



## **An Introduction to Engineering Studies Stage 6 in the New HSC**

The new *Engineering Studies Stage 6 Syllabus* replaces the current 2/3 Unit (common) and 3 Unit (additional) syllabus in Engineering Science (July 1994). The new syllabus is to be implemented with Year 11 in 2000 and will be first examined in 2001.

The syllabus provides information that was formerly available in the KLA handbook. This includes descriptions of course requirements, assessment weightings for internal and external examination and examination specifications.

### ***What is similar?***

Significant amounts of content that were covered in the Engineering Science 2 Unit course remain. Some content from the existing 3 Unit course has been included in some modules.

### ***What are the overall improvements?***

- The new syllabus provides all students with the opportunity to access challenging outcomes and content.
- The scope and depth of course content is made clear in the description of what '*students learn about*' and what '*students learn to*'.
- The syllabus content has been updated to reflect changes in engineering practice.
- The Engineering Studies syllabus has been developed as an application-based study of engineering concepts and the engineering profession.
- The course content has been organised into modules.
- The modules include a school-based elective module that will allow schools to identify and study areas of work that are of particular local interest.

### ***The following changes have been made to particular sections of the syllabus***

#### **Rationale, aim and objectives (pp 6, 8)**

A clear rationale has been developed for the Engineering Studies syllabus that emphasises effective engineering practice. The aim of the course has been simplified and clarified. The number of course objectives have been reduced to capture the essence of the syllabus.

**Course structure (pp 9–11)**

The most significant change to the Engineering Studies syllabus is that it has been developed in a modular format. Two module types have been developed in the Preliminary and HSC courses. These are application modules and focus modules. Application modules are based on the study of engineering products or systems, while focus modules are based on the scope of the engineering profession. An engineering report is to be prepared by students for each of the course modules.

**Outcomes (pp 12–13)**

The outcomes provide explicit links to the objectives in both the Preliminary and HSC courses.

**Content (pp 15–44)**

The content covered in the Engineering Studies syllabus is a combination of content from the existing Engineering Science 2 Unit course and additional areas of study that have been identified as being relevant to current engineering practice.

The areas of work from the 3 Unit Engineering Science course that have been included in this course are:

Area of content	Related module
Shear force and bending moment	Civil Structures (p 31)
Heat treatment of materials	Personal and Public Transport (p 34) Aeronautical Engineering (p 41)
Aluminium alloys	Aeronautical Engineering (p 40)
Corrosion	Civil Structures (p 32) Aeronautical Engineering (p 41)

With the addition of these areas of content, a number of content areas previously covered in the Engineering Science 2 Unit course have been deleted from the new syllabus. These include:

- projections and traces of a line in relation to the principal plane
- projections of geometrical solids
- solids of revolution, projections of fillets
- Bow's Notation
- Newton's Laws of motion, velocity and acceleration
- interpretation of equilibrium diagrams and cooling curves.

New content areas have been introduced:

- in modules involving concepts not covered in the current Engineering Science:
  - Bio-Engineering Focus Module
  - Aeronautical Engineering Focus Module
  - Telecommunications Engineering Focus Module.

Although these modules are new, some of the content previously covered in the Graphics and Analysis sections of the Engineering Science syllabus has been included.

- through areas of study that are relevant to various course modules:
  - scope of the profession related to the Bio-engineering, Aeronautical and Telecommunications Engineering Focus Modules.
  - engineering electricity/electronics related to Household Appliances, Personal and Public Transport, Lifting Devices and Telecommunications modules.
  - computer-assisted drawing applications and the use of the Internet as part of the communication section in the course modules.
- through the introduction of individual concepts that collectively form the areas of study identified in each of the modules:
  - crack theory, which is included as part of the study of the Civil Structures module
  - introductory fluid mechanics, which is included as part of the study of the Braking Systems and Aeronautical Engineering modules
  - Bernouli's Principle, which is included as part of the study of the Aeronautical Engineering module.

### **Course requirements (p 45)**

There are no prerequisites to the study of the Preliminary course.

The Preliminary and HSC courses both consist of five modules. Each course is 120 indicative hours.

The Preliminary school-based elective module may be studied at any time in the Preliminary course.

An Engineering Report is required for each Preliminary and HSC course module.

### **Assessment (pp 50–51)**

Assessment details in relation to components, weightings and suggested tasks are provided in the syllabus. A variety of tasks should be used to ensure a balance between the assessment of knowledge, understanding and skills outcomes. It should be further noted that Engineering Reports are specified as being part of total school assessment.

***What will be needed to teach this subject?***

- *Engineering Studies Stage 6 Syllabus.*
- Specimen examination and marking guidelines.

While programs will need to be revised to reflect new syllabus content and outcomes, aspects of current programs may be incorporated where appropriate.

Equipment, used in schools, that meets the requirements of the current syllabus should be adequate to meet the requirements of the new syllabus.

Current resources are appropriate for use with the new syllabuses although there may need to be some adjustment in the way teachers use them.

A further subject-specific document is being developed by the Board of Studies for distribution later in the year. This will assist teachers with the implementation of the revised syllabuses.

A list of a number of resources will be placed on the Board's website, <http://www.boardofstudies.nsw.edu.au>.

The Board of Studies will also provide assessment support materials, which will be generic across subjects.

Cross-sectoral professional development workshops (Department of Education and Training, Catholic Education Commission and members of the Association of Independent Schools) for Engineering Studies Stage 6 will be held. Venues and dates for these workshops have been published on the *New HSC* website — <http://www.newhsc.schools.nsw.edu.au> — and distributed to schools. The materials from the workshops will be available on this website.

*CURRICULUM SUPPORT for Teaching in Technology and Applied Studies 7–12* — a publication distributed each term by the Department of Education and Training — will carry an HSC supplement.

*Assessment and Reporting Bulletin* — published each term as a joint venture of the Department of Education and Training, the Catholic Education Commission and the Association of Independent Schools — will build on principles outlined in Board of Studies' newsletters and assessment support materials.