



# **Industrial Technology**

## **Stage 6 Syllabus**

2008

# Contents

1	The Higher School Certificate Program of Study .....	4
2	Rationale for Industrial Technology in the Stage 6 Curriculum .....	5
3	Continuum of Learning for Industrial Technology Stage 6 Students .....	6
4	Aim.....	7
5	Objectives .....	7
6	Course Structure .....	8
7	Objectives and Outcomes .....	11
	7.1 Table of Objectives and Outcomes.....	11
	7.2 Key Competencies.....	13
8	Content: Industrial Technology Stage 6 Preliminary Course.....	14
9	Content: Industrial Technology Stage 6 HSC Course .....	18
10	Course Requirements .....	55
11	Post-school Opportunities .....	56
	11.1 Recognition of Student Achievement in Vocational Education and Training (VET) .....	56
12	Assessment and Reporting .....	57

## **2 Rationale for Industrial Technology in the Stage 6 Curriculum**

Much of Australia's economic, social and cultural development can be related to the capacity of our industries to develop and use technology in the manufacture of goods and services. The effective and responsible application of industrial technologies has a direct bearing upon the quality of our lives. For this reason, the study of industrial technology and its role in industry is relevant and purposeful for many students.

The subject provides students with a choice of six different focus area industries, through which they can study the course. These focus areas have been chosen to cover a wide range of potentially accessible and locally available technologies.

Industrial Technology has been developed to incorporate content related to current and developing technologies. It offers students the opportunity to study the interrelationships of technologies, equipment and materials used by industry and to develop skills through the processes of design, planning and production.

Rapid technological change, particularly in the computer-based technologies, is influencing the nature of our industrial enterprises and the work that is undertaken in these enterprises. As a result, our industrial enterprises are becoming more globally competitive.

Industrial Technology seeks to raise students' awareness of the interaction between technology, industry, society and the environment, and to develop their ability to make value judgements about issues, decisions and problems arising from this interaction. Students achieve this by applying practical experiences to the study of the technology, management and organisation of industry.

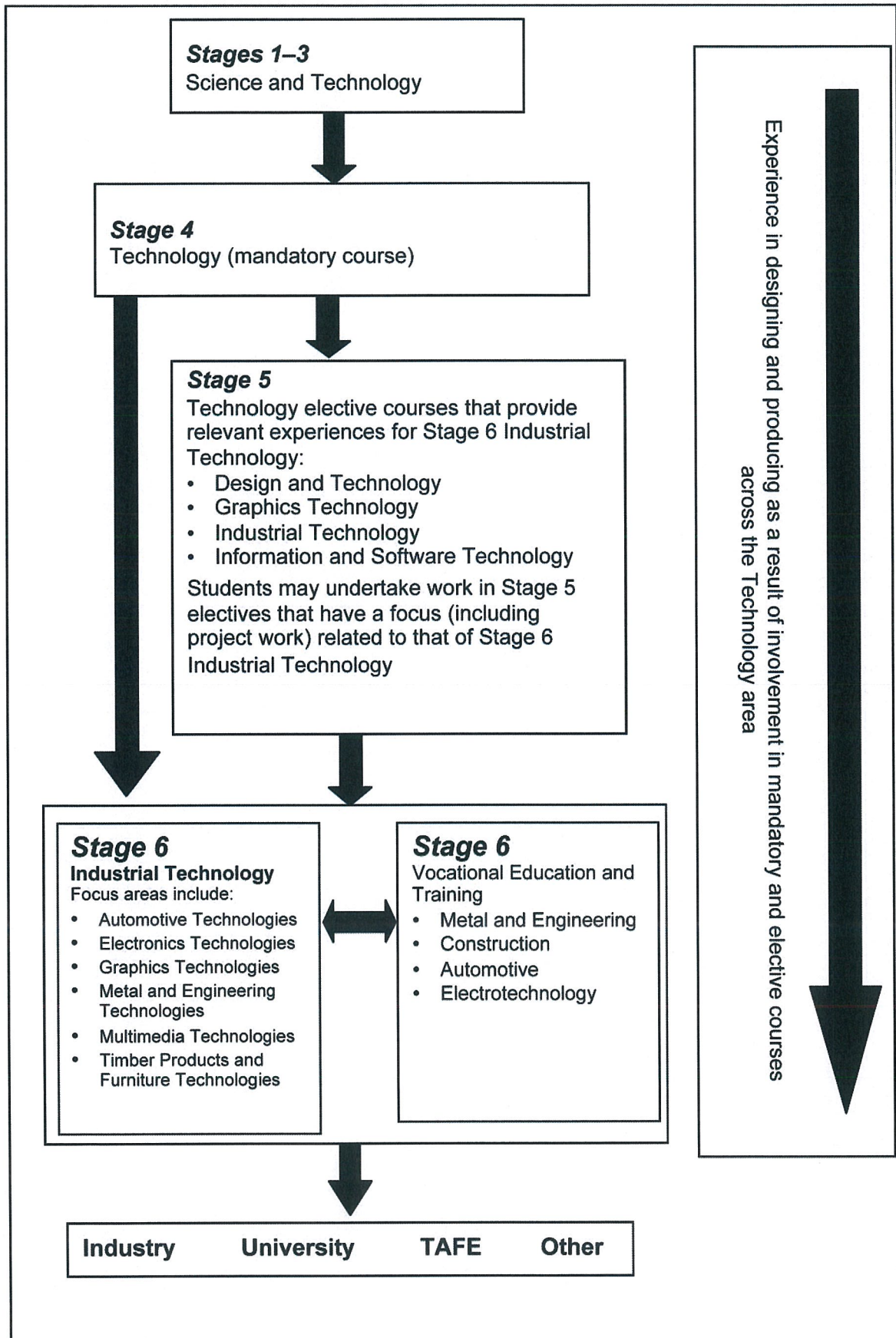
The current Australian industrial workforce is diverse in nature, gender-inclusive and better educated through ongoing training and development.

Increasing retention rates within NSW schools have resulted in a need to link the senior school curriculum more closely with post-school vocational education and work options. This syllabus acknowledges the need to strengthen such links. Through a process of observing and analysing industry practice and through personal practical experiences, students will gain knowledge and skills together with appropriate attitudes about technology and industry.

The course has been designed to be inclusive of the needs, interests and aspirations of students and it provides opportunities for them to learn explicitly about gender issues relating to the industry studied. It also caters for students who wish to undertake further study in a related area at university level or to pursue further industry training. Therefore the skills and knowledge gained through the study of Industrial Technology Stage 6 will enable students to make positive contributions to Australian industry and society.



### 3 Continuum of Learning for Industrial Technology Stage 6 Students



## **4 Aim**

Industrial Technology at Stage 6 is designed to develop in students a knowledge and understanding of the selected industry and its related technologies with an emphasis on design, management and production through practical applications.

## **5 Objectives**

Students will develop:

- knowledge and understanding of the focus area industry and of manufacturing processes and techniques used by industry
- knowledge and understanding of safe and cooperative work practices and of the need for a safe and cooperative work environment
- competence in designing, managing and communicating within a relevant industry context
- knowledge and skills in producing quality products
- knowledge and skills in communication and information processing related to the industry focus area
- an appreciation of quality products and the principles of quality control
- an appreciation of the relationships between technology, the individual, society and the environment.

## **6 Course Structure**

Industrial Technology Stage 6 has a Preliminary course and an HSC course.

The Preliminary course of 120 indicative hours consists of project work and an industry study that provide a broad range of skills and knowledge related to the focus area chosen and an introduction to processes, skills and practices relevant to the design, management, communication and construction of practical projects.

The HSC course of 120 indicative hours consists of the development, management and communication of a major practical project and folio that contribute to the development of knowledge, skills and understanding related to the focus area of study.

Students choose to study ONE of SIX focus areas. The same area is to be studied in both the Preliminary and HSC courses. The focus areas are:

- Automotive Technologies
- Electronics Technologies
- Graphics Technologies
- Metal and Engineering Technologies
- Multimedia Technologies
- Timber Products and Furniture Technologies.

Both the Preliminary and HSC courses are organised around four sections:

- A. Industry Study
- B. Design, Management and Communication
- C. Production
- D. Industry Related Manufacturing Technology.



<b>Preliminary Course</b> <b>120 indicative hours</b>	<b>HSC Course</b> <b>120 indicative hours</b>
<p><b>Industry Study 15%</b></p> <p>Study of the organisation and management of an individual business within the focus area, including:</p> <ul style="list-style-type: none"> <li>• structural</li> <li>• technical</li> <li>• environmental</li> <li>• sociological</li> <li>• personnel</li> <li>• WHS issues</li> </ul>	<p><b>Industry Study 15%</b></p> <p>Study of the organisation and management of the industry related to the focus area, including:</p> <ul style="list-style-type: none"> <li>• structural</li> <li>• technical</li> <li>• environmental</li> <li>• sociological</li> <li>• personnel</li> <li>• sectors within the industry</li> <li>• legislation</li> <li>• WHS issues</li> <li>• career opportunities</li> <li>• historical aspects</li> <li>• sales and marketing</li> </ul>
<p><b>Design 10%</b></p> <p>Design and plan projects through the completion of associated folios</p> <ul style="list-style-type: none"> <li>• elements and principles of design</li> <li>• types of design</li> <li>• quality</li> <li>• influences affecting design</li> </ul>	<p><b>Major Project 60%</b></p> <p><b>Design, Management and Communication</b></p> <ul style="list-style-type: none"> <li>• application of design principles in the production of the Major Project: <ul style="list-style-type: none"> <li>– design development</li> <li>– sketching and idea generation</li> <li>– prototyping, modelling and testing</li> <li>– production and working drawings</li> <li>– quality and ongoing evaluation</li> <li>– selection of appropriate materials, processes and other resources</li> </ul> </li> <li>• application of management and communication skills to produce a related folio justifying: <ul style="list-style-type: none"> <li>– research</li> <li>– design</li> <li>– analysis</li> <li>– evaluation including selection of appropriate materials, components, processes and technologies</li> <li>– ICT</li> <li>– WHS</li> <li>– presentation</li> </ul> </li> </ul> <p><b>Production</b></p> <ul style="list-style-type: none"> <li>• applying knowledge and skills through the construction of a Major Project which reflects: <ul style="list-style-type: none"> <li>– quality</li> <li>– evidence of a range of skills</li> <li>– degree of difficulty</li> <li>– links between planning and production</li> <li>– use of appropriate materials, components, processes and technologies</li> <li>– evidence of practical problem solving</li> <li>– WHS and safe work practices</li> </ul> </li> </ul>
<p><b>Management and Communication 20%</b></p> <p>Manage work through the completion of a management folio linked to each project produced</p> <ul style="list-style-type: none"> <li>• development of a number of practical projects</li> <li>• development of management folios</li> <li>• development of skills related to research, analysis and evaluation</li> <li>• skills in managing projects</li> <li>• documentation skills in the preparation, planning and presentation of a management folio</li> <li>• skills in literacy through written reports, folio work</li> <li>• skills in computer-based technologies</li> <li>• numeracy skills related to sizing, costing, estimating, ordering and efficient resource usage</li> <li>• graphical skills related to the project work</li> <li>• knowledge and understanding of workplace safety and communication: <ul style="list-style-type: none"> <li>– signage</li> <li>– WHS principles and requirements</li> <li>– personal protective equipment (PPE)</li> <li>– safe working practices</li> <li>– risk assessment</li> </ul> </li> </ul>	

<b>Preliminary Course</b> <b>120 indicative hours</b>	<b>HSC Course</b> <b>120 indicative hours</b>
<b>Production 40%</b> <ul style="list-style-type: none"><li>• developing knowledge and skills through the construction of a number of projects</li><li>• acquisition of relevant practical skills</li></ul>	<b>Industry Related Manufacturing Technology 25%</b> <ul style="list-style-type: none"><li>• demonstrates knowledge and understanding of a range of materials, processes, tools, equipment, machinery and technologies related to the focus area industry through practical experiences, including the development of the Major Project</li><li>• new/emerging technologies associated with the industry</li></ul>
<b>Industry Related Manufacturing Technology 15%</b> <ul style="list-style-type: none"><li>• developing knowledge and understanding of a range of materials, processes, tools, equipment and machinery through the construction of a number of projects</li></ul>	



## 7 Objectives and Outcomes

### 7.1 Table of Objectives and Outcomes

Objectives	Preliminary Outcomes	HSC Outcomes
<p>Students will develop</p> <p>1. knowledge and understanding of the focus area industry and of manufacturing processes and techniques used by industry</p>	<p>A student:</p> <p>P1.1 describes the organisation and management of an individual business within the focus area industry</p> <p>P1.2 identifies appropriate equipment, production and manufacturing techniques, including new and developing technologies</p>	<p>A student:</p> <p>H1.1 investigates industry through the study of businesses in one focus area</p> <p>H1.2 identifies appropriate equipment, production and manufacturing techniques and describes the impact of new and developing technologies in industry</p> <p>H1.3 identifies important historical developments in the focus area industry</p>
<p>2. knowledge and understanding of safe and cooperative work practices and of the need for a safe and cooperative work environment</p>	<p>P2.1 describes and uses safe working practices and correct workshop equipment maintenance techniques</p> <p>P2.2 works effectively in team situations</p>	<p>H2.1 demonstrates proficiency in the use of safe working practices and workshop equipment maintenance techniques</p>
<p>3. competence in designing, managing and communicating within a relevant industry context</p>	<p>P3.1 sketches, produces and interprets drawings in the production of projects</p> <p>P3.2 applies research and problem-solving skills</p> <p>P3.3 demonstrates appropriate design principles in the production of projects</p>	<p>H3.1 demonstrates skills in sketching, producing and interpreting drawings</p> <p>H3.2 selects and applies appropriate research and problem-solving skills</p> <p>H3.3 applies and justifies design principles through the production of a Major Project</p>
<p>4. knowledge and skills in producing quality products</p>	<p>P4.1 demonstrates a range of practical skills in the production of projects</p> <p>P4.2 demonstrates competency in using relevant equipment, machinery and processes</p> <p>P4.3 identifies and explains the properties and characteristics of materials/components through the production</p>	<p>H4.1 demonstrates competency in a range of practical skills appropriate to the Major Project</p> <p>H4.2 explores the need to outsource appropriate expertise where necessary to complement personal practical skills</p> <p>H4.3 critically applies knowledge and skills</p>

Objectives	Preliminary Outcomes	HSC Outcomes
	of projects	related to properties and characteristics of materials/components
5. knowledge and skills in communication and information processing related to the industry focus area	<p>P5.1 uses communication and information processing skills</p> <p>P5.2 uses appropriate documentation techniques related to the management of projects</p>	<p>H5.1 selects and uses communication and information processing skills</p> <p>H5.2 examines and applies appropriate documentation techniques to project management</p>
6. an appreciation of quality products and the principles of quality control	<p>P6.1 identifies the characteristics of quality manufactured products</p> <p>P6.2 identifies and explains the principles of quality and quality control</p>	<p>H6.1 evaluates the characteristics of quality manufactured products</p> <p>H6.2 applies the principles of quality and quality control</p>
7. an appreciation of the relationships between technology, the individual, society and the environment	<p>P7.1 identifies the impact of one related industry on the social and physical environment</p> <p>P7.2 identifies the impact of existing, new and emerging technologies of one related industry on society and the environment</p>	<p>H7.1 explains the impact of the focus area industry on the social and physical environment</p> <p>H7.2 analyses the impact of existing, new and emerging technologies of the focus industry on society and the environment</p>

All students in Industrial Technology will complete study in the following areas:

- A. **Industry Study**
- B. **Design, Management and Communication**
- C. **Production**
- D. **Industry Related Manufacturing Technology.**

The course outcomes together with the first two sections above are common to each industry focus area.

For each industry focus area, the Production and Industry Related Manufacturing Technology are listed separately.

It is essential that the content and the focus area outcomes be considered collectively when programming for the course in order to ascertain the depth and breadth of treatment of each topic.

The content in the Preliminary course and the HSC course within each focus area is differentiated in terms of depth of study and its application to the individual student's projects.



In the Preliminary study, the content is introductory and is related to a number of practical projects and the study of an individual business in the focus area. The aim of the Preliminary course is to prepare and equip the students with the necessary knowledge and skills to successfully complete the HSC Major Project and related folio.

The HSC content is centred on the application of design, research and manufacture of a Major Project and related folio, together with a more detailed study of the focus area industry.

## **7.2 Key Competencies**

Industrial Technology Stage 6 provides a context within which to develop general competencies essential for students to become effective learners and make a positive contribution to their community.

During the course, students learn to:

- source, select and sequence information about issues in a selected industry, developing competence in **collecting, analysing, and organising information**
- debate, describe, discuss and explain issues in written, graphic and oral form, developing competence in **communicating ideas and information**
- plan, prepare and present project work and planning folio to meet a range of needs, developing competence in **planning and organising activities**
- cooperate with individuals and groups, developing competence in **working with others and teams**
- design, implement and evaluate solutions to practical situations in a specific focus industry, developing competence in **solving problems**
- plan, develop and modify projects including costing, quantities, measurement and time, developing competence in **using mathematical ideas and techniques**
- experiment with and prepare practical projects using appropriate materials and equipment, developing competence in **using technology**.

The course structure and pedagogy provide extensive opportunities to develop the key competencies.