ENSURING THE
EXPERTISE TO GROW
SOUTH AFRICA

Qualification Standard for the Higher Certificate in Engineering: NQF Level 5

E-07-SC

REVISION No. 4: 01 September 2020

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ECSA

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DEFINITIONS

Academic support: A process that provides additional learning support to students who are not prepared 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 exit-level outcomes within an accredited programme

Accredited programme*:* A programme that has been evaluated and recognised by ECSA 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 in order to receive accreditation.

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

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

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)

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

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: cover those disciplines outside of engineering sciences, natural sciences and mathematics which are relevant to the practice of engineering including but not limited to engineering economics, management, the impact of technology on society, effective communication, and the humanities, social sciences or 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: encompasses the use of computers, networking and software to support engineering activity and as an engineering activity in itself as 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 complexity 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.

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

Engineering discipline*:* Synonymous with *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

Engineering Sciences: have roots in the mathematical and physical sciences, and where applicable, in other natural sciences but extend knowledge and develop models and methods in order 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 sub-discipline (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 moderator(s) are not in the employ of the provider, they make no input into the programme and they have no prior contact with the students.

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

Final Accreditation*:* Accreditation of a programme that was 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.

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

International Engineering Alliance (IEA): is a global organisation, which comprises members from 41 jurisdictions within 29 countries, across seven international agreements. These international agreements govern the recognition of engineering educational qualifications and professional competence. (Numbers can change as new members are admitted)

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 science): 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.

One-higher*:* Applied to a person's qualifications; means that the educational practitioner 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 Accreditation Remote Accreditation conducted using video conferencing or other virtual networks.

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

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 and 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 1*:* 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

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

Sub-discipline*:* Synonymous with *engineering speciality*

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

Washington Accord: is 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**

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
BTech	Bachelor of Technology
CHE	Council on Higher Education
DA	Dublin Accord
Dip	Diploma
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
IEA	International Engineering Alliance
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
SA	Sydney Accord
SADC	Southern African Development Community
SAFEO	Southern African Federation of Engineering Organisations
SAQA	South African Qualifications Authority
WA	Washington Accord

BACKGROUND

The documents that define the Engineering Council of South Africa (ECSA) system for accreditation of programmes meeting educational requirements for professional categories are shown in Figure 1 which also locates the current document.

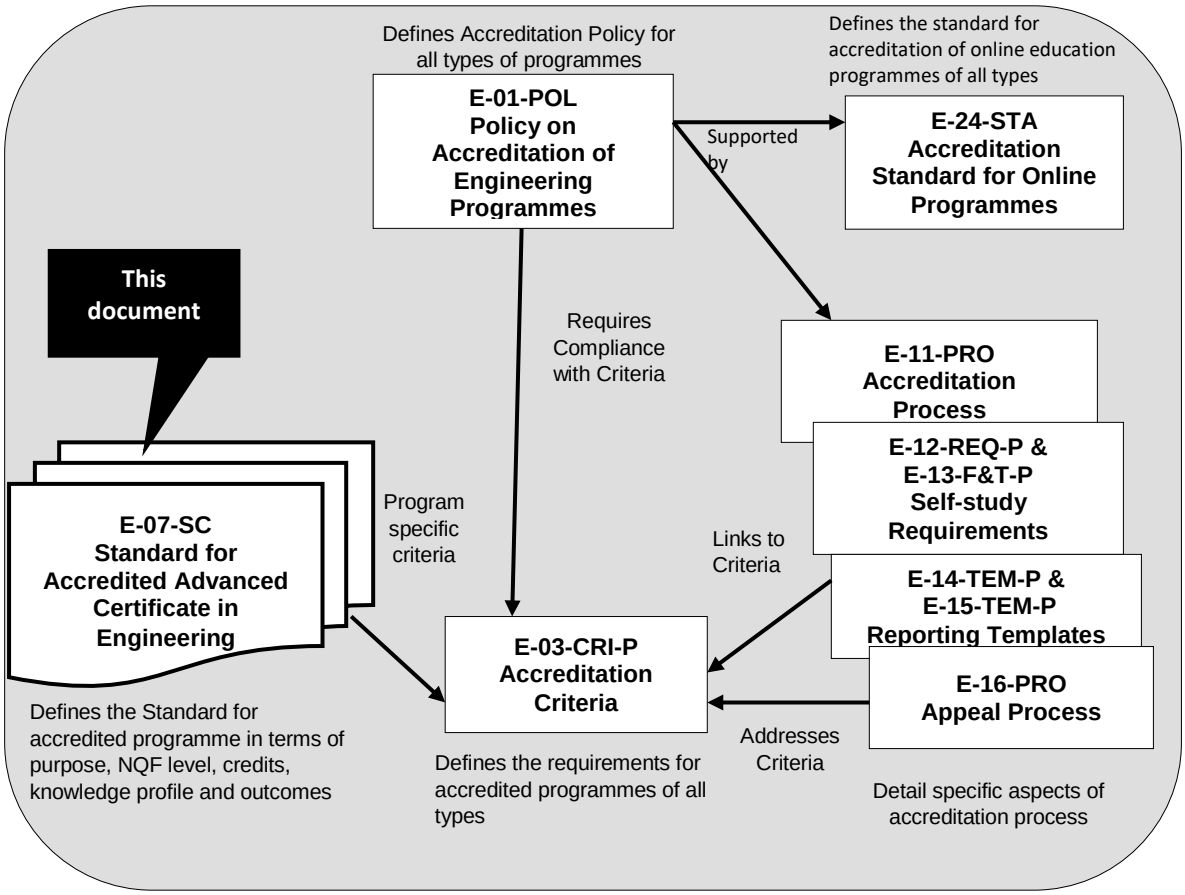


Figure 1: Documents defining the ECSA Accreditation systems

1. POLICY STATEMENT

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

2. PURPOSE OF THIS DOCUMENT

This document defines the standard for accredited Higher 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 ECSAdocument **E-03-CRI-P**.

3. FIELD

Manufacturing, Engineering and Technology

4. SUBFIELD

Engineering and Related Design

5. NQF EXIT LEVEL

Level 5

6. CREDITS

At least 140 credits. Not less than 120 Credits must be at NQF level 5.

7. ACCEPTABLE TITLES

Higher Certificate in Engineering

8. ABBREVIATIONS

H Cert Eng

9. QUALIFIERS

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

9.1 There must be at least one qualifier which contains the words Diploma 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.

9.2 The qualifier(s) must clearly indicate the nature and purpose of the programme.

9.3 The qualifier must be consistent with the fundamental engineering science content on the

programme.

9.4 The target market indicated by the qualifier may be a traditional branch of engineering or a substantial industry area

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: Higher Certificate in Engineering in Civil Engineering, abbreviated H Cert Eng (Civil Engineering) Higher Certificate in Engineering in Civil Engineering in Environmental Engineering abbreviated H Cert Eng (Civil Engineering) (Environmental Engineering)

10 PURPOSE OF THE QUALIFICATION

The primary purpose of the Programmes is primarily vocational-based to develop focused knowledge, understanding abilities and skills as well as experience in work-related context.

The higher certificate in engineering equips graduates with the knowledge base, theory, skills and methodology of one or more engineering disciplines as a foundation for further training and experience towards becoming a competent engineering specified category practitioner. This foundation is achieved through a thorough grounding in mathematics and natural sciences specific to the field, engineering sciences, engineering design and the ability to apply specific established methods. Engineering knowledge is complemented by methods for understanding of the impacts of engineering solutions on people and the environment.

Note: This standard is designed to meet the educational requirement towards registration as a Candidate or Engineering Specified Category Practitioner with the Engineering Council of South Africa

11. PROGRAMME STRUCTURE

Subject to the overall requirement for a minimum of 140 credits determined using the method defined in document **R-01-POL-SC** with not less than 120 credits at NQF level 5, credits must

be distributed in order to create a coherent progression of learning towards the exit-level. Preparatory or remedial courses are not included in the 140 credits.

11.1 Knowledge Areas in the Programme

The content of the programme when analysed by knowledge area must not fall below the minimum SAQA credits in each knowledge area in **Table 1**.

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

Table 1: Minimum curriculum content by knowledge area Knowledge area

Knowledge area	Minimum Credits
Mathematical Sciences	14
Natural Sciences	7
Engineering Sciences	67
Design and Synthesis	17
Complementary studies	7
Work-integrated learning	0
Subtotal	112
For Reallocation	≥28
Total Credits	≥140

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

If the provider includes work-based learning in the programme, credits 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 if this information is documented and presented in the accreditation process.

11.2 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 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 on many forms including further deepening of a theme in the core, a new sub-discipline, or a specialist topic building on the core. It is recognized 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.

11.3 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 degree.

12. 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:

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

13. 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 11 and 12 should be read together.

14. 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

General Range Statement: The competencies defined in the eleven 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.

Level Descriptor: Well-defined engineering problems:

a) can be solved mainly by specific practical engineering knowledge, underpinned by related theory;

and have one or more of the characteristics:

i) are fully defined but require feedback;
ii) are discrete, specifically focused tasks within engineering systems;
iii) are routine, frequently encountered, may be unfamiliar but in a familiar context;

and their solutions have one or more of the characteristics:

i) can be solved in standardized or prescribed ways;
ii) are encompassed by specific standards, codes and documented procedures; requires authorization to work outside limits;
iii) information is concrete, specific and largely complete, but requires checking and possible supplementation;
iv) involve specific issues but few of these impose conflicting constraints and have a specific range of interested and affected parties.

Graduate Attribute 1: Problem solving

Identify, formulate, analyse and solve specifically-defined engineering problems

Graduate Attribute 2: Application of scientific and engineering knowledge

Apply knowledge of mathematics, natural sciences and engineering sciences to wide practical procedures and practices to solve specifically-defined engineering problems.

Level descriptor: Knowledge of mathematics, natural sciences and engineering sciences is characterized by:

- A thorough grounding in the natural sciences applicable to the sub-discipline;
- A thorough grounding in mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the sub-discipline;
- A thorough grounding in the engineering fundamentals required in the engineering sub-discipline; and
- Engineering specialist knowledge in the accepted practice areas in the engineering sub-discipline;

Range Statement The level of knowledge of mathematics, natural sciences and engineering sciences is characterized by:

- A coherent range of fundamental principles in mathematics and natural science underlying a discipline or recognised practice area.
- A coherent range of fundamental principles in engineering science and technology underlying an engineering discipline or recognised practice area.
- A codified practical knowledge in recognised practice area.
- The use of mathematics, natural sciences and engineering sciences, supported by established mathematical formulas, codified engineering analysis, methods and procedures to solve specifically-defined engineering problems.

Graduate Attribute 3: Engineering design

Perform procedural design and synthesis of components, systems, engineering works, products or processes

Range Statement: Perform procedural design of *specifically-defined* components or processes to meet desired needs within applicable standards, codes of practice and legislation. Design problems used in assessment must conform to the definition of *specifically-defined* engineering problems

Graduate Attribute 4: Investigations, experiments and data analysis

Demonstrate competence to design and conduct investigations and experiments.

Range Statement: Tests, experiments and measurements of *specifically-defined* problems are conducted by applying relevant codes and manufacturer guidelines

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 artifact could be produced.

Graduate Attribute 5: Engineering methods, skills and tools, including information technology

Demonstrate competence to use appropriate engineering methods, skills and tools, including those based on information technology for the solution of *specifically-defined* engineering problems, with an awareness of the limitations.

Range Statement: A range of methods, skills and tools appropriate to the disciplinary designation of the program including:

- Sub-discipline-specific tools, processes or procedures;
- Computer packages for computation, modelling, simulation, and information handling;
- Computers and networks and information infrastructures for accessing, processing, managing, and storing information to enhance personal productivity and teamwork.
- Basic techniques from economics, management, and health, safety and environmental protection.

Graduate Attribute 6: Professional and technical communication

Demonstrate competence to communicate effectively, both orally and in writing, with engineering audiences and the community at large.

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 2000 words excluding tables, diagrams and appendices), covering material at exit-level. Methods of providing information include the conventional methods of the sub-discipline, for example engineering, drawings and sketches.

Graduate Attribute 7: Sustainability and impact of engineering activity

Demonstrate critical awareness of the sustainability and impact of engineering activity on the social, industrial and physical environment.

Range Statement: The combination of social, workplace (industrial) and physical environmental factors must be appropriate to the sub-discipline or other designation of the qualification. Evidence may include examples situations in which the graduate is likely to participate.

Issues and impacts to be addressed:

- Are encompassed by standards and documented codes of practice; and
- Are *specifically-defined* and discrete and part of an engineering system.

Graduate Attribute 8: Individual, team and multidisciplinary working

Demonstrate competence to work effectively as an individual, in teams and in multidisciplinary environments.

Range Statement: Multidisciplinary 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.

Graduate Attribute 9: Independent learning ability

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

Range Statement: Operate in well-structured environment with some unfamiliar elements requiring personal responsibility and initiative, accurately self-evaluate and take responsibility for learning requirements; be aware of social and ethical implications of applying knowledge in particular contexts.

Graduate Attribute 10: Engineering professionalism

Demonstrate critical awareness of the need to act professionally and ethically and to exercise judgment and take responsibility within own limits of competence.

Range Statement: Evidence includes case studies typical of engineering practice situations in which the graduate is likely to participate. Ethics and the professional responsibility of a technician and the contextual knowledge specified in the range statement of Graduate Attribute 7 is generally applicable here.

Graduate Attribute 11: Engineering management

Demonstrate knowledge and understanding of engineering management principles and economic decision-making.

Range Statement: Tasks are discipline specific and within the technical competence of the graduate.

Management principles include:

- Planning: set objectives and review achievement;
- Organising: identify and organize tasks. Recognize responsibilities.
- Leading: set example, communicate, motivate;
- Controlling: monitor own performance and check against standards

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

i) Work-directed theoretical learning.
ii) Problem-based learning.
iii) Project-based learning.
iv) Work-based learning, and
v) Simulated learning.

Note: While attribute 12 is specific to workplace practices, other attributes may be demonstrated simultaneously

15. INTEGRATED ASSESSMENT

Providers of programmes must demonstrate in the quality assurance process that an effective integrated assessment strategy is 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.

16. RECOGNITION OF PRIOR LEARNING

Providers may make use of recognition of prior learning at intermediate levels but must take full responsibility for assessing the graduate attributes.

17. ARTICULATION POSSIBILITIES

The graduate attributes ensure that a graduate of a programme meeting these standards would meet requirements for entry to a number of programmes including:

17.1 Admission to an Advanced Certificate in Engineering, as specified in **E-23-P**, designed to support articulation to satisfy an engineering technician education benchmark.

17.2 Admission to an Advanced Certificate in Engineering Practice, as specified in **E-23-P**, designed to support articulation to satisfy an engineering technician education benchmark.

17.3 Admission to an Advanced Diploma in Engineering, as specified in **E-23-P**, designed to support articulation to satisfy an engineering technologist education benchmark.

17.4 In certain disciplines, progression toward the Government Certificate of Competency.

17.5 In the past there has not been dedicated education for Specified Categories as defined by ECSA to meet specific requirements of other legislations that require engineering-related functions or work to be performed at a specifically defined level. This qualification has been designed to meet these requirements

18. MODERATION AND REGISTRATION OF ASSESSORS

Providers of programmes must demonstrate in the quality assurance process that an effectivemoderation 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 the programmes

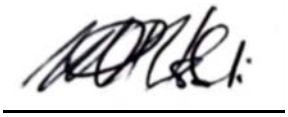
REVISION HISTORY

Revision Number	Revision Date	Revision Details	Approved By
Rev 1	10 May 2012	Technology SGG Working Group	Reconfiguration of Council approved document to align with E-02-PE
Draft A	5 April 2015	New CHE format applied. E-07-PN Types A and B and E-07SC Rev 1 documents consolidated. "Assessment Criteria" replaced with "Competency Indicators"	SGG Working Document
Draft B	19 April 2015	Cleaned up towards final format	SGG Working Document
Draft E	29 May 2015	Logical improvements recommended by the SGG implemented. Consensus on the inclusion of Competency Indicators could not be reached	RSPC
Draft D	29 July 2015	Minor editing – final version for submission to parties involved, Council and CHE	Amended and approved by the ESGB
Rev 2	26 November 2015		Approved by Council
Rev 3	23 January 2016	Council approved version revised and CHE objection against the use of their logo and ECSA using the wrong procedure to register the standard addressed.	Approved by ESGB – no deviation from Council approved version
Rev 4 Draft A	14 August 2020	Realignment of E-series documents	Working Group
Rev 4 Draft B	19 August 2020	Reviewed by Education Business Unit	Education Business Unit
Revision 4	20 August 2020	Review by the Executive	EL Nxumalo
Revision 4	01 September 2020	Approval	RPSC
Revision 4	11 August 2021	Correction of Table 1. The subtotal is 112 not 119 and for redistribution it is 28 not 21.	Education BU

The Qualification Standard for:

Higher Certificate in Engineering: NQF Level 5

Revision 4 dated 01 September 2020 and consisting of 24 pages has been reviewed for adequacy by the Business Unit Manager and is approved by the Executive: Research Policy and Standards **(RPS).**



Business Unit Manager — 08/09/2021 Date

Executive: **RPS** — 15/09/2021 Date

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

APPENDIX A: Consistency of Graduate Attributes with Critical Crossfield Outcomes

SAQA Critical Cross-Field Outcomes	Equivalent Graduate Attributes
Identifying and solving problems in which responses display that responsible decisions using critical thinking have been made.	GA 1, 2, 3, 5
Working effectively with others as a member of a team, group, organisation and community.	GA 8
Organising and managing oneself and one's activities responsibly and effectively.	GA 8, GA11
Collecting, analysing, organising and critically evaluating information.	GA 1, 3, 5
Communicating effectively using visual, mathematical and/or language skills.	GA 2, 6
Using science and technology effectively and critically, showing responsibility toward the environment and health of others.	GA 2, 3, 4, 5, 7
Demonstrating an understanding of the world as a set of Related systems by recognizing that problem contexts do not exist in isolation.	GA 1, 3,
Contributing to the full personal development of each learner and the social and economic development of society at large, by making it an underlying intention of the programme of learning to make an individual aware of:	
• reflecting on and exploring a variety of strategies to more effectively learn	GA 9
• participating as responsible citizens in the life of national and global communities local	GA 10
• being culturally and aesthetically sensitive across a of contexts range	GA 7
• exploring education and career opportunities	GA 8
Developing entrepreneurial opportunities	GA 3