

The Chartered Engineer (CEng) Standard

Chartered Engineers develop solutions to complex engineering problems using new or existing technologies, and through innovation, creativity and technical analysis.

Chartered Engineers shall demonstrate:

- The theoretical knowledge to solve problems in new and established technologies and to develop new analytical techniques
- Successful application of the knowledge to deliver innovative products and services or taking technical responsibility for complex engineering systems
- Responsibility for the financial and planning aspects of projects, sub-projects or tasks
- Leadership and development of other professional staff through management, mentoring or coaching
- Effective interpersonal skills in communicating technical matters
- Understanding of the safety and sustainability implications of their work, seeking to improve aspects where feasible
- Commitment to professional engineering values

A Chartered Engineer will be able to demonstrate their competence in all of the areas listed, but the depth and extent of their experience and competence will vary with the nature and requirements of their role. They will demonstrate a level of competence and commitment in each area, (A1–E5), at a level which is consistent with their specific role. It is to be expected that

they will have a higher level of competence in some areas than others and their role may provide limited experience in certain areas. However, they need to demonstrate an understanding of, and familiarity with, the key aspects of competence in all areas as a minimum requirement while demonstrating higher levels of competence in those areas which are critical to their role. Overall, they will demonstrate an appropriate balance of competences to perform their role effectively at Chartered Engineer level.

The examples of evidence are intended as guidance to help identify activities that might demonstrate the required competence and commitment for Chartered Engineer registration. They are intended as examples only as the most appropriate evidence will vary with each individual role. The list is not exhaustive and other types of evidence might be valid. There is no requirement to provide multiple examples of evidence for each area of competence, but examples from two or three projects or tasks would be useful.

Competence		Examples of evidence
<p>A. Knowledge and understanding</p> <p>Chartered Engineers shall use a combination of general and specialist engineering knowledge and understanding to optimise the application of advanced and complex systems.</p> <p>This competence is about the ability to understand underpinning technical principles relevant to the applicant's area of practice and applying them to develop technical solutions. This could involve technical solutions for novel problems or dealing with significant technical complexity. This may involve the integration of a range of technologies and consideration of other factors. This competence requires that an applicant is maintaining and developing their knowledge in their field of practice and not just that required for specific tasks.</p>	<p>The applicant shall demonstrate that they:</p> <p>1. Have maintained and extended a sound theoretical approach to enable them to develop their particular role</p>	<ul style="list-style-type: none"> • Formal training related to your role • Learning and developing new engineering knowledge in a different industry or role • Understanding the current and emerging technology and technical best practice in your area of expertise • Developing a broader and deeper knowledge base through research and experimentation • Learning and developing new engineering theories and techniques in the workplace
	<p>2. Are developing technological solutions to unusual or challenging problems, using their knowledge and understanding and/or dealing with complex technical issues or situations with significant levels of risk.</p>	<ul style="list-style-type: none"> • Carrying out technical research and development • Developing new designs, processes or systems based on new or evolving technology • Carrying out complex and/or non-standard technical analyses • Developing solutions involving complex or multi-disciplinary technology • Developing and evaluating continuous improvement systems • Developing solutions in safety-critical industries or applications

Competence		Examples of evidence
<p>B. Design, development and solving engineering problems</p> <p>Chartered Engineers shall apply appropriate theoretical and practical methods to the analysis and solution of engineering problems.</p> <p>This competence is about the ability to apply engineering knowledge effectively and efficiently to the individual tasks which need to be undertaken in the applicant's role.</p>	<p>The applicant shall demonstrate that they:</p> <p>1. Take an active role in the identification and definition of project requirements, problems and opportunities</p>	<ul style="list-style-type: none"> Identifying projects or technical improvements to products, processes or systems Preparing specifications, taking account of functional and other requirements Establishing user requirements Reviewing specifications and tenders to identify technical issues and potential improvements Carrying out technical risk analysis and identifying mitigation measures Considering and implementing new and emerging technologies
	<p>2. Can identify the appropriate investigations and research needed to undertake the design, development and analysis required to complete an engineering task and conduct these activities effectively</p>	<ul style="list-style-type: none"> Identifying and agreeing appropriate research methodologies Investigating a technical issue, identifying potential solutions and determining the factors needed to compare them Identifying and carrying out physical tests or trials and analysing and evaluating the results Carrying out technical simulations or analysis Preparing, presenting and agreeing design recommendations, with appropriate analysis of risk, and taking account of cost, quality, safety, reliability, accessibility, appearance, fitness for purpose, security (including cyber security), intellectual property constraints and opportunities, and environmental impact

Competence		Examples of evidence
B. Design, development and solving engineering problems (continued)	<p>The applicant shall demonstrate that they:</p> <p>3. Can implement engineering tasks and evaluate the effectiveness of engineering solutions.</p>	<ul style="list-style-type: none"> • Ensuring that the application of the design results in the appropriate practical outcome • Implementing design solutions, taking account of critical constraints, including due concern for safety, sustainability and disposal or decommissioning • Identifying and implementing lessons learned • Evaluating existing designs or processes and identifying faults or potential improvements including risk, safety and life cycle considerations • Actively learning from feedback on results to improve future design solutions and build best practice

Competence		Examples of evidence
<p>C. Responsibility, management and leadership</p> <p>Chartered Engineers shall demonstrate technical and commercial leadership.</p> <p>This competence is about the ability to plan the applicant's own work and manage or specify the work of others effectively, efficiently, and in a way which provides leadership at an appropriate level, whether technical or commercial. Leadership is not necessarily about having a formal line management role. In matrix management and other types of organisational structure, where Chartered Engineers are working within complex and varied working relationships, they will provide leadership to achieve objectives. This competence is also about the ability to consider and identify improvements to quality.</p>	<p>The applicant shall demonstrate that they:</p> <p>1. Plan the work and resources needed to enable effective implementation of a significant engineering task or project</p>	<ul style="list-style-type: none"> • Preparing budgets and associated work programmes for projects or tasks • Systematically reviewing the factors affecting the project implementation including safety, sustainability and disposal or decommissioning considerations • Carrying out a task or project risk assessment and identifying mitigation measures • Leading on preparing and agreeing implementation plans and method statements • Negotiating and agreeing arrangements with customers, colleagues, contractors and other stakeholders, including regulatory bodies • Ensuring that information flow is appropriate and effective
	<p>2. Manage (organise, direct and control), programme or schedule, budget and resource elements of a significant engineering task or project</p>	<ul style="list-style-type: none"> • Operating or defining appropriate management systems including risk registers and contingency systems • Managing the balance between quality, cost and time • Monitoring progress and associated costs and cost forecasts, taking appropriate actions when required • Establishing and maintaining appropriate quality standards within legal and statutory requirements • Interfacing effectively with customers, contractors and other stakeholders

Competence		Examples of evidence
C. Responsibility, management and leadership (continued)	<p>The applicant shall demonstrate that they:</p> <p>3. Lead teams or technical specialisms and assist others to meet changing technical and managerial needs</p>	<ul style="list-style-type: none"> • Agreeing objectives and work plans with teams and individuals • Reinforcing team commitment to professional standards • Leading and supporting team and individual development • Assessing team and individual performance, and providing feedback • Seeking input from other teams or specialists where needed and managing the relationship • Providing specialist knowledge, guidance and input in your specialism to engineering teams, engineers, customers, management and relevant stakeholders • Developing and delivering a teaching module at Masters level, or leading a University research programme
	<p>4. Bring about continuous quality improvement and promote best practice.</p>	<ul style="list-style-type: none"> • Promoting quality throughout the organisation as well as its customer and supplier networks • Developing and maintaining operations to meet quality standards eg ISO 9000, EQFM • Supporting or directing project evaluation and proposing recommendations for improvement • Implementing and sharing the results of lessons learned

Competence		Examples of evidence
<p>D. Communication and interpersonal skills</p> <p>Chartered Engineers shall demonstrate effective communication and interpersonal skills.</p> <p>This is the ability to work with others constructively, to explain ideas and proposals clearly and to discuss issues objectively and constructively.</p>	<p>The applicant shall demonstrate that they:</p> <p>1. Communicate effectively with others, at all levels, in English</p>	<ul style="list-style-type: none"> • Preparing reports, drawings, specifications and other documentation on complex matters • Leading, chairing, contributing to and recording meetings and discussions • Exchanging information and providing advice to technical and non-technical colleagues • Engaging or interacting with professional networks
	<p>2. Clearly present and discuss proposals, justifications and conclusions</p>	<ul style="list-style-type: none"> • Contributing to scientific papers or articles as an author • Preparing and delivering presentations on strategic matters • Preparing bids, proposals or studies • Identifying, agreeing and leading work towards collective goals
	<p>3. Demonstrate personal and social skills and awareness of diversity and inclusion issues.</p>	<ul style="list-style-type: none"> • Knowing and managing own emotions, strengths and weaknesses • Being confident and flexible in dealing with new and changing interpersonal situations • Identifying, agreeing and working towards collective goals • Creating, maintaining and enhancing productive working relationships, and resolving conflicts • Being supportive of the needs and concerns of others, especially where this relates to diversity and inclusion

Competence		Examples of evidence
<p>E. Personal and professional commitment</p> <p>Chartered Engineers shall demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.</p> <p>This competence is about ensuring that the applicant is acting in a professional manner in their work and in their dealings with others. A Chartered Engineer should set a standard and example to others with regard to professionalism.</p>	<p>The applicant shall demonstrate that they:</p> <p>1. Understand and comply with relevant codes of conduct</p>	<ul style="list-style-type: none"> • Demonstrating compliance with your Licensee's Code of Professional Conduct • Identifying aspects of the Code which are particularly relevant to your role • Being aware of the legislative and regulatory frameworks relevant to your role and how they conform to them • Leading work within relevant legislation and regulatory frameworks, including social and employment legislation
	<p>2. Understand the safety implications of their role and manage, apply and improve safe systems of work</p>	<ul style="list-style-type: none"> • Identifying and taking responsibility for your own obligations and ensuring that others assume similar responsibility for health, safety and welfare issues • Ensuring that systems satisfy health, safety and welfare requirements • Developing and implementing appropriate hazard identification and risk management systems and culture • Managing, evaluating and improving these systems • Applying a sound knowledge of health and safety legislation, for example: HASAW 1974, CDM regulations, ISO 45001 and company safety policies

Competence		Examples of evidence
E. Personal and professional commitment (continued)	<p>The applicant shall demonstrate that they:</p> <p>3. Understand the principles of sustainable development and apply them in their work</p>	<ul style="list-style-type: none"> • Operating and acting responsibly, taking account of the need to progress environmental, social and economic outcomes simultaneously • Providing products and services which maintain and enhance the quality of the environment and community, and meet financial objectives • Recognising how sustainability principles, as described in the Guidance on Sustainability on page 48, can be applied in your day-to-day work • Understanding and securing stakeholder involvement in sustainable development • Using resources efficiently and effectively in all activities • Taking action to minimise environmental impact in your area of responsibility
	<p>4. Carry out and record the Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice</p>	<ul style="list-style-type: none"> • Undertaking reviews of your own development needs • Planning how to meet personal and organisational objectives • Carrying out planned and unplanned CPD activities • Maintaining evidence of competence development • Evaluating CPD outcomes against any plans made • Assisting others with their own CPD
	<p>5. Understand the ethical issues that may arise in their role and carry out their responsibilities in an ethical manner.</p>	<ul style="list-style-type: none"> • Understanding the ethical issues that you may encounter in your role • Giving an example of where you have applied ethical principles as described in the Statement of Ethical Principles on page 47 • Giving an example of where you have applied or upheld ethical principles as defined by your organisation or company