

ENGINEERS AUSTRALIA

ACCREDITATION BOARD

ACCREDITATION MANAGEMENT SYSTEM

EDUCATION PROGRAMS AT THE LEVEL OF PROFESSIONAL ENGINEER

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Title Glossary



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Table of Contents

1. INTRODUCTION	4
2. GLOSSARY OF TERMINOLOGY.....	4
2.1. Key Bodies	4
2.2. Educational Outcomes	4
2.2.1. Field of Practice	4
2.2.2. Specialisation (or Specialist Field)	4
2.2.3. Enabling Skills and Knowledge	4
2.2.4. Technical Domains	4
2.2.5. Technical Competence	5
2.2.6. Personal and Professional Skills or Capabilities	5
2.2.7. Engineering Application Skills	5
2.2.8. Practical, Laboratory or Hands-on skills	5
2.2.9. Generic Attributes	5
2.2.10. Educational Objectives	5
2.2.11. Graduate Outcomes	5
2.2.12. Educational Outcomes or Graduate Outcomes Specification	5
2.2.13. Competency standards.....	6
2.2.14. Stage 1 Competency	6
2.2.15. Stage 2 Competency	6
2.3. Educational Organisation and Environment	6
2.3.1. Educational Institution, Educational Organisation, Education Provider	6
2.3.2. Operating environment	6
2.3.3. Home campus	6
2.3.4. Remote campus or Offshore Campus	6
2.3.5. Engineering School	6
2.3.6. Academic Staff or Teaching Staff	7
2.3.7. Sessional staff	7
2.3.8. Support Staff.....	7
2.4. Quality Assurance	7
2.4.1. Constituencies	7
2.4.2. Benchmarking.....	7
2.4.3. Quality Systems.....	7
2.5. Education study program and award	8
2.5.1. Program.....	8
2.5.2. Academic Units or subjects or courses	8
2.5.3. Degree	8

2.6. Engineering Education Process	8
2.6.1. Educational design	8
2.6.2. Delivery mode	8
2.6.3. Flexible Delivery	8
2.6.4. Distance Mode or Distance Based Implementation or Distance Based Delivery	9
2.6.5. Articulation	9
2.6.6. Advanced Standing	9
2.6.7. Implementation Pathways	9
2.6.8. Professional Practice Exposure	9
2.6.9. Performance Monitoring and Performance Evaluation	9
2.6.10. Assessment	9
2.6.11. Summative Assessment	9
2.6.12. Formative Assessment	10
2.6.13. Moderation	10
2.7. Accreditation Outcomes	10
2.7.1. Full Accreditation	10
2.7.2. Provisional Accreditation	10
2.8. Accreditation Process	10
2.8.1. Accreditation Criteria or Criteria	10
2.8.2. General Review	11
2.8.3. Evaluation Panel or Panel	11
2.8.4. Accreditation Cycle	11
2.8.5. Engineers Australia Officers	11
2.8.6. Panel Observers or Observers	11
2.8.7. Initial Documentation or Submission Document or Documented Submission	11
2.8.8. Panel Teleconference or Pre-visit Teleconference	11
2.8.9. Evaluation Visit or Visit	11
2.8.10. Desktop Assessment	12

1. INTRODUCTION

In the following section, a glossary of terminology is provided as a fundamental reference to the Accreditation Management System for programs at the level of Professional Engineer.

2. GLOSSARY OF TERMINOLOGY

2.1. Key Bodies

In the Accreditation Management System document set:

- “the Council” means the Council of Engineers Australia,
- “the Board” means the Accreditation Board of Engineers Australia,
- “ACED” is the acronym for the Australian Council of Engineering Deans,
- “AAEE” is the acronym for the Australasian Association for Engineering Education.

Other acronyms are explained when first introduced in the documents.

2.2. Educational Outcomes

2.2.1. Field of Practice

The designated field, branch or discipline of engineering (eg Civil Engineering) which defines a broad field and encompasses a range of foundation technical domains.

2.2.2. Specialisation (or Specialist Field)

The branch of engineering (e.g. Civil Engineering) taken to an advanced and usually more focussed level in a particular program, and featured either in the title of the degree or as a major field of study in the graduate’s transcript or statement of academic record.

2.2.3. Enabling Skills and Knowledge

Underpinning mathematics, science, and engineering science foundations for developing specific and specialist capabilities appropriate to a designated field of engineering practice.

2.2.4. Technical Domains

The skill and knowledge areas that are fundamental building blocks for practice within a broad field and provide a basis for the development of higher-level, specialist capabilities.

2.2.5. Technical Competence

Ability to competently apply mathematics, science and engineering science fundamentals to problem solving in technical domains and specialist areas associated with a designated field of practice.

2.2.6. Personal and Professional Skills or Capabilities

Appropriate attitudes and abilities of a generic nature including oral and written communication skills; information literacy; team skills and leadership ability; a capacity for lifelong learning; an understanding of and commitment to ethical, social, cultural, and environmental responsibilities of the professional engineer.

2.2.7. Engineering Application Skills

Ability to apply underpinning skills and knowledge, technical capabilities and personal and professional skills to the structured solution of complex and often ill-defined problems, to engineering design and to the task of project management. Includes also the ability to operate within a business environment with appropriate skills in organisational and enterprise management as well as an understanding of the fundamental principles of business.

2.2.8. Practical, Laboratory or Hands-on skills

Ability to undertake test, measurement and data collection activities as well as designing and conducting experiments following safe and sustainable laboratory and field practice procedures. Includes also abilities associated with the characterisation, selection and application of engineering systems, devices, components and materials, the development, selection and application of engineering resources, tools and models as well as critical reflection, error and fault diagnosis and outcome reporting.

2.2.9. Generic Attributes

Essential characteristics and qualities of graduates from a professional engineering program within any discipline. A set of ten generic attributes has been identified by Engineers Australia in the Accreditation Policy.

2.2.10. Educational Objectives

Statements consistent with the generic attributes and the mission of the educational institution which describe the expected characteristics and/or capabilities and/or achievements of mature graduates of a particular program, focussing on the first few years of their career.

2.2.11. Graduate Outcomes

Measurable abilities of emerging graduates for a particular program, consistent with the generic attributes and the educational objectives of the program but linked with associated performance criteria and the Stage 1 Competency Standard for Professional Engineer. Range of ability and performance level to be assessed in accordance with defined quantitative and/or qualitative measures.

2.2.12. Educational Outcomes or Graduate Outcomes Specification

A collective statement of the educational objectives and targeted graduate capabilities for a particular engineering education program.

2.2.13. Competency standards

The level or threshold of capability achievement which is deemed to be acceptable for an appropriate career category and level. Engineers Australia has developed competency standards for the career categories of Engineering Associate, Engineering Technologist and Professional Engineer. Competency Standards have been published for the entry to practice level and also for the level of the mature, independent practitioner.

2.2.14. Stage 1 Competency

The level or threshold of capability needed for entry to practice as a qualified member of the engineering team at the appropriate career category. Stage 1 competency corresponds to completion of an accredited or recognised educational qualification. The Stage 1 Competency Standard builds on the generic attributes defined in the Policy on Accreditation to provide a generic framework for building a program specific statement of graduate outcomes.

2.2.15. Stage 2 Competency

The level or threshold of capability expected of a mature, independent and experienced engineering practitioner in the appropriate career category. Stage 2 competency is the requirement for Chartered membership of Engineers Australia.

2.3. Educational Organisation and Environment

2.3.1. Educational Institution, Educational Organisation, Education Provider

These terms are used to denote the host body authorised by legislation to award degrees.

2.3.2. Operating environment

The combination of physical infrastructure and resources, staff, organisational structure and governance that underpins the delivery of an engineering education program at any particular location.

2.3.3. Home campus

The headquarters facility of the host educational institution and frequently the location hosting the primary implementation of a program.

2.3.4. Remote campus or Offshore Campus

Alternative site for program implementation through a partner organisation or wholly owned facility.

2.3.5. Engineering School

The entity responsible for the design, development, delivery and review of the educational program/s to be accredited. In Australia this entity can be referred to as a division, faculty, school, department or other organisational element. In North America and elsewhere, the term faculty often denotes the teaching staff, and the organisational entity is often a College. Many Australian faculties of en-

engineering or organisational divisions have sub-units called schools and/or departments and in some cases full accountability for engineering program design, development and delivery is devolved to this level.

2.3.6. Academic Staff or Teaching Staff

The teaching team members employed by the host educational institution on a full or part time basis and responsible for the planning, educational design, delivery, review and continuous quality improvement of an engineering education program leading to the award of an engineering degree. In North America the collective teaching team members would be known as faculty.

2.3.7. Sessional staff

Members of the teaching team primarily assisting with the delivery of an educational program on a part time or casual basis. Sessional staff are sometimes practising industry professionals or post graduate students providing selected teaching input.

2.3.8. Support Staff

Employees of the host educational institution responsible for the provision of technical and administrative support functions.

2.4. Quality Assurance

2.4.1. Constituencies

All groups, sometimes known as stakeholders, with a key interest in engineering education (or a particular program) and its outcomes: e.g. students, engineering employers and the profession generally, alumni, academic staff, university administrators, other professions and the wider community, school educators and career advisers, key interest groups within the profession.

2.4.2. Benchmarking

A point of reference allowing critical comparison of operating environment, program design and delivery and quality systems as input to the processes of continuous quality improvement and leading to the development of best practices. For an individual provider the process of benchmarking may well be a comparison and sharing of ideas and approaches with similar or differentiated educational providers either in Australia or internationally.

2.4.3. Quality Systems

The supporting framework which 'closes the loop' on program planning, development, delivery, review and continuous improvement. Aspects include engagement with external constituencies, feedback processes, determination of objectives and outcome targets, educational design, assessment, performance evaluation, benchmarking, dissemination of educational design philosophy and closing the loop at the program and academic unit levels.

2.5. Education study program and award

2.5.1. Program

The sequence of structured educational experiences undertaken by the student, leading on completion, and on satisfactory assessment of performance, to the award of an engineering degree. In Australia, a professional engineering degree program is of four years full-time duration or equivalent, and comprises a number of identifiable academic units (or subjects or courses), projects and other mandatory components. A course in North America is equivalent to an academic unit in Australia.

2.5.2. Academic Units or subjects or courses

The individual and discrete structural educational entities in which a student enrolls separately. A collection of such units generally comprises the student's program of study for the semester/year and attracts credit towards the degree. An entire academic program usually comprises a set structure of compulsory and elective academic units.

2.5.3. Degree

The professional engineering degree in Australia is most commonly entitled Bachelor of Engineering, abbreviated BE or BEng. Some providers have separate degree titles in different branches of engineering: for example BE in Civil Engineering, BE in Computer Systems Engineering; or occasionally Bachelor of Computer Systems Engineering, Bachelor of Geomatic Engineering, etc. Others award the degree under the single title Bachelor of Engineering but offer specialisation in particular branches of engineering, sometimes known as Majors and identified in the graduate's statement of academic record but not in the formal title of the degree.

2.6. Engineering Education Process

2.6.1. Educational design

Development of a structural framework and detailed content of an education program including the educational objectives and targeted graduate capabilities (the educational outcomes specification); program structure of academic units and associated credits; academic unit learning outcomes, learning activities and assessment design; mapping unit learning outcomes and performance measures to the delivery of graduate capabilities, closing the loop on learning outcomes, learning activities and assessment measures at the academic unit level.

2.6.2. Delivery mode

The method of learning ranging from traditional classroom or face to face teaching through flexible learning options manifested as alternative implementation pathways within a particular program structure.

2.6.3. Flexible Delivery

The use of optional delivery vehicles within a program definition offering students the benefits of learning modes other than the traditional on-campus classroom based approach. Examples of such vehicles could be the use of in-

dependent learning materials, remedial or supplementary support materials and pathways, computer/web based resources and self assessment systems, project and problem based learning, team or group learning, studio based approaches, work place and cooperative learning schemes.

2.6.4. Distance Mode or Distance Based Implementation or Distance Based Delivery

Specific provision for learning in an off-campus mode. Such a delivery approach will require some periods of on-campus attendance however learning is undertaken largely in an independent mode using appropriately packaged resources and support systems.

2.6.5. Articulation

Entry to a program at an advanced level, through appropriate recognition of prior learning.

2.6.6. Advanced Standing

Credit granted for designated academic study units within a program, on the basis of prior learning.

2.6.7. Implementation Pathways

The various optional routes available to a student following a designated educational program. Such pathways can range from alternative academic units selected from a list of electives, defined major and minor academic unit sequences, optional cooperative modes, project and/or thesis options, workplace learning options, distance modes and various articulation routes right through to a remote campus or offshore implementation of a program.

2.6.8. Professional Practice Exposure

Experiential learning in an engineering workplace setting and/or through direct interface with practising engineering professionals. Mechanisms include work placement, industrial internships, vacation work experience, cooperate learning schemes, site visits, industry and community based problem solving, assignments and projects, interviews with members of the engineering team and sessional teaching by practising professionals.

2.6.9. Performance Monitoring and Performance Evaluation

Tracking the overall level of attainment of both individual students and a total cohort against targeted graduate outcomes and program objectives.

2.6.10. Assessment

Judgement of a student's level of attainment against designated learning outcomes, usually localised at the level of the individual academic unit. Tracking of assessment processes is critical in the evaluation of overall performance and the attainment of graduate capability targets.

2.6.11. Summative Assessment

Measures of student attainment contributing to an assessment result at the academic unit level or to an overall achievement metric for the program as a whole.

Examples of the latter being grade point average, weighted average score or the determination of Honours.

2.6.12. Formative Assessment

Assessment instruments used as an integral part of the learning process, confirming for the individual student the validity of an approach or solution and providing an objective indication of learning progress.

2.6.13. Moderation

The processes used to test and control assessment and performance measures to assure that standards are preserved across a student cohort, across academic units and programs, and across national and international boundaries.

2.7. Accreditation Outcomes

Based on recommendations of the evaluation panel, the Accreditation Board will make decision on the future accreditation status of programs under consideration for a particular institution.

2.7.1. Full Accreditation

Granted to programs that clearly satisfy the accreditation criteria and accorded nominally for a 5-year term, in accordance with the normal cycle of general reviews. Fully accredited programs are deemed to deliver graduates equipped with the stage 1 competencies defined by Engineers Australia. A successfully completing student will only be recognised by Engineers Australia and by other Washington Accord signatory bodies as having graduated from an 'accredited program', where that program has been accorded full accreditation.

2.7.2. Provisional Accreditation

Granted to new programs, and applies until full accreditation is achieved. Provisional accreditation should normally be considered in the first year of implementation of a new program and provides an opportunity for Engineers Australia to identify necessary amendments or improvements to the curriculum, operating environment or quality systems well before full accreditation is sought. Application for full accreditation should be made as soon as the first student intake reaches the final stages of the program. Full accreditation must be achieved for the proper recognition of graduates.

2.8. Accreditation Process

The evaluation of a professional engineering education program and consequent decision on its status of recognition by the relevant authority in accordance with standards of equivalence set by international accord.

2.8.1. Accreditation Criteria or Criteria

Designated performance metrics guiding the evaluation and decision making steps of accreditation, and also providing an operating framework for educational design, development and delivery.

2.8.2. General Review

The routine, cyclic process of evaluating existing and newly implemented education programs for accreditation. The general review process generally embraces the collective program offerings of a single educational institution at a particular campus or location.

2.8.3. Evaluation Panel or Panel

The team of specialists appointed by the Accreditation Board to assess programs submitted by an educational institution for accreditation in accordance with the accreditation criteria. The panel submits recommendations on accreditation for final consideration by the Board.

2.8.4. Accreditation Cycle

The 5-year repetitive sequence of steps associated with implementing the general review task, beginning with negotiation of dates for submission documentation and visitation and concluding with the delivery of a final report and confirmation of accreditation.

2.8.5. Engineers Australia Officers

Employees of Engineers Australia with responsibility for the accreditation function. One or two Engineers Australia officers are normally included as members of the evaluation panel along with academic and industry specialists.

2.8.6. Panel Observers or Observers

Additional persons approved by the Accreditation Board and the host educational institution to participate in the activities of the evaluation panel for the purposes of evaluating or witnessing the accreditation processes.

2.8.7. Initial Documentation or Submission Document or Documented Submission

Comprehensive material developed by the educational institution that systematically addresses the accreditation criteria. The submission should be prepared with the intention of providing *prima facie* evidence that the criteria are satisfied for each particular program under consideration.

2.8.8. Panel Teleconference or Pre-visit Teleconference

A meeting of the evaluation panel often conducted prior to a scheduled visit to consider submission documentation, to plan the remaining steps in evaluation process and to provide initial feedback to the education provider.

2.8.9. Evaluation Visit or Visit

A normal step in the accreditation process where a panel collectively travels to the home campus, remote campus or offshore site of an education provider to conduct interviews with a range of stakeholders, to inspect infrastructure and facilities and to consider documented teaching materials, student work and records associated with the quality system. The evaluation visit is normally an integral part of the general review process and often also necessary in the evaluation of newly introduced programs.

2.8.10. Desktop Assessment

Under particular circumstances an evaluation panel may finalise its recommendation on accreditation following consideration of just the submitted documentation and without the need for an evaluation visit. This can occur for instance in the provisional accreditation of new programs which are closely related to programs already accredited for implementation at a particular location and a particular institution.