

Underpinning Knowledge & Understanding Criteria for IEng Registration

1. Science and mathematics

Engineering is underpinned by science and mathematics, and other associated disciplines, as defined by the relevant professional engineering institution(s). You will need to demonstrate:

| UK&U Criteria | Examples |
|---|---|
| <p>1.1 - Knowledge and understanding of the scientific principles underpinning relevant current technologies, and their evolution</p> <p>1.2 - Knowledge and understanding of mathematics and an awareness of statistical methods necessary to support application of key engineering principles.</p> | <p>You need to demonstrate your knowledge and understanding of the scientific principles that underpin your experience within your area of expertise/specialism within building services engineering and the built environment.</p> <p>Give examples to demonstrate where you have applied numerate and scientific approaches to problem solving on a project or range of projects in your career including how you would assess any limitations.</p> <p>It is likely you will have gained your underpinning knowledge incrementally over your career and through a variety of methods. You should provide details, with examples, of how you have gained this knowledge, how you have kept up to date in terms of relevant current technologies, as well as developing and building upon this knowledge over time.</p> <p>Over your career you will have used your underpinning knowledge and understanding of mathematics and statistical methods to undertake and apply to problems as well as being able to implement engineering processes and technologies. You should provide examples of where you have applied mathematical and computational models effectively, relevant to the built environment, and show that you have an understanding and importantly an appreciation of their limitations.</p> |

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2. Engineering analysis

Engineering analysis involves the application of engineering concepts and tools to the solution of engineering problems. You will need to demonstrate:

| UK&U Criteria | Examples |
|---|---|
| <p>2.1 - Ability to monitor, interpret and apply the results of analysis and modeling in order to bring about continuous improvement</p> <p>2.2 - Ability to apply quantitative methods in order to understand the performance of systems and components</p> <p>2.3- Ability to use the results of engineering analysis to solve engineering problems and to recommend appropriate action</p> <p>2.4 - Ability to apply an integrated or systems approach to engineering problems through know- how of the relevant technologies and their application.</p> | <p>You will need to demonstrate you have a thorough understanding of current engineering principles as well as their limitations.</p> <p>You should be able to provide examples of where you have undertaken systems analysis and demonstrate both quantitative and qualitative analysis in relation to your building services engineering specialty. Consideration should also be given as to where your technical knowledge considers statutory and safety requirements.</p> <p>You should demonstrate how and when you have applied an integrated or systems approach to engineering problems based upon your experience and knowledge. Examples may be drawn from when you have worked with different clients or on different projects.</p> |

3. An Integrated approach to Building Services Engineering (AKA Design)

Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems. You will need to demonstrate the knowledge, understanding and skills to:

| UK&U Criteria | Examples |
|--|---|
| <p>3.1 - Be aware of business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics</p> <p>3.2 - Define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards</p> <p>3.3 - Work with information that may be incomplete or uncertain and be aware that this may affect the design</p> <p>3.4 - Apply problem-solving skills, technical knowledge and understanding to create or adapt design solutions that are fit for purpose including operation, maintenance, reliability etc</p> <p>3.5 - Manage the design process, including cost drivers, and evaluate outcomes</p> <p>3.6 - Communicate their work to technical and non- technical audiences.</p> | <p>Using your technical knowledge and understanding you should be able to give a variety of examples of how you have used processes and methodologies together with how you have adapted them, holistically, for the areas for which you have involved.</p> <p>Give examples of your structured, unstructured and on the job learning over the years and how you have built and developed your own learning to be able to apply your problem solving skills and your underpinning technical knowledge in order to deliver engineering solutions relating to aspects of design, products, operation and maintenance of the built environment. The solutions presented should have due regard to any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards</p> <p>You should be able to demonstrate a degree of lateral thinking in the analysis, resolution and integration of engineering problems and how they have been applied, to the satisfaction of others, to projects for which you have had some responsibility.</p> <p>You will need to demonstrate a progressive skillset of interpersonal skills together with the ability to communicate to both technical and non-technical colleagues a reasoned engineering argument.</p> |