Draft Learning Outcomes - AAQAH Edition 2

Notes for consultation:

- *These learning outcomes are informed by UK-SPEC 3rd edition and refinement may be needed following consultation on UK-SPEC 4th edition.*
- *The learning outcomes at level 5 and above are proposed for use with both of AHEP 4th edition and AAQAH 2nd edition. The learning outcomes are levels 3 and 4 are specified for AAQAH only.*
- *If printing this table it is best to use A3 paper.*
- **DA = informed by a Dublin Accord Graduate Attribute, SA = based upon a Sydney Accord Graduate Attribute; WA = based upon a Washington Accord Graduate Attribute. These cross references will be deleted from the final version of the document]*
- *A'number' is used within the consultation document as an identifier to enable respondents to comment on headings and notes. These references will be deleted from the final version of the document but other numbering will be retained.*

A1 **Area of Learning**	A2 **Engineering Technician /ICTTechnician** Level 3 England, Wales, Northern Ireland, Level 6 or 7 Scotland	A3 **Exceeds Engineering Technician/ICT Technician** Level 4 England, Wales, Northern Ireland, Level 7 Scotland	A4 **Towards Incorporated Engineer threshold** Level 5 England, Wales, Northern Ireland, Level 8 Scotland	A5 **Incorporated Engineer** Level 6 England, Wales, Northern Ireland, Level 9 or 10 Scotland		A6 **Incorporated Engineer (with further learning required for CEng)** Level 6 England, Wales, Northern Ireland, Level 10 Scotland	A7 **Chartered Engineer** Level 7 England, Wales, Northern Ireland, Level 11 or 12 Scotland	
	A8 **Level 3 qualifications and apprenticeship approved or accredited as fully meeting the academic requirement for EngTech registration**	A9 **HNCs and equivalent qualifications and apprenticeships approved or accredited as fully meeting the academic requirement for EngTech registration and partially meeting the academic requirement for IEng registration**	A10 **HNDs and equivalent qualifications and apprenticeships approved or accredited as fully meeting the academic requirement for EngTech registration and partially meeting the academic requirement for IEng registration**	A11 **Bachelors Top-up Degrees and equivalent qualifications and apprenticeships approved or accredited as meeting the requirement for Further Learning for IEng registration**	A12 **Bachelors degrees and Bachelors (Honours) degrees and equivalent qualifications and apprenticeships approved or accredited as fully meeting the academic requirement for IEng registration**	A13 **Bachelors (Honours) degrees and equivalent qualifications and apprenticeships approved or accredited as fully meeting the academic requirement for IEng registration and partially meeting the academic requirement for CEng registration**	A14 **Masters degrees other than the Integrated Masters and equivalent qualifications and apprenticeships approved or accredited as meeting the requirement for Further Learning for CEng registration**	A15 **Integrated Masters degrees and equivalent qualifications and apprenticeships approved or accredited as fully meeting the academic requirement for CEng registration**
	A16 On successful completion of an approved or accredited qualification or apprenticeship, an individual will be able to							
A17 **Science and Mathematics** *Engineering is underpinned by science and mathematics, and other associated disciplines, as defined by the relevant professional engineering institution(s).*	T1. Apply knowledge of mathematics, natural science and engineering principles to well-defined engineering problems. (DA1*)	H1. (as T1) Apply knowledge of mathematics, natural science and engineering principles to well-defined engineering problems. (DA1)	F1 .Apply knowledge of mathematics, natural science and engineering principles to broadly-defined engineering problems (DA1)	B1. Apply knowledge of mathematics, natural science and engineering principles to broadly-defined engineering problems. At least some of the knowledge will be informed by current developments in the subject of study (SA1*)	B1. Apply knowledge of mathematics, natural science and engineering principles to broadly-defined engineering problems. At least some of the knowledge will be informed by current developments in the subject of study (SA1)	C1. Apply knowledge of mathematics, natural science and engineering principles to the solution of complex engineering problems. At least some of the knowledge will be at the forefront of the particular subject of study (WA1*)	M1a. Apply knowledge of mathematics, natural science and engineering principles to the solution of complex engineering problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider	M1b. Apply a broad-based knowledge of mathematics, natural science and engineering principles to the solution of complex engineering problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider

							multidisciplinary context of engineering	multidisciplinary context of engineering
A18 **Engineering Analysis** *Engineering analysis involves the application of engineering concepts and tools to the solution of engineering problems.*	T2. Identify and use appropriate tests, measurements and other methods of analysis appropriate to their field of activity	H2. Identify and analyse well-defined engineering problems reaching substantiated conclusions using tests, measurements and other methods of analysis appropriate to their field of engineering. (DA 2, DA4)	F2. Analyse broadly-defined engineering problems reaching substantiated conclusions	B2. Analyse broadly-defined engineering problems reaching substantiated conclusions using first principles of mathematics, natural science and engineering science (SA2)	B2. Analyse broadly-defined engineering problems reaching substantiated conclusions using first principles of mathematics, natural science and engineering science (SA2)	C2. Analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural science and engineering science (WA2)	M2. Analyse complex engineering problems reaching substantiated conclusions in the absence of complete data using first principles of mathematics, natural science and engineering science	M2. Analyse complex engineering problems reaching substantiated conclusions in the absence of complete data using first principles of mathematics, natural science and engineering science
	T3. Apply appropriate solutions to well-defined engineering or ICT problems using methods specific to their field of activity	H3. Apply appropriate techniques and resources, including use of modern engineering and IT, tools to well-defined engineering problems, with an awareness of their limitations (DA5)	F3. Use computer-aided engineering tools to model broadly-defined engineering problems	B3. Use computer-aided engineering tools to model broadly-defined engineering problems, recognising the limitations of the techniques employed (SA5)	B3. Use computer-aided engineering tools to model broadly-defined engineering problems, recognising the limitations of the techniques employed (SA5)	C3. Select and apply appropriate analysis techniques using computer-aided engineering tools to model complex engineering problems, recognising the limitations of the techniques employed (WA5)	M3. Select and apply appropriate analysis techniques in the absence of complete data using computer-aided engineering tools to model complex engineering problems, discussing the limitations of the techniques employed	M3. Select and apply appropriate analysis techniques in the absence of complete data using computer-aided engineering tools to model complex engineering problems, discussing the limitations of the techniques employed
A19 **Design and innovation** *Engineers need understanding of design, and the ability to design viable products, process or systems, even if not working in design roles.*	T4. Contribute to design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet business, customer and user needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations	H4. Design solutions for well-defined technical problems and assist with the design of systems, components or processes to meet business, customer and user needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations (DA3, DA6)	F4. Design solutions for broadly-defined engineering problems that meet business with appropriate consideration of health & safety, cultural, societal and environmental matters, codes of practice and industry standards	B4. Design solutions for broadly-defined engineering problems that meet business, customer and user needs with appropriate consideration of health & safety, costing & pricing, cultural, societal and environmental matters, codes of practice and industry standards (SA3, SA6)	B4. Design solutions for broadly-defined engineering problems that meet business, customer and user needs with appropriate consideration of health & safety, costing & pricing, cultural, societal and environmental matters, codes of practice and industry standards (SA3, SA6)	C4. Design solutions for complex engineering problems that meet business, user and customer needs with appropriate consideration of health & safety, costing & pricing, cultural, societal and environmental matters, codes of practice and industry standards (WA3, WA6)	M4. Design innovative solutions for complex engineering problems that evidence some originality and design systems, components or processes that meet business, user and customer needs with appropriate consideration of health & safety, costing & pricing, cultural, societal and environmental matters, codes of practice and industry standards	M4. Design innovative solutions for complex engineering problems that evidence some originality and design systems, components or processes that meet business, user and customer needs with appropriate consideration of health & safety, costing & pricing, cultural, societal and environmental matters, codes of practice and industry standards

	T5. Apply an integrated or systems approach to the solution of well-defined engineering problems	H5 (as T5) Apply an integrated or systems approach to the solution of well-defined engineering problems	F5. Apply an integrated or systems approach to the solution of broadly-defined engineering problems	This learning outcome is met at the previous level of study	B5 (as F5) Apply an integrated or systems approach to the solution of broadly-defined engineering problems	C5. Apply an integrated or systems approach to the solution of complex engineering problems	This learning outcome is met at the previous level of study	M5. (as C5) Apply an integrated or systems approach to the solution of complex engineering problems
A20 **The Engineer and Society** *Engineering activity can have economic, social, security, ethical and environmental impacts.*	T6. Undertake engineering work in a way that contributes to sustainable development.	H6. Understand and evaluate the sustainability and impact of engineering practice in the solution of well-defined engineering problems (DA7)	F6. Discuss the sustainability and impact of professional engineering practice	B6. Evaluate the sustainability and impact of professional engineering practice	B6. Evaluate the sustainability and impact of professional engineering practice (SA7)	C6. Evaluate the sustainability and impact of professional engineering practice (WA7)	This learning outcome is met at the previous level of study	M6 (as C5). Evaluate the sustainability and impact of professional engineering practice (WA7)
	T7. Apply ethical principles and recognise the need for engineers to exercise their responsibilities in an ethical manner and in line with professional codes of conduct (DA8)	H7 (as T7) Apply ethical principles and recognise the need for engineers to exercise their responsibilities in an ethical manner and in line with professional codes of conduct (DA8)	F7 (as T7). Apply ethical principles and recognise the need for engineers to exercise their responsibilities in an ethical manner and in line with professional codes of conduct (DA8)	This learning outcome is met at the previous level of study	B7 (as F7) Apply ethical principles and recognise the need for engineers to exercise their responsibilities in an ethical manner and in line with professional codes of conduct (SA8)	C7 (as B7) Apply ethical principles and recognise the need for engineers to exercise their responsibilities in an ethical manner and in line with professional codes of conduct (WA8)	This learning outcome is met at the previous level of study	M7 (as C7). Apply ethical principles and recognise the need for engineers to exercise their responsibilities in an ethical manner and in line with professional codes of conduct (WA8)
	T8 Identify, evaluate and mitigate risks (the effects of uncertainty) specific to their field of activity	H8 Identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	F8. Identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	B8. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	B8. Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	C8. Use a risk management framework to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity	This learning outcome is met at the previous level of study	M8 (as C8). Use a risk management framework to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity
	T9. Adopt a security-minded approach and recognise the need for engineers to take a holistic and proportionate approach to the mitigation of security risks.	H9 (as T9). Adopt a security-minded approach and recognise the need for engineers to take a holistic and proportionate approach to the mitigation of security risks.	F9. (as T9). Adopt a security-minded approach and recognise the need for engineers to take a holistic and proportionate approach to the mitigation of security risks.	This learning outcome is met at the previous level of study.	B9 (as T9). Adopt a security-minded approach and recognise the need for engineers to take a holistic and proportionate approach to the mitigation of security risks.	C9 (as T9). Adopt a security-minded approach and recognise the need for engineers to take a holistic and proportionate approach to the mitigation of security risks.	This learning outcome is met at the previous level of study.	M9 (as T9). Adopt a security-minded approach and recognise the need for engineers to take a holistic and proportionate approach to the mitigation of security risks.

A21 **Engineering Practice** *This is the practical application of engineering knowledge and skills, which needs to take account of contextual constraints such a legal requirements.*	F10. Contribute to practical investigations of well-defined engineering problems including conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to provide valid conclusions	F10. Conduct practical investigations of well-defined engineering problems including conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to provide valid conclusions	F10. Conduct practical investigations of broadly-defined engineering problems including conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to provide valid conclusions	B10. Conduct practical investigations of broadly-defined engineering problems using research-based methods including design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to provide valid conclusions (SA4)	B10. Conduct practical investigations of broadly-defined engineering problems using research-based methods including design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to provide valid conclusions (SA4)	C10. Conduct practical investigations of complex engineering problems using research-based methods including design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to provide valid conclusions (WA4)	This learning outcome is met at the previous level of study	M10 as (C10). Conduct practical investigations of complex engineering problems using research-based methods including design and conduct of experiments, analysis and interpretation of experimental data, and synthesis of information to provide valid conclusions (WA4)
	T11a Plan and carry out a personal programme of work, making use of relevant materials, equipment, tools, processes, and/or products	H11a (as T11a) Plan and carry out a personal programme of work, making use of relevant materials, equipment, tools, processes, and/or products	F11. Use appropriate materials, equipment, engineering technologies and processes	B11. Select and apply appropriate materials, equipment, engineering technologies and processes	B11. Select and apply appropriate materials, equipment, engineering technologies and processes	C11. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations	This learning outcome is met at the previous level of study	M11 (as C11) Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations
	T11b Understand and use suitable techniques, procedures and practices for engineering operations and processes	H11b Understand and use suitable techniques, procedures and practices to undertake well-defined engineering tasks						
	T12a Demonstrate awareness of engineering management principles, commercial context and project management.	H12a Apply knowledge of engineering management principles, commercial context and project management. (DA11)	F12. Apply knowledge of engineering management principles, commercial context and project management	B12. Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters (SA11)	B12. Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters (SA11)	C12. Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters including intellectual property rights (WA11)	This learning outcome is met at the previous level of study	M12 (as C12). Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters including intellectual property rights (WA11)
	T12b Demonstrate ability to use and apply information from technical literature effectively.	H12b (as T12b) Demonstrate ability to use and apply information from technical literature effectively						
	T13 Function effectively as an individual and as a member of a team. (DA 9)	H13 (as T13) Function effectively as an individual and as a member of a team. (DA 9)	F13. Function effectively as an individual, and as a member or leader of a team	B13 (as F13). Function effectively as an individual, and as a member or leader of a team	B13. Function effectively as an individual, and as a member or leader of a team (SA9)	C13. Function effectively as an individual, and as a member or leader of a team, and in multidisciplinary settings (WA9)	This learning outcome is met at the previous level of study	M13 (as C13) Function effectively as an individual, and as a member or leader of a team, and in multidisciplinary settings (WA9)
	T14 Communicate effectively with technical and non-technical audiences. (DA10))	H14 (as T14) Communicate effectively with technical and non-technical audiences. (DA10)	F14 (as T14). Communicate effectively with technical and non-technical audiences	B14 (as F14). Communicate effectively with technical and non-technical audiences	B14 (as F14). Communicate effectively with technical and non-technical audiences	C14. Communicate effectively on complex engineering matters with technical and non-technical audiences	M14. Communicate effectively on complex engineering matters and using diverse methods with	M14. Communicate effectively on complex engineering matters and using diverse methods with technical

			(SA10)	(SA10)	(SA10)	(WA10)	technical and non-technical audiences	and non-technical audiences
	T15 Plan self-learning and improve performance, as the foundation for lifelong learning/CPD (DA12	H15 (as T15) Plan self-learning and improve performance, as the foundation for lifelong learning/CPD (DA12)	F15. Plan self-learning and development as the foundation for lifelong learning/CPD	B15 (as F15) Plan self-learning and development as the foundation for lifelong learning/CPD	B15 (as F15) Plan self-learning and development as the foundation for lifelong learning/CPD	C15.(as F15) Plan self-learning and development as the foundation for lifelong learning/CPD (WA12)	This learning outcome is met at the previous level of study	M15.(as F15) Plan self-learning and development as the basis for lifelong learning/CPD (WA12)
	T15 Demonstrate awareness of quality issues and the potential for continuous improvement	H15 (as T15) Demonstrate understanding of quality issues and the potential for continuous improvement						

A22 **Notes**

A23 1. **Well defined engineering problems** involve several issues, but with few of these exerting conflicting constraints, and can be solved in standardised ways.

A24 2. **Broadly-defined engineering problems** involve a variety of factors which may impose conflicting constraints, but can be solved by the application of well-proven analysis techniques.

A25 3. **Complex engineering problems** have no obvious solution and may involve wide-ranging or conflicting technical issues and/or user needs.

A26 4. These learning outcomes should be interpreted in the context of a particular disciplinary or multidisciplinary engineering practice.

A27 5. An approved or accredited programme must meet all of the identified learning outcomes for all learners, however learning hours are likely to vary between the five areas of learning

A28 6. It is recognised that an accredited or approved programme may deliver learning outcome(s) beyond the threshold level, including where learning outcome are met at the previous level of study, however such additional learning is not prescribed or required for academic accreditation.

A29 7. The learning outcomes may be a useful reference for PEIs looking to accredit IPD schemes.

A30 8 The Engineering Council defines security as ‘the state of relative freedom from threat or harm caused by deliberate, unwanted, hostile or malicious acts. It operates on a number of levels ranging from national security issues to countering crime’ – see the guidance note at: https://www.engc.org.uk/standards-guidance/guidance/guidance-on-security/