

## Discipline Specific Guidelines: Agricultural Engineering

### Acceptable Training for Registration as Professional Engineers

It is recommended that Candidate Engineers (CEs) provide a copy of this document to each supervisor of their training and to each of their referees.

#### 1. Introduction

These guidelines are aimed at providing more information about the requirements for registration through the Engineering Council of South Africa (ECSA) in addition to the broader requirements set out in Policy Statement R2/1A.

- 1.1 Candidates wishing to become registered as professional engineers with ECSA must:
  - (i) hold a relevant academic qualification recognised by ECSA through accreditation or evaluation, or pass any examination which ECSA may prescribe; and
  - (ii) demonstrate that they have been trained to an acceptable level of competence in defined elements, in so far as it relates to agricultural engineering, for at least three years; and
  - (iii) display the attributes of a professional person.
- 1.2 Immediately upon graduation, candidates are encouraged to apply to ECSA for registration as candidate engineers (CEs), where after they will be provided with all relevant documents needed for the complete training period.
- 1.3 The recommended way of achieving the requisite levels of competence in all the training elements is through a focused and collaborative process of acceptable training, where the CEs and their employers (mentors) plan and execute the actual training on the basis of ECSA's Policy Statement R2/1A, as well as the training objectives listed in these Discipline Specific Guidelines.
- 1.4 CEs will be expected to gain practical experience in a position of responsibility and to prove that their education, training, experience and professional development have enabled them to discharge, in full, the responsibilities of a professional engineer in agricultural engineering.

#### 2. Academic Qualifications

- 2.1 The minimum academic qualification required for registration, as a CE is a bachelor's degree in agricultural engineering, obtained from a South African university.

The list of South African bachelor degrees in agricultural engineering accredited by ECSA, may be obtained from the Education Department of ECSA at:

**Tel:** (011) 607-9500  
**Fax:** (011) 622-9295  
**E-mail:** [engineer@ecsa.co.za](mailto:engineer@ecsa.co.za)  
**Web:** [www.ecsa.co.za](http://www.ecsa.co.za)

or in writing at:

**Private Bag X691  
Bruma  
2026**

- 2.2 Persons who have graduated from a university not accredited by ECSA will be assessed individually on merit. If their qualifications are evaluated as being at least equivalent to an accredited South African degree, candidates will be eligible for registration as CEs and could then follow the formal route to registration as professional engineers.
- 2.3 Persons whose qualifications are not accredited or recognised by ECSA may follow an alternative route to meet the academic requirements for registration as CEs. Candidates must apply to ECSA and obtain the necessary information on the procedure to be followed.
- 2.4 Those who meet ECSA's academic requirements should register as CEs without delay. Application forms can be obtained from ECSA. CEs must, from the outset, also obtain copies of the application form for registration as professional engineers.

### **3. Training and Professional Development under a Commitment and Undertaking (CU), and Mentorship**

#### **Commitment and Undertaking (CU)**

- 3.1 CEs must persuade their employers to register a Commitment and Undertaking with ECSA, namely that they will structure the training of, and actually train, their CEs, in accordance with the requirements of ECSA's Policy Statement R2/1A as well as the requirements set out in these Discipline Specific Guidelines. Each CU will be allocated a permanent registration number, which should be quoted by all CEs when applying for registration as professional engineers.
- 3.2 Employers must, at the same time, submit the name(s) of a mentor(s) from within the organisation (see § 3.4 below) or, if an internal mentor is not available, the name of an external mentor (see § 3.5 below) to guide CEs through the required process of training. A CU will not be registered by ECSA unless the name of at least one mentor (internal or external) is provided.

#### **Mentorship and Supervision**

- 3.3 ECSA and the South African Institute of Agricultural Engineers (SAIAE) will jointly maintain a list of internal and external mentors. A mentor must be registered as a professional engineer. Council will only in exceptional cases consider the listing of experienced and mature professional engineering technologists, professional certificated engineers, or professional engineering technicians, upon application and motivation by the organisation/mentor concerned. These mentors will be deemed not only to be capable of fulfilling their functions in a professional manner but also as being committed to advising and guiding their CEs in their professional development.
- 3.4 It is **STRONGLY RECOMMENDED** that all CEs should have a mentor who is working in the same organisation as the CEs (internal mentor).
- 3.5 If an internal mentor is not available, a list of external mentors can be obtained from ECSA or SAIAE. It will be expected of employers who make use of the services of external mentors to create an environment in which such mentors can feel free to make recommendations in the reasonable knowledge that their recommendations will be given sympathetic consideration.

- 3.6 It will be expected of all mentors to become fully conversant with their functions and responsibilities referred to in Policy Statement R2/1A and guidelines issued by ECSA from time to time, to conduct regular discussions with their CEs and to assess their progress in accordance with the guidelines set out in Policy Statement R2/1A and these Discipline Specific Guidelines. Since the effectiveness of mentors will be monitored continuously, Council will attach much value to the opinion of "the conscientious mentor" as to the registrability (or otherwise) of their CEs.
- 3.7 It is not expected of mentors to take responsibility for the day-to-day supervision and training of CEs. Mentors/employers should do everything in their power to ensure that competent persons, preferably registered with ECSA, are available to oversee this function as supervisors.

#### **4. General**

- 4.1 Training reports, which must be updated regularly, form an essential part of the monitoring process, and these reports must be filled in on the correct forms (Forms A2.1 and A2.2) of the application form. These forms should be obtained from ECSA as soon as the CEs start their training.
- 4.2 It is a requirement that CEs who are aspiring to become professional engineers should, with the assistance of their mentors, achieve their training objectives by structuring their training in such a way as to cover the various elements of training referred to in Policy Statement R2/1A and these Discipline Specific Guidelines.
- 4.3 The rate at which CEs progress through their training is determined by themselves, their mentors and other factors, such as the state of the economy and availability of training opportunities.
- 4.4 Where CEs, training under a CU decide to change employers, they should ensure that they continue their training under another CU registered with ECSA by their new employers. CEs should also ensure that their new employers provide mentors to guide them through the remainder of their training period and to take over where the previous mentor ended. It may even be advisable to retain the previous mentor, if this is at all practicable.
- 4.5 Once all the objectives have been achieved to the satisfaction of the mentor, CEs should, in principle be registerable, and could then apply for registration as a professional engineer. Depending on the circumstances, CEs may expect to take a minimum of three years to achieve acceptable competence in all the prescribed elements.
- 4.6 Regardless of whether or not CEs train under a CU, it is recommended that they strive to participate in a process of continuing learning. This concept includes continuing education and professional development.
- 4.7 Continuing learning may include the attending of courses, technical conferences, seminars, symposia, organised site visits, as well as meetings of professional bodies and self-study. The process of continuing learning should achieve a balance between technical content and managerial/professional aspects.
- 4.8 The mentors of CEs should, on a consultative basis, suggest suitable continuing learning programmes.
- 4.9 SAIIE and educational institutions may be able to assist in advising on courses which are available.

- 4.10 It will be to the advantage of CEs when applying for registration as professional engineers if they can demonstrate their participation in a process of continuing learning.

## **5. Professional Attributes**

The following attributes are considered common to all professional engineers and the requirements for these attributes are designed to ensure that CEs acquire competence with respect to professional responsibility in decision making, engineering judgement, leadership, communication and an appreciation of their own professional and working environments.

### **5.1 Professional Responsibility**

CEs must ensure that their work reaches a level of responsibility commensurate with that which ECSA would normally expect of an engineer with three years post-graduate experience, both in terms of the type and level of work being performed. This means that responsibility for directing personnel, money and materials must be taken during the execution of a project, or part of a project. When applying for registration as a professional engineer, CEs must demonstrate their ability to work satisfactorily on their own, that they have taken responsibility and, in having done so, achieved a satisfactory outcome.

### **5.2 Engineering judgement displayed in practical application**

When applying for registration as professional engineers, CEs must demonstrate that their engineering work required them to-

- exercise independent technical judgement, combining their experience and application of engineering principles;
- accept responsibility for such decisions; and
- understand and take into account financial, economic, commercial and statutory considerations.

### **5.3 Communications Skills**

CEs must develop the ability to communicate lucidly, accurately and with confidence. ECSA will base its assessment of CEs communication skills on the quality of the application presented.

### **5.4 Professional Environment**

CEs must, when reporting to their mentors on a regular basis, and in discussions with them, demonstrate that they have:

- a general understanding of engineering procedures applicable to their discipline of engineering;
- a general knowledge of legislation which has a bearing on the practice of engineering in South Africa, with a detailed knowledge of the important sections of the Engineering Profession Act, 2000 (Act 46 of 2000), and the Acts and Regulations applicable to their specific discipline of engineering;
- a good understanding of the Code of Professional Conduct applicable to registered persons;
- an understanding of the purpose of and relationship between the various organisations involved in their discipline of engineering; and
- full familiarity with the requirements for registration set out in Policy Statement R2/1A as well as these Discipline Specific Guidelines.

## 6. Discipline Specific Elements

When a CE's application for professional registration is considered, the extent to which the CE has obtained acceptable experience in each of the **technical elements** is assessed. Distinction is made between three core technical elements and five supplementary technical elements. Agricultural engineering has various fields of work (agricultural mechanisation, farm buildings and facilities, soil conservation, water utilisation, agricultural product processing, storage and climate control) and it is important that CEs should obtain as wide a variety of training in engineering as possible, initially and thereafter focus their attention on a specific speciality in which they feel they have a particular aptitude. The following guidelines, which are not intended to be comprehensive, give an indication of the discipline specific elements in which CEs should be trained.

The Training/Experience Report (A2.1) of the Application Form must be set out in such a manner that the CEs' specific experience is divided into the different subsections of the core technical elements and at least two supplementary technical elements for each period, as applicable. A project report of 2000 to 4000 words needs to be submitted in addition to the standard training reports, as discussed in more detail in section 8. This report will be reviewed by reviewers appointed by SAIAE, with a recommendation on the CE's registerability, prior to ECSA considering the application for registration.

### 6.1 Core Technical Elements

It is normally expected that a CE should obtain adequate experience in each of the three core technical elements:

#### 6.1.1 Problem solving, Planning and Design

Problem solving includes investigations and analysis of current situations, problem identification, development of possible solutions, evaluation of various solutions, selection of the best solution and implementation.

The utilisation of resources (time, money and materials) as well as the planning, broad layout of projects, systems and schemes, including evaluation of aspects such as viability, environmental impact and legal implications.

Design includes the application of theoretical knowledge and practical skills in a working field of structures, machinery and systems through the application of mathematical comparisons, standards, norms and codes. This includes such aspects as knowledge of the properties of materials, knowledge of the performance of machinery and appliances, as well as knowledge of production and erection methods.

#### 6.1.2 Site Work

This Involves investigations, surveys, construction supervision, measurement and maintenance on sites away from the office; i.e. on farms, construction sites, cultivated fields, in cold storage rooms, glass houses, factories and workshops.

#### 6.1.3 Management of Resources

This involves knowledge of the organisational set-up of the employer is necessary, as well as knowledge of planning, organisation, leadership and control regarding people, funds, machinery, methods and materials. Personal involvement in these aspects are necessary.

## 6.2 Supplementary Technical Elements

It is normally expected that CEs should obtain adequate experience in at least two of the **supplementary technical elements** . The following guidelines which are not intended to be comprehensive, give an indication of what the elements include:

### 6.2.1 Tender Specifications

It may include the evaluation of specifications and the compilation and interpretation of statistical data.

### 6.2.2 Testing with Interpretation

This involves the execution of engineering measurements on equipment and systems and the engineering interpretation of the resulting information.

### 6.2.3 Development

This involves the development of mechanisms, systems, structures, machinery, techniques, procedures and computer programmes with the emphasis on obtaining non-standard original solutions to problems.

### 6.2.4 Technology Transfer

This involves the transfer of technology to others by means of advisement, interviews, discussions, presentations, lectures and publications.

### 6.2.5 Research

This involves basic and applied research, as well as investigations to obtain original information. This includes surveys, investigations and literature studies, in addition to laboratory and field measurements.

## 7. Presentation of Training Report

The report must be presented per period, in a format which is divided according to the Discipline Specific Elements, which include the core technical elements as well as the supplementary elements. It is important to give a qualified indication in respect of time, extent, costs and responsibility in the execution of projects. The report may be illustrated by means of specific examples, tasks or problem cases.

## 8. Project Report

The purpose of the 2000 to 4000 word type written Project Report is to demonstrate both the technical and professional competence of the Candidate.

The Report should describe a particular project in which the Candidate has played a major role during his/her period of training and practical experience. The depth of his/her role in the development of this project and the background to any important decisions for which the Candidate was responsible must be given. The report should include numerical analyses, drawings and/or the illustrations as appropriate, and should include cost data to show that the Candidate has an adequate understanding of the financial implications of decisions taken.