

FULL SCOOP
Pr. REGISTRATION
(Candidacy & Professional)
ENGINEERING COUNCIL
OF SOUTH AFRICA
2020





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REGULATORY CONTEXT

Section 22: Constitution of the Republic of South Africa refers that:

"Every citizen has the right to choose their trade, occupation or profession freely. The practice of a trade, occupation or profession may be regulated by law."

- South Africa *chose to regulate* the profession
- This gave <u>rise</u> to the Engineering Profession Act, 2000 (EPA) (Act No. 46 of 2000)
- EPA provided for the establishment of a juristic person to be known as the Engineering Council of South Africa (ECSA)
- Registration is a <u>tool</u> by which ECSA regulates the profession





BUILT ENVIRONMENT LANDSCAPE



DPW – Department of Public Works **CBE** – Council for the Built Environment **SACAP** – South African Council for the Architectural Profession **SACLAP** – South African Council for the Landscape Architectural Profession **ECSA** – Engineering Council of **South Africa**

SACPVP – South African Council for the Property Valuers **SACPCMP** – South African Council for **Project and Construction Management** Professions **SACQSP** – South African















REGULATION OF THE ENGINEERING PROFESSION GOVERNANCE

Pepartment of Public Works Ministry

*ECSA
Council

*Council

*Council

*Council

*CEO

*CEO

*CEO

*CEO

*Executive Authority

*Counting Authority

*Counting Officer

*ECSA is a statutory body established in terms of the Engineering Profession Act, 2000 (Act No. 46 of 2000), and derives its *mandate and responsibilities* from the Act.





REGULATION OF THE ENGINEERING PROFESSION Cont'd

- The main focus of EPA (Act No. 46 of 2000) is the promotion of and all aspects relevant to the actions of persons registered with ECSA. *Public interest* is encompassed in ECSA's mission statement that reflects its commitment to education and training:
 - -"To ensure, through a process of quality assurance, that persons entering the profession are educated and trained according to widely accepted standards, so as to be able to render a professional service for the benefit of the public and the country as a whole."





REGULATION OF THE ENGINEERING PROFESSION Cont'd ECSA MANADATE

- As per Section 13(e) of the EPA (Act No. 46 of 2000) which states that ECSA may establish mechanisms for registered persons to gain recognition of their qualifications and professional status in other countries, ECSA is a member of the International Engineering Alliance (IEA).
- IEA is a global Non-Profit-Organisation, which comprises members from 36 jurisdictions within 28 countries, across the 7 **international agreements.**
- These international agreements govern the recognition of engineering educational qualifications through the educational accords and professional competence through the competence agreements.





REGULATION OF THE ENGINEERING PROFESSION Cont'd ECSA MANDATE

- By being a Member/Signatory of the IEA, the advantage is that:
 - Through the Educational Accords and Competence Agreements members of the IEA establish and enforce internationally bench-marked standards for engineering education and expected competence for engineering practice
 - Advance educational quality and enhance global mobility within the engineering profession





REGULATION OF THE ENGINEERING PROFESSION Cont'd ECSA MANDATE

• Therefore, ECSA is recognised internationally under the auspices of the IEA via the:

Educational Accords:

- ☐ Washington Accord (WA),
- ☐ Sydney Accord (SA), and
- □ Dublin Accord (DA)

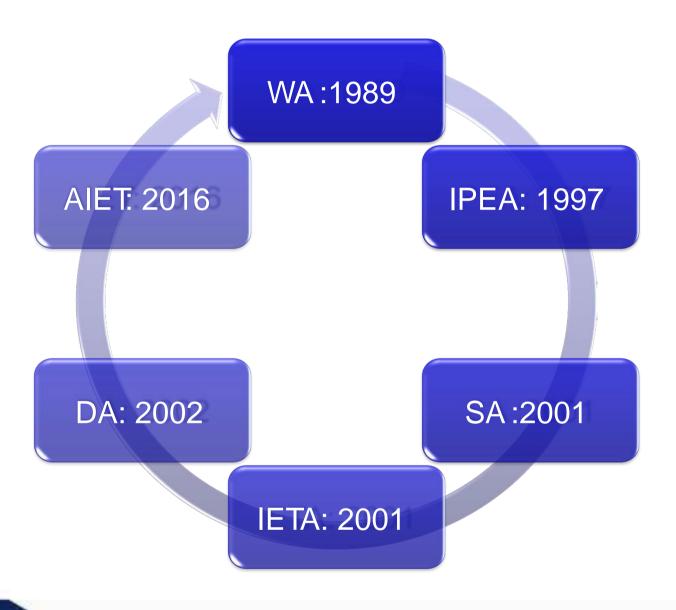
□ Competency Agreements:

- □ International Professional Engineers Agreement (IPEA), and
- ☐ International Engineering Technologist Agreement (IETA)
- ☐ Agreement for International Engineering Technicians (AIET)
- Due to the geographical position of South Africa, ECSA is not a member of the Asia Pacific Economic Cooperation (APEC) Engineer Agreement (One of the 4 competency agreements)





REGULATION OF THE ENGINEERING PROFESSION Cont'd ECSA MANDATE







REGULATION OF THE ENGINEERING PROFESSION



Signatories

Australia 1989

Canada 1989

China 2016

Chinese Taipei 2007

Hong Kong

China 1995

India 2014

Ireland 1989

Japan 2005

Korea 2007

Malaysia 2009

New Zealand 1989

Pakistan 2017

Peru 2018

Russia 2012

Singapore 2006

South Africa 1999

Sri Lanka 2014

Turkey 2011

United Kingdom 1989

United States 1989



Members

Australia 1997

Canada 1997

Chinese Taipei 2009

Hong Kong

China 1997

India 2009

Ireland 1997

Japan 1999

Korea 2000

Malaysia 1999

New Zealand 1997

Pakistan 2018

Singapore 2007

South Africa 1997

Sri Lanka 2007

United Kingdom 1997

United States 1997

Provisional

Bangladesh

Costa Rica

Mexico

Philippines

Provisional

Bangladesh Pakistan

Russia

Netherlands





REGULATION OF THE ENGINEERING PROFESSION

SA

Signatories

Australia 2001 Canada 2001 Chinese Taipei 2014

Hong Kong China 2001

Ireland 2001

Korea 2013

Malaysia 2018

New Zealand 2001

South Africa 2001

United Kingdom 2001

United States 2009

Provisional

Peru

Sri Lanka

IEATA

Members

Australia 2018

Canada 2001

Hong Kong China 2001

Ireland 2001

New Zealand 2001

South Africa 2001

United Kingdom 2001





REGULATION OF THE ENGINEERING PROFESSION Cont'd

DA

Signatories

Australia 2013

Canada 2002

Ireland 2002

New Zealand 2013

Korea 2013

Malaysia 2018

South Africa 2002

United Kingdom 2002

United States 2013 2009

AIET

Members

Australia 2016

Canada 2016

Ireland 2016

New Zealand 2016

South Africa 2016

United Kingdom 2016





REGULATION OF THE ENGINEERING PROFESSION ECSA MANDATE

Civil Engineers Ireland Pr Eng Only

MUTUAL RECOGNITION AGREEMENTS

Electrical

Engineers
Ireland

Pr Eng Only

Mechanical
Engineers
Ireland
Pr Eng
Only

All Disciplines
Engineers Australia

All Categories
of
Registration

INTERNATIONAL REGISTER











RELATIONSHIP WITH THE VOLUNTARY ASSOCIATIONS

(VAs)

ECSA

Functions:

- Set Standards
 - Accredit
 - •Register
 - •Regulate
 Professional
 Conduct
- •Act in the interests of the public
- Advise government

Recognition

Provider Peer Assessors, Accreditors, Investigators

Presidents Forum

Engineering Voluntary
Associations

AeSSA
SAIAE
SAICHE
SAICE
SAIEE
SAIIE
SAIMM
CESA
IPET
COET +





ROLE PLAYERS RELATED TO REGISTRATION

Qualifications Evaluator

Education Committee

STAFF

- Executives
- Registration Dept
- Education Dept.
- Call Centre Agents
- Finance and Strategy
- Legal and HR

VOLUNTEERS

- Experience Appraisal
- Assessors
- Professional Reviewers
- Moderators
- Trainers/Facilitators
- Research, Policy &
- Standards
- Central Registration Commitee

Voluntary Associations and ECSA

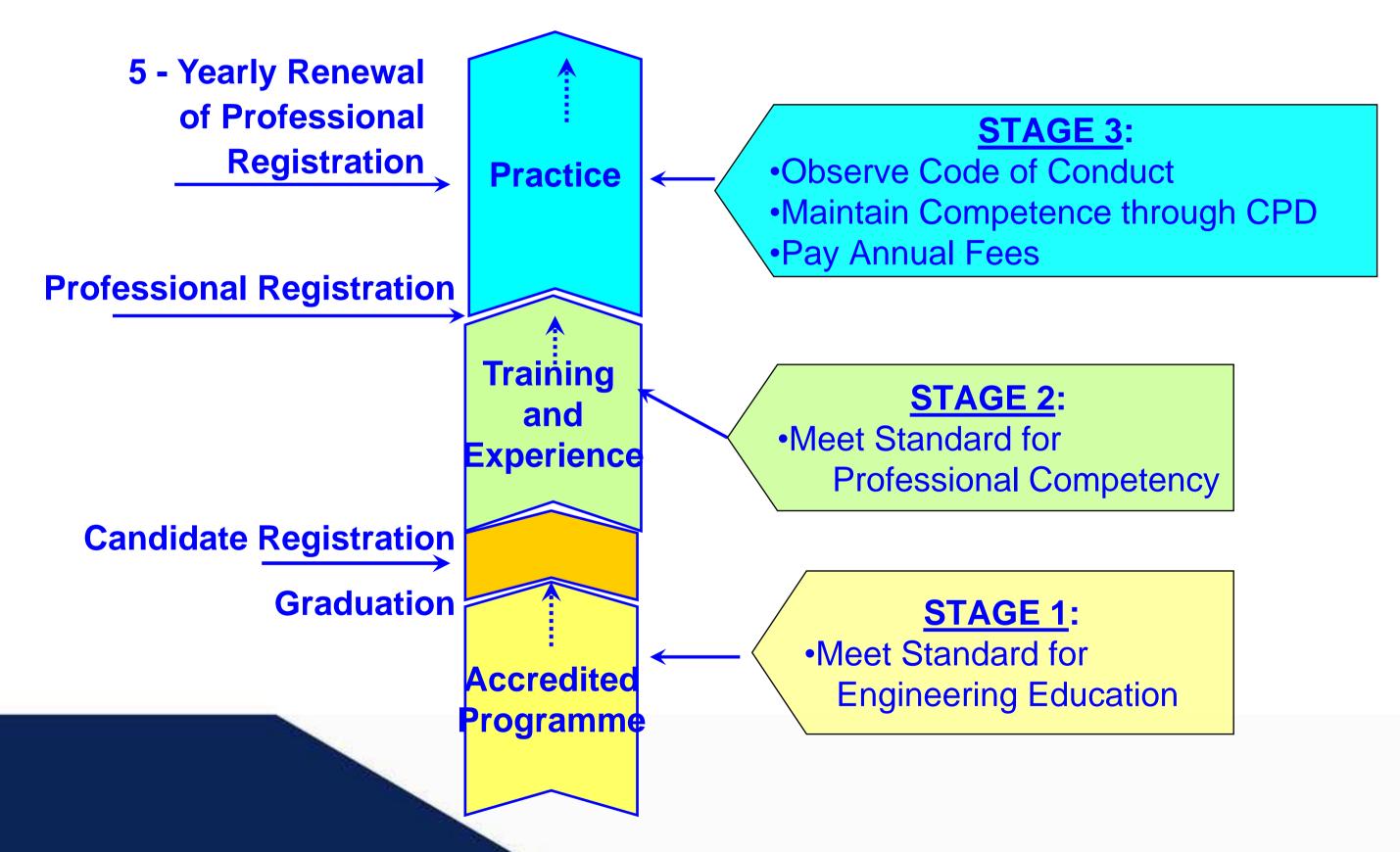
External Industry

- Applicant
- Referee
- Supervisor
- Employers
- Mentor
- Application Advisor





PROFESSIONAL DEVELOPMENT MODEL







REGISTRATION REQUIREMENTS: Categories of Registration

CANDIDATE

EPA Section 18.(1)(b)

Subcategories:

- Candidate Engineer
- BEng/BSc(Eng)
- Candidate Engineering Technologist
- o BEngTech
- o BTech
- AdvDipEng
- Candidate Certificated Engineer
- o Government Certificate of Competency
- Candidate Engineering Technician
- NDip
- o Dip Eng
- o Dip Eng Tech
- AdvCert(Eng)
- AdvCert(Eng Prac)

PROFESSIONAL

EPA Section 18.(1)(a)

Subcategories:

- Professional Engineer
- BEng/BSc(Eng)
- Alternative route*
- Professional Eng. Technologist
- BEngTech
- o BTech
- o AdvDipEng
- Alternative route*
- Professional Cert. Engineer
- Government Certificate of Competency + 1yr Legal Appointment
- Professional Eng. Technician
- NDip/Dip Eng/Dip Eng Tech/AdvCert(Eng)/ AdvCert(Eng Prac)/ Alternative route*

PECIFIED CATEGORY

EPA Section 18.(1)(c)

Subcategories:

As specified by the

Council

- Lift Inspector
- Lift Machinery Inspector
- Medical Equipment Maintainer
- Fire Protection System Practitioner
- Civil Laboratory Technical Controller
- HCert(Eng)
- Alternative route*



*Ref E-17-P Section 2.4 (i) to (iv)



CATEGORIES OF REGISTRATION: ALTERNATIVE ROUTE

Academic Qualification Registration as a Professional Engineering Technician or Candidate Engineering Technician								
Before 1971		1971 – 1980			Post 1980			
Name	Years	Responsible	Name	Years	Responsible	Name	Years	Responsible
	Experience	Experience		Experience	Experience		Experience	Experience
ATC1/NTC4	8	1	NCT/NND	6	1	N4	8	1
ATC2/NTC5	7,5	1	NHCT	6	1	N5	7,5	1
NTD/NED	6	1	ID	6	1	N6	7	1
NDip Tech	3	1	NDT	3	1	NTD/NNDip	6	1
NHDT (Only Elec	3	1	MDipTech	3	1	Adv Cert	3	1
& Mech)						(Eng)		
						(Benchmark)		
No Tertiary	10	1	T1 (Cert)	8,5	11	Adv Cert (Eng	3	1
Qualification &						Prac) (Benchmark)		
N3			T1 (Dip)	8	1	NDip (Benchmark)	3	1
			T2 (Cert)	7,5	1	Dip Eng (Benchmark)	3	1
			T2 (Dip)	6	1	Dip Eng	3	1
						Tech		
						(Benchmark)		
						HNDip	3	1
						BTech	3	1
						Adv Dip Eng	3	1
						BEng Tech	3	1





CATEGORIES OF REGISTRATION: ALTERNATIVE ROUTE

Academic Qualification Registration as a Professional Engineering Technologist or Candidate Engineering Technologist								
Before 1971		1971 – 1980			Post 1980			
Name	Years	Responsible	Name	Years	Responsible	Name	Years	Responsible
	Experience	Experience		Experience	Experience		Experience	Experience
ATC1/NTC2	14	10	NCT/NND	10	6	N4	14	10
ATC2/NTC5	13	9	NHCT	9	5	N5	13	9
NTD/NED	11	8	ID	11	7	N6	11	8
NDT	6	4	NDT	6	4	NTD	10	7
NHDT (Only Elec & Mech)	5	3	MDipTech	3	1	AdvC ert (Eng)	8	5
No Tertiary Qualification & N3	20	10	T1 (Cert)	14	10	Adv Cert (Eng Prac)	8	5
			T1 (Dip)	13	9	NDip	8	5
			T2 (Cert)	12	8	Dip Eng	8	5
			T2 (Dip)	11	7	Dip Eng Tech	8	5
						HND	6	4
						BTech (Benchmark)	3	1
						Adv Dip Eng (Benchmark)	3	1
						BEng Tech (Benchmark)	3	1





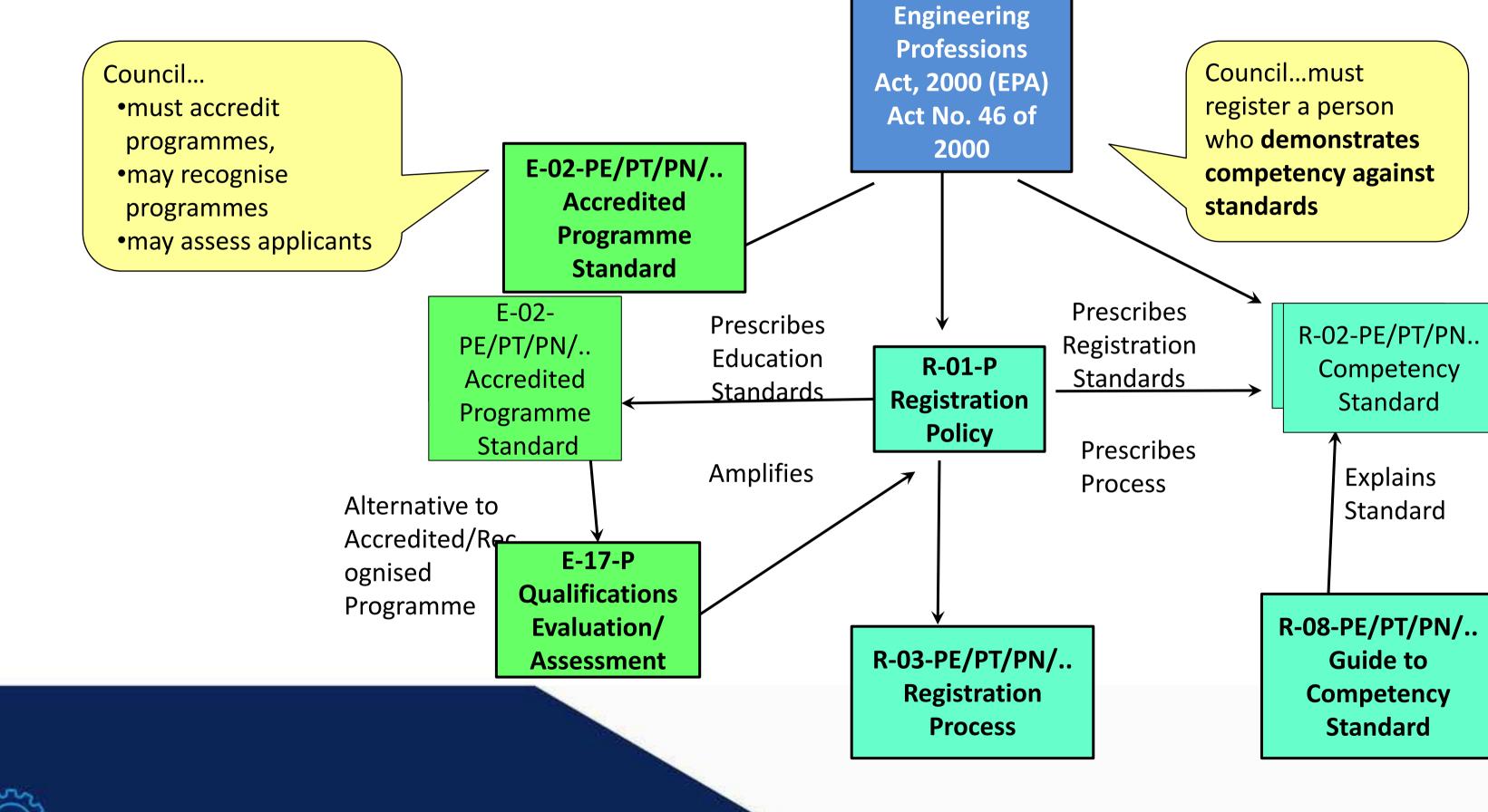
CATEGORIES OF REGISTRATION

REGISTRATION CATEGORY	QUALIFICATION (BENCHMARK)	LEVEL DESCRIPTOR
Engineer	BSc(Eng)/BEng	Solving <u>complex</u> engineering problems and performing complex engineering activities
Engineering Technologist	Adv Dip EngBTech (Eng)BEng Tech	Solving <u>broadly-define</u> engineering problems and performing broadly-defined engineering activities
Certificated Engineer	Certificate of Competency	Solving <u>broadly-defined</u> engineering problems and performing broadly-defined engineering activities
Engineering Technician	 Adv Cert (Eng) Adv Cert (Eng Prac) NDip Dip Eng Tech Dip Eng 	Solving <u>well-defined</u> engineering problems and performing well-defined engineering activities
Engineering Specified Category	HCert (Eng)	Solving specifically-defined engineering problems and performing specifically-defined engineering activities





DOCUMENTS THAT DEFINES THE ECSA REGISTRATION SYSTEM







- To achieve registration in a *candidate category*, an applicant must:
 - Satisfy the relevant educational outcomes determined by council for the Category
- To achieve registration in a *professional category*, an applicant must:
 - Satisfy the educational outcome as defined for the related candidate category
 - Demonstrate competence against standards determined by council for the category





- Policy R-01-P, "Policy on Registration of Persons in Professional Categories", defines the two methods of assessment of applicants that can be applied in a category:
- Standard Method: Two stage process involves:
 - Experience Appraisal (EA)
 - -Professional Review (PR)
- Exceptional stages in the process that Council may permit:
 - Interview if needed to obtain more information for clarity to complete the assessment
 - Advisory interview is granted as optional if the Applicant is refused registration. This interview must be recorded.





Education Requirements to Registration

An applicant for registration as a candidate in a category may satisfy the relevant **educational requirements** by one of the following means. The applicant:

- (i) holds an accredited qualification or acceptable combination of accredited qualifications prescribed for the category; or
- (ii) holds a qualification or combination of qualifications recognised under an international academic agreement relevant to the category; or





Education Requirements to Registration

- iii) holds a qualification or combination of qualifications that have been determined by case-by-case evaluation to satisfy criteria for substantially equivalence to an accredited qualification for the category by virtue of:
 - (a) the qualification(s) being awarded in a jurisdiction or by a provider that has a record of quality or a quality assurance system known to ECSA; or
 - (b) examination of detailed documentation on the qualification(s) reflecting substantial equivalence; or





Education Requirements to Registration

- iv) presents a combination of evidence determined by Council for the category that indicates an individual level of educational achievement against criteria that is substantially equivalent to an accredited qualification; evidence may include:
 - -(a) qualification(s) or credits towards qualifications not already presented under (iii);
 - -(b) completion of examinations or other forms of assessment set or prescribed by Council; or
 - -(c) portfolio(s) of evidence of work and other outputs presented for assessment; or
 - -(d) other evidence of prior learning presented for assessment



Training Period

- Minimum of three (3) years post qualification
- It generally takes longer than three (3) years to acquire competencies
- Imperative that training programmes are well developed, managed and implemented by employer registered under Commitment & Undertaking
- Spending time on a particular element or training without a qualitative objective will not ensure achievement of the required level of competency for that level





REGISTRATIONS REQUIREMENTS Goal of the training programme

• The goal of the training programme is to allow the candidate to develop his/her competence to the point of being able to demonstrate the outcomes at the required level on a sustained basis and to take responsibility for the work performed.

Candidate's role

 Candidates should appreciate that the onus rest on him/herself to ensure that the training received will culminate in the competency defined in the standards





REGISTRATIONS REQUIREMENTS Goal of the training programme

Supervisor's role

- The supervisor is the person who directs and controls the engineering work of the candidate and who takes responsibility for the work in terms of Section 18(4) of the EPA, 2000 (Act No. 46 of 2000).
- The supervisor is expected, together with the **mentor and candidate**, to plan the training task by task to develop the candidate's competence and to review the achievements of each task.





REGISTRATIONS REQUIREMENTS Cont'd Competency Standard

- Professional Engineering Practitioners are able to perform functions because of their:
 - Knowledge,
 - Skills, and
 - Attitudes
- Competence is developed by:
 - Education,
 - Training, and
 - Experience





REGISTRATIONS REQUIREMENTS Developing Professional Competence

- During the post graduate period of training and experience, the applicant/candidate is in employment and works with and under the supervision of qualified Engineering supervisors and professional mentors.
- A professional mentor guides the applicant/candidate's professional development (with assistance of the Engineering supervisor).
- Training process may involve structured activities, including induction and training courses on specific skills or technologies.





Professional Competence Outcomes defined

- □Eleven outcomes are defined and these are conveniently grouped in five sets.
- ☐ The stem of each outcome is the same in the Professional Engineer, Professional Engineering Technologist, Professional Certificated Engineers, Professional Engineering Technician and Registered Engineering Specified Category Practitioner standards.
- ☐ The standards are differentiated by the insertion of level descriptors (defined in the standards) at the locations shown by [level].





REGISTRATIONS REQUIREMENTS Professional Competence Outcomes

GROUP A – Engineering Problem Solving

Engineers	Technologists/ Certificated Engineers	Technicians	Specified Categories
A:1: Define, investigate and analyse complex engineering problems	A:1: Define, investigate and analyse broadly-defined engineering problems	A:1: Define, investigate and analyse well-defined engineering problems	A:1: Define, investigate and analyse specifically-defined engineering problems
A:2: Design or develop solutions to complex engineering problems	A:2: Design or develop solutions to broadly-defined engineering problems	A:2: Design or develop solutions to well-defined engineering problems	A:2: Design or develop solutions to specifically-defined engineering problems
A:3: Comprehend and apply advanced knowledge:	A:3: Comprehend and apply advanced knowledge:	A:3: Comprehend and apply advanced knowledge:	A:3: Comprehend and apply advanced knowledge:





REGISTRATIONS REQUIREMENTS Cont'd Professional Competence Outcomes

GROUP B – Managing Engineering Activities

Engineers	Technologists/ Certificated Engineers	Technicians	Specified Categories
B:4: Manage part or all of one or more complex eng. activities	B:4: Manage part or all of one or more broadly-defined eng. activities		B:4: Manage part or all of one or more specifically-defined eng. activities
B:5: Communicate clearly with others In complex eng. activities	B:5: Communicate clearly with others In broadly- defined eng. activities	B:5: Communicate clearly with others In well defined eng. activities	B:5: Communicate clearly with others In specifically-defined eng. activities





REGISTRATIONS REQUIREMENTS Professional Competence Outcomes

GROUP C – Impacts of Engineering Activities

Engineers	Technologists/ Certificated Engineers	Technicians	Specified Categories
C:6: Recognise and address the reasonably foreseeable impacts	C:6: Recognise and address the reasonably foreseeable impacts	C:6: Recognise and address the reasonably foreseeable impacts	C:6: Recognise and address the reasonably foreseeable impacts
C:7: Meet all legal and regulatory requirements			



REGISTRATIONS REQUIREMENTS Professional Competence Outcomes

GROUP D – Act ethically, Exercise judgement and taking responsibility

Engineers	Technologists/ Certificated Engineers	Technicians	Specified Categories	
D:8: Conduct engineering activities ethically.	D:8: Conduct engineering activities ethically.	D:8: Conduct engineering activities ethically.	D:8: Conduct engineering activities ethically.	
D:9: Exercise sound judgement in the course of complex eng. activities	D:9: Exercise sound judgement in the course of broadly-defined eng. activities	D:9: Exercise sound judgement in the course of well-defined eng. activities	D:9: Exercise sound judgement in the course of well-defined eng. activities	
D:10: Be responsible for making decisions in complex eng.activities	D:10: Be responsible for making decisions in broadly-defined eng.activities	D:10: Be responsible for making decisions in well- defined eng.activities	D:10: Be responsible for making decisions in well- defined eng.activities	



REGISTRATIONS REQUIREMENTS Professional Competence Outcomes

GROUP E – Initial Professional Development (IPD)

Engineers	Technologists/ Certificated Engineers	Technicians	Specified Categories
E:11: Undertake initial professional development			





REGISTRATIONS REQUIREMENTS Degree of Responsibility

	Progression throughout the candidacy period			
Level	Nature of Work	Responsibility	Level of Support	
A. Being Exposed A. Being Exposed	undergoes induction, observes processes, work of competent practitioners	No responsibility, accept to pay attention	Mentor explains challenges and forms of solution	
B. Assisting B. Assisting	performs specific processes under close supervision	Limited responsibility for work output	Supervisor/Mentor coaches, offers feed back	
C. Participating Participating	performs specific processes as directed with limited supervision	Full responsibility for supervised work	Supervisor progressively reduces support, but monitors outputs	
D. Contributing Contributing	performs specific work with detailed approval of work outputs	Full responsibility to supervisor for quality of work	Candidate articulates own reasoning and compare it with those of supervisor	
E. Performing Performing	works in team without supervision, recommends work outputs, responsible but is appropriate to a registered person not accountable	Level of responsibility to supervisor	Candidate takes on problem solving without support, at most limited guidance	





REGISTRATIONS REQUIREMENTS Level of Development

4 Capability

Applicants/candidates must demonstrate that they have the capability, independently or (at most) with limited guidance, of performing the process and making the decisions required to reach the objectives of each element and also that they have the capability of leading or supervising others in the process.

3 Experience

Applicants/candidates must demonstrate that they have, independently or under supervision, performed the processes relating to each objective. Experience of the relevant techniques and functions must be gained.

2 Knowledge

Applicants/candidates must demonstrate that they have sufficient knowledge of how to carry out the processes that are necessary to meet the objectives.

1 Appreciation

Applicants/candidates must demonstrate that they have a general appreciation of the subject matter as well as of the reasons for its inclusion in the training programme.





Solving Complex Engineering

Table 1: C	haracteristics of Co	mplex enginee	erina problems	(CEP)

Is the problem an engineering problem? Does it What is the nature of the problem? Does it have one of characteristics b, c or d?

What is encountered in the solution process? Do solutions have one of characteristics e, f, g or h? Solutions:

What is involved in decision making while solving the problem and in evaluating the solution? Does it have one of characteristics i or j? Do decisions:

- a) require in-depth fundamental and specialised engineering knowledge
- b) is ill-posed, under specified, requiring identification and refinement
- c) is high-level problems including component parts or sub-problems
- d) is unfamiliar or involve infrequently encountered issues
- e) are not obvious, require originality or analysis based on fundamentals that are outside the scope of standards and codes
- f) require information from variety of sources that is complex, abstract or incomplete
- g) the solutions are outside the scope of standards and codes.
- h) involve wide-ranging or conflicting issues: technical, engineering and interested or affected parties
- i) require judgement in decision making in uncertain contexts
- j) have significant consequences in a range of contexts





REGISTRATIONS REQUIREMENTS Defining Complex Engineering Activities

The test for a complex engineering activity (CEA) stated in Section 2.1.2 of Policy R-02-PE is based on involvement in the six (6) descriptors illustrated in Table 2.

If the work meets several of the criteria then the activities are classified as complex engineering activities.

Table 2 : Complex engineering activities (CEA)

Complex engineering activities are characterised by several or all of:

- a) Scope of activities may encompass entire complex engineering systems or complex subsystems
- b) A *context* that is complex and varying, is multidisciplinary, requires teamwork, unpredictable, may need to be identified
- c) Requires diverse and significant resources: including people, money, equipment, materials, technologies
- d) Significant *interactions* exist between wide-ranging or conflicting technical, engineering or other issues
- e) Are *constrained* by time, finance, infrastructure, resources, facilities, standards and codes, applicable laws
- f) Have significant *risks* and *consequences* in range of contexts



REGISTRATIONS REQUIREMENTS ECSA policy vs IEA Exemplar Competency Criteria

\geq	ECSA Policy R-02-PE	Corresponding IEA Competency Criteria Outcome
	Group A: Engineering Problem Solving	
	1:-Define, investigate and analyse complex engineering problems	EC3: Problem Analysis Define, investigate and analyse complex problems.
	2:-Design or develop solutions to complex engineering problems	EC4: Design and development of solutions Design or develop solutions to complex problems.
	3:-Comprehend and apply advanced knowledge: principles, specialist knowledge, jurisdictional and local	EC1: Comprehend & apply universal knowledge Comprehend and apply advanced knowledge of the widely-applied principles under pinning good practice.
		EC2: Comprehend & apply local knowledge Comprehend and apply advanced knowledge of the widely-applied principles under pinning good practice specific to the jurisdiction in which he/she practices.





REGISTRATIONS REQUIREMENTS ECSA policy vs IEA Exemplar Competency Criteria

Corresponding IEA Competency Criteria Outcome
ctivities
EC9: Manage engineering activities
Manage part or all of one or more complex activities
EC10: Communication
Communicate clearly with others in the course of his/her activities
vity
EC5: Evaluation
Evaluate the outcomes and impacts of complex activities.
EC6: Protection of society
Recognise the reasonably foreseeable social, cultural and
environmental effects of complex engineering activities generally, and
have regard to the need for sustainability; recognise that the protection
of society is the highest priority.



REGISTRATIONS REQUIREMENTSECSA policy vs IEA **Exemplar Competency Criteria**

ECSA Policy R-02-PE

Corresponding IEA Competency Criteria Outcome

Group C: Impacts of Engineering Activity

7:-Meet all legal and regulatory requirements and protect the health and safety of people in the course of his or her complex engineering activities.

EC7: Legal and regulatory

Meet all legal and regulatory requirements and protect the public health and safety in the course of his or her activities

Group D: Exercise judgement, take responsibility and act ethically

Conduct his/her activities ethically

9:-Exercise sound judgement in the course of complex engineering activities **EC12: Judgement**

Recognise complexity and assess alternatives in light of competing requirements and incomplete knowledge.

Exercise sound judgement in the course of his or her complex activities.





REGISTRATIONS REQUIREMENTS ECSA policy vs IEA Exemplar Competency Criteria

\geq	ECSA Policy R-02-PE	Corresponding IEA Competency Criteria Outcome	
	Group D: Act ethically, exercise judgement and take responsibility		
	10:-Be responsible for making decisions on part or all of complex engineering activities	EC13: Responsibility for decisions Be responsible for making decisions on part or all of complex activities.	
	Group E: Manage Own Development		
	11:-Undertake professional development activities sufficient to maintain and extend his or her competence	EC11: Lifelong learning Undertake CPD activities sufficient to maintain and extend his or her competence.	

Ref R-02-PE & IEA Graduate Attributes and Professional Competencies





REGISTRATIONS REQUIREMENTS Solving Broadly-defined Engineering Problems

i? Do decisions:

Table 1 : Characteristics of	f Broadly-defined engineering problems (BDEP)
Is the problem an engineering problem? Does it	a) require coherent and detailed engineering knowledge underpinning the applicable technology area
What is the nature of the problem? Does it have one of characteristics b, c or d?	 b) is ill-posed, under specified, requiring identification and interpretation into the technology area c)encompass systems within complex engineering systems d) belong to family of problems which are solved in well-accepted but innovative ways
What is encountered in the solution process? Do solutions have one of characteristics e, f, g or h? Solutions:	 e) can be solved by structural analysis techniques f) may be partially outside standards, codes, (must provide justification to operate outside), tract or incomplete g) require information from practice area and sources interfacing with practice area that is complex or incomplete h) involves a variety of issues which may impose conflicting constraints: technical, engineering and interested and affected parties
What is involved in decision making while solving the problem and in evaluating the solution? Does it have one of characteristics i or	 i) require judgement in decision making in practice area considering interfaces to other areas j) have significant consequences which are important in the practice area, but may extend more widely

REGISTRATIONS REQUIREMENTS Defining Broadly-defined Engineering Activities

The test for a complex engineering activity (CEA) stated in Section 2.1.2 of Policy R-02-PT is based on involvement in the six (6) descriptors illustrated in Table 2.

If the work meets several of the criteria then the activities are classified as broadly-defined engineering activities.

Table 2: Broadly-defined engineering activities (BDEA)

Broadly-defined engineering activities are characterised by several or all of:

- a) Scope of practice area is linked to technologies used and changes by adoption of new technology into current practice
- Practice area is located within a wider, complex *context*, requires teamwork, has interfaces to other parties and disciplines
- c) Involve the use a variety *resources* (including people, money, equipment, materials, technologies)
- Require resolution of occasional problems arising from *interactions* between wideranging or conflicting technical, engineering or other issues
- e) Are constrained by available technology, time, finance, infrastructure, resources, facilities, standards and codes, applicable laws
- f) Have significant risks and consequences in practice area and in related areas





REGISTRATIONS REQUIREMENTS ECSA Policy vs IEA Exemplar Competency

	ECSA Policy R-02-PT	Corresponding IEA Competency Criteria Outcome
2	Group A: Engineering Problem Solving	
	1:-Define, investigate and analyse	TC3: Problem Analysis
	broadly-defined engineering problems	Define, investigate and analyse complex problems.
	2:-Design or develop solutions to broadly-	TC4: Design and development of solutions
	defined engineering problems	Design or develop solutions to complex problems.
	3:- Comprehend and apply the knowledge	TC1: Comprehend & apply universal knowledge
П	embodied in widely accepted and applied	Comprehend and apply advanced knowledge of the widely-applied
	engineering procedures, processes, systems or	principles under pinning good practice.
	methodologies and those specific to the	TC2: Comprehend & apply local knowledge
	jurisdiction in which he/she practices	Comprehend and apply advanced knowledge of the widely-applied
		principles under pinning good practice specific to the jurisdiction in
		which he/she practices.





REGISTRATIONS REQUIREMENTS ECSA Policy vs IEA Exemplar Competency Criteria

	ECSA Policy R-02-PT	Corresponding IEA Competency Criteria Outcome
	Group B: Managing Engineering Activities	
ı	4:-Manage part or all of one or more broadly-	TC9: Manage engineering activities
J	defined engineering activities	Manage part or all of one or more complex activities
	5:-Communicate clearly with others in the	TC10: Communication
	course of his or her engineering activities	Communicate clearly with others in the course of his/her activities
ı	Group C: Impacts of Engineering Activity	
ı	6:-Recognise and address the reasonably	TC5: Evaluation
ı	foreseeable social, cultural	Evaluate the outcomes and impacts of complex activities.
ı	and environmental effects of broadly-defined	TC6: Protection of society
	engineering activities	Recognise the reasonably foreseeable social, cultural and environmental effects of
		complex engineering activities generally, and have regard to the need for sustainability;
		recognise that the protection of society is the highest priority.





REGISTRATIONS REQUIREMENTS ECSA Policy vs IEA Exemplar Competency Criteria

ECSA Policy R-02-PT	Corresponding IEA Competency Criteria Outcome
Group C: Impacts of Engineering Activity	
7:-Meet all legal and regulatory	TC7: Legal and regulatory
requirements and protect the health and	Meet all legal and regulatory requirements and protect the public
safety of people in the course of his or	health and safety in the course of his or her activities
her broadly-defined engineering	
activities.	
Group D: Exercise judgement, take res	ponsibility and act ethically
8:-Conduct engineering activities	TC8: Ethics
ethically	Conduct his/her activities ethically
9:-Exercise sound judgement in the	TC12: Judgement
course of broadly-defined engineering	Recognise complexity and assess alternatives in light of competing
activities	requirements and incomplete knowledge.
	Exercise sound judgement in the course of his or her complex
	activities.





REGISTRATIONS REQUIREMENTS ECSA Policy vs IEA Exemplar Competency Criteria

	ECSA Policy R-02-PT	Corresponding IEA Competency Criteria Outcome
	Group D: Act ethically, exercise judge	ment and take responsibility
2	10:-Be responsible for making	TC13: Responsibility for decisions
	decisions on part or all of broadly-	Be responsible for making decisions on part or all of complex
	defined engineering activities	activities.
ı	Group E: Manage Own Development	
П	11:-Undertake professional	TC11: Lifelong learning
П	development activities sufficient to	Undertake CPD activities sufficient to maintain and extend his or her
П	maintain and extend his or her	competence.
	competence	







REGISTRATIONS REQUIREMENTS Solving Well-defined Problems

Table 1 : Characteristics of Well-defined engineering problems (WDEP)		
Is the problem an engineering problem? Does it	 a) require coherent and detailed engineering knowledge underpinning the applicable technology area 	
What is the nature of the problem? Does it have one of characteristics b, c or d?	 b) is ill-posed, under- or overspecified, requiring identification and interpretation into the technology area c) encompass systems within complex engineering systems d) belong to family of problems which are solved in well-accepted but innovative ways 	
What is encountered in the solution process? Do solutions have one of characteristics e, f, g or h? Solutions:	 e) can be solved by structural analysis techniques f) may be partially outside standards, codes, (must provide justification to operate outside) tract or incomplete g) require information from practice area and sources interfacing with practice area that is complex or incomplete h) involves a variety of issues which may impose conflicting constraints: technical, engineering and interested and affected parties 	
What is involved in decision making while solving the problem and in evaluating the solution? Does it have one of characteristics i or j? Do decisions:	 i) require judgement in decision making in practice area considering interfaces to other areas j) have significant consequences which are important in the practice area, but may extend more 	

widelv...

REGISTRATIONS REQUIREMENTS Defining Broadly-defined Engineering Activities

The test for a complex engineering activity (CEA) stated in Section 2.1.2 of Policy R-02-PT is based on involvement in the six (6) descriptors illustrated in Table 2.

If the work meets several of the criteria then the activities are classified as broadly-defined engineering activities.

Table 2: Well-defined engineering activities (WDEA)

Well-defined engineering activities are characterised by several or all of:

- a) Scope of practice area is defined by techniques applied; change by adopting new techniques into current practice
- b) Practice area is located within a wider, complex *context*, with well-defined working relationships with other parties and disciplines
- Work involves familiar defined range of resources (including people, money, equipment, materials, technologies);
- d) Require resolution of *interactions* manifested between specific technical factors with limited impact on wider issues;
- e) Are *constrained* by operational context, defined work package, time, finance, infrastructure, resources, facilities, standards and codes, applicable law
- f) Have *risks* and *consequences* that are locally important but are not generally far reaching

REGISTRATIONS REQUIREMENTS ECSA Policy vs IEA Competency Criteria

ECSA Policy R-02-PN	Corresponding IEA Competency Criteria Outcome
Group A: Engineering Problem Solving	
1:-Define, investigate and analyse well- defined engineering problems	NC3: Problem Analysis Define, investigate and analyse complex problems.
2:-Design or develop solutions to well- defined engineering problems	NC4: Design and development of solutions Design or develop solutions to complex problems.
3:-Comprehend and apply knowledge embodied in established engineering practices and knowledge specific to the	NC1: Comprehend & apply universal knowledge Comprehend and apply advanced knowledge of the widely-applied principles under pinning good practice.
jurisdiction in which he/she practices	NC2: Comprehend & apply local knowledge Comprehend and apply advanced knowledge of the widely-applied principles under pinning good practice specific to the jurisdiction in which he/she practices.





REGISTRATIONS REQUIREMENTS ECSA Policy vs IEA Competency Criteria

1	ECSA Policy R-02-PN	Corresponding IEA Competency Criteria Outcome
	Group B: Managing Engineering Activities	
	4:-Manage part or all of one or more	NC9: Manage engineering activities
	well-defined engineering activities	Manage part or all of one or more complex activities
	5:-Communicate clearly with others	NC10: Communication
	in the course of his or her	Communicate clearly with others in the course of his/her activities
	engineering activities	
	Group C: Impacts of Engineering Activity	
	6:-Recognise and address the	NC5: Evaluation
	reasonably foreseeable social,	Evaluate the outcomes and impacts of complex activities.
	cultural	NC6: Protection of society
	and environmental effects of well-	Recognise the reasonably foreseeable social, cultural and environmental
	defined engineering activities	effects of complex engineering activities generally, and have regard to the
		need for sustainability; recognise that the protection of society is the highest
		priority.



REGISTRATIONS REQUIREMENTS ECSA Policy vs IEA Competency Criteria

1	ECSA Policy R-02-PN	Corresponding IEA Competency Criteria Outcome
	Group C: Impacts of Engineering Activity	
	7:-Meet all legal and regulatory requirements	NC7: Legal and regulatory
	and protect the health and safety of people in	Meet all legal and regulatory requirements and protect the public health and
	the course of his or her well-defined	safety in the course of his or her activities
	engineering activities.	
ı	Group D: Exercise judgement, take responsibility and act ethically	
ı	8:-Conduct engineering activities ethically	NC8: Ethics
ı		Conduct his/her activities ethically
ı	9:-Exercise sound judgement in the course	NC12: Judgement
ı	of well-defined engineering activities	Recognise complexity and assess alternatives in light of competing
ı		requirements and incomplete knowledge.
		Exercise sound judgement in the course of his or her complex activities.





REGISTRATIONS REQUIREMENTS Cont'd ECSA Policy vs IEA Competency

ECSA Policy R-02-PN	Corresponding IEA Competency Criteria Outcome	
Group D: Act ethically, exercise judgement and take responsibility		
10:-Be responsible for making decisions on part or all of well-defined engineering activities		
Group E: Manage Own Development		
11:-Undertake professional development activities sufficient to maintain and extend his or her competence	NC11: Lifelong learning Undertake CPD activities sufficient to maintain and extend his or her competence.	



Ref R-02-PN & IEA Graduate Attributes and Professional Competencies



REGISTRATIONS REQUIREMENTS Cont'd Application Form Requirements – Candidacy Status

- ☐General information:
 - Personal details and Demographic data
- □Exams passed/Qualifications (at tertiary level)
- □ Certificates of Competency
- □ Proof of Voluntary Association(s) membership
- □ Employment
- □ Application fee R746.00 within a year of obtaining qualification, 1866.23 post one year of obtaining qualification.
- □Declaration and Proof of Identity
- □Disability register





Application Form Requirements – Professional Status

- □General information:
 - Personal details, Demographic data and Employment
- □Qualifications (at tertiary level)
- □ Previous/current registration
- □ Proof of Voluntary Association(s) membership
- □ Application fee R3732.44 if one is actively registered as candidate, R7452.81 if not actively registered as a candidate.
- **□**Referees
 - Two (2) ECSA professionally registered referee reports for Pr Eng, Pr Cert Eng and Reg Eng Specified Category Practitioner, three (3) for Pr Eng Tech and Pr Eng Techni
- □Declaration and Proof of Identity
- □ Certified copies of educational qualifications (transcripts when required)



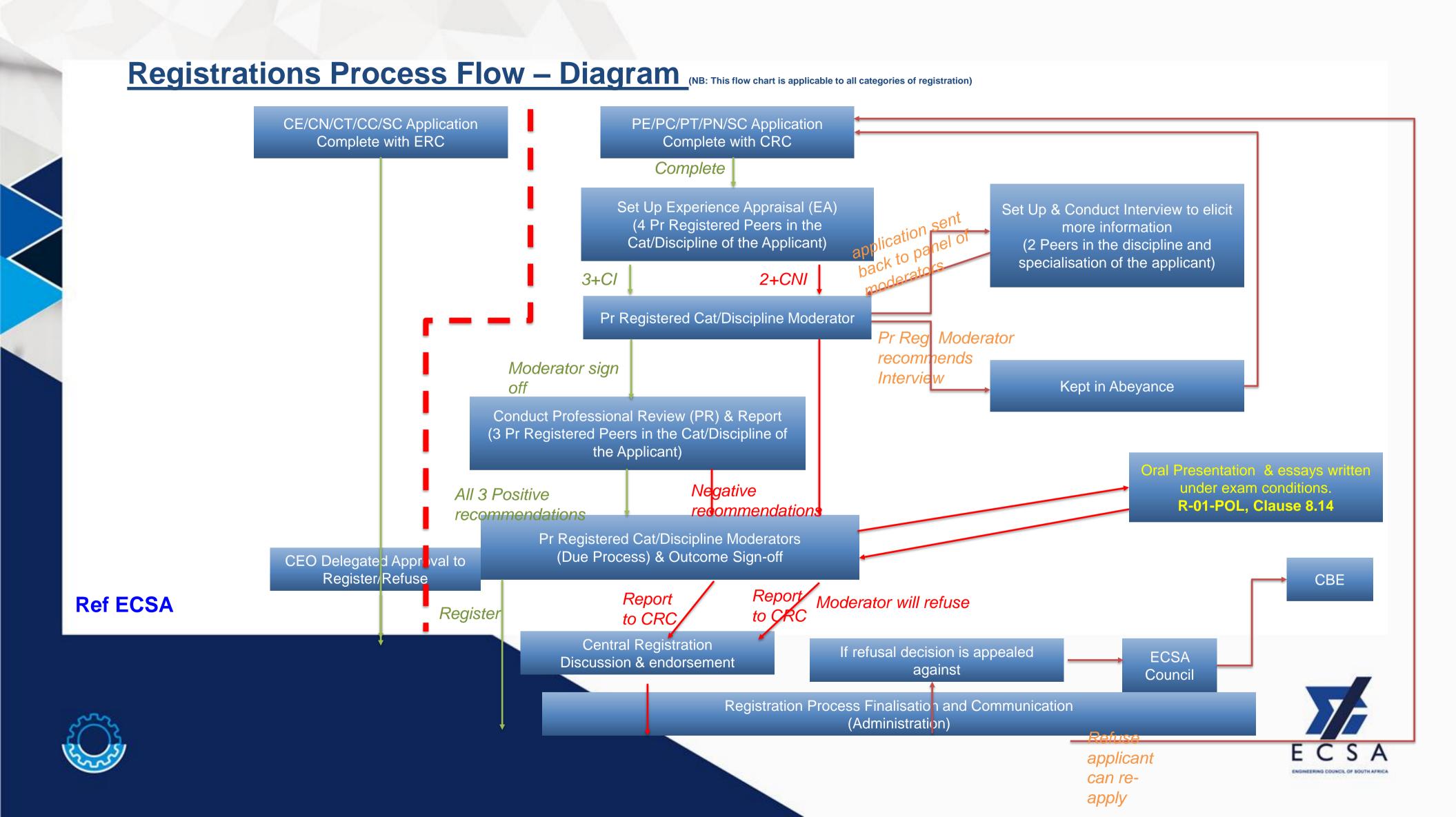


Application Form Requirements – Professional Status

- ☐ Training and Experience Reports (TERs)
- □Summary of the Training and Experience Reports
- □Engineering Report maximum 6000 words complete all 11 Outcomes (Policies R-02-PE/PT/PCE/PN/SC provides guidance)
- □Initial Professional Development (IPD)Report
- □ Presentation (Table 1 & Appendix B: Policy R-03-PE/PT/PCE/PN/SC provides guidance)

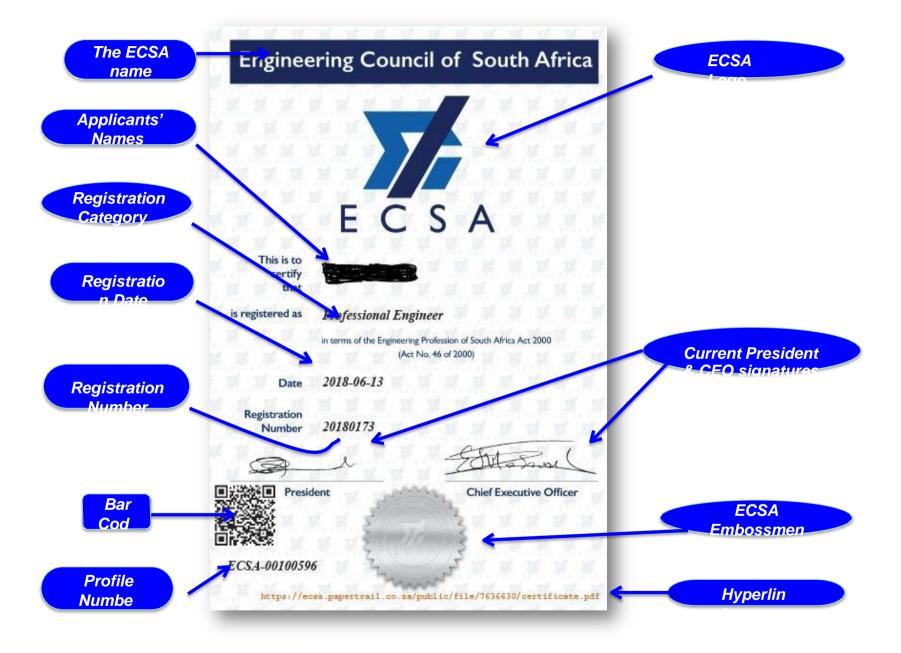






<u>Understanding the features of the ECSA Digital Registration</u>

Certificate







How to certify the ECSA Diaital Reaistration Certificate

- **DECSA Office Interim measure:**
 - Two legal persons in the ECSA offices can commission a copy of the digital certificate post verification by the registration department.
- □This provision is found in Section 18 of the Electronic Communication and Transaction Act, 2002 (Act No. 25 of 2002)
- □ For any confirmation of registration and/or ECSA certificate, you can email:

 - Thabo Sereng: Registration Officer: thabo@ecsa.co.za
 Daniel Mokwele: Assistant Manager: Registrations Department: danielm@ecsa.co.za
 - Valentine Ndlovu: Manager: Registrations Department: <u>valentine@ecsa.co.za</u>







THANK YOU

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