# **Further Learning Report - Introduction**

If you are advised by CIHT at the Initial Assessment stage that the Further Learning Report (FLR) option for CEng is available to you, you may use this to demonstrate further learning to an accredited Master’s level in order to satisfy the CEng academic benchmark and progress to Professional Review.

# **What is an accredited qualification?**

Accredited engineering and technology programmes provide the exemplifying levels of understanding, knowledge and skills that underpin professional engineering competence.

The 5 key areas of learning within accredited degree programmes (as outlined in the Engineering Council’s [Accreditation of Higher Education Programmes](https://www.engc.org.uk/media/3464/ahep-fourth-edition.pdf) 4th edition (AHEP) document) are:

1. Science and mathematics
2. Engineering analysis
3. Design and innovation
4. The engineer and society
5. Engineering practice

In general, accredited MEng programmes are characterised by the requirement for deeper and broader technical and non-technical knowledge than that covered in an accredited BEng (Hons) programme, plus additional project work and a wider appreciation of the economic, social and environmental context of engineering.

# **How to demonstrate the academic benchmark for CEng through the Further Learning Report (FLR) option**

The table below lists the learning outcomes of a UK-accredited MEng programme. You should complete the table, using supporting evidence as an Appendix, to demonstrate how your learning meets each of the criteria.

As the comparison between the course(s) you have completed and a UK-accredited MEng is an academic one, the evidence supplied by you in the FLR must have been subject to a rigorous and measurable assessment process, for example conventional qualifications or examinations carried out by a recognised university, or through work-based assessment based on verifiable and certified achievements.

# **Interpretation**

Within the below table, the following terms are used with the meanings stated:

* **Understanding** is the capacity to use concepts creatively, for example, in problem solving, design, explanations and diagnosis
* **Knowledge** is information that can be recalled
* **Know-how** is the ability to apply learned knowledge and skills to perform operations intuitively, efficiently and correctly
* **Skills** are acquired and learned attributes that can be applied almost automatically
* **Awareness** is general familiarity, albeit bounded by the needs of the specific discipline
* **Complex** implies engineering problems, artefacts or systems that involve dealing simultaneously with a sizeable number of factors that interact and require deep understanding, including knowledge at the forefront of the discipline, to analyse or deal with.

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| **Science and Mathematics**The study of engineering requires a substantial grounding in engineering principles, science and mathematics commensurate with the level of study.  |
| **MEng Learning Outcomes** | **Formal Learning** | **Learning in the workplace** |
| **M1 – Science, mathematics and engineering principles:** Apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering. |  |  |

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| **Engineering Analysis**Engineering analysis involves the application of engineering concepts and tools to analyse, model and solve problems. At higher levels of study engineers will work with information that may be uncertain or incomplete.  |
| **MEng Learning Outcomes** | **Formal Learning** | **Learning in the workplace** |
| **M2 – Problem Analysis:** Formulate and analyse complex problems to reach substantiated conclusions. This will involve evaluating available data using first principles of mathematics, statistics, natural science and engineering principles, and using engineering judgment to work with information that may be uncertain or incomplete, discussing the limitations of the techniques employed. |  |  |
| **M3 – Analytical tools and techniques:** Select and apply appropriate computational and analytical techniques to model complex problems, discussing the limitations of the techniques employed. |  |  |
| **M4 – Technical Literature:** Select and critically evaluate technical literature and other sources of information to solve complex problems. |  |  |

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| **Design & Innovation**Design is the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges commensurate with the level of study. |
| **MEng Learning Outcomes** | **Formal Learning** | **Learning in the workplace** |
| **M5 – Design:** Design solutions for complex problems that evidence some originality and meet a combination of societal, user, business and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental and commercial matters, codes of practice and industry standards. |  |  |
| **M6 – Integrated/systems approach:** Apply an integrated or systems approach to the solution of complex problems. |  |  |

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| **The Engineer and Society**Engineering activity can have a significant societal impact and engineers must operate in a responsible and ethical manner, recognise the importance of diversity, and help ensure that the benefits of innovation and progress are shared equitably and do not compromise the natural environment or deplete natural resources to the detriment of future generations. |
| **MEng Learning Outcomes** | **Formal Learning** | **Learning in the workplace** |
| **M7 – Sustainability:** Evaluate the environmental and societal impact of solutions to complex problems (to include the entire lifecycle of a product or process) and minimise adverse impacts. |  |  |
| **M8 – Ethics:** Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. |  |  |
| **M9 – Risk:** Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity. |  |  |
| **M10 – Security:** Adopt a holistic and proportionate approach to the mitigation of security risks. |  |  |
| **M11 – Equality, diversity and inclusion:** Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. |  |  |

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| **Engineering Practice**The practical application of engineering concepts and tools, engineering and project management, teamwork and communication skills. Engineers also require a sound grasp of the commercial context of their work, specifically the ways an organisation creates, delivers and captures value in economic, social, cultural or other contexts. |
| **MEng Learning Outcomes** | **Formal Learning** | **Learning in the workplace** |
| **M12 – Practical and workshop skills:** Use practical laboratory and workshop skills to investigate complex problems. |  |  |
| **M13 – Materials, equipment, technologies and processes:** Use practical laboratory and workshop skills to investigate complex problems. |  |  |
| **M14 – Quality management:** Discuss the role of quality management systems and continuous improvement in the context of complex problems. |  |  |
| **M15 – Engineering and project management:** Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights. |  |  |
| **M16 – Teamwork:** Function effectively as an individual, and as a member or leader of a team. Evaluate effectiveness of own and team performance. |  |  |
| **M17 – Communication:** Communicate effectively on complex engineering matters with technical and non-technical audiences, evaluating the effectiveness of the methods used. |  |  |
| **M18 – Lifelong learning:** Plan and record self-learning and development as the foundation for lifelong learning/CPD. |  |  |