Requirements towards the title of Chartered Engineer for applicants with a Further Learning Requirement:

Guidance for applicants

Introduction

The formation of a Chartered Engineers involves two phases:

1. Studying and successfully completing an engineering programme accredited by Engineers Ireland as meeting the **educational standard** of a Chartered Engineer. For graduates of Irish accredited qualifications post 2012 and UK accredited qualifications (approx. intake years 1999, 2000, 2001), this educational standard is an accredited master's degree.
2. Your engineering work experience to achieve the **competences** necessary to apply engineering principles to the solution of engineering problems.

This application is a combined assessment of both phases. You are now applying for the assessment of your further learning outcomes and your professional competences together in one application.

If you qualified with an engineering programme accredited by Engineers Ireland you must check here to see if it meets the standard. If it is designated as requiring further learning then this route applies to you. This route also applies to those who have a degree awarded by the Engineering Council UK as requiring further learning.

Applicants must also have completed a range of Continuing Professional Development (CPD) and further learning that, combined, is **substantially equivalent**, but not necessarily identical to, the learning outcomes of an Engineers Ireland accredited master's degree.

Understanding learning outcomes

As you have completed an accredited Bachelor of Engineering (honours) degree, you have already demonstrated a significant proportion of the educational standard required of a Chartered Engineer. The purpose of this assessment is to determine whether through your

further learning you have achieved the **additional learning outcomes** expected, beyond that of your accredited Bachelor of Engineering (honours) degree, to be substantially equivalent to an accredited master's degree.

It is important you understand the difference between the achievement of learning outcomes and development of competences:

- Learning outcomes are what an engineer knows, understands and has the ability to do on completion of a learning process and this is usually acquired in an academic setting;
- Competence is a demonstrated ability to apply knowledge, skills and attitudes for achieving observable results. The hallmark of a competent engineer is the ability to apply the learning outcomes gained during study to real world situations with responsibility and autonomy.

Master's equivalence

Engineers Ireland recognises that the development of the learning outcomes can take place in a wide range of settings, including educational institutions and the engineering workplace. Furthermore, individuals with a personal interest in and enthusiasm for engineering may study engineering and attend various training courses throughout their career. Such individuals may be working as professional engineers in the workplace.

Your further learning might include, but is not restricted to:

- the completion of a master's degree in another subject area (e.g. Master of Business Administration (MBA), Project Management)
- the completion of modules of further study at Level 9 on the Irish NFQ (e.g. Engineers Ireland's Future Professionals Series, a Level 9 diploma in an engineering or other subject area).
- the completion of relevant CPD training or certification.
- involvement in a mentor–mentee relationship leading to development of knowledge required.
- the completion of engineering research in the workplace, which has facilitated your development of the further learning required at master's degree level.

An accredited master's degree is expected to consist of a minimum study effort of 60 ECTS and this typically corresponds to 1500-1800 hours over an academic year. This workload approximately equates to:

- 8-10 hours learning per working week over 4 years post-graduation
- 4-5 hours learning per working week over 8 years post-graduation

Chartered Engineer for applicants with a further learning requirement

While it is not necessary for candidates to demonstrate the time spent achieving the learning outcomes, the above figures should act as a guide for the workload involved in master's equivalence.

Three additional learning outcomes required

The additional learning outcomes expected, over and above those you achieved in your Bachelor of Engineering (honours) degree, are detailed in this section. These learning outcomes are derived from the difference between the programme outcomes of Chartered Engineer standard (generally Level 9 programmes) and Chartered Engineer with Further Learning standard (generally Level 8 programmes or equivalent). If you wish to find out more about the accreditation process you can read the Accreditation Criteria for Professional titles (2014).

Under each learning outcome, guidance is given to assist you to best demonstrate your achievement of the required learning. Please note that this guidance is given to assist you in your application; it is not a checklist. It is quite likely that you will not be able to demonstrate evidence of each of the statements/questions, but you should be able to demonstrate sufficient evidence of learning within each of the learning outcomes to master's equivalence.

Preparing your application

You are now applying for the assessment of your achievement of the further learning outcomes and your professional competences together in one application for the Registered Professional Title of Chartered Engineer.

Eligibility check

1. You must be a member of Engineers Ireland at least three months prior to applying for the registered professional title of Chartered Engineer.
2. You must have qualified from an engineering programme accredited by Engineers Ireland as requiring further learning to meet the educational standard required of a Chartered Engineer. Otherwise, you must have a degree awarded by the Engineering Council UK as requiring further learning.
3. You must have completed a range of CPD and further learning work experience that, combined, demonstrates the substantial equivalence of your achievement of the Learning Outcomes and Competences to Master's level.

Learning outcome statements

As well as being able to demonstrate the five competences for Chartered Engineer, you must provide written statements demonstrating how you achieve each of the three learning outcomes. The statements should clearly demonstrate your understanding of engineering

principles and how you have deepened your knowledge and development **beyond** that achieved in your accredited Bachelor of Engineering (honours) degree to the equivalent of a master's degree.

You should use this Guidance to assist you in identifying the best examples within your further learning to clearly demonstrate your achievement of the learning outcomes. Reference the learning outcomes throughout your statement and clearly link them to your examples. You should provide specific examples of the technical engineering projects you have been involved with, highlighting your technical involvement, **rather than your managerial input**.

Use examples of non-standard projects to highlight the depth and breadth of your design and technical knowledge. This will help to demonstrate that you have deepened and developed your design and technical ability to the required level.

You should keep your application concise, ensuring your argument is clear and easy to understand, as would be expected of a master's degree graduate. Don't simply give an account of what you have done since you graduated, only include those examples that show you have developed the required learning to a master's level.

Your statements should be written in English and you should write in the first person, using 'I' instead of 'we' or 'the team' (e.g. I designed it, I was responsible for etc.). Each of the statements should be a minimum of 1,200 words and should not exceed 3,000 words.

The Three Learning Outcomes for Chartered Engineer

Learning Outcome 1 – Design

You must demonstrate how you have deepened your ability to design a system, component, product or process to a standard substantially equivalent to an accredited Level 9 engineering qualification. *(1200-3000 words)*

Attributes normally associated with Learning Outcome 1:

You should demonstrate:

- How you have developed your contribution to the creative process of problem solving in design.
- How you have critically evaluated problems, using analysis and interpreting data to contribute to the design process.
- Your ability to apply your knowledge and understanding of design methods, processes and techniques in unfamiliar and ill-defined situations.
- Your understanding of the limits of the applications of codes of practice and industry standards and your ability to progress design in their absence.

Further guidance on LO1 (Design)

Engineering design of a process, system or component utilises engineering sciences, mathematics and science to meet a stated objective. Among the fundamental elements of the design process are the establishment of objectives and criteria, synthesis, analysis, construction, verification and evaluation.

You should be able to demonstrate that you have undertaken design calculations at an appropriate level beyond, for example, basic design of steel and reinforced concrete beams. Co-ordination and management of the design process is unlikely to satisfy the learning outcome. While sourcing of information from documents such as Eurocodes, SUDS manuals etc. may contribute significantly to the design learning outcome, please note that it is unlikely to satisfy the research learning outcome

The experience of design for those working for a contractor will be different from those working in a consultancy. Design should be viewed in a wide context, as an activity that creates a component, product or process. It could be a sequential series of steps to produce a solution that may need to be repeated to refine or optimise the solution (i.e. it is iterative). It may involve some or all of the stages Research, Definition (of Constraints / Requirements), Feasibility, Conceptualisation, Preliminary Design and Detailed Design.

An engineering contractor could be involved in the design of temporary works, for example, at a feasibility or conceptual stage, using their knowledge of both site conditions and construction methods to propose and evaluate the most feasible scheme. The detailed design could well be the realm of another consultant or supplier. The

conceptualisation and selection of the scheme design is still design and an important part of design. An engineering contractor could be the designer of a work process used in construction using their knowledge of materials, construction methods and plant to design the process to be used in construction. This could involve sampling and testing of material and processing methods, for example. Other possible areas would be materials (soils, bituminous materials, soil stabilisation, concrete repair materials); temporary works design; processes or techniques involving new technology.

For example, you could show how you have:

- Evaluated and examined the characteristics of a wide range of materials
- Made a hypothesis and designed and tested using that hypothesis. Then how you evaluated your design and proceeded or used another iteration of your initial hypothesis. For example, using alternate materials/layout/geometry in your design. Generally, as a bachelor's degree graduate, you should be capable of completing the design piece on graduation and, in your subsequent work experience, continue to build on this expertise. As a master's degree graduate you should be capable of making more informed and detailed assumptions and iteration changes required to optimise the design.
- Verified designs through the use of high-level engineering principles of design and a range of advanced design techniques.
- Learned how to map options to a solution.
- Applied solutions learned from another design that did not obviously fit with the current problem you were solving.
- Created solutions holistically considering cost, construction/delivery time, quality, environment, maintainability etc.
- Delivered designs based on researched and evaluated assumptions such as steel design, route selections, foundation designs, material selections, ground works, equipment selections, programme of works.
- Completed a critical appraisal of a range of standards, a literature review of results in other countries/locations, implementation of local materials using new design techniques.
- Investigated new products when proposing their implementation in a design.
- Deepened your knowledge and understanding of specialist engineering principles.
- Peer reviewed / collaborated on your designs and analysis with colleagues, academics or other consultants or benchmarked against industry norms.

Learning Outcome 2 – Research

You must demonstrate your ability to apply a range of standard and specialised research tools and techniques of enquiry to a standard that is substantially equivalent to an accredited Level 9 engineering qualification. *(1200-3000 words)*

Attributes normally associated with Learning Outcome 2:

You should demonstrate:

- Your ability to define a research question to a non-standard problem within your particular branch of engineering.
- How you have extracted information pertinent to the research question through critical review of appropriate literature.
- How you have developed a scientific methodology to address the research question.
- That you have interpreted research findings to draw conclusions.

Further guidance on LO2 (Research)

Research is a process supported by a critical review of peer reviewed literature, scientific methods, data collection, analysis and interpretation to meet specified objectives. Steps include: the definition of the research question, literature review, specification of the research objective(s), study design, analysis and interpretation of the data, drawing conclusions, and reporting/presenting findings.

Level 9 research typically involves systematic investigation to establish facts and reach conclusions.

For example, you could show:

- How you defined the research question;
- How you collected the data required;
- How you analysed the data require;
- Based on the data collected, on what grounds did you come to your conclusions?

This could be achieved by taking a project that you have been involved in and use the data you have access to and explore the technical issues in detail. It may require a more in-depth analysis to be carried out than what would have been undertaken as part of the work project.

Try to engage in project(s) that have a potential research dimension. One such example (but there are others) would be a project that requires a **significant** element of investigation. Such an investigation seeks to gain information to address particular questions and/ or concerns. Decisions are made based on the analysis and interrogation of measured data. If you are intimately involved with the collection, analysis, interrogation and presentation of such data to address a particular question, this would

go some way to satisfying the research learning outcome, providing you demonstrate how you contributed to the deepening of technical knowledge and understanding.
For example, you could show how you have:

- Conducted experiments to verify your assumptions/design.
- Used and synthesised statistical analysis, research and results from previous tests and experiments to resolve design complexities.
- An understanding of, and expertise in, research tools to provide evidence to prove your assumptions, such as literature research, testing, interviewing, comparing standards for different materials, etc.
- Used a non-standard solution to an engineering problem which was influenced by the results of research you carried out.
- Completed and evaluated site investigations.
- Been mentored through a research project and can therefore demonstrate how you have evaluated your research tools on an ongoing basis.
- Peer reviewed / collaborated on your research or publications/ presentations.
- Undertaken accident and incident investigation to determine root cause and identifying corrective and preventative actions for future control.

Learning Outcome 3 – Broadening of Expertise

You must demonstrate how you have been involved in multidisciplinary projects which required you to draw upon technologies and/or expertise outside of your field. *(1200-3000 words)*

Attributes normally associated with Learning Outcome 3:

You should demonstrate*:*

- How in both your research and design you have had the opportunity to be involved in multidisciplinary projects.
- How you have recognised and made use of interactions between engineering technologies and those associated with other professions or disciplines.
- How you have consulted and worked with experts in various fields to progress your projects.

Further guidance on LO3 (Broadening of Expertise)

Chartered Engineers contribute to the development of scientific/technological knowledge in one or more areas of their engineering discipline. They apply a range of standard and specialised tools and techniques in unfamiliar, ill-defined problems, possibly involving other disciplines.

Engineering projects will, by their nature, have multidisciplinary inputs ranging from the role within the team such as technicians and engineers working together to the input of other professions. Some examples of this include building services input to a structural design; environmental scientist input to a construction project design/implementation; a legal advisor input to the route selection phase of a construction project.

For example, you could show how you have:

- Worked with technicians in the implementation of a project.
- Guided specialists in the implementation of a project.
- Written and agreed minutes in project meetings with multidisciplinary participants.
- Consulted with and implemented non-engineering expert advice/input to your project or design. (e.g. electrical, building services, drainage, environmental, geotechnical, sound engineers, contractor, consultant etc.)
- Developed skills to relay your technical input to a non-technical audience.
- Taken a leadership role in a research/project group.
- Developed a project plan dependent on input from others for its completion.
- Prepared for and presented at public/client meetings and documented subsequent interactions.
- An ability to ask the right questions to extract information and knowledge.
- An ability to challenge opinion as part of the process in reaching a conclusion.

- Are building your confidence in your knowledge and ability.
- Participated and consulted with employees and others in the development of risk assessments and method statements, or other engineering solutions to eliminate or minimise risk.

The Five Competences for Chartered Engineer

Competence 1 – Engineering Knowledge

Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology. 500 words or less.

Attributes normally associated with competence 1:

1. How have you maintained and extended a sound theoretical approach in enabling the introduction and exploitation of engineering technology and other relevant developments?
2. How have you understood and applied advanced knowledge of the widely applied engineering principles underpinning good practice?
3. How have you applied creative problem-solving approaches to your area of engineering expertise?
4. How have you promoted innovation and technology transfer?

Further Guidance on Competence 1 (Engineering Knowledge)

- Describe how you have used the engineering theory you learned through your qualification and applied it to your practical experience.
- Discuss if you have engaged in formal postgraduate study to broaden your knowledge.
- Provide information on how you have extended your knowledge by applying and exploiting further professional development tools/sources/information in the workplace.
- Indicate how you have systematically deepened your knowledge through research and experimentation.
- Show how you have assessed the impact of emerging technologies and identified how to apply them to new areas.

- Show how you have kept aware of and improved your knowledge of technological advances.
- Give examples of how you have conducted a sound appraisal of statistical data to improve the effectiveness of your design/product/service.
- Indicate how you have applied and/or understood engineering design principles and their impact on the final outcome of your design/product/service.
- Give examples of how you used innovation and knowledge gained to approach problem solving.
- Show how you have worked with all stakeholders to define requirements for your services.
- Give examples of how you have used creativity and initiative in investigating/analysing/conceptualising possible solutions, also illustrating how you came to a final recommendation.

- Describe how you have successfully passed on the knowledge you have gained to improve the advantage to your project and company.
- Show how you have led or managed the promotion or exploitation of opportunities to transfer technology within an area of expertise while demonstrating awareness of legal implications.

Competence 2 – Application of Engineering Knowledge

Apply appropriate theoretical and practical methods to the analysis and solution of complex engineering problems.

500 words or less.

Attributes normally associated with competence 2:

1. How have you identified potential projects and opportunities?
2. How have you conducted appropriate research and undertaken design, evaluation and development of possible solutions?
3. How have you planned, implemented, designed, evaluated and modified engineering solutions holistically?

Further Guidance on Competence 2 (Application of Engineering Knowledge)

- Give examples of how you applied your engineering knowledge and experience to improve and innovate.
- Show how you have used your knowledge of your employers' expertise to introduce potential new projects/products.
- Describe how you have continually reviewed and taken the initiative for the enhancement of designs, products and processes.
- Give examples of how you have identified the complexity of potential projects and used your original thought to design and deliver satisfactory outcomes to engineering challenges.

- Describe how you have been involved in market research and tender processes for engineering services/products/processes.
- Give examples of how you have used simulated or computer modelling to compare and contrast impacts and outcomes of potential solutions to deliver a final outcome.
- Show how you have undertaken evaluations of risks, costs and impacts in the design/development of your engineering service/product/process.

- Give examples of how you have planned, costed, analysed, corrected and/or modified in the delivery of your engineering services.
- Show how you have developed and documented a recommendation/proposal for client/process requirements.
- Show how you have developed concepts into detailed designs/processes.
- Describe how you have tested products/services/designs, negotiated modifications or adaptations if required, and evaluated the final solution against the original brief or specification.
- Describe how you have actively participated in stakeholder consultation.

Competence 3 – Leadership

Prove technical, commercial and managerial leadership.

500 words or less

Attributes normally associated with competence 3:

1. How have you planned for effective project implementation?
2. How have you managed (planned, budgeted, organised, directed and controlled) tasks, people and/or resources?
3. How have you developed the capabilities of staff to meet the demands of changing technical and managerial requirements?
4. How have you brought about improvement through quality management?
5. How have you been responsible for making decisions on part or all of complex projects?

Further Guidance on Competence 3 (Leadership)

- Show how you have prepared and agreed a proposal for the development and delivery of a project.
- Give examples of how you have led or managed project planning activities including resource allocation and identification of key milestones to ensure delivery of the project.
- Demonstrate how you have recognised the competence of others and how you have managed their input to the delivery of the project.

- Show how you have set and implemented work objectives, with prioritisation to allow for efficiencies with regard to cost and resource allocation.
- Give examples of where you have provided leadership to other engineers or other personnel.
- Describe how you have monitored and adapted projects to deliver best results within the required standards/regulations.
- Demonstrate how you have led risk assessment with regard to planning activities.

- Show how you have developed and improved the capabilities and skills of your project team.
- Give examples of your input to training plans for staff and your involvement in reviews of effectiveness of workplace training programmes.
- Show how you have applied and improved quality standards and control. Demonstrate how you have fostered the acceptance by colleagues/staff of quality management principles.

- Give examples of decisions you have made and their impact on projects.

Competence 4 – Communication Skills

Use effective communication and interpersonal skills.

500 words or less

Attributes normally associated with competence 4:

1. How have you worked and communicated effectively in English with others at all levels?
2. How do you effectively present and discuss ideas and plans?
3. How have you been responsible for negotiations and building teams?

Further Guidance on Competence 4 (Communication Skills)

- Give examples of how you have chaired meetings and documented project progress with input from multidisciplinary teams.
- Show how you have developed, maintained and promoted effective working relationships.
- Describe how you have used empathy and listening skills to respond effectively and efficiently to colleagues/clients.

- Describe presentations and proposals you have delivered to a range of audiences (e.g., clients/colleagues/non-technical audiences).
- Show how you have prepared for presentations to or discussions with a variety of audiences.
- Describe how you express yourself effectively in written and oral communications.

- Show how you resolve conflicts, promote confidence and effectively negotiate with all project participants.
- Demonstrate how you take responsibility within a team capacity and how you identify collective goals.
- Demonstrate how you treat people with respect in a professional capacity.

Competence 5 – Ethical Practice

Make a personal commitment to abide by the appropriate code of professional conduct, recognising obligations to society, the profession and the environment.
500 words or less

Attributes normally associated with competence 5:

1. How have you complied with appropriate Codes and Rules of Conduct?
2. How have you managed and applied safe systems of work?
3. How have undertaken to ensure your engineering work is in compliance with the Codes of Practice on Risk and the Environment?
4. How have you ensured your continuing professional development to maintain the currency of your professional engineering knowledge and skills?

Further Guidance on Competence 5 (Ethical Practice)

- Give examples of codes and controls that you have applied in your professional practice.
- Give examples of how you balance the responsibility for welfare, health and safety with responsibility to the profession, sectoral interests or to other engineers.
- Clearly show how you understand and comply at all times with the Engineers Ireland Code of Ethics.

- Demonstrate your knowledge of health and safety requirements and your application of these requirements in your work.
- Describe how you keep informed on current health and safety legislation and best practice relevant to your area of expertise.
- Give examples of how you have assessed risk and safety requirements and how you have exercised mitigation measures.
- Show how you take precautions when dealing with hazards.

- Give examples of how you have operated responsibly in your professional work to balance economic, commercial, social and environmental outcomes simultaneously.
- Show how you have strived to achieve the objectives of your engineering work with due consideration to the environment by adopting sustainable management practices.
- Give examples of how your designs/products/services have taken account of total life cycle implications to the environment.

- Describe how you regularly assess your own development needs and prepare action plans to identify your CPD requirements.
- Show how you evaluate your CPD and learning to identify competence development and assessment.
- Give examples of how mentoring or training others has helped you to develop your competence as a professional.

- Demonstrate how you remain informed on engineering issues and developments both nationally and internationally.

Completing and Submitting Your Application

1. Notify your two supporters that you are applying;
2. Inform them of the time-line for submission;
3. Complete all sections of the Application Template and submit a draft to your supporters for comment;
   - You should ask your supporters to take an active role in critiquing your report to ensure that you submit a first-class application. For further information on this, please read our Guidance Notes for Supporters.
4. Await comment/approval from your two supporters. They must both complete the Supporter section of the template;
5. Call the Membership Team to pay the application fee by credit card and submit your SUPPORTER-APPROVED application to Engineers Ireland by email;
6. Steps 1-5 must be completed on or before the deadline date (see above).

What Happens Next?

Your Application is Assessed
Once your application is submitted, it will be sent to one of our assessors for review;
Your assessor needs to determine if, from the evidence presented in your report, that you broadly meet the standard of Chartered Engineer.

Your assessor has 4 recommendation options:

a) **Progress straight to interview**. No issues have been found with the application and broadly meets the standard to progress to the interview-stage of the process;

b) **Modify application and resubmit for the next deadline**. Some issues have been found with the report. For example, it's poorly written or it doesn't express the candidate's own duties and responsibilities;

c) **Defer application to develop further competence**. This is where the assessor determines that the candidate has shown a deficit in his/her competence and needs to gain further depth and breadth of experience;

d) **Modify application and resubmit for this deadline**. This is for exceptional cases only if perhaps, the assessor feels that the candidate has left out something in the report in error or perhaps has not given a complete glossary of terms. In other words, something VERY minor that does not affect the overall acceptability of the application.

The Interview

- Once your application has been approved to progress to the interview-stage of the process, you will be offered an interview within 6 months of the application date. Interview sessions are held regularly.

- You will be interviewed by two or three experienced Chartered Engineers whose engineering discipline closely matches your own.

- The interview will last between 60 and 90 minutes.

- You will be asked to give a 10-minute presentation at the start of the interview.

- Your interviewers will explore your demonstration of the three learning criteria and the five competences.

- The result of your interview will be submitted to our Membership and Qualifications Board at its nearest available monthly meeting (except August).

- You will be notified of the result of your interview by email within 5 working days of the Membership meeting.

CHECK LIST FOR YOUR FULL APPLICATION

1. **Title page details**
2. **Personal details**
3. **Employer details**
4. **Education details in chronological order**
5. **Supporter details**
6. **Areas of engineering expertise**
7. **Engineering discipline**
8. **Areas of activity**
9. **Summary of career details in chronological order**
10. **Career Summary Report in chronological detail (2000 words)**
11. **Glossary of terms in alphabetical order**
12. **Learning Outcome Statements**
    a. **Design (1200-3000 words)**
    b. **Research (1200-3000 words)**
    c. **Broadening of Expertise (1200-3000 words)**
13. **Statements of Competence**
    a. **Competence 1 – Your Engineering Knowledge (500 words)**
    b. **Competence 2 – Application of your Engineering Knowledge (500 words)**
    c. **Competence 3 – Leadership (500 words)**
    d. **Competence 4 – Communication Skills (500 words)**
    e. **Competence 5 – Ethical Practice (500 words)**
14. **CPD Table in reverse chronological order**
15. **CPD Future Development Statements**
    a. **Short-term Goals (200 words)**
    b. **Mid-term Goals (200 words)**
    c. **Long-term Goals (200 words)**
16. **Essay 1 – Topic of your own choice (500 words)**
17. **Essay 2 – Topic from Engineers Ireland current list (500 words)**