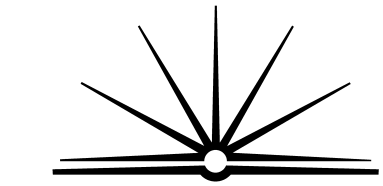

Graphics Technology
Years 7–10

Syllabus

June 2003

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1 Introduction

1.1 The K–10 Curriculum

This syllabus has been developed within the parameters set by the Board of Studies NSW in its *K–10 Curriculum Framework.* This framework ensures that K–10 syllabuses and curriculum requirements are designed to provide educational opportunities that:

- engage and challenge all students to maximise their individual talents and capabilities for lifelong learning
- enable all students to develop positive self-concepts and their capacity to establish and maintain safe, healthy and rewarding lives
- prepare all students for effective and responsible participation in their society, taking account of moral, ethical and spiritual considerations
- encourage and enable all students to enjoy learning, and to be self-motivated, reflective, competent learners who will be able to take part in further study, work or training
- promote a fair and just society that values diversity
- promote continuity and coherence of learning, and facilitate the transition between primary and secondary schooling.

The framework also provides a set of broad learning outcomes that summarise the knowledge, understanding, skills, values and attitudes essential for all students to succeed in and beyond their schooling. These broad learning outcomes indicate that students will:

- understand, develop and communicate ideas and information
- access, analyse, evaluate and use information from a variety of sources
- work collaboratively with others to achieve individual and collective goals
- possess the knowledge and skills necessary to maintain a safe and healthy lifestyle
- understand and appreciate the physical, biological and technological world and make responsible and informed decisions in relation to their world
- understand and appreciate social, cultural, geographical and historical contexts, and participate as active and informed citizens
- express themselves through creative activity and engage with the artistic, cultural and intellectual work of others
- understand and apply a variety of analytical and creative techniques to solve problems
- understand, interpret and apply concepts related to numerical and spatial patterns, structures and relationships
- be productive, creative and confident in the use of technology and understand the impact of technology on society
- understand the work environment and be equipped with the knowledge, understanding and skills to evaluate potential career options and pathways
- develop a system of personal values based on their understanding of moral, ethical and spiritual matters.

The ways in which learning in the *Graphics Technology Years 7–10 Syllabus* contributes to the curriculum and to the student's achievement of the broad learning outcomes are outlined in the syllabus rationale.

In accordance with the *K–10 Curriculum Framework*, the *Graphics Technology Years 7–10 Syllabus* takes into account the diverse needs of all students. It identifies essential knowledge, understanding, skills, values and attitudes. It enunciates clear standards of what students are expected to know and be able to do in Years 7–10. It provides structures and processes by

which teachers can provide continuity of study for all students, particularly to ensure successful transition through Years 5 to 8 and from Year 10 to Year 11.

The syllabus also assists students to maximise their achievement in Graphics Technology through the acquisition of additional knowledge, understanding, skills, values and attitudes. It contains advice to assist teachers to program learning for those students who have gone beyond achieving the outcomes through their study of the essential content.

1.2 Students with Special Education Needs

In the K–6 curriculum, students with special education needs are provided for in the following ways:

- through the inclusion of outcomes and content in syllabuses which provide for the full range of students
- through the development of additional advice and programming support for teachers to assist students to access the outcomes of the syllabus
- through the development of specific support documents for students with special education needs
- through teachers and parents planning together to ensure that syllabus outcomes and content reflect the learning needs and priorities of individual students.

Students with special education needs build on their achievements in K–6 as they progress through their secondary study and undertake courses to meet the requirements for the School Certificate.

It is necessary to continue focusing on the needs, interests and abilities of each student when planning a program for secondary schooling. The program will comprise the most appropriate combination of courses, outcomes and content available.

Life Skills
For most students with special education needs, the outcomes and content in sections 6 and 7 of this syllabus will be appropriate but for a small percentage of these students, particularly those with an intellectual disability, it may be determined that these outcomes and content are not appropriate. For these students the Life Skills outcomes and content in section 8 and the Life Skills assessment advice below can provide the basis for developing a relevant and meaningful program.

Access to Life Skills outcomes and content in Years 7–10
A decision to allow a student to access the Graphics Technology Years 7–10 Life Skills outcomes and content should include parents/carers and be based on careful consideration of the student's competencies and learning needs.

The decision should establish that the outcomes and content in sections 6 and 7 of the *Graphics Technology Years 7–10 Syllabus* are not appropriate to meet the needs of the student. Consideration should be given to whether modifications to programs and to teaching, including adjustments to learning activities and assessment, would enable the student to access the syllabus outcomes and content.

As part of the decision to allow a student to access the Graphics Technology Years 7–10 Life Skills outcomes and content, it is important to identify relevant settings, strategies and resource requirements that will assist the student in the learning process. Clear time frames and strategies for monitoring progress, relevant to the age of the student, need to be identified and collaborative plans should be made for future needs.

It is not necessary to seek permission of the Office of the Board of Studies for students to undertake the Graphics Technology Years 7–10 Life Skills outcomes and content, nor is it necessary to submit planning documentation.

Life Skills assessment

Each student undertaking a Graphics Technology Years 7–10 Life Skills course will have specified outcomes and content to be studied. The syllabus content listed for each outcome forms the basis of learning opportunities for students.

Assessment should provide opportunities for students to demonstrate achievement in relation to the outcomes and to generalise their knowledge, understanding and skills across a range of situations or environments including the school and the wider community.

Students may demonstrate achievement in relation to Graphics Technology Years 7–10 Life Skills outcomes independently or with support. The type of support will vary according to the particular needs of the student and the requirements of the activity. Examples of support may include:

- the provision of extra time
- physical and/or verbal assistance from others
- the provision of technological aids.

2 Rationale

Graphics Technology enables students to practise logical thought and decision-making while developing skills applicable to a range of domestic, commercial and leisure activities. They engage in both manual and computer-based forms of image generation and manipulation and develop knowledge of the wide application of graphics in a variety of contexts and an ever-increasing range of vocations. Graphics Technology also develops students' technical and visual literacy, equipping them for participation in a technological world.

The study of Graphics Technology will develop in students an understanding of the significance of graphical communication and the techniques and technologies used to convey technical and non-technical ideas and information. They will learn about the application of these techniques and technologies in industrial, commercial and domestic contexts.

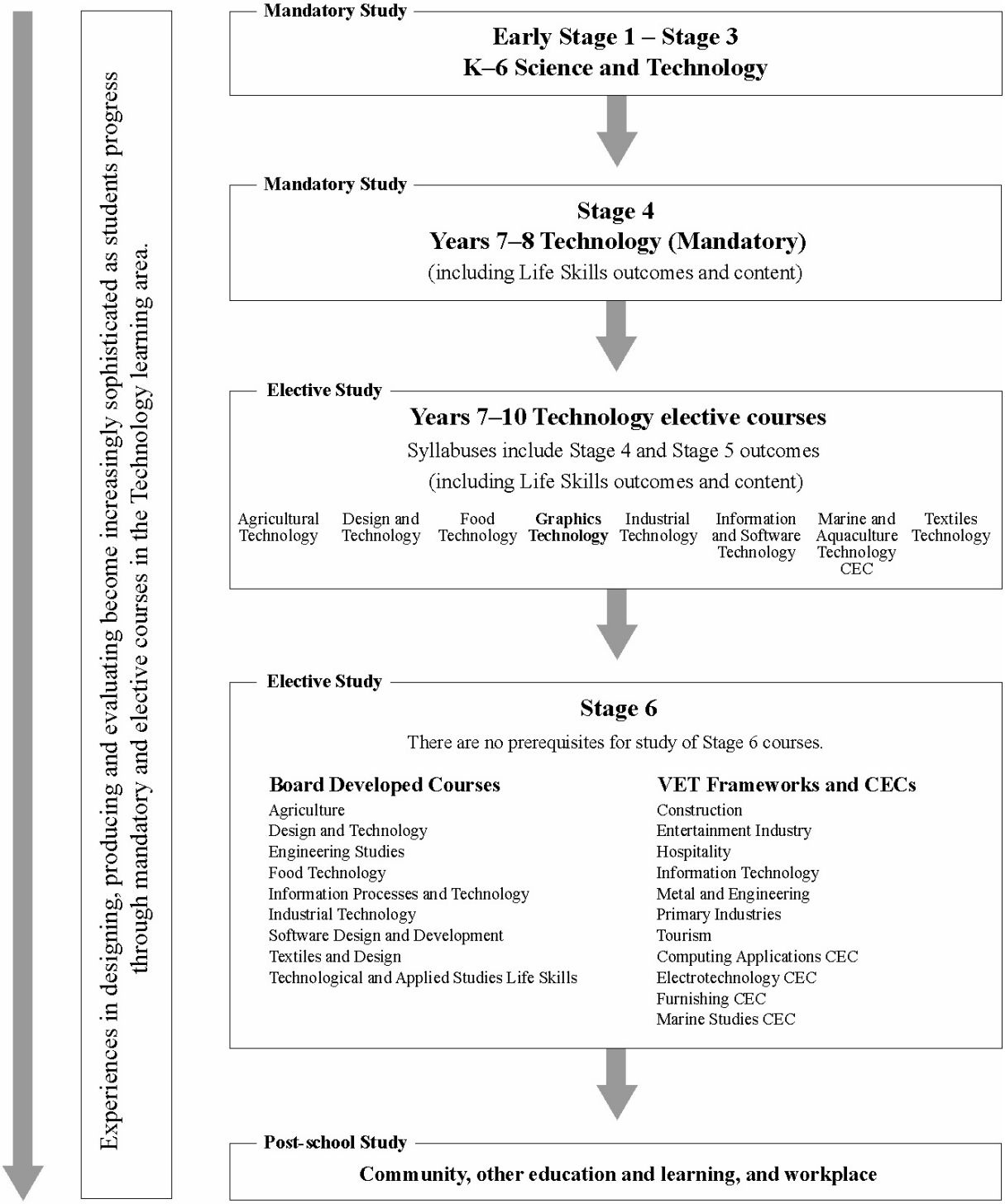
The use of graphical images to communicate information overcomes the barriers of time and linguistic, cultural and social differences. In an age of globalised industry and rapid technological development, where computer-aided design (CAD), computer-aided manufacture (CAM), interactive graphic design (IGD) and multimedia applications are widely used, the study of Graphics Technology is particularly relevant.

Graphics is a universal language and an important tool for thinking and communicating. Graphics Technology develops in students specific manipulative and cognitive skills in using a variety of tools, materials and techniques widely available in industrial, commercial and domestic settings. An important part of the cognitive process associated with this syllabus involves the generation and use of images, models and pictures. This includes the visualisation and manipulation of three-dimensional concepts and images and the interpretation and presentation of ideas graphically. Through the study of Graphics Technology students will develop the capacity to solve problems and generate and communicate solutions. They will become confident in the application of conventions and procedures that are essential to the global transfer of concepts and images irrespective of language barriers.

Through the study of Graphics Technology students become increasingly productive, creative, discriminating and confident in the development and use of a range of technologies relevant to current practice in graphics and graphics-related industries. The syllabus encourages the development of collaborative skills in the real and virtual worlds using intranet and/or extranet technologies, and fosters an understanding of the advantages and responsibilities that are associated with these processes.

The study of Graphics Technology in Years 7–10 develops in students an understanding of related work environments while developing skills and understanding that will equip them for potential vocational pathway, future learning and leisure and lifestyle activities.

3 The Place of the Graphics Technology Years 7–10 Syllabus in the Technology K–12 Curriculum



4 Aim

The aim of the *Graphics Technology Years 7–10 Syllabus* is to develop in students the ability to think creatively, devise solutions and communicate information to a range of audiences using a variety of graphical techniques and media.

5 Objectives

Knowledge, understanding and skills

Students will develop knowledge, understanding and skills to:

1 visualise, sketch and accurately draw shapes and objects to communicate information to specific audiences

2 interpret, design, produce and evaluate a variety of graphical presentations using a range of manual and computer-based media and techniques

3 use graphics conventions, standards and procedures in the design, production and interpretation of a range of manual and computer-based graphical presentations

4 select and apply techniques in the design and creation of computer-based presentations and simulations to communicate information

5 apply Occupational Health and Safety (OHS) practices and risk management techniques to the work environment

6 appreciate the nature and scope of graphics in industry and the relationships between graphics technology, the individual, society and the environment.

6 Outcomes

Objectives Students will develop knowledge, understanding and skills to:	**Stage 4 Outcomes** A student:	**Stage 5 Outcomes** A student:
1 visualise, sketch and accurately draw shapes and objects to communicate information to specific audiences	4.1.1 uses freehand sketches to interpret and visualise objects 4.1.2 selects and uses a range of presentation techniques suitable to a variety of audiences	5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques 5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations
2 interpret, design, produce and evaluate a variety of graphical presentations using a range of manual and computer-based media and techniques	4.2.1 interprets and produces a range of drawings 4.2.2 recognises the application of a range of drawings in conveying information	5.2.1 designs and produces a range of graphical presentations 5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes
3 use graphics conventions, standards and procedures in the design, production and interpretation of a range of manual and computer-based graphical presentations	4.3.1 applies elementary graphics conventions, standards and procedures in graphical communications 4.3.2 completes drawings within specified time frames	5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications 5.3.2 manages the development of graphical presentations to meet project briefs and specifications
4 select and apply techniques in the design and creation of computer-based presentations and simulations to communicate information	4.4.1 understands and uses computer-based drafting technologies	5.4.1 manipulates and produces images using computer-based drafting and presentation technologies 5.4.2 designs, produces and evaluates multimedia presentations

Objectives Students will develop knowledge, understanding and skills to:	**Stage 4 Outcomes** A student:	**Stage 5 Outcomes** A student:
5 apply OHS practices and risk management techniques to the work environment	4.5.1 recognises and responds to workplace hazards 4.5.2 works in a responsible and safe manner	5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment 5.5.2 demonstrates responsible and safe work practices for self and others
6 appreciate the nature and scope of graphics in industry and the relationships between graphics technology, the individual, society and the environment	4.6.1 relates classroom experiences to industrial and commercial applications	5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings 5.6.2 evaluates the impact of graphics on society, industry and the environment

Stage 4 outcomes have been provided to assist the assessment and reporting of student achievement in those schools that choose to begin elective study before Year 9. Teachers are advised to select from the syllabus content to target the specific needs of students who commence study in Stage 4.

Life Skills

For some students with special education needs, particularly those students with an intellectual disability, it may be determined that the above outcomes are not appropriate. For these students, Life Skills outcomes and content can provide the basis for the development of a relevant and meaningful program – see section 8.

7 Content

7.1 Organisation of Content

Graphics Technology Years 7–10 is an elective course that builds on the knowledge, skills and experiences developed in the study of the *Technology (Mandatory) Years 7–8 Syllabus*.

The major emphasis of the *Graphics Technology Years 7–10 Syllabus* is on students being actively involved in the planning, development and production of quality graphical presentations. Students should be provided with broad experiences to develop knowledge, understanding and skills in a range of media and areas of application.

Modules
The *Graphics Technology Years 7–10 Syllabus* content is organised into two core modules and thirteen option modules. Core modules are designed to provide a broad understanding of the principles and techniques associated with producing graphical presentations in a variety of styles and formats. Option modules allow students to develop knowledge, understanding and skills in specific graphics-related fields. These fields may be selected to provide experiences appropriate to individuals' abilities while catering for their special interests.

Core modules are structured in a sequential manner, with the knowledge, understanding and skills developed in Core Module 1 applied and enhanced in Core Module 2. Schools may deliver the core modules concurrently to maximise the utilisation of resources. Option modules may also be delivered concurrently to enable a thematic approach to the delivery of course content.

Each core module is designed to be taught in not less than 50 hours of planned learning experiences. Individual option modules will be delivered over 25 hours of planned learning experiences. Students will study four options in a 200-hour course. Option modules will be selected from a prescribed list.

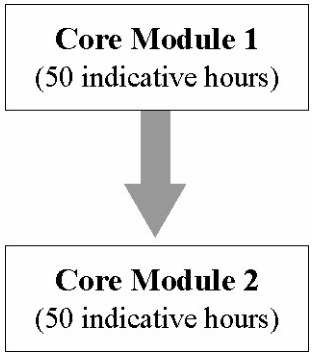
Essential content
All modules provide essential content designed to develop knowledge, understanding and skills related to the four key areas of:
- graphics principles and techniques
- design in graphics
- planning and construction
- presentation.

Additional content
Students can move beyond the essential content in order to broaden and deepen their understanding and skills, and to extend their interest in particular aspects of Graphics Technology.

Additional content is suggested in Core Module 2 and in each option module.

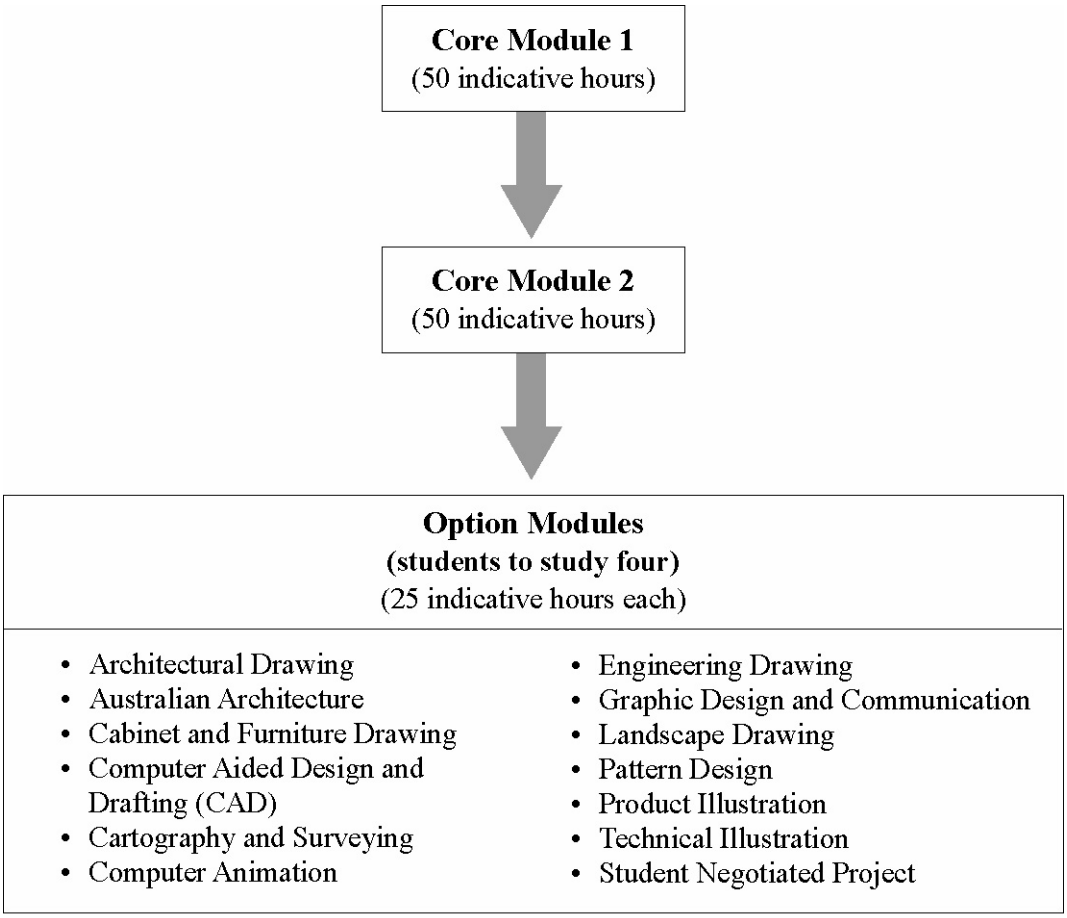
Courses of study
Graphics Technology may be offered as a 100-hour or 200-hour course.

100-hour course
Students undertaking the 100-hour course are required to complete Core Module 1 and Core Module 2.



200-hour course
Students studying the 200-hour course are required to complete Core Modules 1 and 2 followed by the study of four option modules.

Students studying the 200-hour course may choose to undertake a Student Negotiated Project as one of the four options required. In this project they may choose to revisit an option for further investigation, undertake projects that combine aspects of a number of option modules or pursue an area of graphics with local or personal significance (eg marine, aeronautical or agricultural). The student will be required to negotiate the area(s) of study of the project with the teacher.



Life Skills

Life Skills outcomes and content are in section 8.

Cross-curriculum content

Cross-curriculum content assists students to achieve the broad learning outcomes defined in the Board of Studies *K–10 Curriculum Framework*. It is incorporated in the content of the *Graphics Technology Years 7–10 Syllabus* in the following ways:

Information and Communication Technologies (ICT)

ICT applications are integrated into all aspects of the syllabus. These include:

- word processing: consideration of layout and design principles in graphical presentations; insertion of text and specifications into drawings
- multimedia/presentation: use of multimedia and presentation software in the design, development and production of graphical presentations
- simulation/modelling: use of appropriate simulation and 3D modelling software in the development and production of graphical presentations
- graphics: experiences in CAD-based software packages to develop and produce graphical presentations for a range of audiences. Experiences will also include layer and filter techniques, animation and 3D programs
- computer-based communication: presentation software, multimedia software, web creation and preparation software, use of the internet in research activities and of networks in collaborative learning environments.

Work, Employment and Enterprise

In all core and option modules students apply appropriate industry standards and follow correct work practices. They gain an understanding of the scope and nature of the graphics industry, and the range of options allows students to develop knowledge about and skills in specific areas of the industry. Technical literacy and numeracy are integral to the study of the course, helping to prepare students for their place in the workforce. Problem-solving, workplace communication, collaborative work practices and Occupational Health and Safety are embedded in all modules and options.

Aboriginal and Indigenous

The course will provide opportunities for students to learn to recognise the importance of graphical communications to the Aboriginal and Indigenous people and to learn about cultural influences on design and drafting. The syllabus encourages empathy and understanding through the consideration of the cultural significance and etiquettes related to the use of images in communication.

Difference and Diversity

Graphics Technology provides opportunities for students to develop an appreciation of the rights and contributions of others and an acceptance of a variety of views and opinions. These will be fostered through participation in collaborative work practices of both an informal and structured nature.

Environment

Opportunities for students to develop an appreciation for the environmental impact of new technologies and traditional practices are embedded in all modules. Specific environmental issues are addressed in each of the option modules.

Gender

Graphics Technology will provide opportunities for students to study the application of graphics to a broad range of fields. Students will develop an awareness of the appropriateness of graphical communications in terms of images and the gender-specific messages that may be conveyed. The syllabus allows teachers flexibility to shape the teaching program to suit the needs and interests of all students.

Key Competencies

The syllabus provides a structured context for the development of the key competencies considered essential for the acquisition of effective higher-order thinking skills. By following the course, students will learn to:

- source, select and sequence information relating to graphics technology, developing competence in ***collecting***, ***analysing***, ***and organising information***
- ***communicate ideas and information*** using a range of visual media and graphical representations appropriate to target audiences
- plan, prepare and present project work and sequence activities, developing competence in ***planning and organising activities***
- cooperate with individuals and groups in structured and informal group projects, developing competence in ***working with others and teams***
- design, implement and present solutions specific to graphics technology, developing competence in ***solving problems***
- ***use mathematical ideas and techniques*** in the sketching, measurement, drafting and manipulation of objects and images
- engage with a variety of software, hardware and drafting equipment associated with the graphics industry, developing competence in ***using technology***.

Literacy

The syllabus provides extensive opportunities for the development and consolidation of student literacy with an emphasis on the development of visual and technical literacy.

Multicultural

Students will develop an awareness and appreciation of the contributions made by people from a variety of cultural backgrounds in the area of graphics. They will develop an understanding of the importance of graphics in overcoming linguistic barriers in the communication of information.

Numeracy

Numeracy skills are developed in all areas of Graphics Technology. Measurement, use of scales, application of 2D/3D coordinates, applied geometric constructions and digital units of measurement are integral to the core modules and options. Students experience numeracy concepts such as size, proportion and spatial relationships in both the real and virtual worlds.

Across the Years 7–10 curriculum there are other areas of cross-curriculum content that all students will experience through the mandatory curriculum. In Graphics Technology, Civics and Citizenship will be an additional area of cross-curriculum content.

7.2 Content for Years 7–10

A note to teachers about practical experiences
To satisfy the requirements of the syllabus students must undertake a range of practical experiences that occupy the majority of course time. Practical experiences will be used to develop knowledge and understanding of and skills in designing, producing and evaluating. Student capability, confidence and expertise at their current stage of development is an important consideration in determining the teaching and learning sequences in the course.

In developing and delivering teaching programs teachers should be aware of and adopt relevant guidelines and directives of their education authorities and/or schools. Teaching programs should recognise and reflect relevant State and Commonwealth legislation, regulations and standards, including Occupational Health and Safety, Chemical Safety in Schools and Animal Welfare guidelines. Teachers need to be aware of activities that may require notification, certification, permission, permits and licences.

Core Module 1

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
Work Practices	
• equipment – type and care	• use and maintain appropriate drafting equipment
• the importance of – selection and maintenance of equipment – clean and ordered work practices	• apply planned and ordered approaches to producing drawings
• collaborative work practices	• work collaboratively in the production of a graphics project
• Occupational Health and Safety – government legislation – potential work environment hazards and risks	• identify OHS issues that impact on work environments
Standards	
• Australian and international drafting standards	• apply drafting conventions to create standard page layouts (eg paper size, borders, title blocks, projection symbols)
Computing Principles	
• CAD application set-up	• configure drafting applications
• the CAD environment including – tools – methods and modes – constraints and modifiers	• analyse and break down CAD drawing techniques into three general steps – what shape to draw (tools) – how to draw that shape (tool methods/modes) – where to start and end the shape (constraints/modifiers)

Students learn about:	**Students learn to:**
	• use basic CAD concepts including 2D/3D coordinate geometry, scale and measurement to carry out basic drafting construction • manipulate objects in relation to size, placement and orientation • evaluate and discriminate between manual and CAD techniques
• output options including printers, file formats, magnetic/optical media and computer-based communication media	• output information to a specified device or medium
Social and Ethical Issues • social and environmental implications of the graphics industry	• critically analyse graphical images for gender, social and cultural messages that may be conveyed
Design in Graphics • design principles and processes	• identify design principles and processes in the development, production and evaluation of graphical presentations
• methods of graphical representation used in design • freehand pictorial and orthogonal drawings	• identify and interpret different graphical representations of an existing design • visualise and sketch common objects • identify and apply freehand drawing techniques to a range of simple orthogonal and pictorial drawing types
Planning and Construction *Applied Geometry* • measurement and accuracy • application of scales in drawing	• use scales in the production of drawings
• simple geometric constructions • tangency	• apply basic geometric construction and tangency to graphical communication
• directional bearing and angular measurement	• apply directional bearing, distance and scale to two-dimensional course plotting
Orthogonal Drawing • first and third angle projection • relating principal planes to the projection of views in the first and third angle	• create orthogonal drawings in third angle projection
• multi-view drawings • measuring and drawing objects • drawing from pictorial images	• identify and produce drawings used in design and manufacture
• dimensioning to appropriate Australian drawing standards • variations in international drawing standards and units of measurement	• recognise and apply appropriate AS1100 drawing standards
• creating orthogonal drawings using CAD	• use the features of CAD software to create and dimension orthogonal drawings

Students learn about:	**Students learn to:**
Pictorial Drawing • oblique drawing • isometric drawing	• measure and draw simple objects • produce pictorial drawings from orthogonal drawings using manual and/or CAD techniques
Presentation *Rendering* • shading, shadows, tone, texture • representation and colour • computer modelling and computer-based graphics	• use manual and /or computer-based rendering techniques in a variety of 2D and 3D drawings
Product Drawing • drawing to convey technical information or product concept – shape description – size description – technical information • use of CAD to generate final drawings	• consolidate and apply pictorial, orthogonal and presentation techniques to a range of products • identify and produce types of drawings used in marketing
Techniques • manual presentation methods	• present product information in a clear and innovative manner

Core Module 2

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.4.2 designs, produces and evaluates multimedia presentations

5.5.1 identifies, assesses and manages relevant OHS factors to mimimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
Work Practices	
• the importance of accurate and neat work practices	• develop a planned and ordered work regime to produce neat and accurate drawings
• collaborative work practices	• work collaboratively in the production of a graphics project
• career opportunities pathways in graphics	• explore careers in graphics • analyse the roles and contributions of males and females to the graphics industry
• Occupational Health and Safety	• respond to OHS issues to ensure a safe working environment
Standards	
• Australian drafting standards	• apply AS1100 drafting standards
• drafting scales and templates including radius, circle, nut/bolt and architectural	• use standard instruments in the production of drawings and presentations
Computing Principles	
• the CAD environment	• use standard features of CAD software including layers, symbol libraries and page templates
Social and Ethical Issues	
• different cultural approaches and sensitivities to the use and applications of graphical communication	• identify the cultural significance of graphical communications throughout history

Students learn about:	**Students learn to:**
Design in Graphics	
• design principles and processes	• apply design principles and processes in the development, production and evaluation of graphical presentations • select and apply graphical communication techniques for specific purposes
• research sources, eg internet, journals, magazines, digital media, libraries and personal interviews	• use a range of sources to gather information to assist in the development of project work
• collaborative work environments	• work collaboratively in research and/or design activities
• freehand design drawings	• apply different graphical representations in elementary design situations • use sketches to assist with problem-solving and communication of ideas
• the use of computer graphics to assist in the development and representation of designs	• use 3D modelling and rendering to visualise and experiment with designs
Planning and Construction	
Applied Geometry	
• basic developments of simple solids including application to cones, prisms, cylinders and pyramids	• produce developments of simple objects • apply development techniques to pattern design
• true lengths of lines	• apply basic construction techniques to determine the true length of inclined lines
Orthogonal Drawing	
• assembled orthogonal drawings	• produce assembly drawings from exploded pictorial drawings and detail drawings
• sectioned orthogonal views	• produce orthogonal drawings containing full sections • select appropriate views and drawing types for a particular context • apply orthogonal drawing techniques to architectural, engineering or cabinet drawing
• standard representation of common engineering and architectural features	• relate common drawing conventions to AS1100 standards • employ manual techniques and drawing templates to draft common engineering and architectural elements
• the use of CAD software in the development of more complex orthogonal drawings	• use the hatching and fill features of CAD in the creation of sectioned views • use CAD symbol libraries to draw common engineering elements • apply layers to the production of orthogonal drawings
Pictorial Drawing	
• a variety of pictorial representation techniques including – isometric and oblique – planometric/axonometric – 1 and 2-point perspective	• visualise and draft common objects • construct pictorial circles and geometric shapes • utilise a range of pictorial representations

Students learn about:	**Students learn to:**
• generation of graphic shapes in the CAD environment to create realistic 3D images	• create 3D images using the principles of extrusion and revolution • manipulate 3D objects in relation to size, placement and orientation
Presentation	
Pictorial Rendering	
• rendering pictorial drawings to assist others in the visualisation of a product or concept • 3D modelling and rendering	• apply manual rendering and/or modelling techniques to a range of products • model and render a simple product in 3D using CAD or appropriate graphics software
Techniques	
• multimedia and traditional presentation methods	• apply both traditional and multimedia techniques to present products graphically

Additional Content **Students learn about:**	**Students learn to:**
• advanced geometric constructions	• apply advanced geometric curve construction techniques to the representation of helix and cam profiles
• advanced orthographic projection	• create auxiliary views to orthogonal drawings to represent the true-shape-of-surface of single and/or double inclined surfaces
• advanced pictorial projection	• apply isometric projection techniques to the creation of true isometric drawings • apply 2 and 3-point perspective techniques to the construction of pictorial views • represent complex curved surfaces in isometric and oblique drawings

Option Module: Architectural Drawing

The Architectural Drawing module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods associated with architecture.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.4.2 designs, produces and evaluates multimedia presentations

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• Australian architectural drafting standards	• apply AS1100 drafting standards • use scales, symbols and units of measure
• the role of architects in the building process	
• drafting media	• use different drafting media in the creation and presentation of architectural drawings
• architectural CAD applications	• use features of CAD software such as advanced view control and architectural tools • output and reproduce architectural drawings using a variety of devices and media
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics

Students learn about:	**Students learn to:**
Design in Graphics	
• freehand architectural design drawings	• apply different architectural drawing types to elementary design situations for communication with clients
• related government authorities and statutory requirements	• apply building codes and building approval requirements • design safe architectural spaces
• environmental issues relating to architectural design • current building practice	• design ecologically friendly architectural spaces • identify techniques used in modern building construction
Planning and Construction	
• architectural working drawings including – site/block plans – floor plans – sub-floor plans – standard elevations – sections	• produce plans for a variety of architectural purposes
• applications of CAD software in the development of architectural drawings	• set CAD software preferences • access and utilise architectural symbol libraries • create multi-layer architectural drawings
Presentation	
• architectural pictorial drawing	• create and render pictorial drawings for presentation • model and render architectural designs in 3D using graphics software
• architectural plans	• use sheet and detail numbering to link several architectural drawings as part of a complete set of working drawings

Additional Content	
Students learn about:	**Students learn to:**
• specialised architectural CAD features	• use specialised architectural CAD features such as 2D/3D wall and roof tools/wizards in the creation of drawings
• architectural detail drawing	• produce additional detail drawings such as sub-floor plan, footing detail, shadow, plumbing and electrical plans
• advanced multimedia architectural presentation	• create physical models of architectural designs • use CAD animation techniques to create architectural walkthroughs and flyovers • combine rendered drawings and photographs to create montages to help realistically visualise an architectural design

Option Module: Australian Architecture

The Australian Architecture module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on Australian architecture, its standards, building characteristics and historical qualities.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• architectural drafting standards	• apply AS1100 drafting standards • use scales, symbols and units of measure
• Australian architectural styles and eras • architectural conservation and heritage considerations and practice	• identify different historical Australian building styles and eras • identify cultural influences on Australian building styles
• the role of architects in Australian architecture	• describe the varying responsibilities of architects in the design, planning, construction and preservation of historical and contemporary Australian building styles
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics
Design in Graphics	
• freehand architectural drawing	• apply different architectural drawing types to the sketching of historic and contemporary architectural buildings and features

Students learn about:	**Students learn to:**
• Australian architectural design	• collect and annotate images from different sources and media, representing Australian architectural styles and features
• environmental issues affecting Australian architectural design	• reflect environmental considerations in the development of graphics presentations
Planning and Construction	
• the representation of Australian architectural designs	• represent historic and contemporary architectural design, showing construction detail and distinctive design elements, through the production of – site plans – floor plans – elevations – detail drawings
• applications of CAD software in the development of architectural drawings	• set CAD software preferences • utilise architectural symbol libraries • add architectural detail elements to symbol libraries for later use • create multi-layer architectural drawings
Presentation	
• historical architectural pictorial drawing	• create and render pictorial drawings to highlight internal and external architectural design features and elements • model and render simple architectural designs in 3D using CAD or appropriate graphics software • produce drawings that document, for posterity, significant historical buildings

Additional Content **Students learn about:**	**Students learn to:**
• the application of multimedia techniques to an Australian architectural case study	• create physical models of historical and contemporary Australian architectural designs • use CAD animation techniques to create architectural walkthroughs and flyovers • combine drawings and photographs to create a portfolio of a significant Australian architectural design or style

Option Module: Cabinet and Furniture Drawing

The Cabinet and Furniture Drawing module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in the furniture and cabinetmaking industries.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• cabinet and furniture drafting standards	• apply AS1100 drafting standards • use standard scales and units of measure as applied to cabinet and furniture drawing • apply the standard representation of furniture and cabinet elements
• materials used in cabinet and furniture construction • environmental considerations in material selection	• name common materials used in cabinet and furniture making
• joinery methods and techniques	• graphically describe cabinet and furniture joints and fittings
• applications of CAD to computer aided manufacture (CAM)	
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics

Students learn about:	**Students learn to:**
Design in Graphics	
• freehand cabinet and furniture design drawings	• use sketches in planning drawing layouts, component assemblies and design situations • measure and sketch from existing products • apply ergonomic principles in cabinet and furniture design
Planning and Construction	
• working drawings related to cabinet and furniture production	• apply drawing standards to a range of furniture items • produce multi-view drawings incorporating a variety of joints and fittings • construct detail drawings to illustrate joinery and design details • create cutting/parts lists • apply the principles of tangency to the drawing of curved furniture profiles • apply the principles of sectioning to complete and detail views • use an appropriate level of detail and dimensioning to fully describe an item
• application of CAD software in the development of cabinet and furniture drawings	• use CAD software to create working drawings
Presentation	
• cabinet and furniture pictorial drawings	• apply pictorial drafting techniques in the production of assembled and exploded cabinet and furniture drawings using manual and/or CAD techniques • produce 3D cutaway views to illustrate construction and assembly details • employ rendering techniques to represent different cabinet and furniture materials and finishes

Additional Content	
Students learn about:	**Students learn to:**
• historical aspects of cabinet and furniture design	• identify and compare traditional cabinet and furniture construction with modern mass-production techniques
• working rods	• create patterns and working rods suitable for use in cabinet and furniture construction
• scale furniture model making	• create small-scale models from working drawings to help visualise a design

Option Module: Computer Aided Design and Drafting (CAD)

The Computer Aided Design and Drafting module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in computer aided design and drafting.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.4.2 designs, produces and evaluates multimedia presentations

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• CAD techniques such as – wire frame modelling – surface modelling – solid modelling	• use correct CAD construction techniques • identify and utilise 3D CAD representations and modelling techniques
• specialised CAD features such as – solid and Boolean modelling – polygons – bezier and spline curves	• identify and apply the use of specialised CAD tools/features
• computer aided manufacture (CAM) processes and applications	• describe in general terms the CAM process • identify the links between CAD software and CAM applications
• standard export file types used in CAD	• use appropriate file types for exporting CAD files to – other graphics software programs such as rendering packages, animation packages, CAM and other CAD packages – non-CAD applications such as word processing and desktop publishing

Students learn about:	**Students learn to:**
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics
Design in Graphics	
• the use of CAD to assist in both the development and representation of designs • the use of CAD object and symbol libraries	• use rapid modelling to illustrate simple design concepts through the use of CAD • use CAD object and symbol libraries • modify existing drawings/models in the production of similar items
Planning and Construction	
• CAD modelling	• create 2D and 3D CAD representations of complex, compound shapes • create 3D models directly in the 3D CAD environment using 3D drawing tools • duplicate objects
Presentation	
• advanced CAD rendering techniques • the applications of surface textures to rendered 3D models to create photo-realistic images	• manipulate light sources, object orientation and camera position to create specific rendered 3D snapshots/views of an object
• advanced CAD animation techniques • the applications of CAD animation to areas such as the entertainment industry • advanced multimedia presentations • rapid prototyping techniques • implications for data when importing and exporting files	• use CAD animation techniques to create rendered walkthrough and/or flyover animations of 3D models • export and combine CAD images and animations with other computer media to create multimedia presentations of objects/concepts

Additional Content **Students learn about:**	**Students learn to:**
• 3D model surface textures	• input and apply textures to model surfaces as part of the photo-realistic rendering of computer models
• CAM applications	• apply CAD to 2D CAM in the manufacture of simple 2D items such as electronic printed circuit boards (PCBs), patterns/templates or name plaques • apply CAD to 3D CAM in the manufacture of simple 3D items • create simple objects through the use of numerical control (NC) software

Option Module: Cartography and Surveying

The Cartography and Surveying module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in cartography and surveying.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• cartography standards	• apply standard scales, symbols, units of measure for length and direction, line types and conventions • consolidate and apply the standard representation of mapping elements
• cartography and surveying terminology	• use common cartographic terms including contours, latitude/longitude and keys • use common surveying terms including easements, boundaries, encroachments, lot numbers and deposited plan (DP)
• common survey and cartographic map types	• distinguish between common types of maps/surveys and the information they convey
• cartographic and surveying tools and techniques	• identify the application of specialised tools in surveying and cartography • apply basic mathematical geometry to distance, area and angular calculations in surveying

Students learn about:	**Students learn to:**
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics
Design in Graphics	
• freehand site sketching and mapping	• apply survey data to the production of preliminary site maps
• the interpretation of survey and cartographic data	• identify and interpret different representations of survey and cartographic data
• environmental and cultural issues relating to surveying	
Planning and Construction	
• identification, interpretation and production of specific purpose plans and maps	• collect, interpret and use site data to produce – building surveys – site plans – contour plans – specialised maps – elevations/cross-sections
• applications of surveying in planning and construction	• outline the application of surveying to civic and architectural planning • outline the application of surveying techniques, such as site peg-out and identification surveys, in construction
Presentation	
• the presentation of cartographic data	• present cartographic data through the production of specialist maps such as – topographic maps – road maps – marine charts – other special purpose maps • create maps and/or 3D contour models using manual and/or computer-based techniques

Additional Content **Students learn about:**	**Students learn to:**
• practical surveying techniques	• apply practical surveying techniques, such as determining levels, bench marks, angles and distances, to field work
• contour surveying	• construct contour maps using spot levels taken from a site survey
• advanced multimedia presentation	• combine drawings and site photographs to present cartographic information • use layering techniques involving mixed media to present a variety of cartographic information • use CAD animation techniques to create landscape flyovers to assist in the visualisation of designs

Option Module: Computer Animation

The Computer Animation module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in the production of computer-based animations and simulations.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.4.2 designs, produces and evaluates multimedia presentations

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• animation terminology such as frame rates, tracks, sampling, tweening, compression and transition	• use animation terminology and techniques
• general animation techniques such as path-based and cell-based animation, morphing and warping	• select and use general animation techniques
• standard file types used in CAD-based animation	• use appropriate file types in the creation of computer animations
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics
Design in Graphics	
• the use of animation to assist in the development and representation of designs	• utilise simple animation techniques to quickly generate representations of a design

Students learn about:	**Students learn to:**
• digital input methods used in animation such as digital cameras, scanners or graphics tablets • animation design techniques such as 'storyboarding'	• use a range of devices to generate components of an animation including backgrounds and surface textures • design computer animations
Planning and Construction	
• 3D CAD modelling and rendering	• create and render simple 3D models using CAD and/or rendering software
• simple 3D CAD animation techniques	• create simple animation of 3D models through altering model position/orientation or camera position/angle • use animation software to create simple animations by digitally splicing together a number of static, rendered snapshots
• advanced 3D CAD animation techniques	• use advanced CAD animation techniques to create model walkthrough and flyover animations
Presentation	
• multimedia and hypermedia presentation of animations	• add soundtracks to animation to increase the realism of presentation to a client • use hypermedia techniques in the interactive presentation of animations either within the presentation medium or the animation itself
• importing and exporting data between applications and the implications for data transfer	• import and export files between different software applications

Additional Content **Students learn about:**	**Students learn to:**
• 3D model surface textures	• apply photo-realistic textures to model surfaces as part of the rendering and animation of computer models
• virtual reality	• create simple, interactive animations using techniques such as interactive panoramas and interactive object virtual reality

Option Module: Engineering Drawing

The Engineering Drawing module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in engineering.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, and standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• engineering drafting standards	• apply AS1100 drafting standards • use standard scales, symbols and units of measure as applied to engineering drawing
• conventional representation of features and parts	• consolidate and apply the standard representation of engineering elements
• the role of engineers in the manufacturing process	
• engineering materials	• name common materials used in engineering applications
• environmental considerations in material selection	
• engineering CAD applications including rapid prototyping	• use features of CAD software such as advanced view control and engineering symbol libraries • relate the applications of engineering CAD to computer aided manufacture (CAM)
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics

Students learn about:	**Students learn to:**
Design in Graphics	
• freehand engineering design drawings	• use sketches in planning drawing layouts, component assemblies and design situations • take measurements from an existing component and represent engineering detail through dimensioned sketches
Planning and Construction	
• detail drawings	• apply engineering drawing standards to a range of components • produce drawings incorporating a variety of engineering features • use an appropriate level of dimensioning to fully describe a component
• assembly drawings	• produce fully itemised assembly drawings incorporating a parts list • represent engineering features and parts of assembled components • apply sectioning techniques to assembly drawings
• application of CAD software in the development of engineering drawings	• use CAD software to create engineering detail and assembly drawings
Presentation	
• engineering working drawings	• use sheet and part numbering to link several detail and assembly drawings as part of a complete set of working drawings
• CAD layering techniques	• use the multi-layering features of CAD to present working drawings in an integrated form

Additional Content	
Students learn about:	**Students learn to:**
• the representation of specialised engineering features such as tolerances, types of fit, surface finishes and welds	• produce drawings incorporating specialised engineering features
• aligned and offset sections	• apply aligned and offset sectioning techniques to engineering drawings
• auxiliary views	• produce auxiliary orthogonal views to detail the true shape of an inclined face
• output to CAM	• use engineering CAD in the production of items using CAM techniques

Option Module: Graphic Design and Communication

The Graphic Design and Communication module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in graphic design.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.4.2 designs, produces and evaluates multimedia presentations

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• standard symbols/conventions used in graphical communication • the significance of standard symbols in international/multilingual communication	• identify and apply standard symbols and related conventions to a number of graphic design and communication contexts
• graphic design concepts and principles including – composition – proportion – balance – tone – contrast – brightness – colour	• apply graphic design principles to areas of communication such as – graphic design – typographic design – desktop publishing
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics

Students learn about:	**Students learn to:**
Design in Graphics	
• freehand design sketching	• develop and present graphic designs through the use of freehand sketching • sketch presentation page layouts
• issues affecting graphic design including trademarks and copyright	• apply an understanding of issues such as trademarks and copyright in the production and reproduction of communication graphics
• computer-based research and design techniques	• use digital image libraries in the design of graphics • use digital input devices such as scanners and digital cameras to assist in the research and development of designs
Planning and Construction	
• the development of graphical images and presentations	• apply geometric construction techniques to the development of icons, logograms and typeface • create graphics using both orthographic and pictorial drafting techniques • use rendering techniques to apply tone and colour to graphic designs • combine different media such as text, drawings and photos in the development of graphics
• digital graphic design	• identify and use appropriate software to produce graphic designs for a given situation
Presentation	
• forms of graphic communication which could include – instructional and maintenance manuals – letterheads and logos – graphs and charts – advertising – maps – signage	• apply graphic design principles to the presentation of graphics in a number of forms

Additional Content	
Students learn about:	**Students learn to:**
• multimedia graphic presentation methods such as – internet – computer slideshows – film/video – transfer printing – airbrushing techniques	• communicate graphic designs using both traditional and computer-based media/techniques

Option Module: Landscape Drawing

The Landscape Drawing module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in landscape architecture and design.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• landscape drafting conventions	• use standard scales, symbols and units of measure as applied to landscape drawing • apply the standard representation of landscape materials and plant elements to landscape drawing
• landscape elements and construction techniques including – common plant types and landscape materials – structural landscape elements and their construction	• incorporate landscape elements into designs and presentations
• the role of landscape architects	• identify the varying responsibilities of landscape architects in design, planning and construction
• drafting media	• use different drafting media in the creation and presentation of landscape drawings
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics

Students learn about:	**Students learn to:**
Design in Graphics	
• freehand landscape concept drawings	• measure and sketch site plans • sketch landscape and architectural elements
• related government authorities and statutory requirements	• apply appropriate building codes and statutory requirements
• environmental issues relating to landscape design	• design environmentally friendly landscapes
• interpretation of existing plans	• interpret photos, contour and site surveys/plans
• relationship of landscape design to architectural design	• use landscaping elements to enhance architectural design
Planning and Construction	
• landscape design drawing techniques such as grid paper, symbol templates, keys and legends	• produce – site plans – shadow plans – elevations/cross-sections • produce rendered landscape plans using various techniques • create and use a personal manual or digital scrapbook of landscape symbols and elements
Presentation	
• landscape pictorial drawing	• create and render plan, elevation and pictorial drawings suitable for presentation to a client • create simple landscape designs in 2D using CAD or appropriate graphics software
• pictorial montages	• merge drawings with other images to help visualise the overall design

Additional Content **Students learn about:**	**Students learn to:**
• applications of CAD software in the development of landscape design drawings	• use landscape symbol libraries • create multi-layer landscape/architectural drawings
• specialised design applications	• apply landscape design principles and drawing types to irrigation and drainage system design
• advanced multimedia landscape design presentation	• create physical models of landscape designs • use CAD animation techniques to create landscape flyovers

Option Module: Pattern Design

The Pattern Design module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used in the development and production of patterns, templates and developments for flat sheet materials.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• construction of freehand curves	• construct freehand curves through the use of projection of loci points
• labelling of vertices	• label the vertices of objects as a part of development construction
• pattern elements and their representation such as seams, fold lines, tabs and outlines	• apply common terms for elements of a pattern
• sheet materials and construction techniques	• compare and contrast the characteristics of common sheet materials • compare and contrast common folding and joining methods used in industry
• industrial applications of pattern design	• identify the industrial applications of pattern design in areas such as sheet metal, packaging and textiles
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics

Students learn about:	**Students learn to:**
Design in Graphics	
• freehand drawing as a tool in pattern design	• visualise and sketch: – orthogonal and pictorial views of completed items – developments of these items
• factors influencing pattern	• apply an understanding of factors such as methods of joining, material rigidity and strength in the design of pattern seams and folds • consider environmental issues through the economic use of materials in pattern design
• graphical analysis of existing designs	• analyse and break down existing items into sheet form to better understand their development and construction
Planning and Construction	
• development of basic truncated solids	• produce developments of simple truncated objects, including application to cones, prisms, cylinders and pyramids
• development of simple intersecting surfaces	• produce developments of simple co-planar intersections of cylinders and prisms
• development of simple transition pieces	• produce developments of simple transition pieces, including same shape-different size and different shape-different size transitions
Presentation	
• pictorial representation of plain and intersecting solids	• create representations of plain and intersecting solids to help visualise the 3D form of a pattern
• pattern creation and modelling	• create simple working patterns, ready for use • construct 3D models of simple solids from developments/patterns

Additional Content **Students learn about:**	**Students learn to:**
• development of more complex intersecting surfaces	• produce developments of non-co-planar intersections
• development of more complex transition pieces	• produce developments of more complex transition pieces
• applications of CAD to pattern creation and modelling	• construct 3D computer models of simple, truncated and intersecting solids to assist in visualisation of the 3D form of a development/pattern
• rapid prototyping	• use the features of CAD software to create developments and patterns that make economic use of sheet materials

Option Module: Product Illustration

The Product Illustration module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used to illustrate a range and variety of products.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience to select and develop appropriate presentations

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of different modes of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.4.2 designs, produces and evaluates multimedia presentations

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• product illustration conventions and applications • varying applications of product illustrations in product design, development and marketing	• identify and apply the techniques used in commercial product drawing, architecture and engineering • identify and apply appropriate scales for use in graphic illustration/product drawing contexts
• graphic design principles including – composition – proportion – balance – tone – contrast – brightness – colour	• identify and apply graphic design concepts to the production of graphic illustrations
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics

Students learn about:	**Students learn to:**
Design in Graphics	
• freehand design sketching	• use sketches to assist in the development and communication of ideas and plan presentation page layouts
• the use of digital and other electronic techniques such as scanners and digital cameras	• use photocopying and digital reproduction techniques for the enlargement, reduction and transfer of images • use digital input devices to assist in the research and development of designs
Planning and Construction	
• the creation of product drawings using both orthographic and pictorial drafting techniques	• produce orthogonal drawings to show assemblies and sections • produce exploded pictorial drawings of simple products • apply the use of cutaway sections in pictorial drawings
• commercial drawing methods	• use applicable templates and other drawing aids • use CAD for the development of 2D and 3D drawings
• digital illustration	• identify and use appropriate software to produce and render graphic illustrations
Presentation	
• the appropriate use of rendering techniques	• use a variety of rendering techniques and media to illustrate: – tone, colour and texture – shade, shadow and reflections – a range of materials
• graphic presentation using multimedia methods	• communicate graphic designs to a range of audiences using both traditional and computer-based media/techniques

Additional Content **Students learn about:**	**Students learn to:**
• advanced CAD applications	• input and apply textures to surfaces as part of the photo-realistic rendering of 3D product models • use CAD or appropriate animation software to create rendered animations of 3D product models
• advanced multimedia presentation techniques	• create realistic physical models to enhance the presentation of product designs • combine rendered illustrations and photographs to create montages to help realistically visualise product designs
• the in-depth application of product illustration methods in commercial settings	• research and apply a variety of traditional and/or computer-based techniques to produce a folio of presentation drawings for the manufacturing and/or marketing of a product

Option Module: Technical Illustration

The Technical Illustration module extends students' knowledge, understanding and skills of graphics technology with a particular emphasis on the standards and presentation methods used to graphically illustrate technical processes and concepts.

Projects undertaken in this module should promote the sequential development of skills and reflect an increasing degree of student autonomy as they progress through the course.

Outcomes

A student:

5.1.1 communicates ideas graphically using freehand sketching and accurate drafting techniques

5.1.2 analyses the nature of information and intended audience and selects and applies presentations appropriate to each

5.2.1 designs and produces a range of graphical presentations

5.2.2 evaluates the effectiveness of graphical communications for a variety of purposes

5.3.1 identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications

5.3.2 manages the development of graphical presentations to meet project briefs and specifications

5.4.1 manipulates and produces images using computer-based drafting and presentation technologies

5.4.2 designs, produces and evaluates multimedia presentations

5.5.1 identifies, assesses and manages relevant OHS factors to minimise risks in the work environment

5.5.2 demonstrates responsible and safe work practices for self and others

5.6.1 demonstrates the application of graphics to a range of industrial, commercial and personal settings

5.6.2 evaluates the impact of graphics on society, industry and the environment

Students learn about:	**Students learn to:**
Graphics Principles and Techniques	
• standards and conventions used in technical illustration	• apply standards, conventions, scales and units of measure • use appropriate manual drafting templates and CAD symbol libraries to represent elements such as nuts, bolts and ellipses
• applications of technical illustration including – engineering design – cabinet and furniture design – product design	• apply technical illustration principles to industrial situations
• Occupational Health and Safety (OHS) in the graphics industry	• demonstrate safe and responsible work practices to self and others • identify OHS issues related to products and processes in graphics
Design in Graphics	
• freehand sketching and planning	• measure and sketch product detail to represent existing products or to help visualise product design • sketch and plan technical illustration layouts

Students learn about:	**Students learn to:**
Planning and Construction	
• technical illustration styles and techniques	• interpret detail from existing orthogonal drawings in the production of instructional and maintenance diagrams • produce sectioned and cutaway drawings to reveal technical detail • produce exploded pictorial illustrations to convey assembly and construction detail • select and use dimensioning and labelling methods suitable to pictorial drawings • produce pictorial drawings which contain circles, semi-circles, quadrants and free-form curves
• CAD applications in technical illustration	• use suitable CAD tools and methods to produce technical illustrations
Presentation	
• incorporating technical illustrations into documents and presentations such as – handbooks – manuals – textbooks – brochures – hypertext/hypermedia presentations	• incorporate technical illustrations into documents and presentations
• technical rendering	• use rendering techniques in the presentation of technical illustrations to enhance product detail • apply manual presentation methods using a variety of media

Additional Content **Students learn about:**	**Students learn to:**
• CAD applications for technical illustration	• use CAD 3D modelling in the production of technical illustrations
• computer-based multimedia presentation methods	• use animation techniques to convey technical information to a targeted audience • combine technical illustrations and animations with other computer media to create multimedia presentations

Option Module: Student Negotiated Project

Students studying the 200-hour course may choose to undertake a Student Negotiated Project as one of the four options required. In this project they may choose to revisit an option for further investigation, undertake projects that combine aspects of a number of option modules, or pursue an area of graphics with local or personal significance (eg marine, aeronautical or agricultural). The student will be required to negotiate the area(s) of study of the project with the teacher.

Outcomes

A student:

5.1.1	communicates ideas graphically using freehand sketching and accurate drafting techniques
5.1.2	analyses the nature of information and intended audience to select and develop appropriate presentations
5.2.1	designs and produces a range of graphical presentations
5.2.2	evaluates the effectiveness of different modes of graphical communications for a variety of purposes
5.3.1	identifies, interprets, selects and applies graphics conventions, standards and procedures in graphical communications
5.3.2	manages the development of graphical presentations to meet project briefs and specifications
5.4.1	manipulates and produces images using computer-based drafting and presentation technologies
5.4.2	designs, produces and evaluates multimedia presentations
5.5.1	identifies, assesses and manages relevant OHS factors to minimise risks in the work environment
5.5.2	demonstrates responsible and safe work practices for self and others
5.6.1	demonstrates the application of graphics to a range of industrial, commercial and personal settings
5.6.2	evaluates the impact of graphics on society, industry and the environment

In developing a Student Negotiated Project, students and teachers need to ensure that the project provides opportunities for the:

- achievement of a range of syllabus outcomes (see above)
- development of knowledge, understanding and skills in
  - graphics principles and techniques
  - design in graphics
  - planning and construction
  - presentation.

Life Skills

For some students with special education needs, particularly those students with an intellectual disability, it may be determined that the above content is not appropriate. For these students, Life Skills outcomes and content can provide the basis for the development of a relevant and meaningful program – see section 8.

8 Life Skills Outcomes and Content

The Board of Studies recognises that a small percentage of students with special education needs may best fulfil the mandatory curriculum requirements for Graphics Technology by undertaking Life Skills outcomes and content. (Requirements for access to Life Skills outcomes and content are detailed in section 1.2.)

Life Skills outcomes will be selected on the basis that they meet the particular needs, goals and priorities of each student. Students are not required to complete all outcomes. Outcomes may be demonstrated independently or with support.

In order to provide a relevant and meaningful program of study that reflects the needs, interests and abilities of each student, schools may integrate Graphics Technology Life Skills outcomes and content across a variety of school and community contexts.

8.1 Outcomes

Objectives Students will develop knowledge, understanding and skills to:	**Outcomes** A student:
1 visualise, sketch and accurately draw shapes and objects to communicate information to specific audiences	LS 1.1 participates in the development of graphics projects LS 1.2 undertakes graphical presentations to communicate ideas
2 interpret, design, produce and evaluate a variety of graphical presentations using a range of manual and computer-based media and techniques	LS 2.1 recognises appropriate techniques for a variety of projects LS 2.2 evaluates the effectiveness of graphical presentations
3 use graphics conventions, standards and procedures in the design, production and interpretation of a range of manual and computer-based graphical presentations	LS 3.1 recognises that there is a range of graphics standards
4 select and apply techniques in the design and creation of computer-based presentations and simulations to communicate information	LS 4.1 uses computer-based presentation techniques
5 apply Occupational Health and Safety (OHS) practices and risk management techniques to the work environment	LS 5.1 demonstrates safe practices in the use of tools, materials and techniques in undertaking a project
6 appreciate the nature and scope of graphics in industry and the relationships between graphics technology, the individual, society and the environment	LS 6.1 recognises the use of graphics technology in a variety of contexts

8.2 Content

The content forms the basis for learning opportunities. Content will be selected on the basis that it meets the needs, goals and priorities of each student. Students are not required to complete all of the content to demonstrate achievement of an outcome.

The examples provided are suggestions only.

<table>
<tr><td colspan="2">Outcomes
LS 1.1 A student participates in the development of graphics projects.
LS 1.2 A student undertakes graphical presentations to communicate ideas.</td></tr>
<tr><td>Students learn about:
• a design process for graphics projects

• using a design process in the context of a project</td><td>Students learn to:
• use freehand sketches to express ideas
• refine ideas using a variety of techniques, eg pictorial drawing, orthogonal drawing, drawing media, coloured/textured papers, shade/shadow techniques
• select appropriate media, drawing types, equipment
• use simple conventions for drawing
• make drawings: pictorial, orthogonal, applied geometry
• use safe practices
• use a variety of communication techniques to present ideas including computer-based presentations and portfolios
• evaluate process and product
• participate in a specific graphics project, eg
design a personal logo for a given purpose
– cut and paste given symbols to create a logo for use in picture symbol communication system (compics)
– develop ideas and design and draw a logo to personalise a school folder or book cover
– use computer drawing program to create a logo for a personal business card or letterhead
draw a mobile phone
– customise a standard line drawing of a mobile phone using rendering techniques – colour, texture, shade, shadow
– copy a drawing of a mobile phone and use drawing techniques to customise face
– develop detailed drawings for an original mobile phone design using a number of drawing techniques
design and draw a vehicle accessory
– select a line drawing of a vehicle and customise with accessories
– copy a drawing of a vehicle accessory
– develop detailed drawing of a vehicle accessory</td></tr>
</table>

Outcomes

LS 2.1 A student recognises appropriate techniques for a variety of projects.

LS 2.2 A student evaluates the effectiveness of graphical presentations.

Students learn about:	**Students learn to:**
• different drawing types – pictorial drawing – orthogonal projection – applied geometry	• recognise different drawing types, eg – exploded isometric – orthogonal projection – perspective drawing – oblique drawing
• different drawing media	• recognise appropriate drawing media for specific purposes, eg coloured/textured papers, pastels, charcoal, graphite sticks, markers
• different drawing techniques	• recognise appropriate drawing techniques for a specific purpose, eg shade and shadow, computer aided design and drafting (CAD)
• features of graphical presentations	• recognise the features of graphical presentations in terms of – conveying information – ease of use – appeal • recognise the impact of – the selection of drawing type, materials and techniques – presentation techniques – drawings to complement words
• evaluating graphical presentations	• respond to questions to evaluate the effectiveness of graphical presentations, eg *instructions for: assembly of a cardboard file box, constructing a model plane, using a domestic appliance* – Could you identify the parts from the drawing? – Were the drawings in the right sequence? – Were there enough steps to make the process clear? *signage: toilet signs, domestic appliances, road signs, car dashboard symbols, hazard warnings* – Did you understand the symbols? – Was the colouring effective? – Could the signs be seen from a distance and in the dark?

Outcome LS 3.1	A student recognises that there is a range of graphics standards.
Students learn about:	**Students learn to:**
• graphics standards	• identify simple conventions of drawing devised from – Australian engineering drawing standards – Australian architectural drawing standards – local government ordinances

Outcome LS 4.1	A student uses computer-based presentation techniques.
Students learn about:	**Students learn to:**
• computer-aided drawing programs • multimedia programs	• use paint/draw programs in the context of design projects • make computer-aided drawings • use multimedia programs for presentation/communication of graphics design projects

Outcome LS 5.1	A student demonstrates safe practices in the use of tools, materials and techniques in undertaking a project.
Students learn about:	**Students learn to:**
• safe handling and storage of drawing equipment and drawing media • safe work practices	• use drawing equipment and drawing media safely, eg use airbrush equipment and spray can finishes in well-ventilated areas • care for and store drawing equipment, eg store compasses safely, store felt-tipped markers with caps in place to extend shelf life • use safe practices in practical areas, eg computer equipment, sharp objects

Outcome LS 6.1	A student recognises the use of graphics technology in a variety of contexts.
Students learn about:	**Students learn to:**
• the role of graphics in society as – universal language – learning aid – representation of design – marketing tool	• recognise the use of graphics in society, eg – signage: safety, road, sports, domestic – learning: graphics in books/textbooks, multimedia presentations – instruction: maps, assembly instructions, house plans, blueprints – marketing: to attract attention, to sell products

9 Continuum of Learning in Graphics Technology K–10

9.1 Stage Statements

Stage statements illustrate the continuum of learning in the *Graphics Technology Years 7–10 Syllabus* and are summaries of the knowledge, understanding, skills, values and attitudes that have been developed by students as a consequence of achieving the outcomes for the relevant stage of learning.

Early Stage 1 – Science and Technology K–6

Students who have achieved Early Stage 1 show a growing awareness of, and interest in, the natural and made environment. They demonstrate confidence in proposing ideas for designs they develop through play and modelling. They demonstrate curiosity about artefacts, events, phenomena, places and living things around them.

Early Stage 1 students use play to explore ideas, manipulate materials and trial solutions. They develop and begin to refine their understanding of environments, materials, equipment and other resources through trial and error. They ask questions, suggest ideas, propose their own explanations and are able to report verbally and graphically on their actions and observations.

Students in this stage use their senses to observe features of their immediate environment and to explore the properties of a range of common materials. They identify and group living and non-living things according to some common characteristics.

Students explore and identify the needs of people and other living things. They recognise the use of some forms of energy, and their ideas about energy are beginning to develop as they experience energy in different contexts.

Students generate their own ideas using make-believe and express these verbally, pictorially and through modelling. They are unlikely to perceive the steps in a designing and making process as they often work in situations where these aspects occur at the same time. They identify what they like or dislike about their designs or explorations.

Students in Early Stage 1 recognise that information can come from a variety of sources, including other people, and from different media, eg books and videos. They demonstrate an awareness of a range of uses for computer-based technology; as well, they show an emerging confidence in their ability to explore and use computer-based technologies with assistance, to create text and images and to play games.

Students show growing awareness of the appropriate use and maintenance of a range of classroom equipment. They give reasons for safe working practices and organisational procedures related to the use of equipment, resources and materials.

Students develop ideas through the use and manipulation of concrete materials as a means of progressing towards abstract thought.

Stage 1 – Science and Technology

Students who have achieved Stage 1 are developing an awareness of the wider world and are applying their scientific and technological understanding to new and different situations. They are starting to develop the social skills required to investigate, design and make products and services.

Students are starting to appreciate the dependence of living things and their environments. They recognise that people create products, services and environments to meet their own needs. They build on their existing understanding of some of the forms of energy.

Students are able to interpret information and make predictions based on their own observations. They are better able to accept that the result of a test may be different from what was originally expected.

Students are able to recognise the purpose of an investigation and seek further information as a result of their own curiosity. They begin to see that an investigation is a series of orderly steps. They use their senses to identify similarities and differences. Students show curiosity about natural and made environments and seek explanations that allow them to interpret their observations.

Using plans, drawings and models, Stage 1 students begin to generate and select ideas to best meet design task objectives, and give simple explanations of why they have chosen a certain idea. Students in this stage can draw plans for a design and can explain some of the features and materials to be used. They can write labels and simple explanations when creating images.

Students recognise, and discuss with others, some of the strengths and limitations of what they have done and identify some changes that could be made to improve plans or models, eg appearance. They make comparisons about what they like and dislike about familiar products, systems or environments.

Students effectively manipulate materials that are available in the classroom environment, and show a growing awareness of the different properties of such materials and how they affect the way in which the materials are used. They recognise that some materials occur naturally, while others are made.

Students have a developing awareness of a range of media and information products. They are able to use computer technology to start, open files or applications, save and shut down. They are able to use computer-based technologies where appropriate for a given task.

They are able to identify the different forms of technology in their immediate environments and explain how they help us. They safely use, maintain and store equipment such as scissors, magnifying glasses, computers and disks.

Stage 2 – Science and Technology

Students who have achieved Stage 2 are able to initiate their own investigations as a result of something that has aroused their curiosity. They ask perceptive questions and respond to design tasks in innovative ways. They identify ways of improving their own scientific and technological activities by considering issues such as how well something works, its appearance and how it might affect the environment.

Students develop the capacity to ask questions to clarify understanding. They predict outcomes by proposing explanations and testing to see if their predicted outcomes eventuate. As students develop skills in predicting, testing, recording results and drawing conclusions, they begin to form understanding about 'fair testing' that takes into account the need for consistent conditions except for one variable, in order to ensure accurate results.

Students who have achieved Stage 2 are able to explore ideas for investigations and their design proposals in order to identify where decisions still need to be made, and to suggest possible courses of action. Students may suggest modifications to improve their initial proposals, including the selection of different solutions to arrive at a suitable outcome.

Students are able to explore the properties, capabilities and working characteristics of both natural and manufactured materials and components. They recognise that materials are varied and have different properties that affect their use. They can select, maintain and safely use classroom tools and equipment, hardware and software and justify their selection for particular tasks.

Students give consideration to issues such as function and aesthetics when designing and evaluating products, services and environments. They can identify some limitations when carrying out a design task. Students develop plans that show some consideration of the types and quantities of materials required and an awareness of the need for accuracy in a plan for production purposes.

Students recognise the function of some hardware and software and are able to select and use these to meet the requirements of a task. They can discuss the possibilities and limitations of using a range of technology including computer-based technology.

Students are developing a capacity to understand relationships in the natural world. They can identify and describe some aspects of the structure and function of living things and some of the ways living things interact. They can also identify and describe some of the interactions of the Earth with other parts of the solar system. Students in this stage devise systems that inform or utilise their understanding of some forms of energy.

Students also demonstrate a greater understanding of and control over a design process. They recognise the importance of evaluation throughout a design cycle.

Stage 3 – Science and Technology

Students who have achieved Stage 3 are able to undertake investigations independently in order to satisfy their own curiosity. They demonstrate a willingness to initiate their own investigations; this might include designing appropriate fair tests to evaluate a range of possible explanations for the results of their investigations.

Students select and use appropriate language, structures and media and demonstrate skills in critically examining and communicating scientific and technological ideas and issues. Students can relate their scientific and technological understanding to new tasks or different situations.

Students research and investigate to identify phenomena and processes that have influenced Earth over time. They build on their existing understanding of forms of energy.

Students are aware of the skills and processes involved in designing and making, investigating and using technology. They manage the design process including aspects of time management, design constraints and needs of the target audience. At this stage, they can make decisions involving some conflicting interests or issues, eg ethical, aesthetic, environmental and cultural.

Students use two and three-dimensional drawings and models to develop and modify their design ideas and to communicate details to others. They recognise and use some conventions and symbols related to developing plans and diagrams, such as measurements and some use of scale. They can observe the form and detail of objects carefully in order to produce accurate drawings from different views and they reflect on their drawings, sketches or computer models.

Students are aware of a range of issues related to scientific and technological achievements. They are capable of acquiring information from a variety of sources and are able to experiment with new techniques and skills as technologies change. Students identify emerging trends by using data, diagrams and a range of tools and equipment to assist with observations.

Students recognise that computer-based technologies have a wide range of applications in society and can identify and describe some of the effects of such technologies on individuals and communities. Students who have achieved Stage 3 can confidently and competently use a range of computer-based hardware and applications. Students at this stage can identify alternative uses and can be creative in adapting available software to the requirements of a task.

Students reflect on the methods used and positive and negative results of technological and scientific activity both throughout their own projects and in personal, local and global contexts.

Stage 4 – Technology (Mandatory)

Students at Stage 4 are able to independently initiate design projects and investigations that reflect an understanding of needs and opportunities. They demonstrate the ability to research and extract information from a variety of sources and a willingness to use experiments and tests to enhance the development of a design project. They describe factors that influence design.

Students select and use a broad range of media and methods and appropriate language and structures to accurately communicate design ideas to a diverse audience. This may include recounting the process of designing, producing and evaluating used when developing design projects. Students are aware of the skills and processes involved in designing and are able to generate and communicate design ideas and solutions. They develop knowledge and understanding of a range of design processes, roles of designers and associated work opportunities. They can identify what makes good design and are able to creatively develop quality design projects.

Students responsibly, safely, confidently and accurately apply a range of contemporary and appropriate tools, materials and techniques and understand the implications and applications of these in the wider community. Students demonstrate competence when using a range of ICTs and have the ability to select and use them appropriately in developing design projects.

Students recognise the importance of safety, quality and management in the design and production of design projects. They learn to manage their own time by sequencing processes of designing, producing and evaluating to plan ahead. They work collaboratively and learn to work safely with others in technological environments.

Throughout the design process students reflect on and evaluate their design projects. They consider the impact of innovation and emerging technology on society and the environment and identify and explain ethical, social, sustainability and environmental considerations related to design projects.

Stage 4 – Graphics Technology

The study of Graphics Technology at Stage 4 enhances and enriches the experiences gained through Technology (Mandatory). In particular, it focuses more directly on the development of specific knowledge and practical skills associated with the development of graphical communications and the technologies related to graphics.

They use freehand sketches to draw objects and communicate information to audiences. They can identify and use graphic conventions and understand and use digital drafting technologies. Students can work in a safe and responsible manner and relate what they are experiencing in the classroom to the industrial and commercial applications.

Stage 5 – Graphics Technology

At Stage 5 students are able to visualise, sketch and accurately draw shapes and objects to assist with communication with a range of audiences. They select from and use a range of drawings to communicate ideas graphically using freehand sketching, instrument drawing and computer-based techniques.

Students independently and collaboratively produce relevant types of drawings used in design, manufacture and marketing. They are able to identify and select appropriate drawing types for communication with a range of technical and non-technical audiences across national and international boundaries. They are proficient in selecting and producing appropriate drawing types for communication in design, manufacturing and marketing.

Students select and apply the appropriate Australian drawing standards (AS1100), ordinances and regulations to a range of drawings in a variety of contexts. Students are able to select and identify the graphics standards applicable to a range of graphics industries. They also consistently and proficiently apply appropriate standards to all graphical communication exercises.

Students select and use appropriate computer-based presentation techniques to develop and communicate design solutions. They can manipulate and draw images using appropriate computer-based drafting and presentation technologies. They demonstrate a high level of proficiency in using computer-based technologies to develop and communicate with a technically literate audience.

Students demonstrate knowledge and competence in applying OHS practices and risk management techniques to the graphics work environment. They independently identify and assess relevant OHS factors in the work environment and employ safe and responsible work practices.

Students recognise and appreciate the relationship between graphics technology, the individual, society and the environment. Students demonstrate an understanding of the effect that the graphics industry has on Australian society and an appreciation of the impact of the graphics industry on commercial activities and the environment.

10 Assessment

10.1 Standards

The Board of Studies *K–10 Curriculum Framework* is a standards-referenced framework that describes, through syllabuses and other documents, the expected learning outcomes for students.

Standards in the framework consist of two interrelated elements:
- outcomes and content in syllabuses showing what is to be learnt
- descriptions of levels of achievement of that learning.

Exemplar tasks and student work samples help to elaborate standards.

Syllabus outcomes in Graphics Technology contribute to a developmental sequence in which students are challenged to acquire new knowledge, understanding and skills.

The standards are typically written for two years of schooling and set high, but realistic, expectations of the quality of learning to be achieved by the end of Years 2, 4, 6, 8, 10 and 12.

Using standards to improve learning
Teachers will be able to use standards in Graphics Technology as a reference point for planning teaching and learning programs, and for assessing and reporting student progress. Standards in Graphics Technology will help teachers and students to set targets, monitor achievement, and, as a result, make changes to programs and strategies to support and improve each student's progress.

10.2 Assessment for Learning

Assessment for learning in Graphics Technology is designed to enhance teaching and improve learning. It is assessment that gives students opportunities to produce the work that leads to development of their knowledge, understanding and skills. *Assessment for learning* involves teachers in deciding how and when to assess student achievement, as they plan the work students will do, using a range of appropriate assessment strategies including self-assessment and peer assessment.

Teachers of Graphics Technology will provide students with opportunities in the context of everyday classroom activities, as well as planned assessment events, to demonstrate their learning.

In summary, *assessment for learning*:
- is an essential and integrated part of teaching and learning
- reflects a belief that all students can improve
- involves setting learning goals with students
- helps students know and recognise the standards they are aiming for
- involves students in self-assessment and peer assessment
- provides feedback that helps students understand the next steps in learning and plan how to achieve them
- involves teachers, students and parents in reflecting on assessment data.

Quality Assessment Practices

The following *Assessment for Learning Principles* provide the criteria for judging the quality of assessment materials and practices.

Assessment for learning:

- **emphasises the interactions between learning and manageable assessment strategies that promote learning**
  In practice, this means:
  - teachers reflect on the purposes of assessment and on their assessment strategies
  - assessment activities allow for demonstration of learning outcomes
  - assessment is embedded in learning activities and informs the planning of future learning activities
  - teachers use assessment to identify what a student can already do.

- **clearly expresses for the student and teacher the goals of the learning activity**
  In practice, this means:
  - students understand the learning goals and the criteria that will be applied to judge the quality of their achievement
  - students receive feedback that helps them make further progress.

- **reflects a view of learning in which assessment helps students learn better, rather than just achieve a better mark**
  In practice, this means:
  - teachers use tasks that assess, and therefore encourage, deeper learning
  - feedback is given in a way that motivates the learner and helps students to understand that mistakes are a part of learning and can lead to improvement
  - assessment is an integral component of the teaching-learning process rather than being a separate activity.

- **provides ways for students to use feedback from assessment**
  In practice, this means:
  - feedback is directed to the achievement of standards and away from comparisons with peers
  - feedback is clear and constructive about strengths and weaknesses
  - feedback is individualised and linked to opportunities for improvement.

- **helps students take responsibility for their own learning**
  In practice, this means:
  - assessment includes strategies for self-assessment and peer assessment emphasising the next steps needed for further learning.

- **is inclusive of all learners**
  In practice, this means:
  - assessment against standards provides opportunities for all learners to achieve their best
  - assessment activities are free of bias.

10.3 Reporting

Reporting is the process of providing feedback to students, parents and other teachers about students' progress.

Teachers can use evidence gathered from assessment to extend the process of *assessment for learning* into their *assessment of learning*. In a standards-referenced framework this involves teachers in making professional judgements about student achievement at key points in the learning cycle. These may be at the end of a year or stage, when schools may wish to report differentially on the levels of knowledge, understanding and skills demonstrated by students.

Descriptions of levels of achievement for Stage 4 and Stage 5 in Graphics Technology have been developed to provide schools with a useful tool to report consistent information about student achievement to students and parents, and to the next teacher to help to plan the next steps in the learning process. These describe observable and measurable features of student achievement at the end of a stage, within the indicative hours of study. Descriptions of levels of achievement provide a common language for reporting.

At Stage 5 there are six levels of achievement. Level 6 describes a very high level of achievement in relation to course objectives and outcomes. Level 2 describes satisfactory achievement, while the level 1 description will help identify students who are progressing towards the outcomes for the stage.

At the end of Year 10, teachers of Graphics Technology Years 7–10 will make an on-balance judgement, based on the available assessment evidence, to match each student's achievement to a level description. This level will be reported on the student's School Certificate Record of Achievement.

At Stage 4 there are four levels of achievement. Level 4 describes a very high level of achievement; levels 2 and 3 describe satisfactory and high achievement that should provide a solid foundation for the next stage of learning. The level 1 description will help identify students who are progressing towards the outcomes for the stage.

For students undertaking Life Skills outcomes and content in Years 7–10, the content listed for each identified Life Skills outcome forms the basis of the learning opportunities for these students. It also provides examples of activities on which teachers can base judgements to report student progress in relation to individual learning goals.

10.4 Choosing Assessment Strategies

Planning for assessment is integral to programming for teaching and learning. In a standards-referenced framework, teachers assess student performance on tasks in relation to syllabus outcomes and make on-balance judgements about student achievement. Assessment relies on the professional judgement of the teacher and is based on reliable data acquired in a fair and challenging environment, from multiple performances in a variety of contexts. Assessment is fundamental for furthering student learning.

In planning programs, teachers, individually and collaboratively, review the syllabus and standards materials. They use these materials to describe for themselves what students should know and be able to do at a particular stage, and they consider the kinds of evidence their students could produce to show they have learnt what they needed to learn.

Students are provided with a description of the learning expected to be accomplished, opportunities to discuss the criteria on which judgements will be based, time to learn, and where possible, examples of what that learning looks like.

Assessment is used to determine the students' initial knowledge, understanding and skills, to monitor student progress and to collect information to report student achievement. The assessment cycle is continuous; students receive and give themselves feedback on what they have learnt, and what needs to be done to continue their learning. Students gain information about their learning through feedback from teachers and from self-assessment and peer assessment. The challenge and complexity of assessment tasks increase to enable students to develop evaluative independence as they assess their own knowledge, understanding and skills, and determine ways to improve their learning.

Teachers of Graphics Technology should employ a range of assessment strategies to ensure that information is being gathered regarding the knowledge and understanding that are being acquired, and the skills that are being developed. Strategies should be appropriate to the outcomes being addressed, be manageable in number and be supportive of the learning process. Teachers could work collaboratively in planning appropriate assessment strategies. Working collaboratively leads teachers to develop a shared understanding of the syllabus standards and also supports teachers in making consistent and comparable judgements of student achievement in relation to these standards.

In planning for assessment in Graphics Technology it is important for teachers to consider:
- the requirements of the syllabus
- the accessibility of the proposed activity in terms of language requirements
- the appropriateness of the challenge presented to individual students
- resource availability
- how the task will be administered
- the way in which feedback will be provided.

In planning for assessment, teachers of Graphics Technology need to consider how results will be recorded, with a view to ensuring that there is sufficient and appropriate information collected for making an on-balance holistic judgement of the standard achieved by the student at the end of the stage. The evidence collected should enable teachers of Graphics Technology to make consistent judgements to meet the various reporting requirements that the system, school and community may have.

Graphics Technology particularly lends itself to the following assessment techniques, keeping in mind that a range of strategies should be used to assess the outcomes of the course.

Practical experiences
As project work is the main learning activity engaged in by students during the course, it follows that much of the assessment for this course will take place in the context of project work. Practical experiences include hands-on investigation, designing, producing and evaluating activities that are readily assessed through the use of direct observation and holistic judgement.

As Graphics Technology students undertake project work throughout the course they move from undertaking teacher-guided work to a more independent mode. Assessment of these projects should reflect the change in nature and demands of the course at different stages. When students are working on practical work in class, the teacher has the opportunity to observe and note aspects of student learning. When undertaking practical experiences, students could be assessed on their ability to:

- conduct hands-on investigations
- report on and apply the results of investigations
- select appropriate techniques, equipment or materials for a project
- justify their use of a particular technique or material
- use appropriate equipment and methods
- set goals, prioritise tasks and manage time effectively
- use equipment safely and efficiently for an appropriate purpose.

Research projects
Research projects can be used to develop in students analytical, organisational and problem-solving skills and may include case studies and internet research projects. When students undertake research projects, they could be assessed on their ability to:

- conduct appropriate research using a variety of methods
- select and interpret relevant information
- address the chosen issues with clarity
- present information in a logical manner.

Written reports
These may include surveys, evaluation reports, field trip reports, interviews and essays. When students produce a written report, they could be assessed on their ability to:

- show appropriate depth of analysis
- summarise key findings in a concise manner
- use appropriate detail
- use appropriate language consistent with the graphics industry.

Presentations
The development of graphical presentations underpins all learning in Graphics Technology and allows students to develop skills in communicating their ideas using a variety of subject-specific concepts and content. Opportunities also exist for the development of skills in presenting information in oral and written forms. They provide opportunities for students to develop and demonstrate their skills and reflect on the performances of others. Assessment strategies may include drawings, models, multimedia presentations, display techniques and prepared and impromptu oral presentations. When presentations are used for assessment purposes, students could be assessed on their ability to:

- select and use appropriate drawing types
- select and apply appropriate information
- present information in a creative and logical manner
- recognise and apply standards and conventions
- recognise intended audience in the selection of presentation techniques.

Journals

Journals provide opportunities for students to write personal reflections. They allow students to develop knowledge, skills and abilities to make informed, responsible choices. They also develop in students self-awareness and critical thinking skills. When using journals as an assessment technique, students could be assessed on their ability to:

- effectively describe and document the development of their work and the decisions they have made
- show appropriate depth of analysis.

Written and practical tests

Written and/or practical tests can be used to determine if students have the necessary skills, can use correct techniques and can recall, interpret, comprehend and apply knowledge at a level that is appropriate for them to move on to the next step in the learning process. Tests can provide information prior to commencing a unit of work, or along the way, about students' understanding of concepts and allow the teacher to plan further learning activities. It is important that feedback is provided on test performance in order to enhance student learning.

Peer assessment

Graphics Technology encourages the active involvement of students in the learning process. Opportunities exist for individual and collaborative work. Activities involving peer assessment might include evaluating the contribution of individuals to a group task and reflecting on a peer presentation.

Self-assessment

In Graphics Technology students are encouraged to acquire basic skills to become self-directed learners. Opportunities exist for students to reflect on their progress towards the achievement of the syllabus outcomes. This reflection provides the basis for improving their learning. Developing self-assessment skills is an ongoing process, becoming increasingly more sophisticated and self-initiated as a student progresses. By self-assessing students can:

- identify their own personal development over time
- identify key indicators and evidence of their own learning.