ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

# Qualification Standard for the Advanced Certificate in Engineering: NQF Level 6

## E-06-PN

**Revision 5: 24 August 2023**

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ECSA

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## DEFINITIONS

**Academic support:** A process that provides additional learning support to students who are unprepared for the normal curriculum; academic support may be provided prior to or in addition to the normal curriculum.

**Accreditation:** Formal recognition awarded to an education or training programme through a quality assurance procedure that ensured it met the criteria laid down for the type of programme.

**Accredited examinations:** Examinations or other forms of assessment that address the outcomes within an accredited programme.

**Accredited programme:** A programme that ECSA has evaluated and recognised as meeting stated criteria.

**Accredited qualification:** A qualification awarded on successful completion of an accredited programme.

**Accreditation criteria:** Statements of requirements that must be satisfied by a programme to receive accreditation.

**Assessment:** The process of determining the capability or competence of an individual by evaluating performances against standards.

**Assessment criteria:** A set of measurable performance requirements, which indicate that a person meets a specified outcome at the required level.

**Hybrid:** Combined modes of on-line education delivery, with traditional face-to-face class and laboratory activities.

**Branch of engineering:** A generally recognised major subdivision of engineering such as the traditional disciplines of Chemical, Civil or Electrical Engineering or a cross-disciplinary field of comparable breadth, including combinations of engineering fields (e.g., Mechatronics) and the application of engineering in other fields (e.g., Bio-Medical Engineering).


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**Broadly defined engineering problems:** A class of problems with characteristics as defined in document E-02-PT.

**Category:** A mode of registration defined in or under the Engineering Profession Act, 46 of 2000, that has a distinctive purpose, characteristic competencies, educational requirements and defined principal routes to registration.

**Complementary studies:** Studies that cover disciplines other than engineering sciences, natural sciences and mathematics that are relevant to the practice of engineering, including engineering economics, management, the impact of technology on society, effective communication, the humanities, social sciences and other areas that support an understanding of the world in which engineering is practised.

**Complex engineering problems:** A class of problems with characteristics as defined in document E-02-PE.

**Computing and information technologies:** These technologies encompass the use of computers, networking and software to support engineering activity and as engineering activities themselves, are appropriate to the discipline.

**Continuous quality improvement:** A process based on the concept that improvement of a process is always possible subject to on-going assessment of the process and measures to maintain and improve quality.

**Course:** A building block of a programme with defined prerequisites, content and learning objectives with assessment, which if completed successfully provides credit towards a qualification.

**Credit:** A measure of the volume of learning attached to a course or module calculated according to the procedure defined in the relevant standard for the type of programme; a level may be associated with a number of credits.

**Critical:** Describes a factor, component, process, issue or decision in an engineering activity from which other consequences follow; an entity or operation that must be successfully implemented or completed to ensure that a more complex operation or system can function – failure of the critical entity or operation compromises the whole.


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**Dublin Accord:** An agreement for the mutual agreement of engineering programmes that provide the educational foundation for professional engineering technicians.

**Education Committee:** The committee established by Council to address all education matters.

**Educational objective:** A statement of the intended achievement that graduates of a programme must accomplish, often with emphasis on the early years after graduation.

**Education provider:** A public or private higher education institution or body that conducts programmes leading to accredited ECSA engineering qualifications of any type.

**Engineering design and synthesis:** This constitutes the systematic process of conceiving and developing materials, components, systems and processes to serve useful purposes. Design, which may be procedural, creative or open-ended, requires the application of engineering sciences, working under constraints, taking into account economic, health and safety, social and environmental factors, codes of practice and applicable laws.

**Engineering discipline:** Synonymous with a branch of engineering.

**Engineering education programme:** An educational programme that aims to satisfy criteria prescribed by the ECSA.

**Engineering fundamentals:** Engineering sciences and natural sciences that embody a systematic formulation of engineering concepts and principles based on mathematical and natural sciences to support applications.

**Engineering management:** The generic management functions of planning, organising, leading and controlling, applied together with engineering knowledge in contexts including the management of projects, construction, operations, maintenance, quality, risk, change and business.

**Engineering problem-solving:** The process of finding solutions through a conscious and logical approach that relies on the application of engineering knowledge and skills and generic competencies.


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**Engineering Sciences:** These have roots in the mathematical and physical sciences, and where applicable, in other natural sciences but extend knowledge and develop models and methods to lead to engineering applications and solve engineering problems.

**Engineering Speciality:** The extension of engineering fundamentals to create theoretical frameworks and bodies of knowledge for engineering practice areas.

**Engineering subdiscipline (an engineering speciality):** A generally recognised practice area or major subdivision within an engineering discipline, for example, Structural and Geotechnical Engineering within Civil Engineering.

**Evaluation:** Determination of the compliance of a result with prescribed criteria based on documentation, inspection and the application of judgement supported by reasoning.

**External moderation:** A moderation process in which the moderators are not in the employ of the provider; they have no input into the programme and they have no prior contact with the students.

**Face-to-face programme:** Programme offered where lecturers and students share the same physical space during learning process.

**Final accreditation:** Accreditation of a programme that had been given notification of termination of accreditation by the Education Committee after the previous interim accreditation.

**Graduate:** A qualifying learner, irrespective of whether the qualification is a degree or a diploma.

**Graduate attribute:** A statement of the learning outcomes that a student must demonstrate at exit-level to qualify for an award of a qualification; these actions indicate the student's capability to fulfil the educational objectives.

**International Engineering Alliance (IEA):** A global organisation comprising members from 41 jurisdictions within 29 countries, across seven international agreements. These international agreements govern the recognition of engineering educational qualifications and professional competence.


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**Interim accreditation:** Accreditation held at a time within the regular cycle stated by the Education Committee in the decision on the findings of the previous regular accreditation.

**Knowledge area:** A classification of curriculum content into defined types.

**Knowledge profile:** A description of the knowledge of a graduate in terms of the type and balance of knowledge in defined areas.

**Level:** A measure of learning demands regarding types of problems, knowledge required, skills and responsibility, which are expressed in terms of level descriptors.

**Mathematical sciences:** An umbrella term embracing the techniques of mathematics, applied mathematics, numerical analysis, statistics and aspects of computer science cast in an appropriate mathematical formalism.

**Moderation:** The process of ensuring that assessment of an individual meets the required standard and is consistent, objective and fair.

**Module:** Synonymous with course.

**Natural Sciences (formally basic sciences):** These comprise physics (including mechanics), chemistry, earth sciences and the biological sciences that focus on understanding the physical world as applicable to the engineering context.

**Notional hours:** The estimated learning time taken by the 'average' student to achieve the specified learning outcomes of the course unit or programme.

**Online accreditation:** Remote accreditation conducted using video conferencing or virtual networks.

**One-higher:** Applied to a teacher's qualifications; means that the teacher has a relevant academic qualification of at least 120 credits that is at a higher level than the qualification being taught or is professionally registered in an appropriate category.

**Online programme:** Education programme offered over any virtual network, predominantly the internet.


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**Pathway:** Defined arrangement of teaching, learning and assessment within a programme that is one way of gaining the award of a qualification.

**Programme:** A structured, integrated teaching and learning arrangement with a defined purpose and pathway that leads to a qualification.

**Practice area – in the educational context:** Synonymous with a generally recognised engineering speciality.

**Practice area – at the professional level:** A generally recognised or distinctive area of knowledge and expertise developed by an engineering practitioner through the path of education, training and experience.

**Provider:** A higher education provider except if the context indicates otherwise.

**Provisional accreditation:** Accreditation of a new programme once the programme has been implemented and the first cohort of students have completed 50% of the academic credit requirements towards the programme.

**Qualification:** The formal recognition of a specified learning achievement that is usually awarded upon successful completion of a programme.

**Range statement:** A context in which assessment may take place against an outcome that is expressed in terms of situations, activities, tasks, methods and forms of evidence.

**Regular accreditation:** Accreditation according to the accreditation cycle.

**Self-study report:** A provider's account of how a programme meets each accreditation criterion and all applicable policy requirements while covering all methods of programme delivery and all possible pathways for completion of the degree.

**Stage One:** A point in the process of professional or occupational development in engineering at which a person fulfils the educational requirements to register as a candidate in the relevant category.


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**Standards:** These comprise statements of outcomes to be demonstrated and the levels of performance and content baseline requirements in the context of engineering educational programmes.

**Subdiscipline:** Synonymous with engineering speciality.

**Sydney Accord:** An agreement for the mutual recognition of engineering programmes that provide the educational foundation for professional engineering technologists.

**Washington Accord:** An agreement for the mutual recognition of engineering programmes that provide the educational foundation for professional engineers.

**Well-defined engineering problems:** A class of problems with characteristics defined in document E-02-PN.


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## ABBREVIATIONS

| | |
|---|---|
| **AC** | Accreditation Committee |
| **Adv Cert** | Advanced Certificate |
| **Adv Dip** | Advanced Diploma |
| **Adv Dip Eng** | Advanced Diploma in Engineering |
| **BEng** | Bachelor of Engineering |
| **BSc (Eng)** | Bachelor of Science in Engineering |
| **BEng Tech** | Bachelor of Engineering Technology |
| **BEng Tech (Hons)** | Bachelor of Engineering Technology (Hons) |
| **BTech** | Bachelor of Technology |
| **CHE** | Council on Higher Education |
| **Dip Eng** | Diploma in Engineering |
| **Dip Eng Tech** | Diploma in Engineering Technology |
| **EC** | Education Committee |
| **ECSA** | Engineering Council of South Africa |
| **GA** | Graduate Attribute |
| **HCert** | Higher Certificate |
| **HEQC** | Higher Education Quality Committee |
| **HEQSF** | Higher Education Qualifications Sub-Framework |
| **LMS** | Learning Management System |
| **MEng** | Master of Engineering |
| **ND** | National Diploma |
| **NQF** | National Qualifications Framework |
| **PGDip Eng Tech** | Post Graduate Diploma in Engineering Technology |
| **RSPC** | Research, Policy, and Standards Committee |
| **SADC** | Southern African Development Community |
| **SAFEO** | Southern African Federation of Engineering Organisations |
| **SAQA** | South African Qualifications Authority |


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## 1. BACKGROUND

The illustration below defines the documents that comprise the Engineering Council of South Africa (ECSA) system for accreditation of programmes meeting educational requirements for professional categories. The illustration also locates the current document.

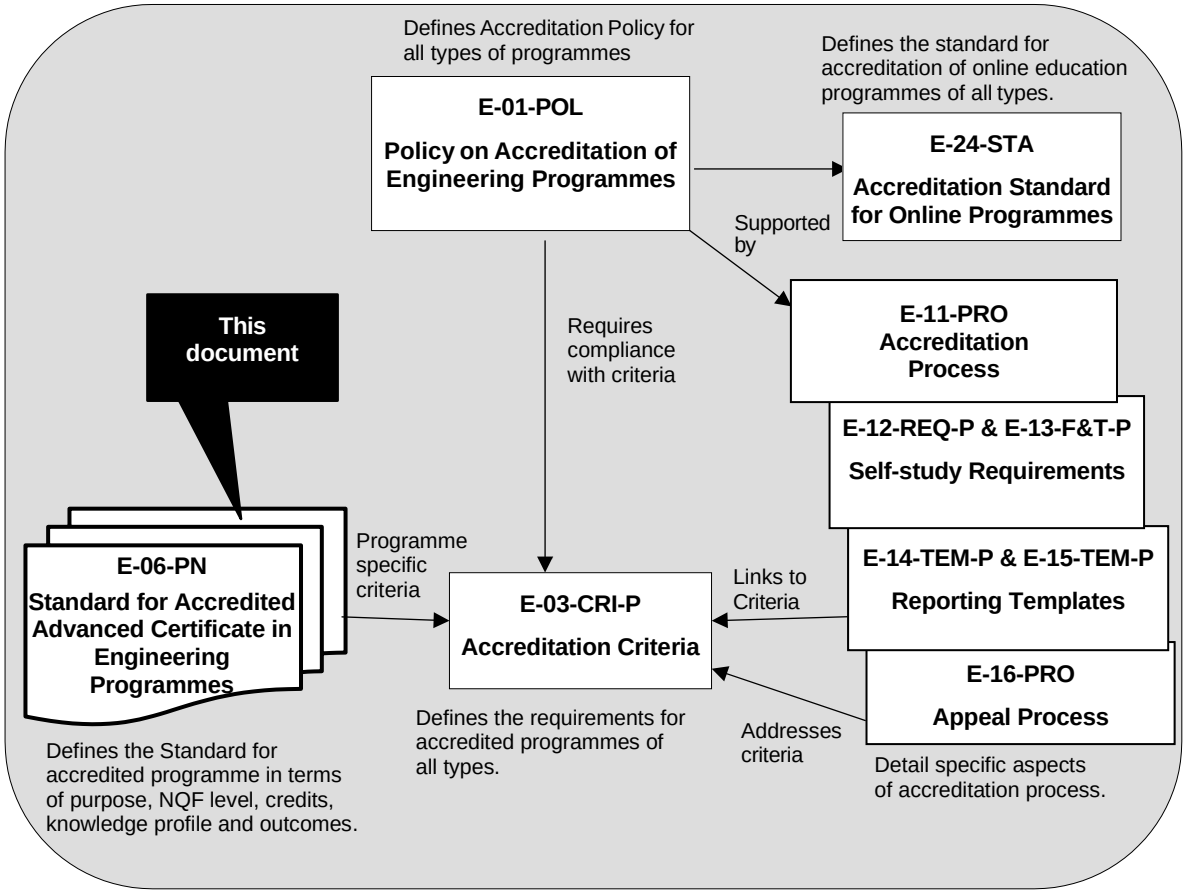


**Figure 1: Documents defining the ECSA Accreditation system**

## 2. STANDARD STATEMENT

ECSA develops and operates a quality assurance system that leads to the accreditation of a number of engineering education programmes.

## 3. PURPOSE OF THIS DOCUMENT

This document defines the standard for accredited Advanced Certificate in Engineering-type programmes in terms of programme design criteria, a knowledge profile and a set of Graduate Attributes. This standard is referred to in the Accreditation Criteria defined in ECSA document **E-03-CRI-P**.

## 4. FIELD

Manufacturing, Engineering and Technology.

## 5. SUBFIELD

Engineering and Related Design.

## 6. NQF EXIT LEVEL

Level 6.

## 7. CREDITS

At least 140 credits. Not less than 120 Credits must be at NQF level 6.

## 8. ACCEPTABLE TITLE

Advanced Certificate in Engineering.

## 9. ABBREVIATION

AdvCert Eng.

## 10. QUALIFIERS

The qualification must have a disciplinary or cross-disciplinary qualifier (discipline, branch, option or endorsement) defined in the provider's rules for the qualification reflected on the academic transcript and qualification certificate, subject to the following:


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(a) At least one qualifier must contain the words 'Advanced Certificate and Engineering' together with a disciplinary description such as: Agricultural, Aeronautical, Chemical, Civil, Computer, Electrical, Electro-mechanical, Electronic, Environmental, Industrial, Extractive Metallurgical, Information, Materials, Mechanical, Mechatronic, Metallurgical, Mineral(s) Process, Physical Metallurgical and Mining. Qualifiers are not restricted to this list.

(b) Qualifiers must clearly indicate the nature and purpose of the programme.

(c) Qualifiers must be consistent with the fundamental engineering science content on the programme.

(d) The target market indicated by the qualifier may be a traditional branch of engineering or a substantial industry area. Programmes should not address narrow niche markets.

In the case of a provider offering programmes with the same first-level qualifier and different second level qualifiers but with insufficiently differentiated purpose or content, only one programme should be accredited.

Examples of acceptable designations in accordance with HEQF and HEQSF policy are Advanced Certificate in Civil Engineering, abbreviated as AdvCert Eng (Civil Engineering) and Advanced Certificate in Civil Engineering in Environmental Engineering, abbreviated as AdvCert Eng (Civil Engineering) (Environmental Engineering).

## 11. PURPOSE OF THE QUALIFICATION

The qualification's purpose is to build the necessary knowledge, understanding, abilities and skills required for further learning towards becoming a competent practising technician. The recognised purpose of this Advanced Certificate in Engineering, accredited as satisfying this standard, is to provide graduates with the following:

(a) Preparation for careers in engineering and related areas, for achieving technical leadership and to make a contribution to the economy and national development.

(b) The educational requirement towards registration as a Professional Engineering Technician with ECSA and to allow the graduate to pursue careers in engineering and related fields.


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(c) A thorough grounding in mathematics, natural sciences, engineering sciences, engineering modelling, engineering design and the ability to enable applications in fields of emerging knowledge together with an appreciation for the world and society in which engineering is practised.

(d) For graduates with an appropriate level of achievement in the qualification, articulation into further engineering qualifications is shown in **E-23-P**, which describes pathways to achieving the Stage One requirements necessary to be professionally registered in various categories.

## 12. PROGRAMME STRUCTURE

Subject to the overall requirement for a minimum of 140 credits determined using the method defined in document **R-01-POL-PC**, with not less than 120 credits at NQF level 6, credits must be distributed to create a coherent progression of learning towards the exit-level. Preparatory or remedial courses are not included in the 140 credits.

### 12.1 Knowledge areas in the programme

When analysed by knowledge area, the programme content must not fall below the minimum SAQA credits in each knowledge area, as displayed in Table 1.

Knowledge areas are defined in document **E-01-POL**. The method for calculating credits and allocating to knowledge areas is also defined in document **E-01-POL**.

**Table 1: Minimum curriculum content by knowledge area**

| Knowledge area | Minimum credits |
|---|---|
| Mathematical sciences | 14 |
| Natural sciences | 14 |
| Engineering sciences | 67 |
| Design and synthesis | 17 |
| Complementary studies | 7 |
| Work-integrated learning | 0 |
| *Subtotal* | *119* |


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| Knowledge area | Minimum credits |
|---|---|
| For reallocation | ≥21 |
| **Total credits** | **≥140** |

The 'For reallocation' component must be taken up by allocating knowledge to the five knowledge areas to form a coherent, balanced programme.

The work-based learning credits in the programme may be assigned and included in the knowledge breakdown only if the work is quality-assured by the provider, the students' performance is comprehensively assessed against defined outcomes and this information is documented and presented in the accreditation process.

### 12.2 Core and specialist requirements

The programme must have a coherent core of mathematics, natural sciences and engineering fundamentals that provides a viable platform for further studies and lifelong learning. The programme must enable development and practice opportunities for fundamental professional developmental abilities such as self-reflection, judgement, honest ethical behaviour, responsibility and self-efficacy. The coherent core must enable development in a traditional discipline or in an emerging field.

A programme must contain specialist engineering study at the exit-level. Specialist study may take many forms, including further deepening of a theme in the core, a new subdiscipline, or a specialist topic building on the core. It is recognised that the extent of specialist study is, of necessity, limited in view of the need to provide a substantial coherent core. Specialist study may take the form of compulsory or elective credits.

### 12.3 Curriculum content

This standard does not specify detailed curriculum content. The engineering fundamentals and specialist engineering science content must be consistent with the designation of the diploma.


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## 13. ACCESS TO QUALIFICATION

This standard is specified as a set of Graduate Attributes and overall distribution of credits. Providers therefore have freedom to construct programmes geared to different levels of preparedness of learners, including the following:

- Use of access programmes for learners who do not meet the minimum learning requirements.
- Creating articulation paths from other qualifications.

## 14. MINIMUM LEARNING ASSUMED TO BE IN PLACE

Designers of a 140-credit programme to meet the graduate attributes and credit requirements defined in this standard assume that entrants are proficient as specified by the provider's entry requirements in mathematics, physical science and reading, speaking and writing in the language of teaching and learning, and reading in English.

**Note:** These assumptions do not prescribe prerequisites. Sections 12 and 13 should be read together.

## 15. GRADUATE ATTRIBUTES

The Graduate Attributes defined below are stated generically and may be assessed in various engineering disciplinary or cross-disciplinary contexts in a provider-based or simulated practice environment. Words and phrases having specific meaning are defined in this document and in ECSA document **E-01-POL**.

**General range statement:** The competencies defined in the 12 Graduate Attributes may be demonstrated in a university-based, simulated workplace context. Competencies stated generically may be assessed in various engineering disciplinary or cross-disciplinary contexts.


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**Well-defined defined engineering problems**

(a) Can be solved mainly by practical engineering knowledge, and have the following characteristics:

(i) Knowledge that supports engineering design and operations based on the techniques and procedures of a practice area.
(ii) Codified practical engineering knowledge in recognised practice area.

Supported by related theoretical knowledge:

(iii) A coherent procedural formulation of engineering fundamentals required in an accepted subdiscipline.
(iv) Engineering specialist knowledge that provides the body of knowledge for an accepted subdiscipline.

(b) and has some or all of the following characteristics:

(i) Involve several technical and nontechnical issues (such as ethical, sustainability, legal, political, economic, societal) and consideration of future requirements.
(ii) Can be solved in standardised ways.
(iii) Are frequently encountered and thus familiar to most practitioners in the practice area.
(iv) Address problems encompassed by standards and/or documented codes of practice.
(v) Involve a limited range of stakeholders with differing needs.
(vi) Address discrete components of engineering systems.

**Graduate Attribute 1: Problem-solving**

Identify and analyse well-defined engineering problems, reaching substantiated conclusions using codified methods of analysis specific to the field of activity.

**Associated knowledge and attitude profile:**

- A descriptive, formula-based understanding of the natural sciences applicable in a subdiscipline and awareness of directly relevant social sciences.
- Procedural mathematics, numerical analysis, statistics applicable in a subdiscipline.


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- A coherent procedural formulation of engineering fundamentals required in an accepted subdiscipline.
- Engineering specialist knowledge that provides the body of knowledge for an accepted subdiscipline.

**Graduate Attribute 2: Application of scientific and engineering knowledge**

Apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialisation, as specified, to wide practical procedures and practices.

**Associated knowledge and attitude profile:**

- As for Graduate Attribute 1.

**Range statement:** Mathematics, natural science and engineering sciences are applied in analysis and modelling of engineering situations, and for reasoning about and solving well-defined engineering problems.

**Graduate Attribute 3: Engineering design**

Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet specified needs.

**Associated knowledge and attitude profile:**

- Knowledge that supports engineering design and operations based on the techniques and procedures of a practice area.

**Range statement:** Design problems used in exit-level assessment must conform to the definition of a well-defined engineering problem. A design problem should be used to provide evidence. The design knowledge base and components, systems, engineering works, products or processes to be designed are dependent on the subdiscipline or practice area. Appropriate consideration must be given to public health and safety, whole-life cost and net zero carbon, as well as resource, cultural, societal and environmental considerations, as required.


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**Graduate Attribute 4: Investigations, experiments and data analysis**

Demonstrate competence to conduct investigations of well-defined problems, locate and search relevant codes and catalogues, conduct standard tests and measurements.

**Associated knowledge and attitude profile:**

- Engagement with the current technological literature of the practice area.

**Range statement:** The balance of investigation and experiment should be appropriate to the subdiscipline. Research methodology is to be applied in research or an investigation where the student engages with selected knowledge in the research literature of the subdiscipline.

**Note:** An investigation differs from a design in that the objective is to produce knowledge and understanding of a phenomenon and a recommended course of action rather than specifying how an artefact can be produced.

**Graduate Attribute 5: Use of engineering tools**

Demonstrate competence to apply appropriate techniques, resources and modern computing, engineering, and IT tools to well-defined engineering problems, with an awareness of the limitations.

**Associated knowledge and attitude profile:**

- Procedural mathematics, numerical analysis and statistics applicable in a subdiscipline.
- Codified practical engineering knowledge in a recognised practice area.

**Range statement:** A range of techniques, resources and modern engineering and IT tools appropriate to the disciplinary designation of the programme.

**Graduate Attribute 6: Professional and technical communication**

Demonstrate competence to communicate effectively and inclusively on well-defined engineering activities, both orally and in writing, with the engineering community and society at large, by being able to comprehend the work of others, document own work and give and receive clear instructions.


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**Range statement:** Material to be communicated is in an academic or simulated professional context. Audiences range from engineering peers, academic personnel and related engineering peers, using appropriate academic or professional discourse. Written reports range from short (300 words) to long (a minimum of 2 000 words, excluding tables, diagrams and appendices), covering material at exit-level. Methods of providing information include the conventional methods of the subdiscipline, for example engineering drawings, and subject-specific methods.

**Graduate Attribute 7: The engineer and the world**

Demonstrate critical awareness of the sustainable development impacts on society, the economy, sustainability, health and safety, legal frameworks and the environment.

**Associated knowledge and attitude profile:**

- A descriptive, formula-based understanding of the natural sciences applicable in a subdiscipline and awareness of directly relevant social sciences.
- Knowledge that supports engineering design and operations based on the techniques and procedures of a practice area.
- Knowledge of issues and approaches in engineering technician practice, such as public safety and sustainable development.

**Range statement:** The combination of social, workplace (industrial) and physical environmental factors must be appropriate to the subdiscipline or other designation of the qualification. Comprehension of the role of engineering in the world and identified issues in engineering practice in the subdiscipline: health, safety and environmental protection, and risk assessment and management, and the impacts of engineering activity: economic, social, cultural, environmental and sustainability.

**Developmental considerations:**

- Ability to self-reflect and show contextual awareness of social, workplace and governmental environments through exposure to complex, multi-disciplinary and/or unfamiliar problems.


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- Ability to identify and position a design/artefact in the bigger picture and use appropriate judgement (intentionally incorporate multiple perspectives) to obtain a final solution or product.
- Ability to listen and interpret information from a variety of stakeholders to appropriately position identified problems/challenges/opportunities in the relevant context.

**Graduate Attribute 8: Individual and collaborative teamwork**

Demonstrate competence to function effectively as an individual, and as a member or leader in diverse and inclusive teams and in multi-disciplinary, face-to-face, remote and distributed settings.

**Associated knowledge and attitude profile:**

- Knowledge of professional ethics, responsibilities and norms of engineering practice. Awareness of the need for diversity by reason of ethnicity, gender, age, physical ability etc. with mutual understanding and respect, and of inclusive attitudes.

**Range statement:** Multi-disciplinary tasks require co-operation across at least one disciplinary boundary. Co-operating disciplines may be engineering disciplines with different fundamental bases other than that of the programme or may be outside engineering.

**Developmental considerations:**

- Develop the ability to self-reflect and self-evaluate within an interpersonal engagement towards enabling appropriate understanding of self and other team members.
- Develop the ability to listen and interpret different motivations, personalities or workstyles within a team context towards enabling functional team dynamics.
- Knowledge of team cohesion and dynamics, motivational styles, frameworks for conflict and tension resolution and the ability to apply these.
- Ability to negotiate and manage time and project components related to interpersonal needs and agendas. Time management also includes understanding the value of time, and determining if a task is better (cheaper) achieved by a single person or a team.


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**Graduate Attribute 9: Independent learning ability**

Demonstrate competence to engage in independent learning through well-developed learning skills.

**Associated knowledge and attitude profile:**

- Engagement with the current technological literature of the practice area.

**Range statement:** Operate independently in well-defined contexts recognising the need for and have the ability for independent updating in the face of specialised technical knowledge.

**Developmental considerations:**

- Openness to constructive feedback, awareness of own limitations, ability to cope with the discomfort of uncertainty and having access to a range of approaches, reflective self-evaluation, curiosity and proactive engagement, resilience, confidence to ask for help and draw from a broad range of stakeholders.
- Reflection of self-learning to begin to recognise if what has been covered meets the needs of the activity / task.

**Graduate Attribute 10: Engineering professionalism**

Understand and commit to professional ethics and norms of technician practice, including compliance with relevant laws.

**Associated knowledge and attitude profile:**

- As for Graduate Attribute 8.

**Range statement:** Evidence includes case studies typical of engineering practice situations in which the graduate is likely to participate. An understanding of the need for diversity and inclusion is required.

**Developmental considerations:**

- Self-management, professional responsibility and awareness of expertise and limitations, good judgement, process of on-going self-reflection and evaluation.


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- Timeous, clear, realistic communication of risks and concerns and feedback on progress.
- Self-efficacy, accepting feedback and consequences and commitment.

**Graduate Attribute 11: Project management and finance**

Demonstrate awareness of engineering management principles.

**Range statement:** Basic techniques from economics and project management applied to one's own work, as a member or leader in a technical team, and to manage projects in multi-disciplinary environments.

**Graduate Attribute 12: Workplace practices**

Demonstrate an understanding of workplace practices to solve engineering problems consistent with academic learning achieved.

**Range statement:** Tasks to demonstrate this outcome should be designed to connect academic learning with workplace practice and may be performed in one or more of the following types of work-integrated learning:

- Work-directed theoretical learning
- Problem-based learning
- Project-based learning
- Work-based learning
- Simulated learning.

**Note:** While Graduate Attribute 12 is specific to workplace practices, other attributes may be demonstrated simultaneously.

## 16. INTERNATIONAL COMPARABILITY

International comparability of the graduate attributes in this standard is ensured through the Dublin Accord, an agreement for the mutual recognition of professionally oriented diplomas in engineering. The Graduate Attributes are aligned with the Dublin Accord Graduate Attributes. Comparability is audited on a 6-yearly cycle by a visiting Dublin Accord team.


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## 17. INTEGRATED ASSESSMENT

Providers of programmes must demonstrate in the quality assurance process that an effective integrated assessment strategy has been used. Clearly identified components of assessment must address summative assessment of the graduate attributes. Evidence should be derived from major work or multiple instances of limited scale work.

## 18. RECOGNITION OF PRIOR LEARNING

Providers may use recognition of prior learning at intermediate levels but must take full responsibility for assessing the Graduate Attributes.

## 19. ARTICULATION POSSIBILITIES

The Graduate Attributes ensure that a graduate of a programme meeting these standards meets requirements for entry to several programmes including the following:

- Articulation possibilities as described in **E-23-P**
- In certain disciplines, progression toward the Government Certificate of Competency.

## 20. MODERATION AND REGISTRATION OF ASSESSORS

Providers of programmes must demonstrate in the quality assurance process that an effective moderation process exists to ensure that the assessment system is consistent and fair.

Registration of assessors is delegated by the Higher Education Quality Committee to the Higher Education providers responsible for programmes.


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## REVISION HISTORY

| Revision no. | Revision date | Revision details | Approved by |
|---|---|---|---|
| Revision 1 | 20 July 2012 | Reconfiguration of document approved by Council to align with E-02-PE | Technology SGG Working Group |
| Revision 2 Draft A | 27 November 2015 | Revision 1 converted to new CHE format | SGG draft for submission to ESGB |
| Revision 3 Draft A | 24 January 2016 | Revision 2 revised and CHE objection against the use of their logo and ECSA using the wrong procedure to register the standard addressed. | SGG draft for submission to ESGB |
| Revision 3 Draft A | 2 March 2016 | Minor editing. Final submission to Council | Amended and Approved by ESGB |
| Revision 3 | 24 March 2016 | No amendments | Approved by Council |
| Revision 4 Draft A | 14 August 2020 | Realign with E-Series documents | Working Group |
| Revision 4 Draft B | 19 August 2020 | Review by Education Business Unit | Education Business Unit |
| Revision 4 | 20 August 2020 | Review by the Executive | EL Nxumalo |
| Revision 4 | 1 September 2020 | Approval | RPSC |
| Revision 5 Draft A | 15 March 2023 | Alignment with Version 2021.1 of IEA GAs and PCs | Working Group |
| Revision 5 Draft B | 10 April 2023 | Submission and presentation to the EC for inputs and comments | RDDR and Working Group |
| Revision 5 Draft C | 10 Aug 2023 | Review of the draft standard | RDDR BU |
| Revision 5 Draft D | 14 Aug 2023 | Review by the Executive | EL Nxumalo |


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| Revision no. | Revision date | Revision details | Approved by |
|---|---|---|---|
| Revision 5 | 24 Aug 2023 | Approval | RPSC |
| Revision 5 | 09 Nov 2023 | Noting | Council |

The Qualification Standard for:

**Advanced Certificate in Engineering: NQF Level 6**

Revision 5 dated 24 August 2023 consisting of 26 pages have been reviewed for adequacy by the Business Unit Manager and is approved by the Executive: Research, Policy and Standards (RPS).

Business Unit Manager — 5 February 2024
Date

Executive: RPS — 2024/02/05
Date

This definitive version of this policy is available on our website.


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