

# Civil Engineering Degree Apprenticeship (v1.1): Mapping

March 2025

This document sets out how the Civil Engineering trailblazer group ensured that the degree apprenticeship and its Knowledge, Skills and Behaviours (KSBs) and associated End Point Assessment Plan mapped directly to the requirements for UK-SPEC (IEng) and AHEP outcomes.

This was done to ensure that apprentices could develop their professional competences as part of the degree apprenticeship and be supported by both the training provider & employer, as well as those line managing and mentoring apprentices during their training, and to support preparation for their EPA.

The details of the apprenticeship can be found here:

- Occupation Summary: [Civil engineer / Institute for Apprenticeships and Technical Education](#)
- The Occupational Standard: [Civil engineer / Institute for Apprenticeships and Technical Education](#) (click tab for ‘Occupational Standard’)
- The End Point Assessment Plan: [Civil engineer / Institute for Apprenticeships and Technical Education](#) (click tab for ‘EPA Plan’)

These documents must be read in conjunction with one another to have a holistic understanding and comprehension of the overall **outcomes** from this apprenticeship and its **assessment methodology**. We suggest always using the website version, as from time to time, IfATE does and can make minor amendments to these documents – this can be for policy and practice reasons.

We present this mapping this in several ways (for your ease):

- [Mapping of Duties to KSBs](#)
- [Mapping of KSBs to Assessment Methods \(as prescribed by the EPA Plan\)](#)
- [Mapping of KSBs to UK SPEC IEng Competence Statements](#)
- [Mapping of UKSPEC IEng Competence Statements to Knowledge, Skills and Behaviours \(KSBs\)](#)
- [Mapping of Knowledge, Skills and Behaviours \(KSBs\) to AHEP Accreditation Requirements](#)
- [Mapping of ICE Attributes to KSBs](#) (specific to Institution of Civil Engineers only)

Please note that this apprenticeship now allows all [Joint Board of Moderator Professional Engineering Institutions \(PEIs\)](#) to engage in and support the [accreditation](#), delivery and assessment of this revised occupational standard and its associated EPA Plan – we therefore recommend to all stakeholders to work with the most appropriate professional engineering institutions (PEIs) for this apprenticeship and the setting of where apprentices will be exposed to the KSBs in context of their employment and professional development.

**Further Guidance:** We also advise all readers to familiarise themselves with the delivery requirements as stated and mandated in the [ESFA apprenticeship funding rules](#), as well as understanding the requirements of [20% off the job training](#), requirements for End Point Assessment [gateway](#) and EPA period (for [apprentices](#) and [employers](#)) as well as your roles and responsibilities ([apprentice](#) and [employer](#)).

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## Mapping of Duties to Knowledge, Skills and Behaviours (KSBs)

Please note that this mapping originates from the trailblazer group and is more accurate than the IfATE publication.

Duty	Statement	Mapping to KSBs
D1	Deliver solutions to broadly defined civil engineering problems, by preparing, producing and presenting engineering diagrams and documents, to engineering specifications, industry codes of practice, regulations, standards, and procedures.	K: 1, 2, 3, 7, 9, 10, 12 S: 1, 2, 3, 6, 9, 11, 12 B: 1, 2, 3, 4
D2	Deliver appropriate and effective technical civil engineering solutions, through the identification, selection, review and evaluation of data and technical information, and the use of a range of appropriate engineering analytical methods, techniques, processes, and technologies.	K: 1, 2, 3, 4, 5, 7 S: 1, 2, 3, 4, 5, 7 B: 2, 4
D3	Manage civil engineering tasks or projects, and the input of others, by applying project, team and quality management principles and techniques to effectively identify, organise and manage resources, budgets or costs.	K: 12, 13, 14, 15, 16, 17, 18 S: 12, 13, 14, 15, 16, 17, 18 B: 2, 3, 4
D4	Contribute to the design and development of civil engineering systems, checking the systems meet the requirements of the end user or business need, and that relevant industry standards and procedures are adhered to.	K: 6, 7, 8, 9, 10, 12 S: 6, 7, 8, 11, 12, 13 B: 1, 2, 3
D5	Use a range of practical and workshop skills, selecting and applying appropriate materials, equipment, technologies and processes, to plan, undertake, analyse and evaluate civil engineering activities.	K: 2, 3, 4, 5, 7, 8 S: 2, 3, 4, 5, 7 B: 2, 4
D6	Use analytical and engineering analysis software (such as Computer Aided Design (CAD), digital data modelling systems (such as Building Information Management (BIM), and other techniques), recognising the limitations of the techniques used, to inform, develop or manage civil engineering solutions.	K: 3, 7, 8 S: 3, 7 B: 2, 4
D7	Ensure compliance with health, safety & welfare requirements, apply safe systems of work (including for example the Health and Safety at Work Act 1974, the Construction (Design and Management) regulations), understanding the safety implications of their works, ensuring they apply and improve safe systems of work.	K: 9, 14 S: 6, 9, 10 B: 1, 2, 3
D8	Identify, evaluate and mitigate risks associated with their work, and in the tasks and activities they are responsible for.	K: 9, 10, 11 S: 8, 9 B: 1, 2, 3
D9	Comply with relevant policies, standards, regulations, legislation, strategies, technical guidance, and codes of practice, for example Building Safety Act 2022 or BSI Flex 8670, ensuring they are interpreted, implemented and communicated correctly and appropriately.	K: 9, 12, 15 S: 6, B: 1, 2

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D10	Comply with environmental policies and legislation, practice sustainable principles, evaluating how these impact on civil engineering, and how these assist in the achievement of United Nations Sustainable Development Goals (UNSDG) and reducing carbon emissions.	K: 8, 12 S: 11, 12 B: 1, 2
D11	Use data, information and quality management, and assurance systems and processes, for example ISO 19650, recognising the need for these in managing civil engineering information (for example, information relating to the golden thread) and their application in continuous improvement.	K: 5, 13 S: 5, 13 B: 1, 4
D12	Communicate and liaise effectively with others internal and external to their organisation, such as customers or specialist contractors, respecting the need for the confidentiality and security of data and information.	K: 13, 14, 15, 16, 17, 18, S: 11, 13, 14, 15, 16, 17, 18 B: 3, 5
D13	Work reliably and effectively with others, taking responsibility for their own work and the input of others, and where appropriate, managing others.	K: 13, 14, 15, 16, 17, 18, 19, 20 S: 13, 15, 16, 17, 18, 19 B: 1, 2, 3, 5
D14	Work reliably and effectively with others, taking responsibility for their own work and the input of others, and where appropriate, managing others.	K: 19, 21 S: 17, 20 B: 3, 5
D15	Plan and maintain their own learning and skills development by carrying out continuing professional development in line with professional codes of conduct and/or industry specifications and obligations and promoting the benefits of this to others.	K: 22 S: 21 B: 3, 6

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## Mapping of Knowledge, Skills and Behaviours (KSBs) to each Assessment Method & Grading Criteria

This mapping shows how each KSB in the occupational standard will be collated and graded in the two forms of assessment, set out in the EPA Plan:

- Assessment Method 1: Project: technical report and presentation with questioning
- Assessment Method 2: Professional Discussion (underpinned by portfolio, with the portfolio submitted at EPA Gateway)

### Assessment Method 1: Project: technical report and presentation with questioning

Fail - does not meet all pass criteria

Theme	KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
Civil engineering technical knowledge and techniques	K1 K2 S1 S2	Applies engineering principles, using underpinning theoretical and technical scientific, mathematical and statistical knowledge, to present a solution to the civil engineering problem outlined in the project. (K1, S1)  Applies civil engineering techniques, procedures and methods including measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; outlines how continuous improvement would support improved performance; and reviews, analyses and evaluates the results of their actions in the project. (K2, S2)	Critically evaluates the effectiveness of the methods, procedures and techniques used, to solve the civil engineering problem in the project (K2, S2)
Data and information handling, collection,	K3 K4 K5 S3 S4 S5 B4	Uses mathematical, statistical and data interpretation tools and techniques, analytical and computational methods, and an integrated or systems-based approach, to interpret, solve and	Critically evaluates the use of mathematical, statistical and data interpretation tools and techniques adopted to solve the problem outlined in the project. (K3, S3)

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analysis and evaluation		<p>evaluate the civil engineering problem outlined in the project. (K3, S3)</p> <p>Identifies, interprets and compares information relating to the properties of materials, components, parts and processes to select those required to solve the civil engineering problem with attention to detail, accuracy and diligently adopting a continuous improvement approach to the problem outlined in the project. (K4, S4, B4)</p> <p>Researches, collects, selects and uses data and information, including technical literature, to address, analyse, and evaluate the civil engineering problem outlined in the project. (K5, S5)</p>	
Planning and use of resources	K14 S15 B2	<p>Makes decisions and exercises sound independent engineering judgement within limits of their authority to plan and manage project resources, equipment and technology to specifications, timescales and budget, escalating when required to mitigate the impact to the cost, quality, safety, security, environment, commercial and legal requirements of the project. (K14, S15, B2)</p>	<p>Evaluates the impact of their decision making on the project requirements. (S15)</p>
Industry standards, policies, and regulatory requirements	K9 K12 S6 S11	<p>Produces civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation. (K9, S6)</p> <p>Applies principles of sustainable development to the civil engineering project and evaluates the impact of the sustainable choices made on the lifecycle of the project in line with UN Sustainable Development Goals (UNSDGs), net-zero carbon emissions, environmental policies and legislation, the environmental protection and the climate change acts. (K12, S11)</p>	<p>Evaluates the impact of industry standards, policies, regulations, legislation and codes of practice on their project solution. (K9, S6)</p>

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Communication	K15 S18	Uses written and verbal communication techniques and methods incorporating appropriate engineering terminology and conventions to meet the needs of the audience. (K15, S18)	None
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## Assessment Method 2: Professional discussion (underpinned by a portfolio of evidence; with the portfolio submitted at EPA Gateway)

Fail - does not meet all pass criteria

Theme	KSBs	Pass Apprentices must demonstrate all of the pass descriptors	Distinction Apprentices must demonstrate all of the pass descriptors and all of the distinction descriptors
Design, technology and models in civil engineering information	K6 K7 K8 S7 S8	<p>Explains the principles and control processes used, including the factors, legislation, codes of practice and industry standards faced when contributing to the design, development and implementation, and evaluation, of civil engineering solutions. (K6, S8)</p> <p>Explains how they use technical drawings, designs, and models, analytical and computer-based techniques to produce, interpret, and evaluate civil engineering solutions, and the limitations of the techniques used. (K7, S7)</p> <p>Explains the use and limitations of digital modelling techniques, such as Building Information Modelling (BIM), within civil engineering solutions. (K8)</p>	Evaluates the impact digital modelling techniques have on civil engineering solutions. (K8)
Project management	K10 K11 K13 S9 S10 S12 S13 S14	Explains how they apply project management techniques to identify, measure, record, and report progress, show how performance criteria have been met in projects, and how they assess and report on quality using management and assurance	Critically evaluates the impact of the chosen project management technique on their project. (K13, S13)

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<p>and safe systems of work</p>	<p>B1</p>	<p>systems and continuous improvement processes. (K13, S13, S14)</p> <p>Describes how they manage and comply with statutory health and safety regulations and procedures, codes of practice and welfare policies including Construction Design Management (CDM) in their civil engineering role. Explains how they contribute to improvements in safe systems of work (within their own area of responsibility) and encourage others to comply. (K10, S9, B1)</p> <p>Describes how they complete risk assessments to identify, evaluate, manage and mitigate hazards and risks in line with organisational procedures and regulatory requirements in the civil engineering sector. (K11, S10)</p> <p>Describes how they manage engineering activities that contribute to sustainable development and the United Nations' Sustainable Development Goals (UNSDGs). (S12)</p>	
<p>Roles, responsibilities, and engagement with others</p>	<p>K16 K17 K18 K19 K20 S16 S17 S19 B3 B5</p>	<p>Describes the roles and responsibilities found in their organisation and the wider civil engineering sector, and the methods used to monitor and manage their own performance at work, and the input of others, describing how they adapt to, and communicate, changing demands. (K16, S16)</p> <p>Describes how they apply teamworking and collaboration principles, to deliver civil engineering activities, individually and as part of a team. (K17, S19, B3)</p> <p>Describes the relationships between organisations and personnel in the civil engineering sector and how the relationships are impacted by commercial and legal matters. (K18)</p>	<p>Critically evaluates the impact of their individual contribution and collaborative working approaches used to deliver civil engineering activities. (K17, S19)</p>

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		<p>Explains how they comply with industry codes of practice and organisational equity, diversity and inclusion policies. (S17)</p> <p>Describes the importance and benefits of, and how they promote, equity, diversity and inclusion through their responsibilities at work, and how they maintain professional and ethical working relationships with internal, external and connected stakeholders. (K19, B5)</p> <p>Describes the issues, symptoms and warning signs related to stress, anxiety and depression, and how to access sources of help and relevant resources. (K20)</p>	
Personal and professional practice	K21 K22 S20 S21 B6	<p>Describes how they take responsibility for planning, undertaking and reviewing their own professional competence, and how they seek opportunities to enhance their knowledge, skills, and experience, and update and review their continuing professional development (CPD).</p> <p>Explains how they support others to develop their professional competence. (K22, S21, B6)</p> <p>Explains how they apply ethical principles and identify and analyse ethical concerns and implications to legal, civil, reputational and professional risk, to make reasoned choices in their role. (K21, S20)</p>	<p>Evaluates how they use their own performance to inform and improve their own or others' professional competence. (K22, S21)</p> <p>Critically evaluates the legal, civil and reputational implications of unethical behaviour and practice within the civil engineering sector. (K21, S20)</p>



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## Degree Apprenticeship Grading

Performance in the EPA determines the overall grade of:

- Fail
- Pass
- Distinction

Overall grading for the apprenticeship is a combination of individual grades for AM1 and AM2, and the overall Degree Apprenticeship grade is produced as follows:

AM1 Grade Project: technical report and presentation with questioning	AM2 Grade Professional discussion underpinned by a portfolio of evidence	Overall Grading
Fail	Any grade	Fail
Any grade	Fail	Fail
Pass	Pass	Pass
Distinction	Pass	Pass
Pass	Distinction	Pass
Distinction	Distinction	Distinction

The degree award within the degree apprenticeship will also be classified and awarded by the Higher Education Provider using its own marking criteria.

However, the degree award MUST only be awarded if the apprentice successfully passes the EPA element of the apprenticeship (AM1 and AM2). It is Government policy that the degree qualification within the degree apprenticeship cannot be awarded without this.

Please find more information on the IfATE website here: [Degree apprenticeships / Institute for Apprenticeships and Technical Education](#).

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## Mapping of Knowledge, Skills and Behaviours (KSBs) to UKSPEC

Here we present how the Knowledge, Skills and Behaviours (KSBs) are mapped to the IEng competences set out in the 4<sup>th</sup> edition of UK-SPEC, which can be found here: <https://www.engc.org.uk/ukspec4th>

The apprentice must follow a training programme where these KSBs must be met in advance of the apprentice proceeding to EPA Gateway. Therefore, all degree apprenticeship providers must ensure that their programme leading up to the EPA maps to all of these KSB statements, and employers must support the apprentice to achieve these in a timely and structured manner.

Employers and apprentices will undergo regular progress reviews throughout their training period, and these should be discussed, targets set and progress measured – as well as the apprentices academic performance, their progress against the overarching 20% off the job learning log, and how these will be evidenced to support the preparation of the EPA portfolio and to enable the employer to approve and sign off the apprentices as ‘ready for EAP gateway’.

### KNOWLEDGE

Number	Statement	UK SPEC	UK SPEC Mapping	EPA Method
K1	Engineering principles, underpinned by theoretical and technical scientific, mathematical and statistical knowledge.	A1	A1: Have maintained and extended a sound theoretical approach to the application of technology in engineering practice	<b>AM 1 / Technical Project</b>
K2	Engineering techniques, procedures and methods used to measure, test and analyse the performance of civil engineering components and systems.	A1	A1: Have maintained and extended a sound theoretical approach to the application of technology in engineering practice	<b>AM 1 / Technical Project</b>
		A2	A2: Use a sound evidence-based approach to problem solving and contribute to continuous improvement.	
		B1	B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	
K3	Analytical tools and techniques to support integrated or systems-based approaches to problem solving.	A2	A2: Use a sound evidence-based approach to problem solving and contribute to continuous improvement.	<b>AM 1 / Technical Project</b>
		B1	B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	
K4	Properties of, identification and selection criteria for materials, components, or parts, and processes used in civil engineering.	A1	A1: Have maintained and extended a sound theoretical approach to the application of technology in engineering practice	<b>AM 1 / Technical Project</b>
		B1		

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			B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	
K5	Techniques and methods used to research and collect, data and technical information.	B3  C1	B3: Implement design solutions for equipment or processes and contribute to their evaluation.  C1: Plan the work and resources needed to enable effective implementation of engineering tasks and projects	<b>AM 1 / Technical Project</b>
K6	Civil engineering design principles and control processes, including the factors that affect design, and the compliance with building safety and health and safety legislation, codes of practice and industry standards.	B2  B3	B2: Contribute to the design and development of engineering solutions  B3: Implement design solutions for equipment or processes and contribute to their evaluation.	AM 2 / Professional Discussion
K7	Technical drawings, designs, and analytical and computer-based techniques.	B1	B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	AM 2 / Professional Discussion
K8	The use and limitations of computational and digital models, including Building Information Modelling (BIM).	B1	B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	AM 2 / Professional Discussion
K9	Industry policies, standards, regulations and legislation, and codes of practice: Building Safety Act 2022 or BSI Flex 8670, Construction (Design and Management) (CDM) or Design Manual for Roads and Bridges (DMRB).	E2	E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	<b>AM 1 / Technical Project</b>
K10	Statutory health, safety and welfare legislation and regulations including Health and Safety at Work Act 1974 and Construction (Design and Management) (CDM) and policies and procedures to enable safe systems of work.	E2	E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	AM 2 / Professional Discussion
K11	Hazard and risk assessment, evaluation, and mitigation processes, in the civil engineering environment.	E2	E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	AM 2 / Professional Discussion

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K12	Principles of sustainable development and their impact on the lifecycle of civil engineering solutions, including United Nations Sustainable Development Goals (UNSDG) and net-zero carbon emissions, environmental policies and legislations, the environmental protection and the climate change acts.	E3	E3: Understand the principles of sustainable development and apply them in their work	<b>AM 1 / Technical Project</b>
K13	Project management techniques: quality and information management, assurance systems and continuous improvement processes.	C1	C1: Plan the work and resources needed to enable effective implementation of engineering tasks and projects	AM 2 / Professional Discussion
		C4	C4: Take an active role in continuous quality improvement.	
K14	Methods for planning, managing and resourcing civil engineering projects, and the impact on cost, quality, safety, security, environment, commercial and legal matters.	C1	C1: Plan the work and resources needed to enable effective implementation of engineering tasks and projects	<b>AM 1 / Technical Project</b>
		C2	C2: Manage (organise, direct and control), programme or schedule, budget and resource elements of engineering tasks or projects	
K15	Methods of communication and when to use them, using appropriate engineering terminology and conventions.	D1	D1: Communicate effectively with others, at all levels, in English	<b>AM 1 / Technical Project</b>
		D2	D2: Clearly present and discuss proposals, justifications and conclusions	
K16	Roles and responsibilities within organisation and the wider civil engineering sector.	C3	C3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	AM 2 / Professional Discussion
		D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	
K17	Principles of teamwork and collaboration.	C3	C3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	AM 2 / Professional Discussion
		D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	
K18	Relationships between organisations in the civil engineering sector (for example organisations, customers, partners and suppliers), including how these are affected by commercial and legal matters.	C3	C3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	AM 2 / Professional Discussion
K19	Equality, diversity and inclusion, including the Equality Act, their responsibilities, its benefits and importance	D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	AM 2 / Professional Discussion

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K20	Awareness of issues and common symptoms and warning signs of stress, anxiety and depression, plus where to go for help and the resources available.	D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	AM 2 / Professional Discussion
K21	Ethical principles and practices, including the implications to legal, civil, reputational and professional risk.	E5	E5: Understand the ethical issues that may arise in their role and carry out their responsibilities in an ethical manner.	AM 2 / Professional Discussion
K22	K22: Methods to maintain and enhance professional competence and technical knowledge (CPD).	E1 E4	E1: Understand and comply with relevant codes of conduct E4: Carry out and record the Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice	AM 2 / Professional Discussion

## SKILLS

Number	Statement	UK SPEC	UK SPEC Mapping	Assessment Method
S1	Apply engineering principles to solve engineering problems: scientific, theoretical and technical principles.	A1	A1: Have maintained and extended a sound theoretical approach to the application of technology in engineering practice	AM 1 / Technical Project
S2	Apply civil engineering techniques, procedures and methods, and review and evaluate the results, including measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; consider how continuous improvement can contribute to improved performance.	A1	A1: Have maintained and extended a sound theoretical approach to the application of technology in engineering practice	AM 1 / Technical Project
		A2	A2: Use a sound evidence-based approach to problem solving and contribute to continuous improvement.	
		B2	B2: Identify, review and select techniques, procedures and methods to undertake engineering tasks	
S3	Employ mathematical, statistical and data interpretation tools, using analytical and computational methods, and apply an integrated or systems-based approach.	A2	A2: Use a sound evidence-based approach to problem solving and contribute to continuous improvement.	AM 1 / Technical Project
		B2	B2: Identify, review and select techniques, procedures and methods to undertake engineering tasks	
S4	Identify, interpret and compare information to select materials, components or parts used in civil engineering.	A1	A1: Have maintained and extended a sound theoretical approach to the application of technology in engineering practice	AM 1 / Technical Project
		B1	B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	

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S5	Research, collect, select and evaluate technical literature and other sources of data and information to address, analyse and evaluate civil engineering problems.	A2 B1	A2: Use a sound evidence-based approach to problem solving and contribute to continuous improvement. B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	<b>AM 1 / Technical Project</b>
S6	Produce civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation.	B2 B3 E2	B2: Contribute to the design and development of engineering solutions B3: Implement design solutions for equipment or processes and contribute to their evaluation. E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	<b>AM 1 / Technical Project</b>
S7	Select and apply computational and analytical techniques to model civil engineering problems, recognising the limitations of the techniques employed.	B1	B1: Identify, review and select techniques, procedures and methods to undertake engineering tasks	AM 2 / Professional Discussion
S8	Contribute to the design, development and implementation of civil engineering solutions, and evaluate their effectiveness in the context of the whole project life cycle.	B2 B3	B2: Contribute to the design and development of engineering solutions B3: Implement design solutions for equipment or processes and contribute to their evaluation.	AM 2 / Professional Discussion
S9	Manage and comply with statutory health, safety and welfare policies, procedures and regulation, and contribute to improvements in health, safety and welfare, within their own area of responsibility.	E2	E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	AM 2 / Professional Discussion
S10	Complete risk assessments to identify, evaluate, manage and mitigate risks.	E2	E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	AM 2 / Professional Discussion
S11	Apply principles of sustainable development and evaluate their effectiveness on the whole project lifecycle of civil engineering solutions.	E3	E3: Understand the principles of sustainable development and apply them in their work	<b>AM 1 / Technical Project</b>
S12	Manage engineering activities that contribute to sustainable development and the United Nations' Sustainable Development Goals (UNSDGs).	E3 C1 C2	E3: Understand the principles of sustainable development and apply them in their work C1: Plan the work and resources needed to enable effective implementation of engineering tasks and projects C2: Manage (organise, direct and control), programme or schedule, budget and resource elements of engineering tasks or projects	AM 2 / Professional Discussion

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S13	Apply project management techniques, identifying, measuring, recording and reporting progress against civil engineering project performance criteria.	C1	C1: Plan the work and resources needed to enable effective implementation of engineering tasks and projects	AM 2 / Professional Discussion
		C2	C2: Manage (organise, direct and control), programme or schedule, budget and resource elements of engineering tasks or projects	
		C4	C4: Take an active role in continuous quality improvement.	
S14	Manage quality processes and contribute to quality improvements.	C4	C4: Take an active role in continuous quality improvement.	AM 2 / Professional Discussion
S15	Plans and manages resources, equipment and technology, to meet project requirements, specifications, costs and budgets and timescales, with an appreciation of statutory and commercial arrangements.	C1	C1: Plan the work and resources needed to enable effective implementation of engineering tasks and projects	<b>AM 1 / Technical Project</b>
		C2	C2: Manage (organise, direct and control), programme or schedule, budget and resource elements of engineering tasks or projects	
S16	Monitor and manage individual performance, and the input of others, recognising the need to adapt to, and communicate, changing demands.	C3	C3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	AM 2 / Professional Discussion
		D1	D1: Communicate effectively with others, at all levels, in English	
		D3	D3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	
S17	Comply with appropriate codes of practice and equality, diversity and inclusion (EDI) requirements.	D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	AM 2 / Professional Discussion
S18	Communicate in verbal and written contexts using appropriate methods for the audience. Use appropriate engineering terminology and conventions.	D1	D1: Communicate effectively with others, at all levels, in English	<b>AM 1 / Technical Project</b>
		D2	D2: Clearly present and discuss proposals, justifications and conclusions	
S19	Apply teamwork and collaboration principles.	C3	C3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	AM 2 / Professional Discussion
		D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	
S20	Apply ethical principles, identifying and analysing ethical concerns and making reasoned ethical choices.	E5	E5: Understand the ethical issues that may arise in their role and carry out their responsibilities in an ethical manner.	AM 2 / Professional Discussion
S21	Plan, undertake and review their own professional competence, regularly updating, recording and reviewing their continuing professional development (CPD).	E1	E1: Understand and comply with relevant codes of conduct	AM 2 / Professional Discussion

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		E4	E4: Carry out and record the Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice	
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## BEHAVIOURS

Number	Statement	UK SPEC	UK SPEC Mapping	Assessment Method
B1	Works to health, safety and welfare requirements, safe systems of work, industry standards, statutory regulation and legislation, policies, and codes of practice, and ensuring others do likewise.	E2	E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	AM 2 / Professional Discussion
B2	Makes decisions, exercising sound independent engineering judgement, whilst knowing their own limits of authority and when to ask for help or to escalate.	C1	C1: Plan the work and resources needed to enable effective implementation of engineering tasks and projects	AM 1 / Technical Project
		C2	C2: Manage (organise, direct and control), programme or schedule, budget and resource elements of engineering tasks or projects	
		E2	E2: Understand the safety implications of their role and manage, apply and improve safe systems of work	
B3	Works effectively, individually and as part of a team.	C2	C2: Manage (organise, direct and control), programme or schedule, budget and resource elements of engineering tasks or projects	AM 2 / Professional Discussion
		C3	C3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	
		D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	
B4	Solves problems with attention to detail, accuracy, and diligence, and seeks to continually improve.	A2	A2: Use a sound evidence-based approach to problem solving and contribute to continuous improvement.	AM 1 / Technical Project
		C4	C4: Take an active role in continuous quality improvement.	
B5	Promotes equality, diversity and inclusivity in the workplace, maintains professional working relationships with internal, external, and connected stakeholders, and makes reasoned ethical choices.	C3	C3: Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	AM 2 / Professional Discussion
		D3	D3: Demonstrate personal and social skills and awareness of diversity and inclusion issues.	



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B6	Takes responsibility for their own professional development, seeking opportunities to extend and enhance their knowledge, skills, and experience, and support others, in line with professional codes of conduct.	E1 E4	E1: Understand and comply with relevant codes of conduct E4: Carry out and record the Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice	AM 2 / Professional Discussion
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## Mapping of UKSPEC IEng Competence Statements to Knowledge, Skills and Behaviours (KSBs)

### A. Knowledge and understanding

UK SPEC	IEng Competence Statement	KSBs	Knowledge Statement	Skill Statement	Behaviour Statement	Assessment Method(s)
A1	Have maintained and extended a sound theoretical approach to the application of technology in engineering practice	K:1, 2, 4 S: 1, 2, 4 B: -	<p>K1: Engineering principles, underpinned by theoretical and technical scientific, mathematical and statistical knowledge.</p> <p>K2: Engineering techniques, procedures and methods used to measure, test and analyse the performance of civil engineering components and systems.</p> <p>K4: Properties of, identification and selection criteria for materials, components, or parts, and processes used in civil engineering.</p>	<p>S1: Apply engineering principles to solve engineering problems: scientific, theoretical and technical principles.</p> <p>S2: Apply civil engineering techniques, procedures and methods, and review and evaluate the results, including measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; consider how continuous improvement can contribute to improved performance.</p> <p>S4: Identify, interpret and compare information to select materials, components or parts used in civil engineering.</p>	NIL	<b>AM 1 / Technical Project</b>
A2	Use a sound evidence-based approach to problem solving and contribute to continuous improvement	K:2, 3 S: 2, 3, 5 B: 4	<p>K2: Engineering techniques, procedures and methods used to measure, test and analyse the performance of civil engineering components and systems.</p> <p>K3: Analytical tools and techniques to support integrated or systems-based approaches to problem solving.</p>	<p>S2: Apply civil engineering techniques, procedures and methods, and review and evaluate the results, including measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; consider how continuous improvement can contribute to improved performance.</p>	B4: Solves problems with attention to detail, accuracy, and diligence, and seeks to continually improve.	<b>AM 1 / Technical Project</b>

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				<p>S3: Employ mathematical, statistical and data interpretation tools, using analytical and computational methods, and apply an integrated or systems-based approach.</p> <p>S5: Research, collect, select and evaluate technical literature and other sources of data and information to address, analyse and evaluate civil engineering problems.</p>		
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## B. Design, development and solving engineering problems

B1	Identify, review and select techniques, procedures and methods to undertake engineering tasks	K: 2, 3, 4, 7, 8 S: 4, 5, 7 B: -	<p>K2: Engineering techniques, procedures and methods used to measure, test and analyse the performance of civil engineering components and systems.</p> <p>K3: Analytical tools and techniques to support integrated or systems-based approaches to problem solving.</p> <p>K4: Properties of, identification and selection criteria for materials, components, or parts, and processes used in civil engineering.</p>	<p>S4: Identify, interpret and compare information to select materials, components or parts used in civil engineering.</p> <p>S5: Research, collect, select and evaluate technical literature and other sources of data and information to address, analyse and evaluate civil engineering problems.</p>	NIL	<b>AM 1 / Technical Project</b>
			<p>K7: Technical drawings, designs, and analytical and computer-based techniques.</p> <p>K8: The use and limitations of computational and digital models, including Building Information Modelling (BIM).</p>	<p>S7: Select and apply computational and analytical techniques to model civil engineering problems, recognising the limitations of the techniques employed.</p>		NIL

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B2	Contribute to the design and development of engineering solutions	K: 6 S: 2, 3, 6, 8 B: -	NIL	<p>S2: Apply civil engineering techniques, procedures and methods, and review and evaluate the results, including measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; consider how continuous improvement can contribute to improved performance.</p> <p>S3: Employ mathematical, statistical and data interpretation tools, using analytical and computational methods, and apply an integrated or systems-based approach.</p>	NIL	<b>AM 1 / Technical Project</b>
			K6: Civil engineering design principles and control processes, including the factors that affect design, and the compliance with building safety and health and safety legislation, codes of practice and industry standards.	<p>S6: Produce civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation.</p> <p>S8: Contribute to the design, development and implementation of civil engineering solutions, and evaluate their effectiveness in the context of the whole project life cycle.</p>		NIL
B3	Implement design solutions for equipment or processes and contribute to their evaluation.	K: 5, 6 S: 6, 8 B: -	K5: Techniques and methods used to research and collect, data and technical information.	S6: Produce civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation.	NIL	<b>AM 1 / Technical Project</b>
			K6: Civil engineering design principles and control processes, including the factors that affect design, and the compliance with building safety and health and safety legislation, codes of practice and industry standards.	S8: Contribute to the design, development and implementation of civil engineering solutions, and evaluate their effectiveness in the context of the whole project life cycle.		NIL

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## C. Responsibility, management and leadership

C1	Plan the work and resources needed to enable effective implementation of engineering tasks and projects	K: 5, 13, 14 S: 12, 13, 15 B: 2	K5: Techniques and methods used to research and collect, data and technical information.	S12: Manage engineering activities that contribute to sustainable development and the United Nations’ Sustainable Development Goals (UNSDGs).	B2: Makes decisions, exercising sound independent engineering judgement, whilst knowing their own limits of authority and when to ask for help or to escalate.	<b>AM 1 / Technical Project</b>
			K14: Methods for planning, managing and resourcing civil engineering projects, and the impact on cost, quality, safety, security, environment, commercial and legal matters.	S15: Plans and manages resources, equipment and technology, to meet project requirements, specifications, costs and budgets and timescales, with an appreciation of statutory and commercial arrangements.		
			K13: Project management techniques: quality and information management, assurance systems and continuous improvement processes.	S13: Apply project management techniques, identifying, measuring, recording and reporting progress against civil engineering project performance criteria.	NIL	AM 2 / Professional Discussion
C2	Manage (organise, direct and control), programme or schedule, budget and resource elements of engineering tasks or projects	K: 14 S: 12, 13, 15 B: 2, 3	K14: Methods for planning, managing and resourcing civil engineering projects, and the impact on cost, quality, safety, security, environment, commercial and legal matters.	S15: Plans and manages resources, equipment and technology, to meet project requirements, specifications, costs and budgets and timescales, with an appreciation of statutory and commercial arrangements.	B2: Makes decisions, exercising sound independent engineering judgement, whilst knowing their own limits of authority and when to ask for help or to escalate.	<b>AM 1 / Technical Project</b>
			NIL	S12: Manage engineering activities that contribute to sustainable development and the United Nations’ Sustainable Development Goals (UNSDGs).		
				S13: Apply project management techniques, identifying, measuring, recording and reporting progress against civil engineering project performance criteria.		AM 2 / Professional Discussion

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C3	Manage teams, or the input of others, into own work and assist others to meet changing technical and management needs	K: 16, 17, 18 S: 16, 19 B: 3, 5	K16: Roles and responsibilities within organisation and the wider civil engineering sector.  K17: Principles of teamwork and collaboration.  K18: Relationships between organisations in the civil engineering sector (for example organisations, customers, partners and suppliers), including how these are affected by commercial and legal matters.	S16: Monitor and manage individual performance, and the input of others, recognising the need to adapt to, and communicate, changing demands.  S19: Apply teamwork and collaboration principles.	B3: Works effectively, individually and as part of a team.  B5: Promotes equality, diversity and inclusivity in the workplace, maintains professional working relationships with internal, external, and connected stakeholders, and makes reasoned ethical choices.	AM 2 / Professional Discussion
C4	Take an active role in continuous quality improvement.	K: 13 S: 13, 14 B: 4	NIL	NIL	B4: Solves problems with attention to detail, accuracy, and diligence, and seeks to continually improve.	<b>AM 1 / Technical Project</b>
			K13: Project management techniques: quality and information management, assurance systems and continuous improvement processes.	S13: Apply project management techniques, identifying, measuring, recording and reporting progress against civil engineering project performance criteria.  S14: Manage quality processes and contribute to quality improvements.	NIL	AM 2 / Professional Discussion

## D. Communication and interpersonal skills

D1	Communicate effectively with others, at all levels, in English	K: 15 S: 16, 18 B: -	K15: Methods of communication and when to use them, using appropriate engineering terminology and conventions.	S18: Communicate in verbal and written contexts using appropriate methods for the audience. Use appropriate engineering terminology and conventions.	NIL	<b>AM 1 / Technical Project</b>
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# Civil Engineering Degree Apprenticeship (v1.1): Mapping

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				S16: Monitor and manage individual performance, and the input of others, recognising the need to adapt to, and communicate, changing demands.	NIL	AM 2 / Professional Discussion
D2	Clearly present and discuss proposals, justifications and conclusions	K:15 S: 18 B: -	K15: Methods of communication and when to use them, using appropriate engineering terminology and conventions.	S18: Communicate in verbal and written contexts using appropriate methods for the audience. Use appropriate engineering terminology and conventions.	NIL	<b>AM 1 / Technical Project</b>
D3	Demonstrate personal and social skills and awareness of diversity and inclusion issues.	K: 16, 17, 19, 20 S: 16, 17, 19 B: 3, 5	K16: Roles and responsibilities within organisation and the wider civil engineering sector.  K17: Principles of teamwork and collaboration.  K19: Equality, diversity and inclusion, including the Equality Act, their responsibilities, its benefits and importance  K20: Awareness of issues and common symptoms and warning signs of stress, anxiety and depression, plus where to go for help and the resources available.	S16: Monitor and manage individual performance, and the input of others, recognising the need to adapt to, and communicate, changing demands.  S17: Comply with appropriate codes of practice and equality, diversity and inclusion (EDI) requirements.  S19: Apply teamwork and collaboration principles.	B3: Works effectively, individually and as part of a team.  B5: Promotes equality, diversity and inclusivity in the workplace, maintains professional working relationships with internal, external, and connected stakeholders, and makes reasoned ethical choices.	AM 2 / Professional Discussion

## E. Personal and professional commitment

E1	Understand and comply with relevant codes of conduct	K: 9, 22 S: 6, 9, 21 B: 1, 6	K9: Industry policies, standards, regulations and legislation, and codes of practice: Building Safety Act 2022 or BSI Flex 8670, Construction (Design and Management) (CDM) or Design	S6: Produce civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation.	NIL	<b>AM 1 / Technical Project</b>
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			Manual for Roads and Bridges (DMRB).			
			K22: Methods to maintain and enhance professional competence and technical knowledge (CPD).	<p>S9: Manage and comply with statutory health, safety and welfare policies, procedures and regulation, and contribute to improvements in health, safety and welfare, within their own area of responsibility.</p> <p>S21: Plan, undertake and review their own professional competence, regularly updating, recording and reviewing their continuing professional development (CPD).</p>	<p>B1: Works to health, safety and welfare requirements, safe systems of work, industry standards, statutory regulation and legislation, policies, and codes of practice, and ensuring others do likewise.</p> <p>B6: Takes responsibility for their own professional development, seeking opportunities to extend and enhance their knowledge, skills, and experience, and support others, in line with professional codes of conduct.</p>	AM 2 / Professional Discussion
E2	Understand the safety implications of their role and manage, apply and improve safe systems of work	K: 9, 10, 11 S: 6, 9, 10 B: 1, 2	K9: Industry policies, standards, regulations and legislation, and codes of practice: Building Safety Act 2022 or BSI Flex 8670, Construction (Design and Management) (CDM) or Design Manual for Roads and Bridges (DMRB).	S6: Produce civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation.	B2: Makes decisions, exercising sound independent engineering judgement, whilst knowing their own limits of authority and when to ask for help or to escalate.	<b>AM 1 / Technical Project</b>
			K10: Statutory health, safety and welfare legislation and regulations including Health and Safety at Work Act 1974 and Construction (Design and Management) (CDM) and policies and procedures to enable safe systems of work.	S9: Manage and comply with statutory health, safety and welfare policies, procedures and regulation, and contribute to improvements in health, safety and welfare, within their own area of responsibility.	B1: Works to health, safety and welfare requirements, safe systems of work, industry standards, statutory regulation and legislation, policies, and codes of	AM 2 / Professional Discussion



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			K11: Hazard and risk assessment, evaluation, and mitigation processes, in the civil engineering environment.	S10: Complete risk assessments to identify, evaluate, manage and mitigate risks.	practice, and ensuring others do likewise.	
E3	Understand the principles of sustainable development and apply them in their work	K: 12 S: 11, 12 B: -	K12: Principles of sustainable development and their impact on the lifecycle of civil engineering solutions, including United Nations Sustainable Development Goals (UNSDG) and net-zero carbon emissions, environmental policies and legislations, the environmental protection and the climate change acts.	S11: Apply principles of sustainable development and evaluate their effectiveness on the whole project lifecycle of civil engineering solutions.	NIL	<b>AM 1 / Technical Project</b>
				S12: Manage engineering activities that contribute to sustainable development and the United Nations' Sustainable Development Goals (UNSDGs).		AM 2 / Professional Discussion
E4	Carry out and record the Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice	K: 22 S: 21 B: 6	K22: Methods to maintain and enhance professional competence and technical knowledge (CPD).	S21: Plan, undertake and review their own professional competence, regularly updating, recording and reviewing their continuing professional development (CPD).	B6: Takes responsibility for their own professional development, seeking opportunities to extend and enhance their knowledge, skills, and experience, and support others, in line with professional codes of conduct.	AM 2 / Professional Discussion
E5	Understand the ethical issues that may arise in their role and carry out their responsibilities in an ethical manner.	K: 21 S: 20 B: -	K21: Ethical principles and practices, including the implications to legal, civil, reputational and professional risk.	S20: Apply ethical principles, identifying and analysing ethical concerns and making reasoned ethical choices.		AM 2 / Professional Discussion

# Civil Engineering Degree Apprenticeship (v1.1): Mapping

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## Mapping of Knowledge, Skills and Behaviours (KSBs) to AHEP Accreditation Requirements

Here we present how the Knowledge, Skills and Behaviours (KSBs) are mapped to the underpinning learning outcome requirements for IEng competence set out in the 4<sup>th</sup> edition of AHEP, which can be found here: [ahep-fourth-edition.pdf](#)

The apprentice must follow an Engineering Council accredited degree programme as part of the degree apprenticeship. Therefore, the whole degree apprenticeship must meet accreditation learning outcomes – that is the award which includes both the training period (up to EPA gateway) and the EPA element of the degree apprenticeship.

**EPA CREDIT VALUE:** The EPA credit value must be no less than 30 credits of the degree, with [Joint Board of Moderators](#) (JBM) enabling the EPA credit value to be between **30 and 45 credits** of the overall degree but it must include a design thread.

For further guidance on professional accreditation of degree apprenticeships and the integrated EPA approach, please use the following JBM guidance:

- Degree apprenticeships: [jbm-guidance-for-degree-apprenticeships-02-25.pdf](#)
- Integrated degree apprenticeships: [jbm-guidance-for-integrated-degree-apprenticeships-in-england.pdf](#)

Note that the occupational standard has been mapped to the educational base required for Incorporated Engineer (IEng) registration i.e. AHEP statements B1 to B18. The table below also lists the requirements for 'IEng with Partial CEng' which requires solutions to complex problems, for any training provider that is looking to develop a programme at that higher level.

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AHEP	AHEP Statement (IEng)	AHEP Statement (IEng with Partial CEng)	KSBs	Knowledge Statement	Skill Statement	Behaviour Statement	Assessment Method
<i>Science, mathematics and engineering principles</i>							
B1 / C1	B1. Apply knowledge of mathematics, statistics, natural science and engineering principles to <b>broadly-defined</b> problems. Some of the knowledge will be informed by <b>current developments</b> in the subject of study.	C1. Apply knowledge of mathematics, statistics, natural science and engineering principles to <b>the solution of complex</b> problems. Some of the knowledge will be at the <b>forefront</b> of the particular subject of study.	K:1, 2 S: 1, 2 B: -	K1: Engineering principles, underpinned by theoretical and technical scientific, mathematical and statistical knowledge.  K2: Engineering techniques, procedures and methods used to measure, test and analyse the performance of civil engineering components and systems.	S1: Apply engineering principles to solve engineering problems: scientific, theoretical and technical principles.  S2: Apply civil engineering techniques, procedures and methods, and review and evaluate the results, including measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; consider how continuous improvement can contribute to improved performance.	NIL	AM 1 / Technical Project

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<i>Problem Analysis</i>							
B2 / C2	B2. Analyse <b>broadly-defined</b> problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.	C2. Analyse <b>complex</b> problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles.	K: 3 S: 3 B: 4	K3: Analytical tools and techniques to support integrated or systems-based approaches to problem solving.	S3: Employ mathematical, statistical and data interpretation tools, using analytical and computational methods, and apply an integrated or systems-based approach.	B4: Solves problems with attention to detail, accuracy, and diligence, and seeks to continually improve.	AM 1 / Technical Project
<i>Analytical tools and techniques</i>							
B3 / C3	B3. Select and apply appropriate computational and analytical techniques to model <b>broadly defined</b> problems, recognising the limitations of the techniques employed.	C3. Select and apply appropriate computational and analytical techniques to model <b>complex</b> problems, recognising the limitations of the techniques employed.	K: 3, 7, 8 S: 3, B: -	K3: Analytical tools and techniques to support integrated or systems-based approaches to problem solving.	S3: Employ mathematical, statistical and data interpretation tools, using analytical and computational methods, and apply an integrated or systems-based approach.	NIL	AM 1 / Technical Project
				K7: Technical drawings, designs, and analytical and computer-based techniques.  K8: The use and limitations of computational and digital models, including Building Information Modelling (BIM).	S6: Produce civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation.  S7: Select and apply computational and analytical techniques to model civil engineering problems, recognising the limitations of the techniques employed.	NIL	AM 2 / Professional Discussion

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Technical Literature							
B4 / C4	B4. Select and evaluate technical literature and other sources of information to address <b>broadly defined</b> problems	C4. Select and evaluate technical literature and other sources of information to address <b>complex</b> problems.	K: 5 S: 5 B: -	K5: Techniques and methods used to research and collect, data and technical information.	S5: Research, collect, select and evaluate technical literature and other sources of data and information to address, analyse and evaluate civil engineering problems.	NIL	AM 1 / Technical Project
Design							
B5 / C5	B5. Design solutions for <b>broadly defined</b> problems that 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.	C5. Design solutions for <b>complex</b> problems that 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.	K: 6, 9, 10, 11 S: 6, 8, 9, 10 B: 2	K6: Civil engineering design principles and control processes, including the factors that affect design, and the compliance with building safety and health and safety legislation, codes of practice and industry standards.	S8: Contribute to the design, development and implementation of civil engineering solutions, and evaluate their effectiveness in the context of the whole project life cycle.	NIL	AM 2 / Professional Discussion
				K10: Statutory health, safety and welfare legislation and regulations including Health and Safety at Work Act 1974 and Construction (Design and Management) (CDM) and policies and procedures to enable safe systems of work.	S9: Manage and comply with statutory health, safety and welfare policies, procedures and regulation, and contribute to improvements in health, safety and welfare, within their own area of responsibility.		
				K9: Industry policies, standards, regulations and legislation, and codes of practice: Building Safety Act 2022 or BSI Flex 8670,	S6: Produce civil engineering technical solutions in accordance with relevant industry standards, policies,	B2: Makes decisions, exercising sound independent engineering	AM 1 / Technical Project

# Civil Engineering Degree Apprenticeship (v1.1): Mapping

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				Construction (Design and Management) (CDM) or Design Manual for Roads and Bridges (DMRB).	codes of practice, regulations, and legislation.	judgement, whilst knowing their own limits of authority and when to ask for help or to escalate.	
<i>Integrated / systems approach</i>							
B6 / C6	B6. Apply an integrated or systems approach to the solution of <b>broadly defined</b> problems	C6. Apply an integrated or systems approach to the solution of <b>complex</b> problems.	K: 3 S: 3 B: -	K3: Analytical tools and techniques to support integrated or systems-based approaches to problem solving.	S3: Employ mathematical, statistical and data interpretation tools, using analytical and computational methods, and apply an integrated or systems-based approach.	NIL	AM 1 / Technical Project
<i>Sustainability</i>							
B7 / C7	B7. Evaluate the environmental and societal impact of solutions to <b>broadly-defined</b> problems.	C7. Evaluate the environmental and societal impact of solutions to <b>complex problems and minimise adverse impacts.</b>	K: 12 S: 11, 12 B: -	K12: Principles of sustainable development and their impact on the lifecycle of civil engineering solutions, including United Nations Sustainable Development Goals (UNSDG) and net-zero carbon emissions, environmental policies and legislations, the environmental protection and the climate change acts.	S11: Apply principles of sustainable development and evaluate their effectiveness on the whole project lifecycle of civil engineering solutions.	NIL	AM 1 / Technical Project
					S12: Manage engineering activities that contribute to sustainable development and the United Nations' Sustainable Development Goals (UNSDGs).	NIL	AM 2 / Professional Discussion

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<i>Ethics</i>							
B8 / C8	B8. Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.	C8. Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct.	K: 21 S: 20 B: -	K21: Ethical principles and practices, including the implications to legal, civil, reputational and professional risk.	S20: Apply ethical principles, identifying and analysing ethical concerns and making reasoned ethical choices.	NIL	AM 2 / Professional Discussion
<i>Risk</i>							
B9 / C9	B9. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.	C9. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity.	K: 10, 11 S: 9, 10 B: 1	K10: Statutory health, safety and welfare legislation and regulations including Health and Safety at Work Act 1974 and Construction (Design and Management) (CDM) and policies and procedures to enable safe systems of work.  K11: Hazard and risk assessment, evaluation, and mitigation processes, in the civil engineering environment.	S9: Manage and comply with statutory health, safety and welfare policies, procedures and regulation, and contribute to improvements in health, safety and welfare, within their own area of responsibility.  S10: Complete risk assessments to identify, evaluate, manage and mitigate risks.	B1: Works to health, safety and welfare requirements, safe systems of work, industry standards, statutory regulation and legislation, policies, and codes of practice, and ensuring others do likewise.	AM 2 / Professional Discussion
<i>Security</i>							
B10 / C10	B10. Adopt a holistic and proportionate approach to the mitigation of security risks.	C10. Adopt a holistic and proportionate approach to the mitigation of security risks.	K: S: B:	K14: Methods for planning, managing and resourcing civil engineering projects, and the impact on cost, quality, safety, security, environment, commercial and legal matters.	S15: Plans and manages resources, equipment and technology, to meet project requirements, specifications, costs and budgets and timescales, with an appreciation of statutory and commercial arrangements.	NIL	AM 1 / Technical Project

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<i>Equality, diversity and inclusion</i>							
B11 / C11	B11. Recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.	C11. <b>Adopt an inclusive approach to engineering practice and</b> recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion.	K: 19 S: 17 B: 5	K19: Equality, diversity and inclusion, including the Equality Act, their responsibilities, its benefits and importance.	S17: Comply with appropriate codes of practice and equality, diversity and inclusion (EDI) requirements.	B5: Promotes equality, diversity and inclusivity in the workplace, maintains professional working relationships with internal, external, and connected stakeholders, and makes reasoned ethical choices.	AM 2 / Professional Discussion
<i>Practical and workshop skills</i>							
B12 / C12	B12. Use practical laboratory and workshop skills to investigate <b>broadly defined</b> problems.	C12. Use practical laboratory and workshop skills to investigate <b>complex</b> problems.	K: 2 S: 2 B: -	K2: Engineering techniques, procedures and methods used to measure, test and analyse the performance of civil engineering components and systems.	S2: Apply civil engineering techniques, procedures and methods, and review and evaluate the results, including measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; consider how continuous improvement can contribute to improved performance.	NIL	AM 1 / Technical Project



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<i>Materials, equipment, technologies and processes</i>							
B13 / C13	B13. Select and apply appropriate materials, equipment, engineering technologies and processes.	C13. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.	K: 4 S: 4 B: -	K4: Properties of, identification and selection criteria for materials, components, or parts, and processes used in civil engineering.	S4: Identify, interpret and compare information to select materials, components or parts used in civil engineering.	NIL	AM 1 / Technical Project
<i>Quality management</i>							
B14 / C14	B14. Recognise the need for quality management systems and continuous improvement in the context of <b>broadly defined</b> problems.	C14. Discuss the role of quality management systems and continuous improvement in the context of <b>complex</b> problems.	K: 13 S: 13, 14 B: -	K13: Project management techniques: quality and information management, assurance systems and continuous improvement processes.	S13: Apply project management techniques, identifying, measuring, recording and reporting progress against civil engineering project performance criteria.  S14: Manage quality processes and contribute to quality improvements.	NIL	AM 2 / Professional Discussion

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Engineering and project management							
B15 / C15	B15. Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters.	C15. Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal <b>matters including intellectual property rights.</b>	K:13, 14, 16 S: 12, 13, 14 B: -	K14: Methods for planning, managing and resourcing civil engineering projects, and the impact on cost, quality, safety, security, environment, commercial and legal matters.	S15: Plans and manages resources, equipment and technology, to meet project requirements, specifications, costs and budgets and timescales, with an appreciation of statutory and commercial arrangements	NIL	AM 1 / Technical Project
				K13: Project management techniques: quality and information management, assurance systems and continuous improvement processes.  K16: Roles and responsibilities within organisation and the wider civil engineering sector.  K18: Relationships between organisations in the civil engineering sector (for example organisations, customers, partners and suppliers), including how these are affected by commercial and legal matters.	S12: Manage engineering activities that contribute to sustainable development and the United Nations' Sustainable Development Goals (UNSDGs).  S13: Apply project management techniques, identifying, measuring, recording and reporting progress against civil engineering project performance criteria.  S14: Manage quality processes and contribute to quality improvements.	NIL	AM 2 / Professional Discussion

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<i>Teamwork</i>							
B16 / C16	B16. Function effectively as an individual, and as a member or leader of a team.	C16. Function effectively as an individual, and as a member or leader of a team.	K: 16, 17, 20 S: 16, 19 B: 3	K16: Roles and responsibilities within organisation and the wider civil engineering sector.  K17: Principles of teamwork and collaboration.  K20: Awareness of issues and common symptoms and warning signs of stress, anxiety and depression, plus where to go for help and the resources available.	S16: Monitor and manage individual performance, and the input of others, recognising the need to adapt to, and communicate, changing demands.  S19: Apply teamwork and collaboration principles.	B3: Works effectively, individually and as part of a team.	AM 2 / Professional Discussion
<i>Communication</i>							
B17 / C17	B17. Communicate effectively with technical and non-technical audiences	C17. Communicate effectively on complex engineering matters with technical and non-technical audiences	K: 15 S: 16, 18 B: -	K15: Methods of communication and when to use them, using appropriate engineering terminology and conventions.	S18: Communicate in verbal and written contexts using appropriate methods for the audience. Use appropriate engineering terminology and conventions.		AM 1 / Technical Project
					S16: Monitor and manage individual performance, and the input of others, recognising the need to adapt to, and communicate, changing demands.		AM 2 / Professional Discussion

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<i>Lifelong learning</i>							
B18 / C18	B18. Plan and record self-learning and development as the foundation for lifelong learning/CPD	C18. Plan and record self-learning and development as the foundation for lifelong learning/CPD.	K: 22 S: 21 B: 6	K22: Methods to maintain and enhance professional competence and technical knowledge (CPD).	S21: Plan, undertake and review their own professional competence, regularly updating, recording and reviewing their continuing professional development (CPD).	B6: Takes responsibility for their own professional development, seeking opportunities to extend and enhance their knowledge, skills, and experience, and support others, in line with professional codes of conduct.	AM 2 / Professional Discussion

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## Mapping of ICE Attributes to Knowledge, Skills and Behaviours (KSBs)

An apprenticeship is a jointly supported training programme, with the training provider working in partnership with the employer and the apprentice, to achieve the competences (KSBs) set out in the occupational standard.

Version 1.1 of the civil engineering degree apprenticeship also enables apprentices to consider membership and build into the training programme, a clear basis for a pathway to professional registration with the professional engineering institutions in the Joint Board of Moderators, these being:

- Institution of Civil Engineers (ICE)
- Chartered Institution of Highways and Transportation (CIHT)
- Institute of Highways Engineers (IHE)
- Institution of Structural Engineers (IStructE)
- Permanent Way Institution (PWI)

Each of these professional engineering institutions will have their own guidance for degree apprentices, including information on membership, professional development programmes, and routes to professional registration. We recommend that apprentices and employers look towards apprenticeship membership right from the outset of the apprenticeship and developing the professional competences through a structured work-based professional development programme, which will support apprentices to be exposed to all the competences (or KSBs) required to achieve this apprenticeship in a timely manner.

ICE has been supporting apprenticeship end-point assessments since 2018 and we recognise many apprentices, employers and training providers will have been mapping KSBs to ICE 'attributes' for IEng registration and we map these here for you, as well as their assignment to each assessment method (blue for AM1 and green for AM2). Therefore, this part of the mapping document relates specifically to the mapping of Institution of Civil Engineers (ICE) 'attributes' which form the basis of civil engineers in the ICE meeting the requirements of UK SPEC as an IEng registrant.

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ICE attribute	Sub - attribute	Knowledge Statement	Skill Statement	Behaviour Statement
1. Understanding and Practical Application of Engineering	Maintain and extend knowledge of engineering theory and practice, and how technology assists its application	K1: Engineering principles, underpinned by theoretical and technical scientific, mathematical and statistical knowledge (AM1)	-	-
	Solve engineering problems using a sound theoretical approach, based on evidence, and contribute to continuous improvement	-	S1: Apply engineering principles to solve engineering problems and contribute to continuous improvement: scientific, theoretical, and technical principles (AM1)	B4: Solves problems with attention to detail, accuracy, and diligence, and seeks to continually improve (AM1)
	Identify, review and select techniques, procedures and methods to undertake engineering tasks	<p>K2: Engineering techniques, procedures and methods used to measure, test and analyse the performance of civil engineering components and systems (AM1)</p> <p><b>In addition, the EPA assessment plan sets a number of specific requirements that align with this attribute:</b></p> <p>K3: Analytical tools and techniques to support integrated or systems-based approaches to problem solving (AM1)</p> <p>K4: Properties of, identification and selection criteria for materials, components or parts, and processes used in civil engineering (AM1)</p> <p>K5: Techniques and methods used to research and collect data and technical information (AM1)</p>	<p>S2: Apply civil engineering techniques, procedures and methods, review and evaluate the results, including when measuring and testing, designing, installing, commissioning, constructing, maintaining or operating civil engineering components and systems; consider how continuous improvement can contribute to improved performance (AM1)</p> <p><b>In addition, the EPA assessment plan sets a number of specific requirements that align with this attribute:</b></p> <p>S3: Employ mathematical, statistical and data interpretation tools, using analytical and computational methods, and applying an integrated or systems-based approach (AM1)</p> <p>S4: Identify, interpret, and compare information in relation to materials, components or parts used in civil engineering (AM1)</p>	

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		<p>K7: Technical drawings, designs, and analytical and computer-based techniques (AM2)</p> <p>K8: The use and limitations of computational and digital models, including Building Information Modelling (BIM) (AM2)</p>	<p>S5: Select and evaluate technical literature and other sources of data and information to address, analyse and evaluate civil engineering problems (AM1)</p> <p>S7: Select and apply appropriate computational and analytical techniques to model civil engineering problems, recognising the limitations of the techniques employed (AM2)</p>	
	Contribute to the design and development of engineering solutions, implement those solutions, and evaluate their effectiveness in the context of the whole project life cycle	K6: Civil engineering design principles and control processes, including the factors that affect design, and the compliance with building safety and health and safety legislation, codes of practice and industry standards (AM2)	S8: Contribute to the design, development and implementation of civil engineering solutions, and evaluate their effectiveness in the context of the whole project life cycle (AM2)	
	Exercise sound independent engineering judgement	-	-	B2: Makes decisions, exercising sound independent engineering judgement, whilst knowing their own limits of authority and when to ask for help or to escalate (AM1)
2. Management and Leadership	<p>Plan the work and resources needed to enable effective implementation of engineering tasks and projects</p> <p>Manage the planning and organisation of tasks and resources</p>	K14: Methods for planning, managing and resourcing civil engineering projects, and the impact on cost, quality, safety, <u>security</u> , environment, commercial and legal matters (AM1)	<p>S15: Plans and manages resources, equipment and technology, to meet project requirements, specifications, costs/budget and timescales, with an appreciation of statutory and commercial arrangements (AM1)</p> <p><b>In addition, the EPA assessment plan sets additional requirements that align with this attribute:</b></p> <p>S13: Apply project management techniques, identifying, measuring, recording and reporting</p>	-

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			progress against civil engineering project performance criteria (AM2)	
	Manage teams or technical specialisms	K17: Principles of teamwork and collaboration (AM2)	S19: Apply teamwork and collaboration principles (AM2)	B3: Works effectively, individually and as part of a team (AM2)
	Assist others to meet changing technical and managerial needs	K16: Roles and responsibilities within their organisation and the wider civil engineering sector (AM2)	S16: Monitor and manage individual performance, and the input of others, recognising the need to adapt to, and communicate, changing demands (AM2)	
	Manage quality processes and contribute to quality improvements	K13: Project management techniques, including quality and information management and assurance systems and the need and use of continuous improvement processes (AM2)	S14: Manage quality processes and contribute to quality improvements (AM2)	
3. Commercial Ability	Manage, prepare and control costs/budgets of engineering tasks or projects	<p>K14: Methods for planning, managing and resourcing civil engineering projects, and the impact on cost, quality, safety, <u>security</u>, environment, commercial and legal matters (AM1)</p> <p><b>In addition, the EPA assessment plan sets additional requirements that align with this attribute:</b></p> <p>K18: Relationships between organisations, customers, partners &amp; suppliers in the civil engineering sector, including how these are affected by commercial and legal matters (AM2)</p>	S15: Plans and manages resources, equipment and technology, to meet project requirements, specifications, costs/budget and timescales, with an appreciation of statutory and commercial arrangements (AM1)	
	Use sound knowledge of statutory and commercial frameworks within their own area of responsibility and have an appreciation of other commercial arrangements	K9: Industry policies, standards, regulations and legislation, and codes of practice: Building Safety Act 2022 or BSI Flex 8670, Construction (Design and Management) (CDM) or Design Manual for Roads and Bridges (DMRB) (AM1)	S6: Produce civil engineering technical solutions in accordance with relevant industry standards, policies, codes of practice, regulations, and legislation (AM1)	



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4. Health, Safety and Welfare	Demonstrate a sound knowledge of legislation, hazards and safe systems of work	K10: Statutory health, safety and welfare legislation and regulations including Health and Safety at Work Act 1974 and Construction (Design and Management) (CDM) and policies and procedures to enable safe systems of work (AM2)	-	-
	Manage risks	K11: Hazard and risk assessment, evaluation, and mitigation processes, in the civil engineering environment (AM2)	S10: Complete risk assessments to identify, evaluate, manage and mitigate risks (AM2)	
	Manage health, safety and welfare within their own area of responsibility	-	S9: Manage and comply with statutory health, safety and welfare policies, procedures and regulation, and contribute to improvements in health, safety and welfare, within their own area of responsibility (AM2)	B1: Works to health, safety and welfare requirements, safe systems of work, industry standards, statutory regulation and legislation, policies, and codes of practice, and ensuring others do likewise (AM2)
	Contribute to improvements in health, safety and welfare	<b>In addition, the EPA assessment plan sets additional requirements that align with this attribute:</b>  K20. Awareness of issues and common symptoms and warning signs of stress, anxiety and depression, plus where to go for help and the resources available (AM2)		
5. Sustainable Development	Understand the principles of sustainable development and apply them in work	K12: Principles of sustainable development and their impact on the lifecycle of civil engineering solutions, including United Nations Sustainable Development Goals (UNSDG) and net-zero carbon emissions, environmental policies and legislations, the environmental protection and the climate change acts (AM1)	S11: Apply principles of sustainable development and evaluate their effectiveness on the whole project lifecycle of civil engineering solutions (AM1)	-
	Manage engineering activities that contribute to sustainable development and the United Nations' Sustainable Development Goals (UNSDGs)	-	S12: Manage engineering activities that contribute to sustainable development and the United Nations' Sustainable Development Goals (UNSDGs) (AM2)	-
6. Interpersonal Skills and Communication	Communicate well with others at all levels including effective use of	K15: Methods of communication and when to use them, using appropriate engineering terminology and conventions (AM1)	S18: Communicate in verbal and written contexts using appropriate methods for the	-

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	English*, orally and in writing		audience. Use appropriate engineering terminology and conventions (AM1)	
	Discuss ideas and plans competently and with confidence  Demonstrate effective personal and social skills	<b>NOTE:</b> <i>Whilst there are no specific KSBs here, EPA candidates will be assessed on this competence during the technical project presentation with questioning and the professional discussion elements of the EPA.</i>		
	Demonstrate awareness of diversity and inclusion	K19: Equality, diversity and inclusion, including the Equality Act, their responsibilities, its benefits and importance (AM2)	S17: Comply with appropriate codes of practice and equality, diversity & inclusion (EDI) requirements (AM2)	B5: Promotes equality, diversity and inclusivity in the workplace, maintains professional working relationships with internal, external, and connected stakeholders, and makes reasoned ethical choices (AM2)
7. Professional Commitment	Understand and comply with the ICE Code of Conduct	<b>NOTE:</b> <i>Whilst there are no specific KSBs here, ICE will expect applicants to demonstrate this for membership and registration. Other Professional Engineering Institutions will have similar requirements for membership and professional registration.</i>		
	Understand the ethical issues that may arise in their role and carry out their responsibilities in an ethical manner	K21: Ethical principles and practices, including the implications to legal, civil, reputational and professional risk (AM2)	S20: Apply ethical principles, identifying and analysing ethical concerns and making reasoned ethical choices (AM2)	Note B5 includes the requirement "... makes reasoned ethical choices"
	Plan, carry out and record Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice	K22: Methods to maintain and enhance professional competence and technical knowledge (CPD) (AM2)	S21: Plan, undertake and review their own professional competence, regularly updating, recording and reviewing their continuing professional development (CPD) (AM2)	B6: Takes responsibility for their own professional development, seeking opportunities to extend and enhance their knowledge, skills, and experience, and support others, in line with professional codes of conduct (AM2)

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	Identify the limits of their personal knowledge and skills	-	-	<i>Note B2 includes the requirement “... whilst knowing ... when to ask for help or to escalate”.</i>
	Engage with ICE activities	<b>NOTE:</b> <i>Whilst there are no specific KSBs here, ICE will expect applicants to demonstrate this for membership and registration.</i>		