

# ENGINEERS AUSTRALIA

## ACCREDITATION BOARD

### ACCREDITATION MANAGEMENT SYSTEM

#### EDUCATION PROGRAMS AT THE LEVEL OF PROFESSIONAL ENGINEER

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of Professional Engineering Programs



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## 1. PREAMBLE

University education provides the learning base upon which competence for a professional engineering career is built. It is important that the education provides the graduate with the generic attributes listed in Section 2 below.

It is equally important that the education process be accredited by Engineers Australia to give confidence to the students, the universities and the profession that the education will indeed provide a graduate with the required attributes. Through the process of accreditation of university education, as the representative of the profession, Engineers Australia will:

- ensure that graduates from an accredited program are adequately prepared to enter and to continue the practice of engineering;
- promote best practice;
- promote the standing of accredited programs to members and potential members of the engineering profession in Australia.

## 2. THE GENERIC ATTRIBUTES OF A GRADUATE

Graduates from an accredited program should have the following attributes:

- ability to apply knowledge of basic science and engineering fundamentals;
- ability to communicate effectively, not only with engineers but also with the community at large;
- in-depth technical competence in at least one engineering discipline;
- ability to undertake problem identification, formulation and solution;
- ability to utilise a systems approach to design and operational performance;
- ability to function effectively as an individual and in multi-disciplinary and multi-cultural teams, with the capacity to be a leader or manager as well as an effective team member;
- understanding of the social, cultural, global and environmental responsibilities of the professional engineer, and the need for sustainable development;
- understanding of the principles of sustainable design and development;
- understanding of professional and ethical responsibilities and commitment to them; and
- expectation of the need to undertake lifelong learning, and capacity to do so.

### **3. PRINCIPAL ELEMENTS OF ENGINEERS AUSTRALIA ACCREDITATION PROCESS**

There are three principal elements in the Engineers Australia accreditation system which are seen as essential in determining whether the attributes of the graduate engineer are being achieved. These are:

- the teaching and learning environment;
- the academic program being offered;
- exposure to professional engineering practice.

### **4. THE TEACHING AND LEARNING ENVIRONMENT**

The following must be in place within the teaching and learning environment:

- an identifiable structure responsible for engineering education within the university;
- a strategic statement by the university on engineering education;
- an effective advisory mechanism involving industry participation;
- capabilities in terms of staffing and resources to ensure that the stated objectives can be met.

### **5. THE ACADEMIC PROGRAM BEING OFFERED**

The minimum requirement for the academic program is a four-year full-time program or equivalent. The following elements of the academic program are seen as critical to ensuring that the graduates acquire the generic attributes listed in Section 2:

#### **5.1. Program Philosophy and Objectives**

There must be a clear statement of the mission and the objective for each program and of the broad characteristics expected of a graduate.

#### **5.2. Program Structure and Content**

The program structure and content must be such that the graduates acquire the generic attributes listed in Section 2 and achieve the program objectives. Typically a four-year professional engineering program should have the following elements:

- mathematics, science, engineering principles, skills and tools (computing, experimentation) appropriate to the discipline of study. This element should not be less than 40% of total program content;
- engineering design and projects. This element should be about 20% of total program content;
- an engineering discipline specialisation. This element should be about 20% of total program content;

- integrated exposure to professional engineering practice (including management and professional ethics). This element should be about 10% of total program content;
- more of any of the above elements or other elective studies. This could be about 10% of total program content.

### 5.3. Program Standard

The university must employ some method of external benchmarking to ensure that the program material and standards reflect relevant best practice.

## 6. EXPOSURE TO PROFESSIONAL ENGINEERING PRACTICE

The students must be exposed to professional engineering practice integrated throughout their program to enable them to develop an engineering approach and ethos, and to gain an appreciation of professional engineering ethics. The purpose of this is to facilitate their entry into the profession and to better prepare them to be able to develop the attributes listed in Section 2. This exposure must include:

- use of staff with industry experience;
- practical experience in an engineering environment outside the teaching establishment;
- mandatory exposure to lectures on professional ethics and conduct.

Exposure to professional engineering practice may also be obtained through a combination of the following:

- use of guest lecturers;
- use of industry visits and inspection;
- an industry based final year project;
- regular use of a logbook in which experiences are recorded.

## 7. THE ACCREDITATION PROCESS

The Engineers Australia accreditation process will increasingly focus on outcomes as the universities develop internal systems which ensure that the graduate is adequately prepared to enter the engineering profession. It will enable universities to play a more significant role in the accreditation process.

The concept involves quality assurance systems and processes being in place which will ensure that the graduate is adequately prepared to enter the practice of engineering. As universities develop internal processes which cover much common ground with the professional accreditation undertaken by Engineers Australia, there is scope for improved efficiency by minimising duplication in the two processes.

Engineers Australia will visit at five-year intervals to ensure that the education that is being delivered provides the graduates with the attributes listed in Section 2. During the visit emphasis will be placed on verification of the standards reached by the students through detailed inspection of the applicable quality output measures.