



Engineering Studies

Stage 6

Syllabus

Amended 2011

Contents

1	The Higher School Certificate program of study	4
2	Rationale for Engineering Studies in the Stage 6 Curriculum	5
3	Continuum of learning for Engineering Studies Stage 6 students	6
4	Aim	7
5	Objectives.....	7
6	Course structure	8
	6.1 Modules	9
	6.2 The Engineering Report	10
7	Objectives and outcomes.....	11
	7.1 Table of objectives and outcomes	11
	7.2 Key competencies	13
8	Content: Engineering Studies Stage 6 Preliminary course	14
9	Content: Engineering Studies Stage 6 HSC course.....	24
10	Course requirements.....	39
11	Assessment and reporting	40

2 Rationale for Engineering Studies in Stage 6 Curriculum

In the 21st century, engineering will continue to be directed towards developing insight and understanding to the provision of infrastructure, goods and services needed for industry and the community.

The role of engineers includes formulating problems, providing solutions and integrating technical understanding. The profession has a duty to take responsible approaches to wealth creation, to be ethical in their practices and to promote sustainability. With such key responsibilities, communication, synthesis and analysis of information, management skills and teamwork are becoming increasingly important.

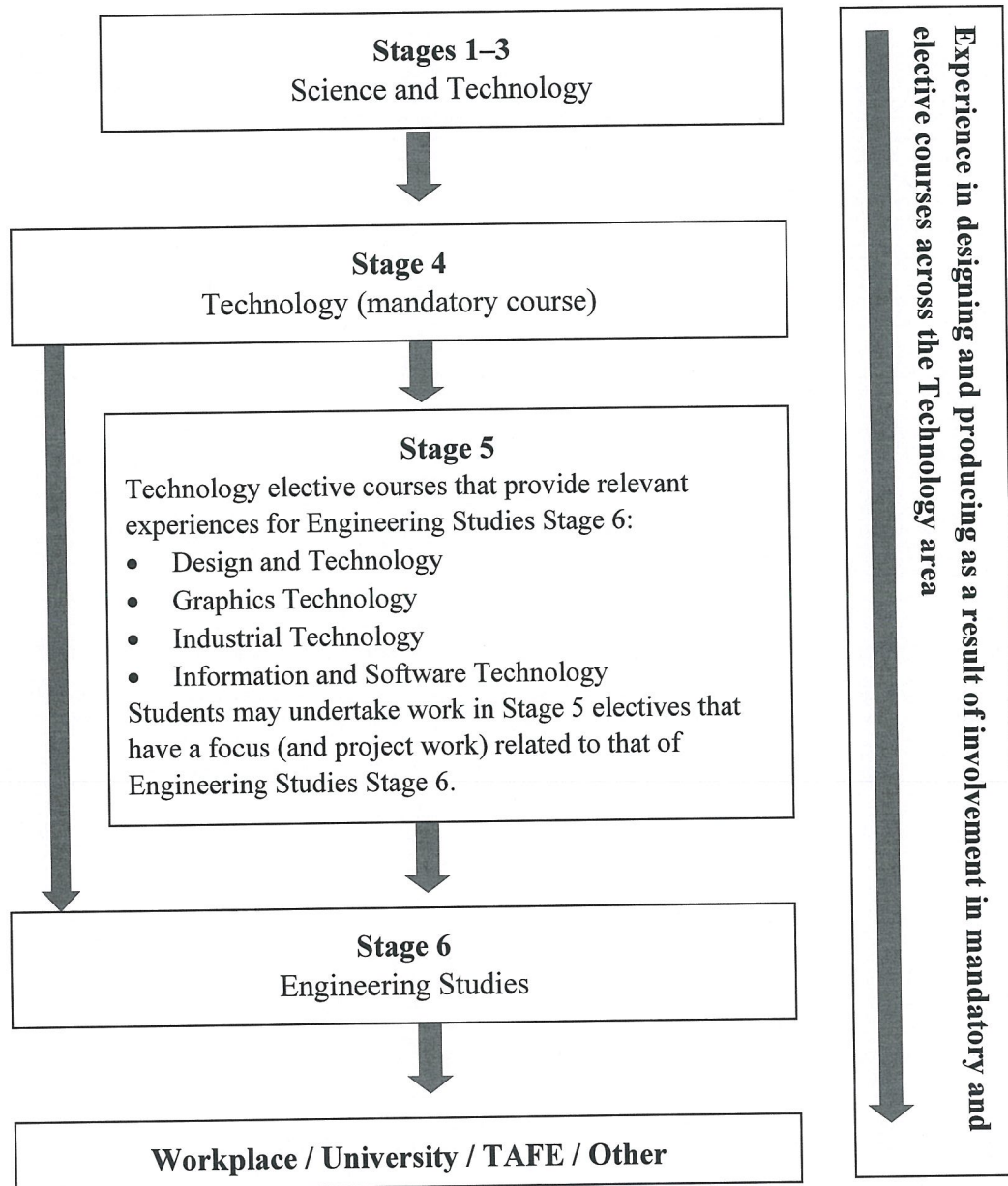
Professional engineering work is concerned with cost-effective, timely, reliable, safe, aesthetically pleasing and environmentally sustainable outcomes as well as maintaining a consciousness of ideals associated with social and ethical responsibilities and service.

The *Engineering Studies Stage 6 Syllabus* is directed towards the development and application of mathematical, scientific and technological skills and their integration with business and management. It provides students with skills, knowledge and understanding associated with a study of engineering, its practices and associated methodologies. The subject promotes environmental, economic and global awareness, problem-solving ability, engagement with information technology, self-directed learning, communication, management and skills in working as a team.

The *Engineering Studies Stage 6 Syllabus* is unique in that it develops knowledge and understanding of the profession of engineering. It also provides an opportunity to integrate the science and mathematics disciplines with societal development and change. The syllabus is inclusive of the needs, interests and aspirations of all students and provides opportunities and challenges to deal with engineering concepts.

Students undertaking Engineering Studies Stage 6 will have the opportunity to follow a number of pathways. These include tertiary study, vocational education and training, and the world of work. For those following a pathway of further study, the insight and experience associated with a study of engineering will be beneficial in their presumed knowledge of the area of study. Students entering into the world of work will benefit from understanding what engineers do, as the work of engineers affects us all.

3 Continuum of learning for Engineering Studies Stage 6 students



4 Aim

The aim of the *Engineering Studies Stage 6 Syllabus* is to develop students' understanding and appreciation of the nature, significance and methodology of engineering and its impact on society.

5 Objectives

Students will develop:

- 1 understanding of the scope of engineering and the role of the engineer
- 2 knowledge and understanding of engineering principles and an appreciation of the responsibilities of engineers in society
- 3 communication skills appropriate to engineering practices
- 4 knowledge and understanding of developments in technology and an appreciation of their influence on people and engineering practice
- 5 management and problem-solving skills in engineering contexts
- 6 skills in the application of engineering methodology.

6 Course structure

The *Engineering Studies Stage 6 Syllabus* comprises a Preliminary course made up of four compulsory modules (three application modules and one focus module), and an HSC course made up of four compulsory modules (two application modules and two focus modules).

Engineering Studies syllabus structure

Preliminary modules

*120 hours indicative time

Engineering application module 1 Engineering fundamentals
Engineering application module 2 Engineered products
Engineering application module 3 Braking systems
Engineering focus module 4 Biomedical engineering

HSC modules

*120 hours indicative time

Engineering application module Civil structures
Engineering application module Personal and public transport
Engineering focus module Aeronautical engineering
Engineering focus module Telecommunications engineering

Note: The modules in the Preliminary course have been designed to progressively develop knowledge, understandings and skills, commencing with Engineering fundamentals module 1 and concluding with Biomedical engineering module 4.

* Each module is 30 hours indicative time

6.1 Modules

A module is a discrete unit of study that integrates knowledge and understanding of various elements of engineering.

Types of modules

Two types of modules are used to facilitate learning in the course. These are **engineering application modules** and **engineering focus modules**.

Engineering application modules develops knowledge and understanding of engineering concepts and impacts through the study of engineered products.

Engineering focus modules develops knowledge and appreciation of the role of engineers by studying the nature of the engineering profession and emphasising the scope of engineering activities in a given field.

6.2 The Engineering Report

In the engineering profession, an Engineering Report contributes to effective management, communication, decision-making and teamwork by providing a synthesis of the various elements that are relevant to a given project. The report can be developed by individuals or collaboratively as a team.

An Engineering Report can be developed for a new project that involves the synthesis of a new design, or it can be prepared as a result of the analysis of an existing engineering application. Engineering Reports may be related to individual components, complex engineered products or engineered systems.

The process of reporting on investigation and practical activities in this course will be through the preparation of Engineering Reports.

In the Preliminary course students will learn to understand the significance of an Engineering Report and then develop an Engineering Report. Students are first required to produce a component of an Engineering Report in Engineering application module 3, Braking systems, before producing a complete Engineering Report in Engineering focus module 4, Biomedical engineering.

In the HSC course students must produce **one** Engineering Report from either of the two Engineering application modules of Civil structures or Personal and public transport, and **one** from either of the two engineering focus modules of Aeronautical engineering or Telecommunications engineering.

Reports will be less detailed in the Preliminary course than those required for the HSC course. Engineering Reports may include:

- introduction to the purpose of the report
- appropriate research
- analysis/synthesis of related issues
- conclusions and/or recommendations
- references.

Reports developed in the HSC course should encompass a degree of both analysis and synthesis of relevant content, and reflect actual engineering practice.

One Engineering Report from the Preliminary course and **one** Engineering Report from the HSC course must be the result of collaborative work, reflecting the importance of teamwork to successful engineering projects.