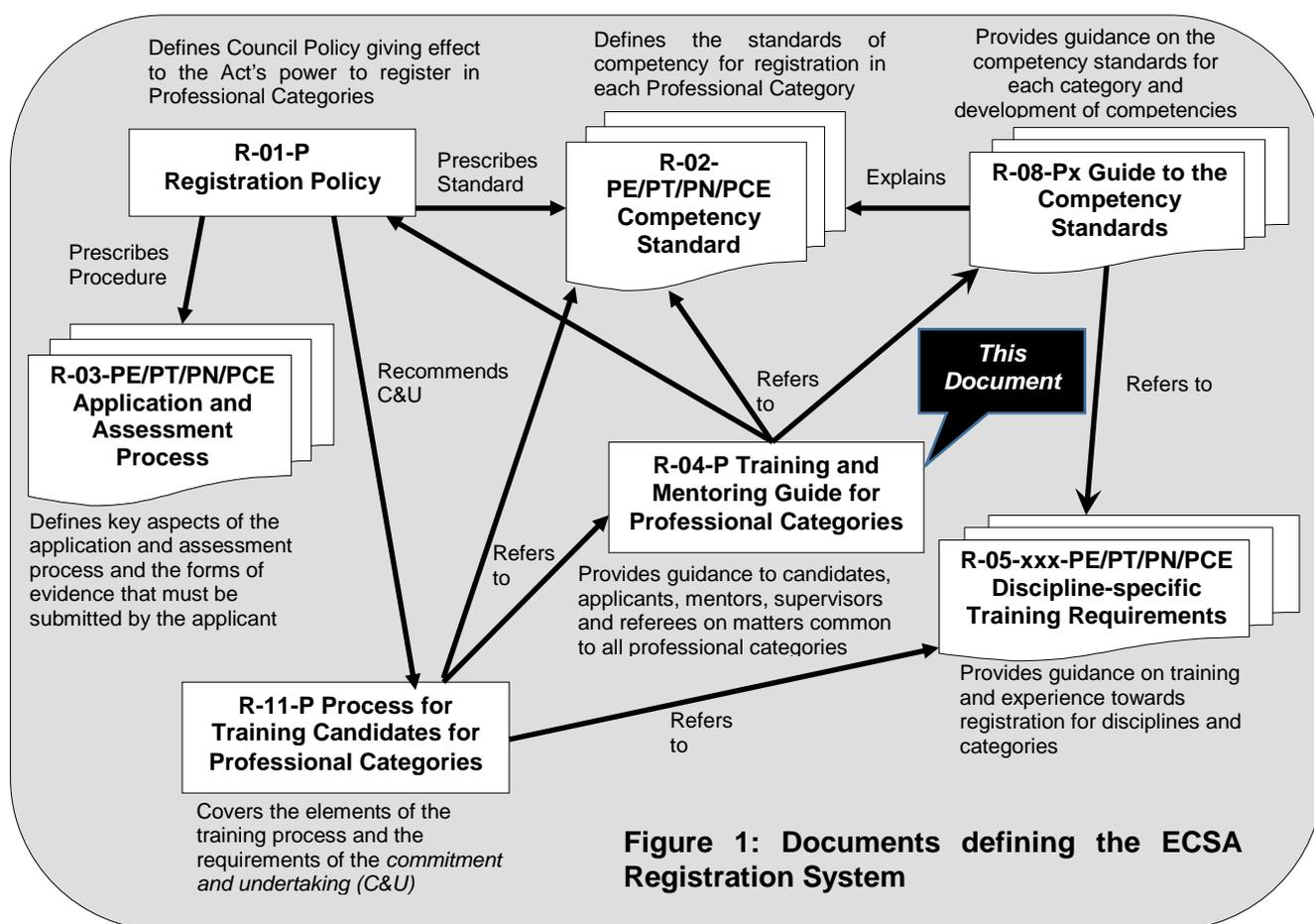


ENGINEERING COUNCIL OF SOUTH AFRICA <i>Standards and Procedures System</i>			 E C S A
Training and Mentoring Guide for Professional Categories			
Status: Ratified by Council			
Document : R-04-P	Rev 2	17 August 2017	

Background: The ECSA Registration System Documents

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



1. Purpose of this document

This document provides guidance to persons who are committed to registering in a professional category with ECSA. The process of training toward registration and the requirements that must be met are described. Particular emphasis is placed on candidacy programmes as the preferred method of training toward registration. Guidance is given to those who supervise them in the work place, and to their mentors. This guide covers the common requirements for all professional categories.

This Guide is designed for two main audiences:

- Persons who are proceeding to registration in a candidate or professional category; and
- Mentors and supervisors who support their training.

This guide is supplemented in each professional category (professional engineer, professional engineering technologist, professional engineering technician and professional certificated engineer) by a guide to the professional competencies for the category (R-08-PE/PT and PCE/PN). Within a category, each discipline (e.g. civil, mechanical, chemical, etc.) may, in addition, provide further guidance on training and registration requirements in the form of a Discipline-specific Training Guide (R-05-xxx-PE/PT/PN/PCE).

This Guide and its companion documents are informative documents. Their interpretation is subject to the applicable [standards, competency indicators, policies and procedures](#).

This guide is designed to be read in printed form and on-screen, both on-line and after downloading either as a Web document (.html) or a PDF document. The document may be navigated by:

- following links according to the [individual user's needs](#); or
- the [Table of Contents](#) may be used to locate the required information

2 Navigating the guide by user needs

A person consulting this guide should use the navigation aid laid out below. It will direct you to the various types of information. Clicking on the hyperlink moves to the next navigation step or to the relevant part of the document. This link, [Navigate](#), inserted at intervals throughout the document, gets the reader back to this section.

A: Which of the following best describes your objective in consulting this guide?

I want detailed information on [candidacy programmes](#)

I want information about the [education requirements](#)

I want information about the [competency standards](#) for registration

I want information on the [application process](#)

I want to find out more about the [categories of registration](#)

I want information on how to [plan and monitor my training programme](#)

I am interested in registering and:

I am not sure if I meet the [education requirements](#)

I am not already registered in any category with ECSA [and want to register](#)

I am already registered as a Candidate with ECSA and [want to register as a professional](#)

I am registered in one professional category and [want to register in an additional professional category](#)

I wish to register as a professional with ECSA [via an international agreement \(What are these?\)](#)

B: If you are interested in registering, the first step is to establish the way that you meet the educational requirements:

I think that I meet the education requirements by the following method

I am already [registered as a candidate](#); or

I have an accredited qualification ([how do I know](#)); or

I have an internationally recognised qualification ([how do I know](#)); **or**
My educational achievement has already been evaluated by ECSA as meeting the educational requirements for a category ([how do I know](#))

You should now [decide whether to apply for candidate or professional registration](#)

I do not meet the educational requirements by the above methods

You must apply for [Educational Evaluation](#) before applying for registration as candidate or professional

C: The second step is to determine whether you should apply for candidate or professional registration. Which of the following best describes your current state of development in engineering work?

I have little or no training and experience after completing my education

You should apply for (or remain in) [candidate registration](#)

I have at least three years training and experience under mentorship and supervision and my mentor has advised that I am ready to apply for professional registration

You should apply for [professional registration](#)

I have at least three years training and experience without continuous mentorship

You should complete the self-evaluation and discuss your situation with a person registered in the category who is preferably a mentor. This information should guide your decision on whether to apply for registration at this stage

D: I have decided to apply for registration. How does the application process work?

[How do I submit an application for candidate registration?](#)

[How do I initiate an application for professional registration?](#)

[How do I submit an application for educational evaluation?](#)

[How is my application for registration as a Professional Engineer processed?](#)

[How is my application for registration as a Professional Engineering Technologist processed?](#)

[How is my application for registration as a Professional Certificated Engineer processed?](#)

[How is my application for registration as a Professional Engineering Technician processed?](#)

[What happens if my application is not successful?](#)

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3 The Engineering Professional Development Process

The main stages in the development of an engineering professional are described in Table 1. This guide applies to the development process between graduation with an accredited or recognised qualification and applying for registration as a professional. This period is bracketed by two important stages in the development of an engineering practitioner at which assessment takes place:

Stage 1: Meet the education requirements for registration in the category; and

Stage 2: Meet the professional competency requirements for registration.

During this time, the person undergoes training and gains experience to develop the competencies required for registration. During this time a person is normally registered as a candidate. A programme of training and experience designed to develop a person is called a *candidacy programme* or the *candidacy phase*. In this guide, a person working toward registration is referred to as a *candidate*. While training through a structured programme is the advised method of developing the competencies for registration, a person may not have registered as a candidate. Unless the context requires otherwise, the term candidate is used throughout this guide and its companion documents.

When the candidate reaches the stage of applying for registration and during this process, the term *applicant* is used.

During the period of training and experience the person is in employment and works with and under the supervision of qualified engineering professionals. The training process may involve structured activities including induction and training courses on specific skills or technologies. The candidate also participates in self-initiated professional development activities, termed *initial professional development* activities.

Table 1: Background: The Engineering Professional Lifecycle and Process of Professional Development

The training process described in this document is a critical part of the development of an engineering professional. The benchmark engineering professional lifecycle has a number of stages:

- 1: *School Education*: achievement of literacy, numeracy and a first level of mathematics, science and language proficiency;
- 2: *Higher Education*: completion of an accredited programme and the attainment of a required level of engineering education;
- 3: *Candidacy Phase*: a programme of training and experience that builds on the higher education qualification to develop the competencies required for registration;
- 4: *Practice as a Registered Person*: registration certifies that the person has demonstrated, through work performed, that he or she has satisfied the generic baseline competency standards for the profession and is permitted to practice and take responsibility for engineering work for which he or she is competent by virtue of education, training and experience. There is a recognition that the person's competence will grow with further experience.

The process of developing competency for registration normally proceeds in the above sequence. The educational requirement is fulfilled first. This step means that requirement for registration as a candidate is met. Registration as a candidate in the relevant category is strongly recommended.

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4 Professional Competency and Competency Standards for Registration

Professional competence means having the attributes necessary to perform the activities within the profession to the standards expected in independent employment or practice. The Engineering Profession Act, 2000 (EPA) uses a competency-based approach to registration. It says that the ECSA Council *must register an applicant in a professional category who*

has demonstrated competency against standards that it has determined for the category. This statement embodies the notion of standards of competency and demonstration of competency.

4.1 What is a competency standard?

The competence of an engineering professional in a category is defined as having the proven attributes necessary to perform the activities within the professional category to the standards expected. The standard of competency, or simply the competency standard, defines a number of outcomes that a person must achieve. In order to be judged competent to register in a category, the outcomes must be achieved at the level stated. 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 Engineer and Professional Engineering Technician standards. The standards are differentiated by the insertion of level descriptors (defined in the standards) at the locations shown by [level].

Group A: Knowledge-based engineering problem solving

Outcome 1:- Define, investigate and analyse *[level] engineering problems*

Outcome 2:- Design or develop solutions to *[level] engineering problems*

Outcome 3:- Comprehend and apply [level] knowledge: principles, specialist knowledge, jurisdictional and local knowledge

Group B: Manage Engineering Activities

Outcome 4:- Manage part or all of one or more *[level] engineering activities*

Outcome 5:- Communicate clearly with others in the course of his or her engineering activities

Group C: Group C: Impacts of Engineering Activity

Outcome 6:- Recognise and address the reasonably foreseeable social, cultural and environmental effects of *[level] engineering activities*

Outcome 7:- Meet all legal and regulatory requirements and protect the health and safety of persons in the course of his or her *[level] engineering activities*

Group D: Exercise judgement, take responsibility and act ethically

Outcome 8:- Conduct engineering activities ethically

Outcome 9:- Exercise sound judgement in the course of *[level] engineering activities*

Outcome 10:- Be responsible for making decisions on part or all of *[level] engineering activities*

Group E: Continuing Professional Development

Outcome 11:- Undertake professional development activities sufficient to maintain and extend his or her competence

Outcomes 1 and 2 require a level descriptor for the level of problem solving. This descriptor takes into account the knowledge required for analysis and design or development of solutions, the degree to which the problem is defined, factors that may make the solution difficult and the uncertainty and consequences of the problem and solution.

Outcomes 4, 6, 7 9 and 10 require a level descriptor for the demands of the engineering activity for each category.

These level descriptors are defined for the four professional categories in the competency standards R-02-PE, R-02-PT, R-02-PCE, and R-02-PN. The candidate or prospective applicant for registration should be familiar with the requirements of the applicable standard for the category.

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4.2 How is Competency Demonstrated?

The answer to this question is in most cases linked to the model for development of professional competency shown in Table 1. The first stage is the attainment of an educational qualification as an important foundation. During the training and experience phase the candidate progressively performs more demanding work and takes on more responsibility. In the final phase the candidate should be working at the level expected of a person who has just become registered but will be under the supervision and control of a registered person.

While working at this level, the candidate will be undertaking work that requires problem analysis and solution, taking impacts and regulation into account, managing processes to ensure that the engineering goals are met, behaving ethically, exercising judgement in decision making and taking full responsibility to the supervisor for the work completed. Effective performance of this work is therefore evidence of competence. The applicant for registration must document this evidence for the registration applications and must undergo documentary interactive assessment by engineering professionals who judge the demonstrated competency against the defined standards.

Detailed guides are available to the competency standards for each Professional Category:

- Guide to the Competency Standards for Registration as a Professional Engineer;
- Guide to the Competency Standards for Registration as a Professional Engineering Technologist/ Professional Certificated Engineer, and
- Guide to the Competency Standards for Registration as a Professional Engineering Technician.

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5 About Registration

5.1 The Categories of Candidate and Professional Registration

ECSA is empowered to register persons in four *professional categories*:

Professional Engineer;
Professional Engineering Technologist;
Professional Certificated Engineer; and
Professional Engineering Technician.

5.2 Registration as a Candidate

Each professional category has a corresponding candidate category where the requirement for registration is that the educational requirements for the category must have been met:

Candidate Engineer;
Candidate Engineering Technologist;
Candidate Certificated Engineer; and
Candidate Engineering Technician.

Registration as a candidate is intended for persons who have completed their engineering education and are training toward registration. Registration as a Candidate serves several purposes:

- Signals the person's intent to seek registration;
- Confirms that educational requirements have been met;
- Provides access to mentoring, information and advice;
- Provides the opportunity to incorporate discipline specific requirements for registration in the training;
- Provides an environment for planning and monitoring the candidate's training and experience; and
- Clarifies the position of the as yet unregistered person with respect to performing identified engineering work.

While most candidates are likely to have attained an accredited or recognised qualification, persons proceeding by other routes may find it useful to have formal recognition of meeting the educational requirements as soon as these can be fulfilled. Thereafter, registration as a candidate may benefit the person's training.

In the case of an applicant for registration as a professional who is not registered as a candidate, the educational standing of the applicant is evaluated within the registration process.

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5.3 Common Requirements for All Applicants

To attain registration with ECSA in a professional category, an applicant must, in terms of the Engineering Profession Act and policies laid out in ECSA document R-01-P, demonstrate that he or she:

- [Meets the educational requirements for the category](#);
- Demonstrates competent performance against the standards laid down for registration in the category; and
- Meets the discipline specific requirements detailed in the Discipline-specific Training Guide, document R-05-PCE (Applicable to Professional Certificated Engineers only).

The educational requirements may be met in the following ways:

- By holding an accredited qualification or qualification(s); or
- By holding a qualification or qualification(s) recognized under an international agreement; or
- Holding qualification or qualification(s) that are evaluated by ECSA as being substantially equivalent to an accredited qualification;
- By being assessed by ECSA against criteria for substantial equivalence to an accredited qualification.

Fuller details are available [below](#).

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5.4 Documents Defining the Registration System

ECSA's registration system is defined in four types of document: policies, standards, procedures and guidelines. This document is of the fourth type, namely a guide to persons who aspire to register as candidate and professionals and apply for registration. The main documents and their relationships are shown in Fig 1.

The registration policy applicable to all categories of registration and applicants proceeding by different routes is defined in ECSA document:

R-01-P: Policy on Registration of Persons in Professional Categories

The competency standard applicable to the category must be consulted: this document defines the outcomes that must be demonstrated by the applicant for registration and the level at which the applicant must perform. These documents are:

R-02-PE: Competency Standard for Registration as a Professional Engineer

R-02-PT: Competency Standard for Registration as a Professional Engineering Technologist

R-02-PN: Competency Standard for Registration as a Professional Engineering Technician

R-02-PCE: Competency Standard for Registration as a Professional Certificated Engineer

The *procedures* for applicants making, and ECSA processing, applications for registration are contained in documents R-03-PE/PT/PN/PCE.

Further *guidelines* to persons proceeding to registration in professional categories are available:

R-08-PE: Guide to the Competency Standards for Registration as a Professional Engineer.

R-08-PT: Guide to the Competency Standards for Registration as a Professional Engineering Technologist and Professional Certificated Engineer.

R-08-PN: Guide to the Competency Standards for Registration as a Professional Engineering Technician.

Guidelines specific to individual disciplines (where these exist) are available in:

R-05-nnn-PE: Discipline-specific Training Guides for Candidate Engineers

R-05-nnn-PT: Discipline-specific Training Guides for Candidate Engineering Technologists.

R-05-nnn-PN: Discipline-specific Training Guides for Candidate Engineering Technicians.

R-05-PCE: Discipline-specific Training Guideline and Requirements for Candidate Certificated Engineers.

6 Meeting Educational Requirements

The education requirements are defined in the standards for accredited qualifications in each category. In the case of recognized and evaluated qualifications, it is Council's policy that substantial rather than exact equivalence is required. Three routes to meeting the education requirements are available.

Which of the following statements applies to the user? I am not already registered as a candidate and:

[I have an ECSA-Accredited qualification for the category](#)

[I have an accredited qualification from a signatory to an agreement that gives recognition of my qualification](#)

[I do not have either of the above but have other engineering qualifications](#)

6.1 ECSA-Accredited Qualifications

ECSA Accredits engineering education programmes and the qualifications attached as meeting the educational requirements toward registration in candidate and professional categories. (There are no accredited qualifications for Certificated Engineers: a Government Certificate of Competency is required for registration as candidate or professional.)

The lists of ECSA- accredited programmes (and hence the degrees awarded) are available as shown:

Professional and Candidate Engineers: [Listed BEng/BSc\(Eng\)-type programmes](#) for graduates completing the requirements for the degree within the start and end years shown in the list.

Professional and Candidate Engineering Technologists: [Listed BTech programmes](#) (with a cognate national diploma as prerequisite) for graduates completing the requirements for the degree within the start and end years shown in the list.

Professional and Candidate Engineering Technicians: [Listed National Diplomas](#) for graduates completing the requirements for the diploma within the start and end years shown in the list.

Recognition of BTech and National Diplomas is subject to confirmation of an acceptable combination of subjects in each case.

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6.2 Qualifications Recognised under International Agreements

The substantial equivalence of qualifications accredited by other signatories to international agreements is verified and monitored by mechanisms provided in the agreements for the various categories.

Professional and Candidate Engineers: Holders of qualifications from programmes accredited (singly or in combination) by a [Washington Accord Signatory](#) completed by graduates within the start and end years¹ of accreditation shown in the signatory's list or database awarded not earlier than the year of entry of the signatory to the Accord.

Professional and Candidate Engineering Technologists : Holders of qualifications from programmes accredited (singly or in combination) by a [Sydney Accord Signatory](#) completed by graduates within the start and end years of accreditation shown in the signatory's list or database awarded not earlier than the year of entry of the signatory to the Accord.

¹ The year of completion is the year in which the requirements for the qualification were fulfilled.

Professional and Candidate Engineering Technician : Holders of qualifications from programmes accredited (singly or in combination) by a [Dublin Accord Signatory](#) completed by graduates within the start and end years of accreditation shown in the signatory's list or database awarded not earlier than the year of entry of the signatory to the Accord.

The Washington, Sydney and Dublin Accords have signatories that are national accrediting bodies that enjoy recognition under the agreements. The Accords also have a form of membership called provisional status for national accrediting bodies that are working toward becoming signatories but have not yet proven their standards and processes to meet an accord's accepted level. Qualifications accredited by bodies holding provisional status in an accord are therefore not recognized by other signatories. Applicants holding qualifications from countries with provisional status completed while or before the body has provisional status must apply for educational evaluation.

To determine whether a qualification is accredited by a signatory, the signatory's website should be consulted to find the database or list of accredited qualifications. Holders of qualifications accredited by a signatory awarded before the country's accession to the accord must also apply for educational evaluation.

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6.3 Educational Evaluation

Meeting the educational requirements for a category is a first step toward registration in a professional category and is the sole requirement for registration in a candidate category (except in the case of Candidate Certificate Engineers where the Government certificate of Competency is required). Applicants for registration who do not hold a qualification from an accredited programme or who are not recognised through international agreements must have their educational achievement evaluated.

ECSA's policy (R-01-P) does not require qualifications to meet the exact requirements for an ECSA accredited qualification for the category but they must be *substantially equivalent* according to the criteria defined in document E-17-P. Appropriately worded criteria for substantial equivalence of qualifications and individual achievement are defined for engineers, engineering technologists and engineering technicians respectively in Tables 1, 2 and 3 of document E-17-P. The criteria broadly follow the criteria for accredited qualifications. Criteria that cannot readily be evaluated and which are covered at the registration level are omitted.

Two cases are distinguished (numbered (iii) and (iv)) in the policy:

- (iii) Holders of *qualifications evaluated* (QE) by ECSA as substantially equivalent to an accredited qualification, from both providers whose quality is known to ECSA, allowing an accelerated verification of the qualification, as well as providers where comprehensive evaluation is necessary.
- (iv) Persons who may have partial recognition for qualifications under (iii) and must undergo *individual assessment* (IA) to obtain the balance of their recognition of substantial equivalence. A variety of individual assessment processes are proposed for different purposes.

Processes for Evaluation of Qualifications (case (iii)) and Assessment of Individuals (case (iv)) are clearly demarcated but are well co-ordinated. The normal sequence is to first treat the application for qualifications evaluation. If an applicant's qualification does not meet all the criteria for substantial equivalence, individual assessment is invoked, with or without additional learning. This will deal with the majority of applicants requiring educational evaluation.

Where an applicant's qualifications do not meet criteria defined in E-17-P examinations appropriate to each category of registration may be used to fulfil requirements:

- *Engineering Fundamentals*, at the category level, examines knowledge in engineering fundamentals relevant to broad disciplinary groupings, with embedded assessment of essential mathematics and natural science underpinning fundamentals (Criteria 1.1 and 1.2).
- *Specialist Engineering Sciences*, at the category level, evidenced by writing and passing a specified number of examinations at the exit level of an accredited qualification offered by an education provider whose programme(s) are accredited by ECSA for the category (Criteria 1.3 and 2).
- *Engineer in Society Essay Test* that assesses contextual knowledge (Criteria 7 and 8) and Communications (Criterion 6).

The remaining criteria (4,5) may be satisfied through a recognition of prior or workplace learning via design or investigation/research portfolios. A [supporting document](#) provides an overview of methods for meeting the educational requirements by methods (iii) and (iv).

This process is essentially an advisory service. There is no concept of refusal to recognise. Rather the applicant is advised of the criteria that have been satisfied for individual categories. Reasons for non-compliance with individual criteria are given. The applicant may provide further evidence, undertake further learning and undergo further assessment until the requirements for the category are fulfilled.

See [applying for educational evaluation](#).

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7 Training through a Candidacy Programme

This section provides information that answers the questions:

- [What is the process of training toward registration?](#)
- [What is my role and responsibility as a candidate?](#)
- [What is the role and responsibility of the mentor?](#)
- [What is the role and responsibility of my supervisor?](#)
- [What are referees and what is their function?](#)
- [How do I \(and my mentor\) plan my training and experience programme?](#)

A candidacy programme normally commences when the trainee graduates from an accredited or recognised programme, registers as a candidate and enters employment with an employer who is committed to training persons toward registration. For Certificated Engineers a letter of appointment as the responsible person is an additional requirement.

Candidacy programmes are typically at least three years in duration. The final level of competence must be that defined in the standard for the category.

The objective of the programme is, through training, experience and initial professional development², to attain the level of competence for registration and through work performance, provide evidence of that competence.

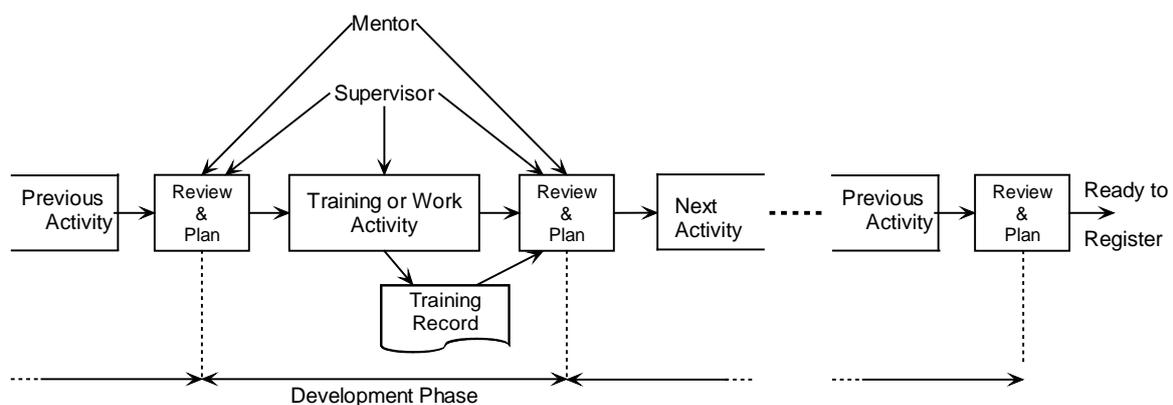
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7.1 Process of Training and Experience

We use the terms training and experience in the following way. *Training* is a process of learning specific practical knowledge, skills, attitudes and values under the direction of competent persons. Training may be supported by formal courses and other learning activities. The majority of training time is spent in engineering work. *Experience* is a process of gaining competence by active involvement in the work environment.

The trainee should register as a candidate in the relevant category as early as possible in the training process, preferably on graduation from an accredited or recognised educational programme. The process of training and experience consists in general of phases or substantial tasks that form convenient units for planning the training and assessing performance.

Figure 2 shows the general elements of a programme of training and experience. The process is governed by [standards, policies and procedures](#). The candidate engages in a sequence of activities that may be the completion of a particular aspect of training or a unit of work, shown as a development phase in Figure 2. For each of the development phases, the candidate, working with the supervisor and mentor, sets and documents the competency development objectives of the phase. At the end of the phase, the candidate, supervisor and mentor review the achievements of the just-completed phase against the objective that were set for the phase. Objectives are then set for the next phase. After one or more phase, when the candidate has worked at the exit level ([Level 5](#)), defined in Table 4, the mentor and candidate may determine that sufficient evidence of competence has been accumulated to apply for registration, provided that the three-year minimum period has elapsed. The candidate then prepares an application for registration, setting out evidence of competency.



² Initial Professional Development consists of activities identified as meeting the post-registration Continuing Professional Development (CPD) requirements but carried out before registration.

Figure 2: Main elements of the professional development process through a candidacy programme.

Detailed information on [Planning and Managing](#) a candidate's programme of training and experience is available later in this guide.

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7.2 Roles and Responsibilities

The goal of the training programme is to allow the candidate to develop his/her competency 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. Three key players in the training of candidates are supervisors, mentors and referees. Table 2 summarises the roles of these players. They are described in terms of roles because an individual may perform more than one player's function.

Table 2: Roles in training candidates and supporting applicants.

Role	Supervisor of Engineering Work	Mentor	Referee
Function	Supervise the work of the candidate, directly or through intermediary, : supervisor takes responsibility for work	Guide and facilitate the professional development of the candidate, guides timing and preparation of application for registration	From knowledge of candidate's work performance, give opinion of competency against standards and integrity
Reporting	Signs training reports		
Registration*	Supervisor registered in terms of s18(4) of EP Act; Intermediaries preferably registered	Must be registered	See Table 3
Location	Employer organisation	Employer organisation or external	Employer organisation or external
Multiple Roles	An individual may play two or three of the above roles		
* Registration of mentors, supervisors, referees in the category of the applicant, unless otherwise agreed by ECSA			

7.2.1 Candidate

Candidates should appreciate that the onus rests on him- or herself to ensure that the training received will culminate in the competency defined in the standards. Council prefers that they follow a training programme under a Commitment and Undertaking Agreement (C&U) (See Section 8), which has been registered by Council and which, as is required, has at least one mentor registered in terms of the C&U. Should candidate engineers experience difficulties with their training, they should attempt to resolve them through the normal channels, for example with the mentors responsible for their guidance. The relevant engineering Institutions/Institutes/bodies, organizations under the Act, have indicated their willingness to assist candidates in this regard.

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7.2.2 Supervisor

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 Engineering Profession Act. Supervision may not be direct but must be performed on an adequately informed base. Intermediaries between the candidate and the supervisor should preferably be registered but, if not registered, must be of adequate engineering competence. 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.

The supervisor may also fulfil the function of the mentor described below.

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7.2.3 The Mentor

The mentor must be professionally registered in the appropriate category or another category if specifically agreed to by Council in the particular case. The mentor's role is to guide and facilitate the professional development of the candidate. A mentor, in agreeing to assist a candidate, must commit to the following duties:

1. The mentor must participate in the planning and advise on the suitability of the programme of work and experience for the candidates development. Training tasks or phases must be planned to ensure that the candidate develops toward the competency required for registration standard for the category of registration.
2. Ensure that the candidate is exposed to increasing demands in problem solving, management, impact assessment and mitigation, consideration of ethical issues, judgement and responsibility.
3. Ensure that the candidate completes the agreed training.
4. If the mentor is not the candidate's supervisor, to liaise with the supervisor to ensure that the work assigned to the candidate is consistent with the training objectives.
5. On the completion of each agreed task or phase, the mentor must receive a report from the candidate and review the outcomes achieved in the light of the objectives.
6. The mentor must assist the candidate to decide when he or she is ready to apply for registration and assist with the actual application.

Should the services of a mentor internal to the organization not be available to an employer, the employer may use the services of an external mentor through one of the relevant engineering Institutions/Institutes/bodies. Mentors thus appointed should be sensitive to any limitations which the employer may wish to set in any given situation.

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Table 3: Referee requirements			
Category	Number	Registration	Order of Preference
Engineer	2	Engineer (at least 1), Foreign Registered Engineer, Technologist, Certificated Engineer	Mentor Immediate Supervisor Indirect supervisor Employer Colleague (not more than 1)
Engineering	3	Technologist	same or higher level, involved in

Technologist		Engineer Or exceptionally Certificated Engineer Technician	work not involved in work Client
Engineering Technician	3	Technologist Engineer Certificated Engineer Technician	
Certificated Engineer	2	Professional Certificated Engineer (at least one) Professional Engineer	Senior to the applicant.

7.2.4 Referees

Referees must be professionally registered who have first-hand experience of the candidates engineering activities, particularly those that are indicative of the professional competency of the candidate. Referees will therefore have supervised, mentored or worked with the candidate or have been in a position of authority with clients for whom work was performed. Referees must be in a position to confidently assess both the candidate's competence as a professional and to attest to the candidate's ethical analyzing. The eligibility and preferred capacity of referees for applicants in various categories is shown in Table 3.

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7.3 Planning and Managing the Candidacy process

In this section we examine a number of things that would be of interest to someone who has committed to training toward registration in a professional category:

- [What types of training programmes are there?](#)
- [How long can I expect to be training and gaining experience?](#)
- [What principles underpin planning a training programme?](#)
- [Where do the competency standards come in?](#)
- [How do I plan my training?](#)
- [How do I document my training and experience?](#)
- [How is my progress reviewed?](#)
- [How do I know when I am ready to register?](#)
- [How do I demonstrate that I am Competent?](#)
- [Technically?](#)
- [In Engineering Management?](#)
- [Taking responsibility](#)

7.3.1 Types of Programme

These guidelines apply to candidates proceeding via candidacy programmes. It is recognized that an individual candidate may experience a combination of training in and outside of a candidacy programme and that training may be carried out with different employers. The end result must always be the same: being able to perform at the level of competency, including the ability to be responsible for work performed, required for registration in the chosen category. Mixed mode training requires extra planning and management effort on the part of supervisors, mentors and the candidate. Three measures are recommended:

- The candidate's record keeping must be consistent across the various periods and modes of training;
- The candidate should, if possible retain the same mentor if the employer or mode of training changes; and
- In the final analysis, the candidate must take ownership of the training and negotiate with employers to ensure that the necessary competencies are attained.

7.3.2 Duration

The purpose of a training programme is to allow a person who has fulfilled the educational outcomes to attain the competence required for registration. It is unlikely that this competency can be developed in less than three years and demonstrated at the required level. R-01-P sets a minimum of three years of training and experience. During this period, the candidate's competency will develop and must be demonstrated at the required level over a period. Mentors, candidates and employers must plan for a period of not less than three years. The duration of tasks in which the candidate is working at a level that evidences readiness for registration must not be shorter than 48 weeks.

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7.3.3 Planning Principles:

Three principles must be followed by supervisors and mentors when planning a candidate's training.

1. The planning, execution and monitoring must focus on the competencies to be developed.
2. A variety of work activities is necessary for the proper development of a candidate. The object of having a variety of work is to broaden the experience of the candidate and to ensure that all aspects of competency are developed and ultimately assessed. Variety may be obtained in different ways, singly or in combination:
 - The engineering activities of an individual are located at various stages in the lifecycle of an engineering activity: conception, planning, design, construction/implementation, operation and withdrawal.
 - Associated with this lifecycle are specific functions including commissioning, testing, improving, trouble-shooting. The candidate should experience several stages in the lifecycle of a project or projects.
 - Variety may also involve different aspects of a discipline (or cross-disciplinary fields)

The Discipline Specific Training Guidelines (and Requirements) give indications of acceptable variety of experience in different disciplines and may enlarge on training aspects appropriate to the discipline..

3. Increasing responsibility and accountability within the organization must be imposed on and accepted by the Candidate until he or she is capable of accepting professional responsibility in making and executing engineering decisions at the full professional level. The descriptors defined in Table 4 should be used for quantifying the degree of responsibility.

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7.3.4 Progression of Training Programme

During development from the graduate level to meeting the competency requirements for registration, the candidate progresses through levels of work capability until the required level for registration is attained. A useful scale of achievement over a candidacy programme is shown in Table 4. At each of the five degrees of responsibility, the table shows the nature of the candidate's work, ranging from being oriented in the engineering environment at degree A to working at the degree of responsibility required for registration, namely E or *Performing*. The responsibility that should be placed on the candidate at each stage is in terms of the candidate's own responsibility and the extent of supervision and mentoring support.

More detailed information on progression – that is how this general definition would map into particular disciplinary contexts - may be included in the discipline specific training guidelines.

The main learning process is through working with competent engineering personnel. The trainee is under the direct or indirect supervision of an engineering professional. A mentor guides the trainee's professional development. The candidate is involved in engineering work of adequate variety and increasing demand and responsibility. The candidate would first *assist* with engineering work, doing defined tasks under close supervision. The candidate progresses to making contributions individually and as a team member to the work. By the end of the training period, the candidate must perform individually and as a team member at the level of problem solving and engineering activity required for registration and exhibit degree of responsibility E. This level of work provides evidence of competency against the standards. Over time, the emphasis on *training*, that is, learning through inputs of others, gives way to learning by doing engineering work and reflecting on observations and achievements, that is *experience*.

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

7.3.5 Documenting Training and Experience

Phase-by-phase planning and review of the candidates training must be supported by documentation, both for the immediate purpose of managing training and for compiling evidence when the candidate comes to apply for registration.

Training and experience is generally arranged in discrete activities, tasks or phases as shown in Figure 2. Each phase of activity is designed to develop specific aspects of competency (outcomes) at an agreed level of problem solving and engineering activity with an appropriate degree of responsibility. Such a unit typically ranges from several weeks to several months in duration. For each task or phase, the candidate, together with the supervisor and mentor, should use a suitable format for recording the planned outcomes and level to be achieved and the results of the previous phase. A suitable template is, for example, the Training and Experience Report (TER) form for professional engineering applicants. This form allows particular aspects of competency to be identified as being amenable to development in this task or phase. In addition, the level at which competency is to be demonstrated is identified as well as the nature of the candidate's responsibility.

When the task or phase is complete, the candidate, supervisor and mentor must assess the level of competence learned and displayed. Level descriptors for problem solving and the demands of engineering work should be consulted to determine progress to the exit level. Such achievement (or shortfall) may influence the planning for subsequent tasks or phases. This assessment is also recorded on the TER form. The assessment at the end of one phase should form an input to the planning of the next or future phases.

The process continues until the candidate is working at the level required for registration against individual outcomes and as a whole.

When the candidate applies for registration, each task or phase must be summarized in the Training and Experience Summary (TES) document and reported in a Training and Experience Report. Each activity is described in company and generic terms. Company terms include the names of specific plants, processes, sites etc while generic descriptions would include terms such as design, trouble shooting, construction, commissioning. The TES and TER are required in the application for registration. It is therefore advisable for the candidate to complete the TER and update the TES at the same time.

As the programme progresses, the candidate's competency must develop towards that required for registration. Supervisors and Mentors should be alert to the candidate arriving at this level of competence.

7.4 Demonstrating Responsibility

The competency standards require not only the demonstration of technical and engineering management proficiency but also the ability to assume responsibility for engineering decisions. An important outcome that applicants for registration must demonstrate is

Learning Outcome 10, namely to be responsible for making decisions on part or all of engineering activities at the level expected for the category. The requirement that the candidate demonstrate that he/she is able to take responsibility for the engineering work performed requires careful management by the supervisor. This section outlines the legal constraints on candidates taking responsibility for engineering work and ways of allowing candidates to display responsibility.

7.4.1 Legal Constraints

A candidate is not allowed, under the Engineering Profession Act, 2000, to take responsibility for the work. Various sections of the Act require registration for particular aspects of work. Section 18(2) requires registration to be able to practice in a professional category. Section 18(3) requires a person who practices in a consulting capacity to be registered in an appropriate category. Section 18(4) requires a person registered as a candidate to work under the supervision and control of a registered person.

Section 26 empowers and requires ECSA to identify work that must be performed or supervised and controlled only by registered persons who must take responsibility for the work. While the Regulations identifying engineering work have not yet been promulgated, they should be used as prudential guidelines as to whether particular work falls into the “identified” category. The Framework document describes the method used for determining whether particular work is identified as *engineering work*.

Registration as a candidate corresponding to a professional category provides a mechanism for persons to perform work under supervision that would otherwise be reserved for registered professionals and thereby demonstrate competency for registration. Such work must be performed under the supervision and control of a registered person who must take responsibility for the work.

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7.4.2 Managing Tensions

Within the training process, it is necessary to manage the conflicting requirements between a candidate not being allowed to take responsibility but nevertheless being required to show that he or she can perform engineering work and take responsibility at professional level.

It is helpful to identify two aspects of responsibility:

- Taking *due care* to ensure that the objectives of engineering work are achieved and that impacts and risks are addressed; and
- Being *accountable* for the work, in particular that due care was taken to deal with risks.

Supervisors and mentors must implement strategies to ensure that the candidate can demonstrate the ability to exercise *due care* without having to make decisions that require accountability; the supervisor must be accountable. Taking due care requires the candidate to exercise the defined competencies: problem solving, management, impact identification and mitigation, ethical behaviour, acting responsibly and applying judgement. Working within the limits of those competencies is a clear requirement. In such a mode of working the candidate would be required by the supervisor to express judgements and propose

decisions and recommendations; these may be at the level that a registered person would normally perform. The candidate, while not carrying any legal accountability, is accountable internally within the employer organisation. The supervisor must check the judgements, decisions and recommendations as he/she bears ultimate responsibility for the work.

7.4.3 Diversity of Engineering

It is recognized that the scope of engineering is too wide for definitive training guides. Engineering education, training and work is generally partitioned according to disciplines/sub-disciplines as well as industry sectors: consulting, contracting, construction, manufacture, mining, process industries, services, utilities and infrastructure. Within a sector or discipline, an engineering practitioner may be concerned with systems, processes, components or materials. The competency standards identify the generic outcomes for competent practitioners, irrespective of discipline or industry sector, for example identify and analyse problems and synthesise solutions. These represent the fundamental, transferable competencies. Rather than formulating complex requirements for all functions, the system relies on engineering peers for training and assessment. Peers are persons who are engineering practitioners in the same discipline and are registered in the category that the candidate aspires to.

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7.5 Competency-focused Planning and Monitoring of Candidacy programmes

The objective of training and experience in a candidacy programme is to develop the competency that must be demonstrated to be registered. Training and work experience must therefore be planned, executed and evaluated to ensure that this goal is attained.

7.5.1 Goals of Training and Experience

Section 4 summarises and groups the competencies that must be demonstrated in the assessment process when the candidate applies for registration. Engineering professional competence is more than satisfying a linear list of outcomes. Figure 3 visualises engineering competence.

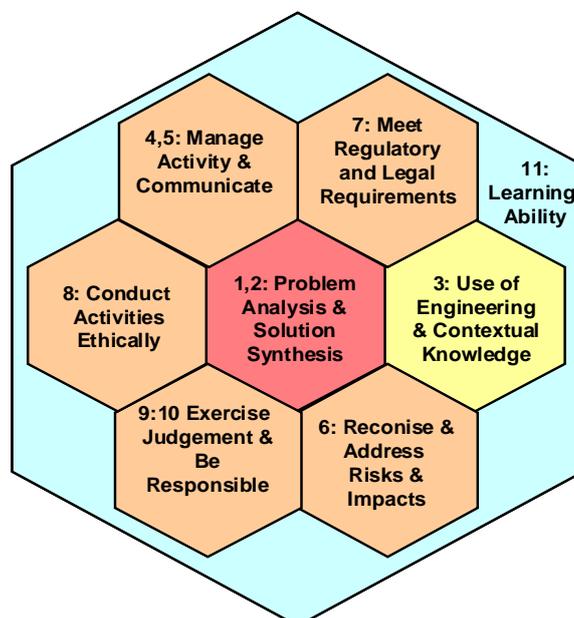


Figure 3: Visualising the interconnectedness of the outcomes that are evidence of engineering competence.

The core activity of engineering is problem solving, that is, bringing about change from an initial state to a final state overcoming barriers on the way to achieve a result useful for people, enterprises or society. Engineering-science based knowledge is brought to bear while taking into account impacts, regulatory factors and ethics. Responsible, judgement-based decision making and management of the process are essential to achieve the engineering goals. Competent engineering practitioners underpin their activities by learning continually, both formally and informally.

Candidates, supervisors and mentors must focus at all times on the goal of training, namely the development of competence as specified by the outcomes in the standard and the required level of performance viewed in an integrated way. The latter has two principal parts: the *level of engineering activities* within which the candidate operates and the *level of problem solving*.

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7.5.2 Relating the Competency Standards to Specific Work

The generic competencies, problem solving, management, impact analysis and taking responsibility, manifest themselves in particular forms of activity, for example design, investigation, trouble-shooting, improvement, research, development. Each of these forms of activity expands further. For example design includes the preparation of a brief. At a company-specific level the functions are performed in relation to specific plant, operations and business activities. Candidates should think of both the specific requirements of a task or phase of work and in terms of the generic competencies required for the work. For example the actual work may be troubleshooting poor performance at the No 4 Acid Plant at the Northern Works. The candidate and colleagues are performing an investigation that may lead to a design review and a redesign of aspects of the plant. Generically, the candidate and colleagues are identifying and analyzing problems, synthesizing solutions and using their knowledge in the process. They also must examine and deal with regulatory, environmental and economic impacts.

Additional generic discipline-specific registration requirements for all of the sub-categories of Professional Certificated Engineer are detailed in document R-05-PCE.

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7.5.3 Evidence-based System

Evidence of competent performance has two essential requirements: first, a capability to *perform a number of defined actions* must be demonstrated, and second, the performance must be at or exceed a *specified level of demand*. The defined actions are the outcomes and typifying actions that reflect acceptable performance contained in the assessment criteria. The level is defined by a specification for the demands of the engineering activities and the nature of problem solving. In a professional field, evidence of competent performance is obtained from the competent performance of substantial engineering tasks by the person being assessed. Typical tasks provide evidence of several outcomes and assessment must be holistic.

The eleven outcomes defined for each category of engineering professional represent different aspects of holistic performance, and professional attributes. The outcomes fall conveniently into five groups: the first relates to problem solving, the next three to engineering practice and professional attributes and the last to the ability to maintain and develop competence. Four of these groups are recognised as competencies in ECSA's previous policy documents R2/1A/B/C/D while the fifth frames continuing professional development as a competency.

While competence is specified by eleven outcomes to be demonstrated at a particular level, the applicant for registration must demonstrate integrated performance against outcomes. This reflects the reality that an engineering task or function is unlikely to require only one outcome, for example problem analysis seldom stands alone; it will require the use of knowledge, the analysis of impacts and must lead seamlessly into the solution phase. One possible visualisation for engineering competence is shown in Figure 3.

Engineering problem solving, made up of analysis and synthesis is central to all engineering activity including design, investigation and management. Problem solving is supported by a number of capabilities, corresponding to outcomes 3 to 10. Outcome 11, continuing professional development, better expressed as the maintenance and extension of competency, provides a platform for the performance of outcomes 1 to 10.

Different engineering functions and assignments will have different mixes of demand. An applicant for registration is expected to provide evidence of working at the required level of problem-solving in engineering activities at the specified level of demand as part of the application for registration.

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7.6 Advanced study while a candidate

In a competency based system, a variety of means can be used to enhance competency and present evidence of competency. Advanced study may contribute to learning towards and providing evidence against the professional outcomes (and educational outcomes for persons without accredited or recognized qualifications). For example, design of novel equipment during a research degree may be considered as evidence against problem solving outcomes 1 and 2. Completing a research degree may provide evidence against educational 5: experimental work and investigation. Because the assessment for registration is competency focused, the previous policy of considering a reduction in the length of the candidacy falls away.

Where credit is sought against a professional-level outcome, the aspect of further study should be documented using a Training and Experience Report form.

8 Additional information for experienced applicants

8.1 Mature Applicants for Professional Registration

Within each category of professional registration, documentation requirements differ between applicants with considerable experience after graduation and at the level required

for registration and those who do not. Specific documentation requirements for each category are defined in the relevant document R-03-PE, R-03-PT, R-03-PCE or R-03-PN.

8.2 Process for persons already registered in a professional category

Applicants who are already registered in one professional category and wish to register in an additional category must meet both the educational and competency requirements for the second category. In most cases of an additional registration, the additional category has more demanding education and professional competence requirements. A person wishing to pursue this route is advised to become familiar with both the educational requirements and the professional competency standards for the additional category.

The enhanced educational requirements can be met by formal study in an accredited programme or other means. Document E-17-P defines the criteria for meeting the educational requirements other than accredited or recognised degrees. A [supporting document](#) outlines various practical means for meeting the individual criteria. The education requirements may be satisfied at any time before applying for registration.

Professional competencies must be developed through work to the level required for the additional category. The level of problem solving must be raised to the new level within engineering activities that satisfy the higher level descriptor.

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8.3 Process for professional registration under an international agreement

ECSA is a signatory to a number of international agreements that are aimed at reducing the complexity of the registration process for a person who is registered with a foreign signatory to an agreement who wished to register with ECSA in a particular professional category. The agreements in force are summarised in Table 5.

The agreements require the applicant to be registered in a particular category with the foreign signatory and, as shown in the table, may place restrictions on the educational route followed by the applicant to obtain the original registration. The MEAs in particular require the educational qualification to have been obtained within the territory of the original signatory. The applicant is not required to meet further educational requirements with ECSA. The evaluation of the application at the professional level is also reduced relative to the process for a person who applies directly. The applicant under mutual exemption agreements is generally not required to attend an interview. Applicants under the EMF and ETMF require an interview to determine adaptation to the local regulatory environment and conditions.

Table 5. International Agreements at the Registration Level		
ECSA is a signatory to a number of agreements designed to aid a person registered in the categories and jurisdictions shown to obtain registration with ECSA		
Agreement	Eligibility Criteria	ECSA Category
Mutual Exemption agreement: Institution of Civil Engineers (UK)	Chartered Engineer via the ICE, having obtained educational qualification(s) in UK	Professional Engineer
Mutual Exemption	Chartered Engineer with	Professional Engineer

agreement: Engineers Ireland	Engineers Ireland: Civil, Electrical, Mechanical Engineering, having obtained educational qualification(s) in Ireland	
Engineers Mobility Forum (EMF)	Registered as a professional Engineer or equivalent on the International Register of an EMF signatory , Washington Accord or substantially equivalent education	Professional Engineer
Engineering Technologists Mobility Forum (EMF)	Registered as a Professional Engineering Technologist or equivalent on the International Register of an ETMF signatory , qualification determined by the original registering signatory to meet the educational requirements specified in the ETMF	Professional Engineering Technologist

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9 What happens if my application is not successful?

9.1 Educational Requirements Incomplete

The Educational Evaluation process never results in refusal. If your qualification(s) are not evaluated as completing the educational requirements you will be informed of the criteria that have been met and the outstanding criteria. You should then consult the [guide on ways that you might undertake further learning and assessment](#) to meet the outstanding criteria. Credits awarded against criteria are valid for five years and new evidence of satisfying individual criteria may be submitted as it becomes available.

9.2 Application for Professional Registration Deferred

Deferment is a way of affording the applicant the opportunity to undertake further training or gain more experience to make up for particular deficiencies in the evidence of competency presented. The normal period of deferment is twelve months. The applicant may submit new evidence when it becomes available. A deferred application is not considered as a refusal and no further fee is payable. The applicant may for good reason apply for an extension up to twelve months. When an application is re-considered after a deferment, a further period of deferment may be granted. An applicant may benefit from an extension or a second deferment but not both.

9.3 Application for Professional Registration Refused

Whenever an application is refused, the criteria that were not satisfied are identified and an indication of why the evidence provided was deficient is given. The applicant can then plan further training and experience to generate evidence of competency. A new application can be made once the evidence has been generated. The applicant should keep a record of

professional development activities undertaken. Provided that the new application is made within five years of the refusal and professional development activities have been ongoing, the applicant will not need to demonstrate competency against the outcomes credited at the first application.

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Revision History

Version	Date	Status/Authorised by	Nature of Revision
Rev 0: Concept A	8 Sept 2007	JIC Working Document	Initial working skeleton
Rev 0: Concept B	21 Oct 2007	JIC Working Document	Description of training process added
Rev 0: Concept C	17 Nov 2007	JIC Working Document	Changes as discussed by JIC, Addition of categories of applicant, Best practice section filled out
Rev 0: Concept H	5 Nov 2010	JIC Working Document	Navigation Added. Understanding Engineering Competencies separated out
Rev 0: concept I	17 Jan 2011	JIC Working Document	Further development: Category specific guide remove to separate document
Rev0: concept J	1 March 2011	JIC Working Document	Further development: some sections rationalised
Rev0: concept K	28 March 2011	JIC Working Document	Sections rationalised and relocated
Rev0: Concept L	24 June 2011	JIC Working Document	Diagram removed from s 5.4, 1 st page reformatted in standard form
Rev 0: Draft 1	31 Oct 2011	JIC Final, submitted for Council approval	No changes relative to Concept L
Rev 1.0	12 Jan 2011	Approved by Council	
Rev 2 Concept A	10 April 2017	For Consideration by the PDSGC	Special provision for Professional Certificated Engineers providing for registration requirements in the DSTG's
Rev 2	11 May 2017	For Consideration by the Pr Cert Eng's Working Group	Alignment with R-02-PCE Rev 2
Rev 2	3 July 2017	For consideration by PDSGC	Approved
Rev 2	17 August 2017	For ratification by Council	Ratified
ECSA CONTROLLED COPY		Executive: Policy Development and Standards Generation	 _____ John Cato 2017-08-18 _____ Date