

ALTERNATIVE ROUTES TO MEMBERSHIP

EXPERIENTIAL LEARNING ROUTE TO

ENGINEERING TECHNICIAN

Engineers Ireland

Cumann na nInnealtóirí

22 Clyde Road, Ballsbridge, Dublin 4, Ireland

Tel: +353 1 668 4341. Fax: +353 1 668 5508

e-mail: membership@engineersireland.ie

http: www.engineersireland.ie

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TABLE OF CONTENTS

1.	INTRODUCTION	1
2.	THE ENGINEERING TECHNICIAN	2
	2.1 DEFINITION OF AN ENGINEERING TECHNICIAN	2
	2.2 FORMATION OF AN ENGINEERING TECHNICIAN	2
	2.3 THE COMPETENCES OF AN ENGINEERING TECHNICIAN	2
3.	ACQUIRING COMPETENCES BY EXPERIENTIAL LEARNING	2
4.	LEARNING THROUGH EXPERIENCE THE COMPTENCES OF AN ENGINEERING TECHNICIAN	3
5.	APPLICATION REQUIREMENTS	4
6.	APPLICATION PROCEDURE	4
7.	THE ROLE OF THE MENTOR	5
8.	THE EXTENDED APPLICATION FORM	5
9.	THE EXAMINERS	6
10.	THE ORAL EXAMINATION	6
11.	SUPPORTERS	7
12.	APPLICATION FEE	7
13.	DURATION OF PROCEDURE	7
APPENDIX A	THE COMPETENCES OF AN ENGINEERING TECHNICIAN	8
APPENDIX B	COMPETENCE DESCRIPTORS	10

1. INTRODUCTION

Engineers Ireland, founded in 1835, represents all branches of the engineering profession and categories of engineer in Ireland.

The fundamental aims of Engineers Ireland are:

- to promote knowledge of engineering and of engineering science
- to establish and maintain standards of engineering education and training
- to promote and provide opportunities for continuing professional development for engineers
- to maintain standards of professional ethics and conduct
- to ensure that the Registered Professional Titles of Engineers Ireland are assigned only to appropriately qualified engineers and technicians.

Within Ireland, Engineers Ireland is the authoritative voice of the engineering profession on relevant national issues. It makes submissions and representations to Government and official bodies on national policy for infrastructure, budgets, industry, education and the overall development of the Irish economy.

Engineers Ireland is a signatory to a wide range of international accords and bilateral agreements which enable holders of various grades of membership and Registered Professional Titles to practise in Australia, Canada, Hong Kong - China, New Zealand, South Africa, the United Kingdom, the United States and all member states of the European Union.

2. THE ENGINEERING TECHNICIAN

2.1 Definition of an Engineering Technician

An Engineering Technician is competent to apply in a responsible manner proven techniques which are commonly understood by those who are expert in a branch of engineering, or those techniques specially prescribed by professional engineers. He/she works under guidance within their allocated responsibility.

2.2 Formation of an Engineering Technician

The formation of an Engineering Technician normally consists of an accredited/approved engineering education programme leading to the award of a National, Technician or Higher Certificate in Engineering followed by a minimum period of three years of appropriate experience in the workplace.

During the certificate programme, the student will gain skills and knowledge in Mathematics and Engineering Science and will study established engineering techniques and technology in their chosen specialisation. These together, provide the technician with the foundation necessary to begin practising in the workplace. During the technician's initial years of employment he/she will develop the necessary technical competences associated with the application of what he/she has learned as a student. Only when a technician can demonstrate that he/she has acquired such competences may his/her formation be regarded as meeting the standards prescribed by Engineers Ireland.

2.3 The Competences of an Engineering Technician

A graduate of an accredited Engineering Technician certificate programme will be able to demonstrate the skills, knowledge and understanding associated with the Programme Outcomes in Part 3 of Engineers Ireland's publication "*Accreditation of Engineering Education Programmes*". The requirements that holders of such accredited programmes must meet in order to succeed in the professional review leading to the title "Engineering Technician", are described in Engineers Ireland's publication "*Regulations for the title Engineering Technician*". The competences required are reproduced here in Appendix A.

3. ACQUIRING THE COMPETENCES BY EXPERIENTIAL LEARNING

3.1 Engineers Ireland recognises that the development of Engineering Technician competences can take place in a wide range of settings. These include educational institutions and the engineering workplace. Furthermore, individuals with a personal interest in and enthusiasm for Engineering Technician work may study engineering technology and attend various training courses throughout their career. Such individuals may be functioning as Engineering Technicians in the workplace.

3.2 Engineers Ireland considers that such Engineering Technicians, provided they succeed in the examination process described here, should be included in the membership of Engineers Ireland and be granted the title of Engineering Technician. As these Engineering Technicians do not hold accredited Engineering Technician certificates, an alternative approach is required when

evaluating whether they meet the requirements by which Engineers Ireland must abide when considering such applications.

- 3.3** It should be understood that not all candidates will have all the competences. It is a matter for the Examiners to determine if they are satisfied with a particular candidate's overall performance, to recommend that the candidate should be granted the title Engineering Technician.
- 3.4** The Experiential Learning procedure has been formulated for those who do not have formal academic qualifications at the required level but who, over an extensive number of years may have developed the competences of an Engineering Technician. This they will have achieved in one or more of the following ways:
- 3.4.1** Participating in various educational and training programmes related to technical engineering.
 - 3.4.2** Working on various technical projects.
 - 3.4.3** Having been recognised as having technical engineering skills by an employer, being assigned to projects requiring such skills.
 - 3.4.4** Functioning as a '*de facto*' Engineering Technician on a range of projects exploring and covering the generality of technical engineering.

4. LEARNING THROUGH EXPERIENCE THE COMPETENCES OF AN ENGINEERING TECHNICIAN

- 4.1** It is easier to quantify experience than it is to measure learning. Experience is an input and learning is an output. Unfortunately there is no guarantee that "X" amount of experience will yield "X" amount of learning. The variables are numerous, including both the qualities of the learner and the quality and duration of the experience.

If an individual is eager to learn, he/she can absorb knowledge, acquire skills and develop new perspectives and insights. On the other hand, an individual who is uninterested or has difficulty learning, may spend years employed in an engineering technology setting paying little attention to the learning potential of his/her working environment and learning little.

- 4.2** The common complaint about those who have learned only from experience is that they can "do" (in a particular setting), but cannot "explain". This is because they may not fully understand the engineering principles that would allow them to apply their learning in new settings or to discuss the concepts embodying these principles in an analytical way.

In addition to an appropriate balance between theory and practice, the learner, through reflection, needs to know why both are necessary and how each extends the value of the other.

- 4.3** In order to succeed, the candidate must successfully demonstrate to Engineers Ireland that he/she:
- a) Has acquired the competences of an Engineering Technician,

- b) Has an appropriate depth and balance of knowledge between theory and practice so that the interplay between the two is strategically effective,
- c) Has the breadth of understanding of the Engineering Technician's competences such that he/she can apply these in a wide range of diverse settings.

5. APPLICATION REQUIREMENTS

- 5.1** Applicants following this Procedure require no formal academic qualifications.
- 5.2** Engineers Ireland considers that the acquisition by an applicant of the competences of an Engineering Technician by experiential learning would require a 10-year period of working in appropriate engineering settings. In exceptional circumstances an applicant might achieve these competences in a shorter period, especially if the applicant has successfully completed appropriate education or training programmes.

6. APPLICATION PROCEDURE

- 6.1** The process is initiated by the applicant completing an "Alternative Routes to Membership Assessment Form", the primary purpose of which is to enable the Membership and Qualifications Board to determine the most appropriate grade of membership/title and/or the process to be followed by the applicant.
- 6.2** If the Board agrees that the applicant should apply for the title of Engineering Technician through the Experiential Learning Procedure the candidate will be invited to complete an Extended Application Form describing past learning and achievements to date.
- 6.3** The Board of Examiners, through the Registrar, will assign a mentor to each candidate. The role of the mentor is to provide candidates with an understanding of how to complete the Extended Application Form.
- 6.4** The completed Extended Application Form, when submitted to Engineers Ireland by the applicant, will be referred to Examiners (Section 9), appointed by the Board of Examiners. The task of the Examiners is to evaluate the candidate's competences as presented in the Extended Application Form and the extent to which these meet the competences listed in Appendix A.
- 6.5** The Examination will consist of:
 - (a) A formal presentation of the contents of the Extended Application Form by the candidate to the Examiners, at the beginning of the Oral Examination.
 - (b) An oral examination (Section 10), during which any aspect of the portfolio may require clarification or elucidation by the Examiners
- 6.6** The Examiners are required to satisfy themselves that the candidate has reached an acceptable level in the competences described in Appendix A. Due consideration will be given to the diversity of settings in which candidates may have developed their competences. The Examiners in the

interpretation of the content of the portfolio will exercise flexibility. Examiners will not expect candidates to have all the competences listed. The set of competences listed represents the ideal profile of an Engineering Technician. It is a matter for the Examiners to exercise careful judgement in reaching a recommendation.

7. THE ROLE OF THE MENTOR

- 7.1 The role of the mentor is confined to assisting the candidate in
- (a) understanding the meaning of the competences described in Appendix A
and
 - (b) accurately identifying and describing his/her skills and knowledge insofar as these relate to the competences.
- 7.2 The mentor's role does not in any way extend to enhancing the quality of the candidate's skills and knowledge beyond assisting the candidate as described above.
- 7.3 The mentor has no role or influence in the examination of the candidate and cannot be held responsible in any way for the outcome of the examination.

8. EXTENDED APPLICATION FORM

- 8.1 The appointed mentor will first discuss with and explain to the candidate, the competences listed in Appendix A.
- 8.2 Information should be provided in relation to the experiential learning gained by the candidate, relating this, in each case, to a competence. Particular care should be taken to use concise language (See Appendix B) so that only experiential learning is being described and not simply experience.
- 8.3 A competence may be a simple or compound statement and the response to it should be structured accordingly. Each response should start with a statement of experiential learning achieved, which should be supported by specific examples of how the candidate's learning meets the competence criteria.
- 8.4 In describing his/her learning, the candidate should demonstrate not only knowledge or skills but also understanding of the engineering principles upon which these are based.
- 8.5 The candidate must demonstrate that he/she can apply his/her competences in a wide range of settings and not just within the confines of a specialised sector of engineering.
- 8.6 Information on the extent and character of the **personal contribution** and level of responsibility exercised by the candidate and where possible, some quantified measure of impact e.g. budget, level of risk, loss implications, etc. should be included. This is intended to assist the Examiners in making an assessment of the candidate and reaching a judgement on the level of competence and personal responsibility exercised.

9. THE EXAMINERS

- 9.1** The Board of Examiners will appoint three Examiners who are Chartered Engineers and members of Engineers Ireland. These will be selected as follows:
- Two Chartered Engineers with experience in an area of engineering cognate to that of the candidate's.
 - A current or former academic member of staff of a university or institute of technology offering one or more honours engineering degree or engineering technology degree programmes accredited by Engineers Ireland.
- 9.2** All three Examiners are required to be competent within the candidate's field of specialisation and to have an understanding of the assessment of learning.
- 9.3** The Board of Examiners, through the Registrar, shall appoint the Chairman.
- 9.4** The duties of the Examiners are to evaluate the Extended Application Form and to make a recommendation in respect of the candidate to the Membership and Qualifications Board.
- 9.5** The recommendation of the Examiners in respect of each candidate is submitted to the Membership and Qualifications Board of Engineers Ireland, whose decision in respect of each application is final.
- 9.6** All members of the Membership and Qualifications Board and Examiners are bound by the Council of Engineers Ireland to maintain complete confidentiality with regard to proprietary or commercially sensitive information relating to a candidate's work or the activities of his/her employing organisation.

10. THE ORAL EXAMINATION

- 10.1** The Examiners will conduct an oral examination with the candidate, based on the content of the Extended Application Form.
- 10.2** The fundamental purpose of the Examination is to evaluate the candidate's understanding of what has been presented in the Extended Application Form and his/her overall Engineering Technician competences.
- 10.3** The Examination will normally extend over a period of at least 1 hour and will commence with the candidate being invited to give a verbal summary (maximum 10 minutes) of the Extended Application Form content. This must highlight the experiential learning being claimed by the candidate.
- 10.4** The Examiners may discuss with and question the candidate about any aspect of the Extended Application Form or oral presentation.
- 10.5** The Examination will be conducted in a formal way and an extensive range of topics will be covered relating to the learning claimed and other appropriate areas.
- 10.6** At the end of the Examination the candidate will be given an opportunity to make a brief reference to any aspect of his/her Extended Application Form

that he/she feels is important and that has not been adequately explored during the examination.

- 10.7** The Examiners will submit their recommendation in respect of the Examination to the Membership and Qualification Board.

11. SUPPORTERS

- 11.1** Each candidate is required to have his/her application supported by two individuals, a Chartered Engineer and an Associate Engineer or two Chartered Engineers familiar with his/her work as an Engineering Technician.
- 11.2** Each supporter should be familiar with the regulations for the Experiential Learning procedure (this document). He/she should also be prepared to support the application by completing the appropriate documentation confirming that the applicant is, in the supporter's considered view, a candidate who merits consideration for the award of the title Engineering Technician.

12. APPLICATION FEE

Engineers Ireland will charge a fee, designed to recover its costs and expenses.

13. DURATION OF PROCEDURE

- 13.1** The candidate will be expected to complete and submit the Extended Application Form within six months of receiving confirmation from Engineers Ireland that he/she may proceed with its preparation.
- 13.2** Examiners will normally require about one month to evaluate the Extended Application Form and prepare for the Examination of the candidate.
- 13.3** The candidate will be given at least two weeks' notice of the date of the Examination.
- 13.4** Engineers Ireland will communicate its decision to the candidate following the meeting of the Membership and Qualifications Board when the recommendation of the Examiners has been considered.

APPENDIX A

THE COMPETENCES OF AN ENGINEERING TECHNICIAN

Five Competences of an Engineering Technician are listed and analysed in terms of the range of abilities normally associated with each one.

Competence 1

Exercise technical judgement at an appropriate level.

This includes the ability to:

- Review and select techniques, procedures and methods to undertake tasks.
- Apply appropriate scientific and engineering principals.
- Contribute to the achievement of technological tasks.

Competence 2

Contribute to the design, development, manufacture, commissioning, operation and maintenance of products, equipment, processes and services.

This includes the ability to:

- Apply appropriate skills
- Apply diagnostic methods
- Identify, organise and use resources effectively with due regards to cost, safety and environmental impact.

Competence 3

Use effective communication and interpersonal skills.

This includes the ability to:

- Use oral, written and electronic methods for the communication of technical and other information.
- Function as an effective member of a team.
- Accept, allocated and supervise technological tasks and related issues.

Competence 4

Accept and exercise personal and professional responsibility.

This includes an ability to:

- Work reliably and effectively without close supervision to the appropriate code of conduct.
- Accept responsibility for work of self and others.
- Keep abreast of developments within the specific field of engineering.
- Contribute to own and others Continuing Professional Development.

Competence 5

Create and apply safe working practices.

In order to achieve this they must:

- be aware of relevant statutory requirements and codes of practice
- assist in the development of safe working practices
- apply safe working and environmentally friendly practices

APPENDIX B

COMPETENCE DESCRIPTORS

The following table gives examples of some skills and the verbs which may be used to describe specific competences.

Skills	Active verbs (examples)
Recall	Define, List, Identify, Name, State, Recognise
Understanding	Explain, Interpret, Predict, Distinguish, Summarise, Justify
Application	Analyse, Solve, Calculate, Evaluate, Plan, Devise, Select, Organise
Manual Skills	Assemble, Measure, Manipulate, Construct, Use
Behavioural Skills	Demonstrate, Communicate, Provide Support, Advise

In drawing up specific competences it is important to avoid ambiguous language.

Avoid Words Like:

Know
Understand
Be familiar with
Become acquainted with
Have a good grasp of
Obtain a working knowledge of
Appreciate
Realise the significance of
Be aware of
Believe
Be interested in

Use Words Like:

List
Describe
Evaluate
State
Explain
Select
Identify
Distinguish
Design
Construct
Solve

Although the above list is arranged in pairs of contrasting words or phrases there is no suggestion that the word in the second column is meant to replace the word or phrase in the same row of the first column.