessment criteria (the basis for judging the evidence) are vital in teaching and learning. The following table show this relationship.

GOALS	ASSESSMENT TASK TYPES	ASSESSMENT CRITERIA
• Apply appropriate and enterprising design and problem solving skills in the production of solutions	• Design brief for a client • Process folio • Portfolio • Design rationale or evaluation • Practical test • Research report	• Design and problem solving • Knowledge and understanding
• Apply quality procedures to the appropriate use of materials and systems	• Process folio • Portfolio • Practical project • Practical test • Model	• Technology skills • Knowledge and understanding
• Use broadly based practical skills relevant to a variety of materials and processes	• Practical project • Practical test • Model	• Technology skills • Knowledge and understanding
• Demonstrate communication skills using oral, written or graphical techniques to enhance their design and technological capacity	• Multimedia presentation • Seminar presentation • Research reports • Test • Written task • Design rationale/evaluation • Portfolio	• Design and problem solving • Technology skills • Knowledge and understanding
• Work independently and collaboratively in accordance with occupational health and safety principles and industry standards	• Practical project • Practical test • Process folio • Seminar presentation with demonstration	• Technology skills • Knowledge and understanding
• Demonstrate ethical decision making and environmental awareness	• Research report • Design rationale/evaluation • Test	• Design and problem solving • Knowledge and understanding
• Demonstrate an awareness of existing and emerging technologies, career pathways and industry standards	• Research report • Written task • Practical project • Process folio	• Design and problem solving • Technology skills • Knowledge and understanding

ACHIEVEMENT STANDARDS

Grade descriptors provide a guide for teacher judgement of students' achievement, based on the assessment criteria, over a unit of work in this subject. Grades are organized on an A-E basis and represent standards of achievement.

Grades are awarded on the proviso that the assessment requirements have been met. Teachers will consider, when allocating grades, the degree to which students demonstrate their ability to complete and submit tasks within a specified time frame.

The following descriptors are consistent with the **system grade descriptors**, which describe generic standards of student achievement across all courses.

Unit Grade Descriptors for T Courses

	Design and Problem Solving	Technology Skills	Knowledge and Understanding
A student who achieves an **A** grade typically	Independently and critically analyses, researches and interprets the fine details of a design problem. Clearly and accurately articulates design intent and critically evaluates solutions. Consistently demonstrates initiative to independently produce a variety of highly developed, imaginative, accurate and innovative ideas and solutions.	Consistently demonstrates highly developed technical and organisational skills in the production, presentation and communication of work, paying careful attention to detail in all elements of a diverse range of tasks. Consistently applies OH&S and injury prevention and management strategies. Consistently and correctly applies appropriate processes and systems in the production of all tasks when working individually and collaboratively.	Consistently demonstrates highly developed contextual understanding of complex subject content and concepts (including related industry standards). Consistently demonstrates the ability to analyse, synthesise and evaluate solutions and information. Consistently demonstrates an insightful understanding of technological innovation and how it can affect society and impact on the environment.
A student who achieves a **B** grade typically	Independently and critically analyses, researches and interprets most details of a design problem. Clearly articulates design intent and evaluates solutions. Demonstrates limited initiative to independently produce highly developed, imaginative, accurate and innovative ideas and solutions.	Demonstrates highly developed technical and organisational skills in the production, presentation and communication of work, paying careful attention to detail in a diverse range of tasks. Applies OH&S and injury prevention and management strategies. Correctly applies appropriate processes and systems in the production of most tasks when working individually and collaboratively.	Demonstrates highly developed understanding of complex subject content and concepts (including related industry standards). Demonstrates a well developed ability to analyse, synthesise and evaluate solutions and information. Strongly demonstrates understanding of technological innovation and how it can affect society and impact on the environment.
A student who achieves a **C** grade typically	Analyses, researches and interprets a design problem. With assistance can articulate design intent and evaluate solutions. Demonstrates initiative to independently produce, ideas and solutions that demonstrate some originality.	Demonstrates satisfactory technical and organisational skills in the production, presentation and communication of tasks. Applies OH&S and injury prevention and management strategies. Applies appropriate processes and systems in the production of some tasks when working individually and collaboratively.	Demonstrates understanding of subject content and concepts (including related industry standards). Demonstrates a basic ability to analyse, synthesise and evaluate solutions and information. Satisfactorily demonstrates understanding of technological innovation and how it can affect society and impact on the environment on a simplistic level.

	Design and Problem Solving	Technology Skills	Knowledge and Understanding
A student who achieves a **D** grade typically	Is able to discuss basic elements of a design problem and research existing solutions. With assistance is able to suggest improvements to design solutions. Demonstrates limited initiative to produce, ideas and solutions that demonstrate some originality.	Demonstrates limited technical and organisational skills in the production, presentation and communication of tasks. Follows OH&S and injury prevention guidelines and expectations. Applies some appropriate processes and systems in the production of tasks when working individually and collaboratively.	Shows limited understanding of subject content and concepts. Is able to demonstrate limited analysis and evaluation of solutions and information. Shows limited understanding of technological innovation and how it can affect society and impact on the environment on a very simplistic level.
A student who achieves an **E** grade typically	With assistance can communicate basic requirements necessary to solve simple design problems. With assistance can suggest simple improvements to existing design solutions. With assistance can produce some simple ideas and solutions to basic problems.	Demonstrates very limited technical and organisational skills in the production, presentation and communication of tasks. Follows OH&S and injury prevention guidelines and expectations with assistance. With assistance applies processes and systems in the production of tasks when working individually and collaboratively.	Shows very limited understanding of subject content and concepts. Demonstrates very limited analysis and evaluation of solutions and information. Shows very limited understanding of technological innovation and how it can affect society and impact on the environment.

Unit Grade Descriptors for A Courses

	Design and Problem Solving	Technology Skills	Knowledge and Understanding
A student who achieves an **A** grade typically	Independently analyses, researches and interprets the details of design problems. Articulates and communicates design intent and provides and receives feedback. Consistently demonstrates initiative to independently produce imaginative, accurate and innovative ideas and solutions.	Repeatedly demonstrates a high level of technical and organisational skills in the production and presentation of work across a variety of assessment task types. Consistently applies OH&S and injury prevention and management strategies. Consistently applies appropriate processes and systems in the production of tasks when working individually and collaboratively.	Repeatedly demonstrates highly developed understanding of all subject content and concepts (including related industry standards). Consistently demonstrates the ability to analyse, synthesise and evaluate information for use in own work. Consistently demonstrates understanding of technological innovation and how it can affect society and impact on the environment.
A student who achieves a **B** grade typically	Independently analyses, researches and interprets most details of design problems. Articulates and communicates design intent and provides and receives feedback. Demonstrates initiative to independently produce imaginative, accurate and innovative ideas and solutions.	Generally demonstrates a high level of technical and organisational skills in the production and presentation of work across a variety of assessment task types. Applies OH&S and injury prevention and management strategies. Applies appropriate processes and systems in the production of most tasks when working individually and collaboratively.	Demonstrates a well developed understanding of subject content and concepts (including related industry standards). Is able to analyse, synthesise and evaluate information for use in own work. Generally demonstrates an understanding of technological innovation and how it can affect society and impact on the environment.
A student who achieves a **C** grade typically	With guidance provides simple analysis, research and interpretation of some details of design problems. In simple language and with assistance, articulates and communicates design intent and provides and receives feedback. Can produce simple, imaginative ideas and solutions.	Independently demonstrates satisfactory technical and organisational skills in the production and presentation of work across a variety of assessment types. Applies OH&S and injury prevention and management strategies. Applies appropriate processes and systems in the production of some tasks when working individually and collaboratively.	Demonstrates an understanding of subject content and concepts and is aware of industry standards and practice. Is able to provide simple analysis, synthesis and evaluation of information for use in own work. Demonstrates some understanding of technological innovation and how it can affect society and impact on the environment.

	Design and Problem Solving	Technology Skills	Knowledge and Understanding
A student who achieves a **D** grade typically	With guidance provides limited analysis of design problems. With assistance, communicates design intent and receives feedback. Can produce limited ideas and solutions to basic problems.	With assistance, demonstrates adequate technical skills in the production and presentation of tasks. Follows OH&S and injury prevention guidelines and expectations with assistance. With guidance, applies appropriate processes and systems in the production of tasks when working individually and collaboratively.	Shows limited understanding of subject content, concepts and industry standards and practice. With assistance, is able to demonstrate limited analysis and evaluation of solutions and information. Provides little evidence of understanding of technological innovation and how it can affect society and impact on the environment.
A student who achieves an **E** grade typically	With intensive guidance, provides very limited analysis of design problems. In simple language and with assistance, communicates design intent and receives feedback. Can produce very simple ideas and solutions to basic problems.	With assistance, demonstrates minimal technical skills in the production and presentation of tasks. Follows OH&S and injury prevention guidelines and expectations with teacher assistance. With guidance, applies basic processes and systems in the production of tasks when working individually and collaboratively.	Shows very limited understanding of subject content and concepts. Shows little ability to analyse and evaluate solutions and information. Shows very limited understanding of technological innovation.

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, as well as statistical moderation of course scores, including small group procedures, for 'T' courses.

Moderation by Structured, Consensus-based Peer Review

Review is a subcategory of moderation, comprising the review of standards and the validation of Unit Grades. In the review process, Unit Grades, determined for Year 11 and Year 12 student assessment portfolios that have been assessed in schools by teachers under accredited courses, are moderated by peer review against system wide criteria and standards. This is done by matching student performance with the criteria and standards outlined in the unit grade descriptors as stated in the Course Framework. Advice is then given to colleges to assist teachers with, and/or reassure them on, their judgments.

Preparation for Structured, Consensus-based Peer Review

Each year, teachers teaching a Year 11 class are asked to retain originals or copies of student work completed in Semester 2. Similarly, teachers teaching 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 and T course and any M units offered by the school, and are sent in to 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
- 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 memoranda and Information Papers.

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COURSE FRAMEWORK DEVELOPMENT GROUP

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The group gratefully acknowledges the work of previous groups who developed and revised the Design and Technology Course Framework.

APPENDIX A: RUBRIC FOR ASSESSMENT TASKS

		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
Design and Problem Solving	**D1 – identify, investigate, specify design requirements**	Critically analyses & investigates a design problem using a wide range of strategies (questioning, examining, categorising) Independently specifies the detailed and in-depth parameters and requirements for the production of a design solution and is able to clearly articulate these in a design brief	Analyses & investigates a design problem using a range of strategies (questioning, examining, categorising) Independently specifies the essential parameters and requirements for the production of a design solution and is able to articulate these in a design brief	Identifies, investigates a design problem using some strategies (questioning, examining, categorising) With some guidance, specifies the essential parameters and requirements for the production of a design solution and can articulate these in a design brief	Identifies a design problem using limited research With assistance, is able to explain the important elements necessary to achieve a design solution	Shows a limited ability to identify a design problem With assistance is able to explain some of the necessary factors relevant to solving a design problem
	D2 – conceptualises range of ideas, details & develops the most appropriate solution	Proposes/produces multiple innovative solutions in response to the analysis of a design problem Independently identifies and justifies one solution that is supported by research, synthesis & in-depth knowledge of context through sketching, annotation and explanation	Proposes/produces multiple solutions in response to the analysis of a design problem Identifies and justifies one solution that is supported by research, synthesis & knowledge of context through sketching, annotation and explanation	Proposes/produces an appropriate solution in response to the analysis of a design problem Identifies and justifies one solution supported by reasoning & knowledge of context through sketching and explanation	Produces a basic solution for a design problem. Identifies one solution with assistance	Produces limited or no solution for a design problem Shows limited knowledge of a solution
	D3- ability to evaluate, receive & provide feedback	Critically and comprehensively tests and evaluates processes and design solutions, receiving and providing constructive feedback	Critically tests and evaluates processes and design solutions, receiving and providing constructive feedback	Tests and evaluates processes and design solutions, receiving and providing feedback	Reflects on the design solutions providing limited feedback	Shows limited reflection on the design solution.

		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
Technology Skills	**T1 – knowledge and application of Industry Standards in the production of practical projects**	Is able to consistently understand and apply Australian Industry standards in design and manufacture in all stages of a task Identifies risks and applies Injury Prevention management strategies and consistently demonstrates OH & S practices	Is able to understand and apply Australian Industry standards in design and manufacture in all stages of a task Consistently applies Industry Prevention management and OH & S practices	Is able to apply Australian Industry standards in design and manufacture in all stages of a task Applies Injury Prevention management strategies and consistently demonstrates OH & S practices	Is able to apply Australian Industry standards in design and manufacture in some stages of a task Demonstrates OH & S practices	Is able to apply Australian Industry standards in design and manufacture in a limited way Demonstrates OH & S practices
	T2 - competence and proficiency in practical skills development	Is able to apply newly learned practical skills, without teacher assistance, to a high technical standard. They can build upon the skills learned to suit various situations	Is able to apply newly learned practical skills, without teacher assistance, to a high technical standard	Is able to apply newly learned practical skills, without teacher assistance, to acceptable technical standard	Is able to apply newly learned practical skills, with teacher assistance	Attempts to apply newly learned practical skills, with teacher assistance
	T3 - effective documentation & communication of information	Is able to clearly and logically document all information, research and experimentation to effectively communicate their decision making and skills learned	Is able to clearly document all information, research and experimentation to effectively communicate their decision making and skills learned	Is able to document information, some research and experimentation to communicate their decision making and skills learned	Is able to document limited related information	Attempts to document related information
	T4 - application of appropriate materials, processes and systems	Is able to consistently make well informed decisions independently regarding selection and application of materials/processes and systems	Is able to make informed decisions independently regarding selection and application of materials/ processes and systems	Is able to make appropriate decisions regarding selection and application of materials/processes and systems	Is able to make some decisions, with assistance, regarding selection and application of materials/ processes	Is able to make limited decisions, with assistance, regarding selection and application of materials or processes
	T5 - proficiency in working independently and cooperatively in a shared environment	Demonstrates excellent organisational skills and efficient use of time and resources in class Demonstrates the ability to work collaboratively, showing leadership and respect for others and the work environment	Demonstrates good organisational skills and efficient use of time and resources in class Demonstrates the ability to work collaboratively, respecting others and the work environment	Demonstrates organisational skills and good use of time and resources in class Demonstrates awareness and respect for others and the work environment	Demonstrates some organisational skills and appropriate use of resources in class Demonstrates awareness of others and understanding of the expectations of the work environment	Demonstrates limited organisational skills Demonstrates limited understanding of the expectations of the work environment

		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	**K1 – Knowledge of subject content**	Repeatedly and accurately makes informed decisions based upon a deep understanding of subject content Is able to synthesise this knowledge and apply it to new learning situations	Is able to make informed design decisions based upon an understanding of subject content Is able to apply this knowledge to a range of learning situations	Is able to make design decisions based upon an understanding of subject content Is able to apply this knowledge to learning situations	Makes design decisions, with teacher guidance, based upon basic subject content	Demonstrates recall of fundamental subject content but struggles to apply this to design situations without teacher assistance and input
	K2- Knowledge of industry standards and practices.	Demonstrates a thorough knowledge of OH & S practices Consistently makes decisions based upon designing standards and understands and applies the construction and manufacturing standards used in similar industry	Demonstrates a good knowledge of OH & S practices Makes decisions based upon designing standards and understands and applies the construction and manufacturing standards used in similar industry	Demonstrates a sound knowledge of OH & S practices Makes decisions based upon designing standards and understands the construction and manufacturing standards used in similar industry	Demonstrates knowledge of OH & S practices Is aware that designing, construction and manufacturing standards exist in similar industry	Demonstrates limited knowledge of OH & S practices Is aware that construction and manufacturing standards exist in similar industry
	K3 - impact of technology on society and the environment	Demonstrates broad and in-depth knowledge of the history of technological innovation in the context of the subject under study and how these developments can affect society Considers detailed environmental and social impacts in the design and construction of projects	Demonstrates in-depth knowledge of the history of technological innovation in the context of the subject under study and how these developments can affect society Considers environmental and social impacts in the design and construction of projects	Demonstrates knowledge of the history of technological innovation in the context of the subject under study and, with guidance, how these developments can affect society Considers environmental and social impacts in the design and construction of projects	Demonstrates basic knowledge of the history of technology in the context of the subject under study Demonstrates basic understanding that design can have environmental and social impacts	Demonstrates some knowledge of the history of technology in the context of the subject under study Can accept that design can have environmental and social impacts

APPENDIX B

GLOSSARY

Analyse
Identify components and the relationship between them; make inferences and find evidence to support generalisations

Create
Devise a new procedure, reorganise elements into a new structure, or invent a product

Design Brief
A detailed document that clearly identifies a design project to be solved, the constraints placed on it, and the criteria to meet requirements

Design intent
Defines the direction and requirements of a solution in order to satisfy the requirements of the design brief

Design process
The process of solving problems through the development of ideas to produce a solution within set guidelines. The following steps should be undertaken and documented in the process of solving a design problem

- Defining the limitations and scope of a design solution
- Research of existing solutions and other relevant information
- The development of a range possible solutions
- The development of the most suitable solution
- Planning and production
- Evaluation and testing of solution

Evaluate
Make a judgement based on criteria; determine the value of ideas, information or quality of work

Industry standards
Uniform standards agreed upon by industry including areas such as injury prevention management, OH&S strategies, design and manufacturing standards and practices

Portfolio
Is a collection of work presented in visual form to demonstrate the student's competency in the unit

Process Folio
A chronological collection of students' work generated when working through the design process to solve a design problem

Rationale
An explanation of why a given task is to be performed, the logical basis of a procedure

Report
Communication, written or oral, to track the progress of a project giving an account of what has been achieved

Synthesise
Apply learned knowledge to a new situation

Technological innovations
The creation, development and implementation of a new product, process or service, with the aim of improving efficiency, effectiveness or competitive advantage.

APPENDIX C

All programs of study for the ACT Year 12 Certificate should enable students to become:

	The examples are indicative and not exhaustive. Those in **bold** relate particularly to the Employability Skills; those in *italics* to the Across Curriculum Perspectives.
• creative and critical thinkers	exploring, imagining, observing, predicting**, thinking laterally**, **generating ideas**, **inquiring and researching**, interrogating, conceptualising, collecting and **analysing data and information**, **classifying**, interpreting, formulating hypotheses, generalising, synthesising, **reflecting**, justifying conclusions, understanding different perspectives, **understanding and application of different thinking strategies, understanding of scientific and mathematical language**, **using scientific and mathematical techniques** (eg estimating, reading and interpreting data, interpolation and extrapolation)
• enterprising problem-solvers	showing **initiative**, **resourcefulness**, resilience, persistence, assessing and taking risks, **recognising and seizing opportunities**, **problem-posing**, **problem-identification**, **problem clarification**, being practical, **being innovative**, using mathematical techniques, **using appropriate technologies**, **working independently** and/or **collaboratively** to achieve a solution, testing assumptions and solutions, modifying approaches
• skilled and empathetic communicators	**oral and written skills in Standard Australian English**, **matching communication to audience and purpose**, using terminology and style appropriate to particular disciplines, **using mathematical language**, creating and **communicating meaning** using multi-modal forms, **imagining the feelings and views of others**, respecting and valuing diversity
• informed and ethical decision-makers	**finding information** and using evidence as the basis for judgements and decisions, **developing awareness of differing perspectives**, having integrity, taking action, **exploring and critically reflecting on own values, attitudes and beliefs**
• environmentally and culturally aware citizens	understanding *the interconnectedness of the natural and constructed world*; the *multicultural nature of Australian society*; *Indigenous perspectives*; and global economic, social and *environmental* issues; *respecting difference*, exercising rights and responsibilities, **acting in the public sphere**, understanding consequences of choices and decisions
• confident and capable users of technologies	**having a range of IT skills**, accessing and evaluating *information*, **designing** and making, **communicating using technologies**, **choosing most appropriate technologies for the task**, refining processes, **willingness to learn new skills**
• independent and self-managing learners	eg **understanding self (***including gender***)**, **having personal goals**, **evaluating and monitoring own performance**, **taking responsibility**, flexibility in adapting course of action, **openness to new ideas**, **managing time and resources**, **planning and organising**
• collaborative team members	eg **contributing to group effectiveness**, **building trust**, **capacity to take different roles within a team**, **respecting differing strengths (***including contributions of boys and girls***)**, **skills in negotiation and compromise**, **sustaining commitment to achieve group goals**

And provide students with

• a comprehensive body of specific knowledge, principles and concepts	through subjects, cross-disciplinary courses and/or projects, **work experience**
• a basis for self-directed and lifelong learning	**through understanding and managing self, developing capabilities and modelling an approach ('taking stock, taking steps') that prepares for an social and economic environment of greater individual responsibility**
• personal attributes enabling effective participation in society	**developing social skills** and capabilities for citizenship, **work experience and recognition of outside learning;** through understanding of a globalised knowledge society