Industrial Technology Trades

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Course Framework

For courses accredited from 2012

BSSS
AUSTRALIAN CAPITAL TERRITORY

INDUSTRIAL TECHNOLOGY TRADES

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:

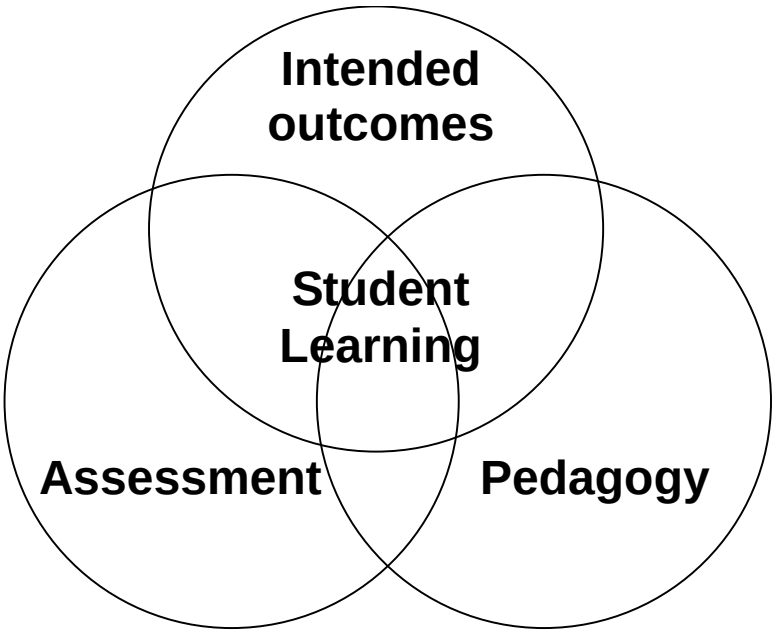
- a comprehensive body of specific knowledge, principles and concepts
- a basis for self-directed and lifelong learning
- personal attributes enabling effective participation in society

*Examples of these student capabilities are provided at **Appendix B**.*

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.
   (*Meta-cognition*)
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 learner' 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*)

Courses currently written under the Industrial Technology Trades Framework include Furniture Construction, Construction Pathways, Automotive Technology and Metal Engineering.

RATIONALE

Courses developed under the Industrial Technology Trades Course Framework are intended to meet the needs of students who have a general interest in industrial technology trades as well as those intending to choose a career pathway into traditional trades and related service industries.

Australia is currently experiencing a skills shortage in traditional trade areas. There is also an increasing demand in Australia and elsewhere for people able to assume highly skilled roles in areas deploying rapidly developing technologies. There is a need for more highly trained new workers and up-skilling of existing workers in the manufacturing and service industries as the levels of newer technologies are increased. For example, there are vastly more complex electronics systems to be fitted and serviced in the automotive industry and new materials and techniques in the building industry. Everybody is affected to some degree by the need to understand and effectively use advancing technology in the workshop, the construction site, the factory, office, home or farm.

Courses under this framework provide opportunities for students to develop relevant technical, vocational and interpersonal competencies suitable for employment and further training. They can also develop skills, knowledge and experiences - such as teamwork, communication and occupational health and safety- that are transferable to other industries.

The range of skills and knowledge in the manufacturing and service industries has increased and will continue to increase. New technologies are constantly replacing recent ones so there is a great need for people involved at any level in the production or use of them to be adaptable. Students and workers need to be able to acquire knowledge quickly and to develop and apply new skills effectively. These skills are transferable so can be used across a wide range of trades and industries. It is also important to maintain traditional skills and attitudes used with older technologies where they underpin and support the newer technologies.

There is an increasing tendency for workers to have several career changes during their lifetime and there are pressures on people to extend their working lives. These changes require retraining that may be funded by industry, but is very often the responsibility of the individual. It is therefore valuable for people to have an education that includes Industrial Technology at the senior secondary level. This could provide them with the best possible base for lifelong learning and for pursuing relevant career choices.

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:

- Understand the concepts, techniques, terminology and content appropriate to the industry focus of the course
- Demonstrate employment related practical skills and workplace best practice
- Demonstrate problem solving ability incorporating evaluation techniques and skills
- Relate basic numeracy and scientific principles to practical applications
- Demonstrate oral, written and graphical communication skills
- Work independently and collaboratively in accordance with occupational health and safety principles and industry standards
- Demonstrate an awareness of existing and emerging technologies and career pathways

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, C 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 essential concepts and context of courses developed under this Industrial Technology Trades framework will be guided by the Industry endorsed training packages for example:

- Furnishings
- Construction, Plumbing and Services
- Metal and Engineering
- Automotive industry Retail, Service and Repair

Skills

- Industry specific skills such as fine motor and physical
- Literacy such as reading, comprehension, writing
- Communication including written, oral and visual
- Numeracy such as costing, quantities, measurement, time, mathematical techniques
- Problem solving such as collecting, organising and analysing
- Teamwork such as sharing, defining roles and responsibilities, recognising and responding to individual's strengths and weaknesses
- Planning and organising
- Ability to work safely
- Ability to work independently

Vocational Courses

Colleges with Registered Training Organization status (RTO) are eligible to deliver units of competence from Training Packages or they may develop vocational courses, classified as A, T or C based on the Training Packages, under the relevant Course Framework. See above for some of the relevant Training Packages.

PEDAGOGY

Teaching Strategies

Course developers are encouraged to outline teaching strategies that are grounded in the Learning Principles and encompass quality teaching. Pedagogical techniques and assessment tasks should promote intellectual quality, establish a rich learning environment and generate relevant connections between learning and life experiences.

Teaching strategies that are particularly relevant and effective in Industrial Trades 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
- Work placements
- Establishing industry links with individuals or groups

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 Items in T courses should require students to utilise the higher order thinking skills that are the basis of the AST.

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

Task Type	Practical	Theory
Examples	Practical test Individual project Group project Continuous observation (eg skills, OHS) Competency based assessment	Folio Written test Assignment Research project Cooperative tasks Planning tasks Risk assessments Presentations
Weightings A Units	**60 - 70%**	**30 - 40%**

Additional Assessment Advice

Assessments will involve aspects of problem solving and OHS.

The Board recommends 3 - 5 assessment items per standard unit (1.0) or 2 - 3 per half standard unit (0.5).

Units of competency must be assessed in accordance with the rules for assessment within the relevant Training Package.

Assessment Criteria

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

- Industry specific skills
- Understanding and application of knowledge
- Understanding and use of Occupation Heath and Safety procedures
- Communication skills

Assessment Rubrics have been developed for some of the Task Types. These are included at ***Appendix A***.

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.

Students undertaking A, T and M accredited vocational programs will be assessed against the criteria and standards referenced in the course frameworks to produce grades and scores. They will also be assessed against competency standards as described in the relevant Training Package.

Students undertaking C accredited vocational programs will be assessed against competency standards as described in the relevant Training Package.

Where vocational programs are delivered through a partnership arrangement, there must be a teacher from the college at which the students are enrolled involved in the assessment of student achievement in determining BSSS unit grades and scores.

The following descriptors are consistent with the **system grade descriptors** that describe generic standards of student achievement across all A or T courses.

UNIT GRADE DESCRIPTORS FOR A COURSES

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typical*	*A student who achieves an **C** grade typically*	*A student who achieves an D grade typically*	*A student who achieves an **E** grade typically*
Industry specific skills	Proficiently and effectively performs all technical skills to a very high standard Demonstrates excellent time management skills	Effectively performs technical skills to a high standard. Demonstrates good time management skills	Performs technical skills to a satisfactory standard Demonstrates adequate time management skills	Performs some technical skills to a satisfactory standard Demonstrates some time management skills	Performs some basic skills Demonstrates very few time management skills
Understanding and application of knowledge	Demonstrates a thorough understanding and knowledge of workplace best practice and all key concepts Effectively applies the knowledge throughout the unit	Demonstrates a good understanding and knowledge of workplace best practice and key concepts Mostly applies the knowledge throughout the unit	Demonstrates an understanding and knowledge of workplace best practice and some key concepts Satisfactorily applies the knowledge throughout the unit	Demonstrates limited understanding and knowledge of workplace best practice Sometimes applies the knowledge throughout the unit	Demonstrates very limited understanding and knowledge of workplace best practice
Understanding and use of OHS procedures	Applies injury prevention management strategies and consistently identifies risks Consistently demonstrates OHS practices	Applies injury prevention management strategies and sometimes identifies risks Consistently demonstrates OHS practices	Applies injury prevention management strategies Demonstrates OHS practices	Usually demonstrates OHS practices	May require support to demonstrate OHS practices
Communication skills	Consistently demonstrates knowledge and understanding clearly and accurately through various communication forms (e.g. written, oral, visual)	Demonstrates knowledge and understanding clearly and accurately through various communication forms (e.g. written, oral, visual)	Demonstrates knowledge and understanding satisfactorily through various communication forms (e.g. written, oral, visual)	Demonstrates limited knowledge and understanding through some communication forms (e.g. written, oral, visual)	Demonstrates very limited knowledge and understanding through few communication forms (e.g. written, oral, visual)

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 judgements.

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 as well as any M units offered by the school, and is sent in to the Office of the Board of Senior Secondary Studies.
Teachers of C courses are required to present portfolios of student work for verification that units are taught and assessed as documented and validation that assessments meet industry standards. The Moderation Officer will report any concerns to the Board.

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 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.

BIBLIOGRAPHY

References for Curriculum Development

Websites from Australian State curriculum bodies:

New South Wales: http://www.boardofstudies.nsw.edu.au
Victoria: http://www.vcaa.vic.edu.au/vce/studies/index.html
Queensland: http://www.qsa.qld.edu.au
South Australia: http://www.ssabsa.sa.edu.au/teacher/teachersubject.php
Tasmania: http://www.tqa.tas.gov.au
Western Australia: http://www.det.wa.edu.au/education

Other references:

Every Chance to Learn: http://activated.act.edu.au/ectl
Curriculum Corporation: http://www.curriculum.edu.au/ccsite
National Library: http://www.nla.gov.au/education

COURSE FRAMEWORK DEVELOPMENT GROUP

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

RUBRIC for Practical Project

Note: Rubrics have been created as a guideline for schools. All tasks should include a marking rubric, however, schools may use the grade descriptors to devise their own rubrics. Rubrics do not replace a sustained comment by the teacher that is specific to the task.

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typical*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Industry specific skills	proficiently and effectively performs all technical skills to a very high standard demonstrates excellent time management skills	effectively performs technical skills to a high standard demonstrates good time management skills	performs technical skills to a satisfactory standard demonstrates adequate time management skills	performs some technical skills required for the project to a satisfactory standard demonstrates some time management skills	performs some basic skills demonstrates very few time management skills
Understanding and application of knowledge	demonstrates a thorough understanding and knowledge of workplace best practice and all key concepts effectively applies the knowledge throughout the unit	demonstrates a good understanding and knowledge of workplace best practice and key concepts mostly applies the knowledge throughout the unit	demonstrates an understanding and knowledge of workplace best practice and some key concepts generally applies the knowledge throughout the unit	demonstrates limited understanding and knowledge of workplace best practice sometimes applies the knowledge throughout the unit	demonstrates very limited understanding and knowledge of workplace best practice
Understanding and use of OHS procedures	applies injury prevention management strategies and consistently identifies risks consistently demonstrates OHS practices	applies injury prevention management strategies and sometimes identifies risks consistently demonstrates OHS practices	applies injury prevention management strategies demonstrates OHS practices	usually demonstrates OHS practices	may require support to demonstrate OHS practices
Communication skills	consistently demonstrates knowledge and understanding clearly and accurately through various communication forms (e.g. written, oral, visual).	demonstrates knowledge and understanding clearly and accurately through various communication forms (e.g. written, oral, visual).	demonstrates knowledge and understanding satisfactorily through various communication forms (e.g. written, oral, visual).	demonstrates limited knowledge and understanding through communication forms (e.g. written, oral, visual	demonstrates very limited knowledge and understanding through few communication forms (e.g. written, oral, visual

Sample Rubric for Written Assignment

Note: Rubrics have been created as a guideline for schools. All tasks should include a marking rubric, however, schools may use the grade descriptors to devise their own rubrics. Rubrics do not replace a sustained comment by the teacher that is specific to the task.

	*A student who achieves an **A** grade typically*	*A student who achieves a **B** grade typical*	*A student who achieves a **C** grade typically*	*A student who achieves a **D** grade typically*	*A student who achieves an **E** grade typically*
Understanding and application of knowledge	demonstrates a thorough understanding and knowledge of workplace best practice and all key concepts effectively applies the knowledge throughout the unit	demonstrates a good understanding and knowledge of workplace best practice and key concepts mostly applies the knowledge throughout the unit	demonstrates an understanding and knowledge of workplace best practice and some key concepts generally applies the knowledge throughout the unit	demonstrates limited understanding and knowledge of workplace best practice sometimes applies the knowledge throughout the unit	demonstrates very limited understanding and knowledge of workplace best practice
Understanding and use of OHS procedures	applies injury prevention management strategies and consistently identifies risks consistently demonstrations OHS practices	applies injury prevention management strategies and sometimes identifies risks consistently demonstrates OHS practices	applies injury prevention management strategies demonstrates OHS practices	usually demonstrates OHS practices	may require support to demonstrate OHS practices
Communication skills	consistently demonstrates knowledge and understanding clearly and accurately through various communication forms (e.g. written, oral, visual)	demonstrates knowledge and understanding clearly and accurately through various communication forms (e.g. written, oral, visual)	demonstrates knowledge and understanding satisfactorily through various communication forms (e.g. written, oral, visual)	demonstrates limited knowledge and understanding through some communication forms (e.g. written, oral, visual)	demonstrates very limited knowledge and understanding through few communication forms (e.g. written, oral, visual)

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 a social and economic environment of greater individual responsibility**
• personal attributes enabling effective participation in society	**through developing social skills** and capabilities for citizenship, **work experience and recognition of outside learning;** through understanding of a globalised knowledge society