Draft Learning Outcomes - AHEP Edition 4

Notes for consultation:

- *These draft learning outcomes are informed by UK-SPEC 3rd edition and refinement may be needed following consultation on UK-SPEC 4th edition.*
- *If printing this table it is best to use A3 paper.*
- *SA = based upon a Sydney Accord Graduate Attribute; WA = based upon a Wasting Accord Graduate Attribute. These cross references will be deleted from the final version of the document.*
- *AH'number' is used within this consultation document as an identified 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.*

AH1 **Area of Learning**	AH2 **Incorporated Engineer**			AH3 **Chartered Engineer**		
	AH4 **Foundation degrees and equivalent qualifications accredited as fully meeting the academic requirement for EngTech registration and partially meeting the academic requirement for IEng registration**	AH5 **Bachelors Top-up Degrees accredited as meeting the requirement for Further Learning for IEng registration**	AH6 **Bachelors degrees and Bachelors (Honours) degrees accredited as fully meeting the academic requirement for IEng registration**	AH7 **Bachelors (Honours) degrees accredited as fully meeting the academic requirement for IEng registration and partially meeting the academic requirement for CEng registration**	AH8 **Masters degrees other than the Integrated Masters and Doctoral programmes accredited as meeting the requirement for Further Learning for CEng registration**	AH9 **Integrated Masters degrees accredited as fully meeting the academic requirement for CEng registration**
AH10 On successful completion of an accredited degree programme, a graduate will be able to:						
AH11 Science and Mathematics	F1. Apply knowledge of mathematics, natural science and engineering principles to broadly-defined engineering problems	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	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 multidisciplinary context of engineering	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
AH12 Engineering Analysis	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	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
	F3. Use computer-aided engineering tools to model broadly-defined engineering	B3. Use computer-aided engineering tools to model broadly-defined engineering	B3. Use computer-aided engineering tools to model broadly-defined engineering	C3. Select and apply appropriate analysis techniques using computer-	M3. Select and apply appropriate analysis techniques in the absence	M3. Select and apply appropriate analysis techniques in the absence

	problems	problems, recognising the limitations of the techniques employed	problems, recognising the limitations of the techniques employed (SA5)	aided engineering tools to model complex engineering problems, recognising the limitations of the techniques employed (WA5)	of complete data using computer-aided engineering tools to model complex engineering problems, discussing the limitations of the techniques employed	of complete data using computer-aided engineering tools to model complex engineering problems, discussing the limitations of the techniques employed
AH13 Design and Innovation	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 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	M4. Design innovative solutions for complex engineering problems that evidence some originality and 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
	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. 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. Apply an integrated or systems approach to the solution of complex engineering problems
AH14 The Engineer and Society	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. Evaluate the sustainability and impact of professional engineering practice
	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	This learning outcome is met at the previous level of study	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 (SA8)	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)	This learning outcome is met at the previous level of study	M7. 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
	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. Use a risk management framework to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity
	F9. 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. 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. 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. Adopt a security-minded approach and recognise the need for engineers to take a holistic and proportionate approach to the mitigation of security risks

AH15 Engineering Practice	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	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. 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
	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. Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations
	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	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. Apply knowledge of engineering management principles, commercial context, project management and relevant legal matters including intellectual property rights
	F13. Function effectively as an individual, and as a member or leader of a team	This learning outcome is met at the previous level of study	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. Function effectively as an individual, and as a member or leader of a team, and in multidisciplinary settings
	F14. Communicate effectively with technical and non-technical audiences	This learning outcome is met at the previous level of study	B14. Communicate effectively with technical and non-technical audiences (SA10)	C14. Communicate effectively on complex engineering matters with technical and non-technical audiences (WA10)	M14. Communicate effectively on complex engineering matters and using diverse methods with technical and non-technical audiences	M14. Communicate effectively on complex engineering matters and using diverse methods with technical and non-technical audiences
	F15. Plan self-learning and development as the foundation for lifelong learning/CPD	This learning outcome is met at the previous level of study	B15. Plan self-learning and development as the foundation for lifelong learning/CPD (SA12)	C15. 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. Plan self-learning and development as the foundation for lifelong learning/CPD

Notes

1. **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.
2. **Complex engineering problems** have no obvious solution and may involve wide-ranging or conflicting technical issues and/or user needs.
3. These learning outcomes should be interpreted in the context of a particular disciplinary or multidisciplinary engineering practice.
4. A graduate from an accredited degree programme must meet all of the identified learning outcomes, however student learning hours are likely to vary between the five areas of learning
5. It is recognised that an accredited degree programme may develop 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.

6. 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/