

The Institution of Engineering Designers

Learning Outcomes - Chartered Engineer (AHEP4)



EDITION CONTROL: LEARNING OUTCOMES - CHARTERED ENGINEER (AHEP4)

Edition	Revision Date	Notes
Edition 1	February 2022	



Learning Outcomes - Chartered Engineer (AHEP4)

Area of Learning	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	Masters degrees other than the Integrated Masters and Doctoral programmes and equivalent qualifications and apprenticeships approved or accredited as meeting the requirement for further learning for CEng registration	Integrated Masters degrees and equivalent qualifications and apprenticeships approved or accredited as fully meeting the academic requirement for CEng registration		
On successful completion of an ap	proved or accredited programme, a	n individual will be able to:			
Science and mathematics					
The study of engineering requires	a substantial grounding in engineer	ing principles, science and mathem	atics commensurate with the		
level of study.					
Science, mathematics and engineering principles	C1. Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study.	M1. Apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering.	M1. Apply a comprehensive knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex problems. Much of the knowledge will be at the forefront of the particular subject of study and informed by a critical awareness of new developments and the wider context of engineering.		
Engineering analysis					

Engineering analysis involves the application of engineering concepts and tools to analyse, model and solve problems. At higher levels of study engineers will work with information that may be uncertain or incomplete.

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Problem analysis	C2. Analyse complex problems	M2. Formulate and analyse	M2. Formulate and analyse	
	to reach substantiated	complex problems to reach	complex problems to reach	
	conclusions using first principles	substantiated conclusions. This	substantiated conclusions. This	
	of mathematics, statistics,	will involve evaluating available	will involve evaluating available	
	natural science and engineering	data using first principles of	data using first principles of	
	principles.	mathematics, statistics, natural	mathematics, statistics, natural	
		science and engineering	science and engineering	
		principles, and using engineering	principles, and using engineering	
		judgment to work with	judgment to work with	
		information that may be	information that may be	
		uncertain or incomplete,	uncertain or incomplete,	
		discussing the limitations of the	discussing the limitations of the	
		techniques employed.	techniques employed.	
Analytical tools and techniques	C3. Select and apply appropriate	M3. Select and apply	M3. Select and apply	
	computational and analytical	appropriate computational and	appropriate computational and	
	techniques to model complex	analytical techniques to model	analytical techniques to model	
	problems, recognising the	complex problems, discussing	complex problems, discussing	
	limitations of the techniques	the limitations of the techniques	the limitations of the techniques	
	employed.	employed.	employed.	
Technical literature	C4. Select and evaluate	M4. Select and critically	M4. Select and critically	
	technical literature and other	evaluate technical literature and	evaluate technical literature and	
	sources of information to	other sources of information to	other sources of information to	
	address complex problems.	solve complex problems.	solve complex problems.	
Design and innovation				
Design is the creation and develor	oment of an economically viable pro	pduct, process or system to meet a	defined need. It involves	

significant technical and intellectual challenges commensurate with the level of study.

Design	C5. Design solutions for complex	M5. Design solutions for complex	M5. Design solutions for complex
	problems that meet a	problems that evidence some	problems that evidence some
	combination of societal, user,	originality and meet a	originality and meet a
	business and customer needs as	combination of societal, user,	combination of societal, user,
	appropriate. This will involve	business and customer needs as	business and customer needs as
	consideration of applicable	appropriate. This will involve	appropriate. This will involve
	health and safety, diversity,	consideration of applicable	consideration of applicable
	inclusion, cultural, societal,	health and safety, diversity,	health and safety, diversity,
	environmental and commercial	inclusion, cultural, societal,	inclusion, cultural, societal,
	matters, codes of practice and	environmental and commercial	environmental and commercial
	industry standards.	matters, codes of practice and	matters, codes of practice and
		industry standards.	industry standards.
Integrated/systems approach	C6. Apply an integrated or	Learning outcome achieved at	M6. Apply an integrated or
	systems approach to the solution	previous level of study.	systems approach to the solution
	of complex problems.		of complex problems.
The engineer and society			
Engineering activity can have a sig	gnificant societal impact and engine	ers must operate in a responsible a	nd ethical manner, recognise the
importance of diversity, and help	ensure that the benefits of innovati	ion and progress are shared equitab	oly and do not compromise the
natural environment or deplete na	atural resources to the detriment of	future generations.	1
Sustainability	C7. Evaluate the environmental	M7. Evaluate the environmental	M7. Evaluate the environmental
	and societal impact of solutions	and societal impact of solutions	and societal impact of solutions
	to complex problems and	to complex problems (to include	to complex problems (to include
	minimise adverse impacts.	the entire life-cycle of a product	the entire lifecycle of a product
		or process) and minimise	or process) and minimise
		adverse impacts.	adverse impacts.
Ethics	C8. Identify and analyse ethical		M8. Identify and analyse ethical
	concerns and make reasoned	Learning outcome achieved at	concerns and make reasoned
	ethical choices informed by	previous level of study.	ethical choices informed by
	professional codes of conduct.		professional codes of conduct.
Risk	C9. Use a risk management	Learning outcome achieved at	M9. Use a risk management
	process to identify, evaluate and	previous level of study	process to identify, evaluate and
	mitigate risks (the effects of		mitigate risks (the effects of
	uncertainty) associated with a		uncertainty) associated with a
	particular project or activity.		particular project or activity.
Security	C10. Adopt a holistic and	Learning outcome achieved at	M10. Adopt a holistic and
	proportionate approach to the	previous level of study.	proportionate approach to the
	mitigation of security risks.		mitigation of security risks.

Equality, diversity and inclusion	C11. Adopt an inclusive	Learning outcome achieved at	M11. Adopt an inclusive
	approach to engineering	previous level of study.	approach to engineering
	practice and recognise the		practice and recognise the
	responsibilities, benefits and		responsibilities, benefits and
	importance of supporting		importance of supporting
	equality, diversity and inclusion.		equality, diversity and inclusion.
Engineering practice			
The practical application of engin	eering concepts and tools, engineer	ring and project management, tean	work and communication skills.
Engineers also require a sound gra	asp of the commercial context of th	eir work, specifically the ways an o	rganisation creates, delivers and
captures value in economic, socia	l, cultural or other contexts.		
Practical and workshop skills	C12. Use practical laboratory		M12. Use practical laboratory
	and workshop skills to	Learning outcome achieved at	and workshop skills to
	investigate complex problems.	previous level of study.	investigate complex problems.
Materials, equipment,	C13. Select and apply	Learning outcome achieved at	M13. Select and apply
technologies and processes	appropriate materials,	previous level of study.	appropriate materials,
	equipment, engineering		equipment, engineering
	technologies and processes,		technologies and processes,
	recognising their limitations.		recognising their limitations.
Quality management	C14. Discuss the role of quality	Learning outcome achieved at	M14. Discuss the role of quality
	management systems and	previous level of study.	management systems and
	continuous improvement in the		continuous improvement in the
	context of complex problems.		context of complex problems.
Engineering and project	C15. Apply knowledge of	Learning outcome achieved at	M15. Apply knowledge of
management	engineering management	previous level of study.	engineering management
	principles, commercial context.		principles, commercial context.
	project and change		project and change
	management, and relevant legal		management, and relevant legal
	matters including intellectual		matters including intellectual
	property rights.		property rights.
Teamwork	C16. Function effectively as an	M16. Function effectively as an	M16. Function effectively as an
	individual, and as a member or	individual, and as a member or	individual, and as a member or
	leader of a team.	leader of a team. Evaluate	leader of a team. Evaluate
		effectiveness of own and team	effectiveness of own and team
		performance.	performance.

Communication	C17. Communicate effectively	M17. Communicate effectively	M17. Communicate effectively
	on complex engineering matters	on complex engineering matters	on complex engineering matters
	with technical and non-technical	with technical and non-technical	with technical and non-technical
	audiences.	audiences, evaluating the	audiences, evaluating the
		effectiveness of the methods	effectiveness of the methods
		used.	used.
Lifelong learning	C18. Plan and record self-	Learning outcome achieved at	M18. Plan and record self-
	learning and development as the	previous level of study	learning and development as the
	foundation for lifelong		foundation for lifelong
	learning/CPD.		learning/CPD.



The Institution of Engineering Designers

Learning Outcomes - Incorporated Engineer (AHEP4)



EDITION CONTROL: LEARNING OUTCOMES - INCORPORATED ENGINEER (AHEP4)

Edition	Revision Date	Notes
Edition 1	February 2022	



Learning Outcomes - Incorporated Engineer (AHEP4)

Area of Learning	Foundation degrees, Higher National Diplomas 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	Bachelors Top-up degrees and equivalent qualifications and apprenticeships approved or accredited as meeting the requirement for further learning for IEng registration	Bachelors degrees and Bachelors (Honours) and equivalent qualifications and apprenticeships approved or accredited as fully meeting the academic requirement for IEng registration
On successful completion of an ap	proved or accredited programme, a	n individual will be able to:	
Science and mathematics			
The study of engineering requires level of study.	a substantial grounding in engineer	ing principles, science and mathem	atics commensurate with the
Science, mathematics and	F1. Apply knowledge of	B1. Apply knowledge of	B1. Apply knowledge of
engineering principles	mathematics, statistics, natural science and engineering principles to broadly-defined problems.	mathematics, statistics, natural science and engineering principles to broadly-defined problems. Some of the knowledge will be informed by current developments in the subject of study.	mathematics, statistics, natural science and engineering principles to broadly-defined problems. Some of the knowledge will be informed by current developments in the subject of study.
Engineering analysis			
Engineering analysis involves the a	application of engineering concepts	and tools to analyse, model and so	lve problems. At higher levels of
study engineers will work with inf	ormation that may be uncertain or	incomplete.	
Problem analysis	F2. Analyse broadly-defined problems reaching substantiated conclusions.	B2. Analyse broadly-defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles	B2. Analyse broadly-defined problems reaching substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles

Analytical tools and techniques	F3. Use appropriate	B3. Select and apply appropriate	B3. Select and apply appropriate	
	computational and analytical	computational and analytical	computational and analytical	
	techniques to model broadly-	techniques to model broadly	techniques to model broadly	
	defined problems.	defined problems, recognising	defined problems, recognising	
	•	the limitations of the techniques	the limitations of the techniques	
		employed.	employed.	
Technical literature	F4. Select and use technical	B4. Select and evaluate	B4. Select and evaluate	
	literature and other sources of	technical literature and other	technical literature and other	
	information to address broadly	sources of information to	sources of information to	
	defined problems.	address broadly defined	address broadly defined	
		problems.	problems.	
Design and innovation				
Design is the creation and develop	oment of an economically viable pro	oduct, process or system to meet a	defined need. It involves	
significant technical and intellect	ual challenges commensurate with t	the level of study		
Design	F5. Design solutions for broadly	B5. Design solutions for broadly	B5. Design solutions for broadly	
	defined problems that meet a	defined problems that meet a	defined problems that meet a	
	combination of user, business	combination of societal, user,	combination of societal, user,	
	and customer needs as	business and customer needs as	business and customer needs as	
	appropriate. This will involve	appropriate. This will involve	appropriate. This will involve	
	consideration of applicable	consideration of applicable	consideration of applicable	
	health and safety, diversity,	health and safety, diversity,	health and safety, diversity,	
	inclusion, cultural, societal and	inclusion, cultural, societal,	inclusion, cultural, societal,	
	environmental matters, codes of	environmental and commercial	environmental and commercial	
	practice and industry standards.	matters, codes of practice and	matters, codes of practice and	
		industry standards.	industry standards.	
Integrated/systems approach	F6. Apply a systematic approach	B6. Apply an integrated or	B6. Apply an integrated or	
	to the solution of broadly-	systems approach to the solution	systems approach to the solution	
	defined problems.	of broadly defined problems.	of broadly defined problems.	
The engineer and society				
Engineering activity can have a sig	gnificant societal impact and engine	ers must operate in a responsible a	nd ethical manner, recognise the	
importance of diversity, and help	ensure that the benefits of innovat	ion and progress are shared equitab	ly and do not compromise the	
natural environment or deplete na	natural environment or deplete natural resources to the detriment of future generations.			
Sustainability	F7. Evaluate the environmental	Learning outcome achieved at	B7. Evaluate the environmental	
	and societal impact of solutions	previous level of study.	and societal impact of solutions	
	to broadly-defined problems.		to broadly-defined problems.	

Ethics	F8. Identify ethical concerns and	B8. Identify and analyse ethical	B8. Identify and analyse ethical
	make reasoned ethical choices	concerns and make reasoned	concerns and make reasoned
	informed by professional codes	ethical choices informed by	ethical choices informed by
	of conduct.	professional codes of conduct.	professional codes of conduct.
Risk	F9. Identify, evaluate and	B9. Use a risk management	B9. Use a risk management
	mitigate risks (the effects of	process to identify, evaluate and	process to identify, evaluate and
	uncertainty) associated with a	mitigate risks (the effects of	mitigate risks (the effects of
	particular project or activity.	uncertainty) associated with a	uncertainty) associated with a
		particular project or activity	particular project or activity
Security	F10. Adopt a holistic and	Learning outcome achieved at	B10. Adopt a holistic and
	proportionate approach to the	previous level of study.	proportionate approach to the
	mitigation of security risks.		mitigation of security risks.
Equality, diversity and inclusion	F11. Recognise the	Learning outcome achieved at	B11. Recognise the
	responsibilities, benefits and	previous level of study.	responsibilities, benefits and
	importance of supporting		importance of supporting
	equality, diversity and inclusion.		equality, diversity and inclusion.
Engineering practice			
The practical application of engin	eering concepts and tools, engineer	ring and project management, team	work and communication skills.
Engineers also require a sound gra	asp of the commercial context of the	eir work, specifically the ways an o	rganisation creates, delivers and
captures value in economic, socia	l, cultural or other contexts.		1
Practical and workshop skills	F12. Use practical laboratory	Learning outcome achieved at	B12. Use practical laboratory
	and workshop skills to	previous level of study.	and workshop skills to
	investigate broadly defined		investigate broadly defined
	problems.		problems.
Materials, equipment,	F13. Select and apply	Learning outcome achieved at	B13. Select and apply
technologies and processes	appropriate materials,	previous level of study.	appropriate materials,
	equipment, engineering		equipment, engineering
	technologies and processes.		technologies and processes.
Quality management	F14. Recognise the need for	Learning outcome achieved at	B14. Recognise the need for
	quality management systems	previous level of study.	quality management systems
	and continuous improvement in		and continuous improvement in
	the context of broadly defined		the context of broadly defined
	problems.		problems.

Engineering and project	F15. Apply knowledge of	B15. Apply knowledge of	B15. Apply knowledge of
management	engineering management	engineering management	engineering management
	principles, commercial context	principles, commercial context,	principles, commercial context,
	and project management.	project management and	project management and
		relevant legal matters.	relevant legal matters.
Teamwork	F16. Function effectively as an	Learning outcome achieved at	B16. Function effectively as an
	individual, and as a member or	previous level of study	individual, and as a member or
	leader of a team.		leader of a team.
Communication	F17. Communicate effectively	Learning outcome achieved at	B17. Communicate effectively
	with technical and non-technical	previous level of study	with technical and non-technical
	audiences.		audiences.
Lifelong learning	F18. Plan and record self-	Learning outcome achieved at	B18. Plan and record self-
	learning and development as the	previous level of study	learning and development as the
	foundation for lifelong		foundation for lifelong
	learning/CPD.		learning/CPD.