YOUR GUIDE TO KNOWLEDGE ASSESSMENTS

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WHY YOU NEED A KNOWLEDGE ASSESSMENT

To apply to become a Chartered Professional Engineer (CPEng) and/or Chartered Member, you need to meet an internationally-benchmarked educational standard. The required educational standard is a Washington Accord-accredited qualification or equivalent level of knowledge.

If you don't have a qualification, combination of qualifications, or overseas registration that we recognise as meeting the required educational standard, we can assess if you have gained the equivalent level of knowledge.

To demonstrate that you've gained the equivalent level of knowledge, you'll need to complete our Knowledge Assessment. You'll need to show you have a level of technical knowledge and understanding gained through your work and learning that is equivalent to a Washington Accord-accredited qualification. You'll need to show you can deal with complex engineering problems and carry out complex engineering activities.

If your Knowledge Assessment is successful, you can complete a first time assessment for CPEng and/or Chartered Membership. This is where you'll demonstrate your competence for independent practice against an internationally-benchmark competence standard.

DEMONSTRATING YOUR EQUIVALENT KNOWLEDGE

You'll need to demonstrate your equivalent knowledge in eight areas, known as elements. The elements are determined by the knowledge profile expected of a graduate of Washington Accord-accredited qualification.

Each element is described below, together with the performance indicators we're looking for. You'll need to provide evidence for at least a majority of each element's performance indicators.

ELEMENT 1 – NATURAL SCIENCES KNOWLEDGE

Description

A systematic, theory-based understanding of the natural sciences applicable to the discipline
eg calculus-based physics.

Performance Indicators

- Fundamental quantitative knowledge underpinning nature and its phenomena.
- Knowledge of the physical world including physics, chemistry and other areas of physical or biological science relevant to your discipline.
- Knowledge of key concepts of the scientific method and other inquiry and problem-solving processes.
- Application of knowledge from one or more of the natural sciences to the solution of complex engineering problems relevant to your discipline.

ELEMENT 2 – MATHEMATICAL KNOWLEDGE

Description

Conceptually-based mathematics, numerical analysis, statistics and formal aspects of computer and information science to support analysis and modelling applicable to the discipline.

Performance Indicators

- Knowledge of mathematics, statistics and numerical methods that supports the development or application of models that replicate 'real world' behaviours.
- An understanding of the assumptions behind theoretical models and their impacts in the development and use of those models.
- Ability to organise and analyse a data set to determine its statistical variability.
- Knowledge of trigonometry, probability and statistics, differential and integral calculus, and multivariate calculus that supports the solving of engineering problems.
- Ability to apply differential equations to characterise time-dependent physical processes.

ELEMENT 3 – ENGINEERING FUNDAMENTAL KNOWLEDGE

Description

A systematic, theory-based formulation of engineering fundamentals required in the engineering discipline.

Performance Indicators

- Ability to define key factual information in core areas of fundamental engineering knowledge relevant to your engineering discipline.
- Evidence of sufficient depth of knowledge of engineering fundamentals to demonstrate an ability to think rationally and independently within and outside a chosen field of specialisation.
- Evidence of sufficient breadth of knowledge of engineering concepts and principles to allow subsequent professional development across a broad spectrum of engineering.
- Ability to apply knowledge of engineering fundamentals to solve complex engineering problems relevant to your discipline.

ELEMENT 4 – SPECIALIST ENGINEERING KNOWLEDGE

Description

Engineering specialist knowledge that provides theoretical frameworks and bodies of knowledge for the accepted practice areas in the engineering discipline, much is at the forefront of the discipline.

Performance Indicators

- Evidence of sufficient depth of knowledge to support practice within one or more recognised field of engineering.
- Evidence of a systematic understanding of the coherent body of knowledge related to a particular field of engineering; its underlying principles and concepts; its usage and applications; and analytical and problem-solving techniques.
- Ability to apply specialist engineering knowledge to solve complex engineering problems.

ELEMENT 5 – DESIGN PROCESS KNOWLEDGE

Description

Knowledge that supports engineering design in a practice area.

Performance Indicators

- Ability to undertake research and analysis to support the design process.
- Ability to investigate a situation or the behaviour of a system and identify relevant causes and effects.
- Ability to develop from first principles and construct mathematical, physical and conceptual models of situations, systems and devices, with a clear understanding of the assumptions made in development of such models.
- Application of technical knowledge, design methods and appropriate tools and resources to design components, systems or processes to meet specified criteria.
- Ability to analyse the advantages and disadvantages of alternative design options to support the development of an optimised design alternative.
- Ability to analyse the constructability or manufacturing feasibility of a project or product.

- Experience of personally conducting a significant design exercise, providing evidence of the consideration of various realistic constraints, such as safety, reliability, ethics, economic factors, aesthetics and social impact.
- Ability to apply appropriate design methods in solving complex engineering problems

ELEMENT 6 – ENGINEERING PRACTICE KNOWLEDGE

Description

Knowledge of engineering practice (technology) in the practice areas in the engineering discipline.

Performance Indicators

Tools and technologies

- Awareness of critical issues affecting current technical and professional practice.
- Awareness of current tools of analysis, simulation, visualisation, synthesis and design, particularly computer-based models and packages, and competence in the use of a representative selection of these.
- Appreciation of the accuracy and limitations of such tools and the assumptions inherent in their use.
- Knowledge of materials and resources relevant to the discipline and their main properties and ability to select appropriate materials and techniques for particular objectives.
- Knowledge of a wide range of laboratory procedures relevant to the discipline and a clear understanding of the principles and practices of laboratory safety.
- Knowledge of current types of systems, equipment, information technology, and specifications that accomplish specific design objectives.

Communication

- Write correspondence that clearly and concisely communicates facts and circumstances related to a project, product or process.
- Plan, prepare and deliver an oral presentation, with appropriate visual aids and other supporting materials.
- Communicate effectively with both technical and non-technical individuals and audiences.

Engineering management principles and economic decision making

- Apply appropriate tools and techniques to monitor project schedules and costs.

Team work

- Operate as an effective team member or leader of a multidisciplinary team.

ELEMENT 7 – ENGINEERING IN SOCIETY KNOWLEDGE

Description

Comprehension of the role of engineering in society and identified issues in engineering practice in the discipline: ethics and the professional responsibility of an engineer to public safety; the impacts of engineering activity: economic, social, cultural, environmental and sustainability.

Performance Indicators

- Demonstration of ethical behaviour in accordance with ethical codes of conduct and established norms of professional conduct.
- Evidence of making ethical decisions and regulating one's own professional conduct in accordance with a relevant code of ethical conduct.
- Implementation of appropriate health and safety practices.
- Application of safe practices in laboratory, test and experimental procedures.
- Awareness of the social and environmental effects of their engineering activities.
- Awareness of sustainable technologies and sustainable development methodologies.
- Ability to identify risks as a consequence of engineering compromises made as a result of project or business constraints, and understanding of techniques to mitigate, eliminate or minimise risk.
- Knowledge of appropriate risk management techniques used to assess the accuracy, reliability and authenticity of information.
- Understanding of the role of quality management systems tools and processes.

ELEMENT 8 – RESEARCH BASED KNOWLEDGE

Description

Engagement with selected knowledge in the research literature of the discipline.

Performance Indicators

- Advanced knowledge in at least one area within your discipline, to a level that engages with current developments in that area.
- Understanding of how new developments relate to established theory and practice and to other disciplines with which they interact.
- Describe advancements in engineering research and technology and science in a particular area of engineering practice.
- Review research articles pertaining to a project component typically encountered in a specific area of engineering design.
- Commitment to lifelong learning.

UNDERSTANDING THE ASSESSMENT PROCESS

Log in to the members area of our website to complete your Knowledge Assessment online. You can access the members area through your member login, or you can apply for temporary access

STAGE 1 – PREPARATION

Document and upload evidence of your engineering knowledge for all eight elements. Your evidence can be from academic study, work experience or further learning.

Suggested Evidence for Elements 1 to 4

Ensure all relevant evidence is available to your assessor:

1. Upload academic transcripts for all your engineering qualifications.
2. Upload a single pdf file for each qualification that gives a brief description of the content of each paper/unit of the qualification. We suggest 20-30 words for each description.
3. Upload four work samples in total that demonstrate application of your knowledge. For each work sample, limit the number of pdf files to no more than three in total. Your work samples should give evidence of use of calculations or computer modelling to predict the performance of an engineering system.
4. In the commentary for these elements, give brief notes on any other work or study experiences that add to your knowledge for the element. We suggest two or three paragraphs for each element.

Suggested Evidence for Elements 5 to 8

Simply write brief notes to address the performance indicators for each element. Add your notes in the commentary boxes for each element.

STAGE 2 – VALIDATION

When you've finished documenting and uploading your evidence, submit your assessment for validation.

Our assessment team will check that your assessment is complete. Then we'll notify you that your assessment is ready to be submitted for evaluation.

STAGE 3 – EVALUATION

When you submit your Knowledge Assessment for evaluation, you'll need to pay the knowledge assessment fee.

Then we'll assign an assessor to evaluate your engineering knowledge. Your assessor may contact you to request additional information through assignments or to arrange for a video meeting.

Your assessment will take up to 8 weeks after you submit and pay your fee.

STAGE 4 – DECISION

We'll notify you of the outcome of your Knowledge Assessment by email.

If your assessment is successful, your next step is to complete a first time assessment of your competence for CPEng and/or Chartered Membership.

If your assessment is unsuccessful, we'll talk you through your options.