Course Specification

Program Summary Information		
1	**Course Title(s)**	*BEng Honours Mechanical Engineering* *BEng Honours Mechanical Engineering with Automotive* *BEng Honours Mechanical Engineering with Manufacturing* *BEng Honours Mechanical Engineering with Professional Placement Year* *BEng Honours Mechanical Engineering with Automotive and Professional Placement Year* *BEng Honours Mechanical Engineering with Manufacturing and Professional Placement Year* *BEng Honours Mechanical Engineering with Foundation Year*
2	**Course Code(s)**	US1541 / US1542 (PPY) / US1541F (FY)
3	**Awarding Institution**	*Birmingham City University*
4	**Teaching Institution(s)** (if different from point 3)	
5	**Professional Statutory or Regulatory Bodies (PSRBs) accreditation** (if applicable)	

6	**Program Description**
	Do you love to innovate, design and solve problems? Our BEng (Hons) Mechanical Engineering degree, with Automotive and Manufacturing pathways, will enable you to apply your passion and skills to become an engineer of the future. Our approach to Engineering is unique. You will not have traditional lectures or be assessed by exams, instead you will learn through practical-based tasks that respond to real-life engineering problems across industries including automotive and transport, manufacturing, technology, energy and construction. This course has been carefully designed in collaboration with industry to ensure that you graduate ready for employment, with core technical skills and knowledge as well as employability skills such as communication, leadership and collaboration. The first year is a common year to provide you with a solid understanding of what engineering is. You will also learn about the different types of engineering to enable you to choose a suitable pathway to continue on to after your first year. You will have the option to specialise in the following pathways after your first year of study:

	Automotive If you choose this pathway, you will explore vehicle dynamics, propulsion technologies, and sustainable mobility to address the evolving needs of the transport sector. This pathway is ideal for those wishing to pursue a career in the automotive or transportation industries in jobs such as Powertrain Engineer, Motorsport Engineer and Crash Safety Engineer.
	Manufacturing This pathway focuses on improving processes and ensuring products maintain high standards. You will learn about advanced manufacturing processes, automation, and Industry 4.0, equipping graduates to lead in modern production environments in sectors like Automation & Robotics Engineering, Quality & Plant Control Engineering, and Supply Chain & Logistics Engineering.
	Mechanical The third pathway continues on the Mechanical Engineering degree through to your final year. This route focuses on core engineering principles, materials science, and thermofluid systems, to prepare you for diverse roles in mechanical system design and development in jobs such as Project Engineer, Energy Engineer, Design Engineer and Systems Engineer. On this course you will: • Learn through block delivery. This means you will study one module at a time across a 6-week period, allowing you to fully immerse yourself and get a deeper understanding of each subject. This style reflects how engineers work and shifts away from traditional models of teaching where students are expected to study multiple modules at one time. • Gain skills that industry need. You will tackle real-world challenges that are co-designed with industry partners, developing skills that the workforce needs. You will also receive feedback and mentorship from industry professionals on your work throughout the course. In addition, the course curriculum follows internationally recognised standards established by the Engineering Council (AHEP4). • Get experience in the workplace. Work experience modules are factored into the course, as well as the opportunity to study abroad so that everyone leaves with practical work experience to take forward into a career. In addition to this, you will have the opportunity to do a professional placement year after year two, to spend a year in industry before returning to complete your final year. • Immerse yourself in practical learning. Each module includes hands-on, project-based tasks that enable you to conceive, design, implement and operate solutions based on the CDIO (Conceive Design Implement Operate) framework. This framework will transform you to think and act like an engineer and integrates professional skills into every aspect of work to ensure you graduate for industry. • Be assessed through competency and not traditional exams or lectures. You will be assessed through your practical outputs that reflect real-world engineering and industry expectations to ensure that your learning transitions seamlessly into a future career • Develop sustainability and digital knowledge. You will create solutions aligned with the United Nations Sustainable Development Goals (UNSDG) and use cutting-edge technology in modules looking at Sustainable Design, Sustainable Energy, Smart Powertrain Systems, Cyber-Physical Systems, Digital Twins, and Artificial Intelligence to stay ahead of engineering innovation. **Foundation year:** This is a preparatory year designed for students who are passionate about engineering but may not yet meet the entry requirements for our degree programmes. Over the course of a year, you'll build a solid grounding in key subjects such as mathematics, engineering principles, and problem-solving, while developing practical skills through hands-on projects and lab work. The foundation year will provide you with a smooth transition to progress on to one of our engineering degrees and set you up for a successful education journey.

7	Course Awards		
7a	**Name of Final Award**	**Level**	**Credits Awarded**
	Bachelor of Engineering Honours in Mechanical Engineering Bachelor of Engineering Honours in Mechanical Engineering with Automotive Bachelor of Engineering Honours in Mechanical Engineering with Manufacturing Bachelor of Engineering Honours in Mechanical Engineering with Professional Placement Year Bachelor of Engineering Honours in Mechanical Engineering with Automotive and Professional Placement Year Bachelor of Engineering Honours in Mechanical Engineering with Manufacturing and Professional Placement Year	*6* 6 6 6 6 6	360 360 360 480 480 480
7b	**Exit Awards and Credits Awarded**		
	Certificate of Higher Education in Mechanical Engineering Diploma of Higher Education in Mechanical Engineering Bachelor of Engineering in Mechanical Engineering Bachelor of Engineering in Mechanical Engineering with Automotive Bachelor of Engineering in Mechanical Engineering with Manufacturing	4 5 6 6 300	120 240 300 300 300
8	**Variation from the University Regulations**		
	This course has approved variations to the University's Academic Regulations. These can be accessed via the student contract page: https://www.bcu.ac.uk/student-info/student-contract		
9	**Delivery Patterns**		

Mode(s) of Study	Location(s) of Study	Duration of Study	Code(s)
BEng (Hons) Full Time	City Centre	3 years	US1541
BEng (Hons) Full Time with Professional Placement	City Centre	4 years	US1542
BEng (Hons) Full Time with Foundation Year	City Centre	4 Years	US1541F

10	Entry Requirements
	The admission requirements for this course are stated on the course page of the BCU website at https://www.bcu.ac.uk/ or may be found by searching for the course entry profile located on the UCAS website.

11	**Course Aims**
	The BEng (Hons) Mechanical Engineering degree is designed to develop innovative, industry-ready engineers with strong technical, problem-solving, professional, and entrepreneurship skills. Through a project-based block delivery model, you will engage in immersive, hands-on learning experiences that integrate fundamental engineering principles with real-world applications. Rooted in the CDIO (Conceive – Design – Implement – Operate) framework, the program equips you with the ability to design and develop cutting-edge mechanical, automotive, and manufacturing solutions. Emphasising collaboration with industry partners, the curriculum ensures that you gain practical experience, exposure to modern engineering challenges, and an understanding of emerging technologies. The mechanical pathway focuses on core engineering principles, materials science, and thermofluid systems, preparing you for diverse roles in mechanical system design and development. The automotive pathway delves into vehicle dynamics, propulsion technologies, and sustainable mobility, addressing the evolving needs of the transport sector. The manufacturing pathway emphasises advanced manufacturing processes, automation, and Industry 4.0, equipping you to lead in modern production environments. By fostering a problem-solving mindset, leadership capabilities, and interdisciplinary collaboration, this program prepares you to become highly skilled engineers capable of tackling complex challenges in a rapidly evolving global industry. The course aims are to: • Offer specialised pathways in core mechanical, automotive, and manufacturing engineering, allowing you to tailor your learning to industry needs and personalised vision. • Provide an accessible and flexible course suitable for you from a wide range of backgrounds to succeed and progress • Provide you with a strong foundation in core mechanical, automotive or manufacturing engineering principles, integrating theoretical knowledge with practical application • Enable you to develop problem-solving, analytical, and critical-thinking skills necessary for addressing complex real-world engineering challenges. • Offer hands-on learning experience to you through a project-based CDIO (Conceive-Design-Implement-Operate) approach, and grow their engineering and innovation skills to solve complex engineering problems. • Develop your' professional, ethical, and leadership skills, preparing them for challenging careers in engineering and beyond. • Foster interdisciplinary teamwork and communication skills, essential for working in diverse engineering environments. • Offer an immersive learning experience through In-person block mode delivery and ensure in-depth engagement with the content for professional development and growth. • Provide an opportunity to engage in live real-world industrial projects and strengthen industry collaboration with embedded guest lectures, industrial mentors, and industrial placements into the program. • Equip you with modern design, modelling, simulation, and manufacturing skills aligned with current and emerging industry demands. • Expose you to complex engineering projects for developing relevant project management skills and handle uncertainty and ambiguity with complex project management.

12	**Course Learning Outcomes**
CLO	
1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex mechanical engineering problems. [AHEP4, C1], [UNSDG, 9,]
2	Analyse complex mechanical engineering problems and reach substantial conclusions using principles of mathematics, statistics, natural science, and engineering. [AHEP4, C2], [UNSDG 7, 9]
3	Select and apply appropriate computational and analytical techniques to model complex engineering problems recognising the limitations of the techniques employed. [AHEP4, C3], [UNSDG 7, 9]
4	Select and evaluate literature and other sources of information to solve complex mechanical engineering problems. [AHEP4, C4].
5	Design solutions for complex engineering problems to meet societal, user, business and customer needs considering health and safety, diversity, inclusions, cultural, societal, environmental matters, codes of practice, and industry standards. [AHEP4, C5], [UNSDG 3, 7, 11]
6	Apply an integrated and system approach to the solution of complex mechanical engineering problems. [AHEP4, C6], [UNSDG 11],
7	Evaluate the environmental and societal impact of solutions to complex engineering problems demonstrating advanced interdisciplinary understanding and therefore minimize adverse impacts. [AHEP4, C7], [UNSDG 13, 14, 15]
8	Identify and analyse ethical concerns and make ethical choices informed by professional codes of conduct. [AHEP4, C8], [UNSDG 16]
9	Use risk management processes to identify, evaluate and mitigate risks associated with engineering projects or activities. [AHEP4, C9],
10	Adopt holistic and proportionate approaches to the mitigation of security risks. [AHEP4, C10]
11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. [AHEP4, C11], [UNSDG 5, 10]
12	Use practical laboratory and workshop skills to investigate complex mechanical engineering problems. [AHEP4, C12]
13	Select and apply appropriate materials, equipment, engineering technologies, and processes recognising their limitations. [AHEP4, C13].
14	Understand the role of quality management system for continuous improvement in the context of complex engineering problems. [AHEP4, C14]
15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matter including intellectual property rights. [AHEP4, C15], [UNSDG 8]

16	Function effectively as an individual and as a member or leader of a team. [AHEP4, C16], [UNSDG 17]
17	Communicate effectively to wider audience on complex engineering matters. [AHEP4, C17]
18	Plan and record self-learning and development and the foundation for lifelong learning/CPD. [AHEP4, C18], [UNSDG 4]
19	Identify, develop, and enhance interdisciplinary employability skills while exploring skill shortages in the wider engineering sector with an awareness of commercial, ethical, and sustainability issues.
20	Explore, develop, and sharpen interdisciplinary entrepreneurship skills through interaction with multidisciplinary industrial mentors, professional bodies, wider businesses, and other stakeholders.

13	**Course Learning, Teaching and Assessment Strategy**
	The Department of Engineering has adopted the Conceive, Design, Implement, and Operate (CDIO) approach as the core feature of its teaching and learning strategies. Project-based learning is critical in our approach, which enables you to learn and apply engineering science and tackle real-world engineering problems through hands-on experience. You will learn engineering principles and apply them in industry-collaborated engineering projects at every level. You will work individually or in a group and start from scratch to design, develop, evaluate, and present your solutions to the academic and industrial mentors in the form of engineering artifacts. This approach fosters active learning through enhanced engagement, encourages critical thinking, and grows problem-solving skills critical to prepare you for real-world engineering challenges. The continuous engagement in the CDIO project enables you to develop core competencies required for engineering graduates, including technical knowledge, professional skills, and personal attributes. You will receive personalized support for your development from course and module teams, industrial mentors, supervisors, and the wider university support system. The assessment strategies at the Department of Engineering uphold the academic standards for each course and its constituent modules. This program employs multiple-means assessments under a 100% portfolio-based assessment strategy, ensuring a comprehensive, practical, and authentic evaluation of your skills and knowledge. This approach aligns with the **CDIO** framework by integrating real-world industrial challenges into assessments and ensuring direct skills applicability. A mix of competency-based assessments such as knowledge tests, skills demonstrations, artifact presentations, reflective logs, technical reports, peer assessments, and business case development are key features of the assessment strategy. Assessments are designed to enable you to demonstrate the achievement of intended module and course learning outcomes. Formative and summative assessments are fully integrated into the learning process. Assessment brief and assessment criteria inform the assessment process and are robust to ensure reasonable parity between the judgments of different markers. You receive relevant feedback for your assessment tasks which are personalised where possible. Iterative portfolio submissions allow you to refine work based on feedback. The validity of assessments and their ongoing suitability is reviewed through the course monitoring and enhancement process and periodic review, informed by External Examiners and external subject specialists (External Advisers). Overall, the teaching-learning and assessment strategies enable you to learn, practice, and grow your professional skills, and prepare you to tackle the 21st century engineering challenges.

14	Course Requirements
14a	**Level 3:** ***Level 3 modules apply to the foundation year students only. You must complete the following core modules (totalling 120 credits) if you enrol in this program with foundation year:***

Module Code	Module Name	Credit Value
RE3.1	Future manufacturing and Design	30
RE3.2	Mechanical Engineering Application Toolkits	30
RE3.3	Automotive Engineering Practice	30
RE3.4	Electrical and Electronic Engineering	30

Level 4:

To complete level 4 in any pathway of this program, you must complete all the following core modules (totalling 120 credits):

Module Code	Module Name	Credit Value
RE4.1	Mechatronic Systems Engineering	30
RE4.2	Computed Aided Design	30
RE4.3	Ethical Design and Manufacturing	30
RE4.4	Applied Mechanics and Structural Analysis	30

Level 5:

To complete level 5 in any pathway of this program, you must complete two common modules worth 60 credits and respective pathway modules worth 60 credits totalling four modules worth 120 credits at this level. There may be a prerequisite module(s) at the previous level(s) to take the pathway module(s) listed below for level 5.

Module Code	Module Name	Credit Value
Common modules for all Pathways (Mechanical, Automotive and Manufacturing)		
RE5.10	Leadership for Engineering Excellence	30
RE5.10	Sustainable Machine Elements Design	30
Modules for Core Mechanical Pathways		
RE5.2	AI and Data-Driven Solutions for Engineering	30
RE5.6	Applied Thermal and Fluid Engineering	30
Modules for Core Automotive Pathways		
RE5.4	High Efficiency Power Transmission Systems	30
RE5.8	Vehicle Instrumentation and Control	30
Module for Core Manufacturing Pathways		
RE5.5	Sustainable Industrial Design	30
RE5.9	Intelligent Control and Automation	30

Professional Placement Year (Optional):
To qualify for the award of Bachelor of Engineering with Honours Mechanical Engineering with Professional Placement, you must complete the following Level 5 module. This applies to all pathways.

Module Code	Module Name	Credit Value
RE5.12	Professional Placement Year	120

Level 6:

To complete level 6 in any pathway of this program, you must complete the common module, an optional module, and respective pathway modules worth 30, 30 and 60 credits respectively in the table below. In total, four modules worth 120 credits at this level. There may be a prerequisite module(s) to take the pathway module(s) listed below for level 6.

Module Code	Module Name	Credit Value
Common modules for all Pathways (Mechanical, Automotive, and Manufacturing)		
RE6.3	Final Year Honours Project	30
Optional modules for all pathways		
RE6.4	Extended Final Year Honours Project	30
RE6.5	Engineering Micro/Virtual Placement	30
Modules for Core Mechanical Pathway		
RE6.1	Sustainable Energy Systems	30
RE6.2	AI-Augmented Computer-Aided Engineering	30
Modules for Core Automotive Pathway		
RE6.8	Lightweight Chassis and Suspension Design	30
RE6.9	Smart Powertrain Systems	30
Module for Core Manufacturing Pathway		
RE6.10	Operations Design and Implementation	30
RE6.11	Advanced Manufacturing and Innovative Materials	30

14b	Structure Diagram

Please note the list of elective modules is indicative only. Students' choice will not be guaranteed for elective modules unless they meet the pre-requisite to undertake the respective elective modules. A fair and transparent process will be adopted and shared with students.

Level 3

SEMESTER ONE		SEMESTER TWO	
Core (All Pathways)			
RE3.1: Future Manufacturing and Design (30)	RE3.2: Mechanical Engineering Application Toolkits (30)	RE3.3: Automotive Engineering Practice (30)	R3.4: Electrical and Electronic Engineering (30)

Level 4

SEMESTER ONE		SEMESTER TWO	
Core (All Pathways)			
RE4.1: Mechatronic Systems Engineering (30)	RE4.2: Computer-Aided Design (30)	RE4.3: Ethical Design and Manufacturing (30)	R4.4: Applied Mechanics and Structural Analysis (30)

Level 5

SEMESTER ONE		SEMESTER TWO	
Core Mechanical Pathway			
RE5.1: Sustainable Machine Elements Design (30)	RE5.2: AI and Data-Driven Solutions for Engineering (30)	RE5.10: Leadership for Engineering Excellence (30)	RE5.6: Applied Thermal and Fluid Engineering (30)
Core Automotive Pathway			
RE5.1: Sustainable Machine Elements Design (30)	RE5.4: High Efficiency Power Transmission Systems (30)	RE5.10: Leadership for Engineering Excellence (30)	RE5.8: Vehicle Instrumentation and Control (30)
Core Manufacturing Pathway			
RE5.1: Sustainable Machine Elements Design (30)	RE5.5: Sustainable Industrial Design (30)	RE5.10: Leadership for Engineering Excellence (30)	RE5.9: Intelligent Control and Automation (30)

Professional Placement Year (Optional):

A Year Long
Optional to All Pathways
RE5.12: Professional Placement Year (120)

Level 6

<table>
<tr><th colspan="2">SEMESTER ONE</th><th colspan="1">SEMESTER TWO</th><th>Elective (All Pathways)</th></tr>
<tr><td colspan="3">Core Mechanical Pathway</td><td rowspan="6">RE6.4: Extended Final Year Honours Project (30)

OR

RE6.5: Engineering Micro/Virtual Placement (30)</td></tr>
<tr><td>RE6.1: Sustainable Energy Systems (30)</td><td>RE6.2: Ai-Augmented Computer Aided Engineering (30)</td><td>RE6.3: Final Year Honours Project (30)</td></tr>
<tr><td colspan="3">Core Automotive Pathway</td></tr>
<tr><td>RE6.8: Lightweight Chassis and Suspension Design (30)</td><td>RE6.9: Smart Powertrain Systems (30)</td><td>RE6.3: Final Year Honours Project (30)</td></tr>
<tr><td colspan="3">Core Manufacturing Pathway</td></tr>
<tr><td>RE6.10: Operations Design and Implementation (30)</td><td>RE6.11: Advanced Manufacturing and Innovative Materials (30)</td><td>RE6.3: Final Year Honours Project (30)</td></tr>
</table>

15	Overall Student Workload and Balance of Assessment

Overall student *workload* consists of academic lead in-person sessions, online/asynchronous learning, facilitated/supervised sessions, directed learning, and private study hours. The indicative workload is based on 10 hours per credit and the distribution of hours may vary among modules. However, the following information indicates how much time you will need to allocate to different activities at each level of the program.

- *Scheduled Learning* includes academic lead in-person sessions, online/asynchronous learning, facilitated/supervised sessions,
- *Directed Learning* includes online activity, peer learning, placements, work-based learning, external visits, Graduate+,
- *Private Study* includes preparation for assessments

The assessment of this program includes flexible competency-based assessments under a 100% portfolio for every module/block covering multiple means of authentic assessments such as competency demonstration, artifact presentation, technical report submission, reflective personal log, project deliverables, etc.

Level 3

Workload

34% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	408
Directed Learning	192
Private Study	600
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Portfolio	100%

Level 4

Workload

34% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	408
Directed Learning	192
Private Study	600
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Portfolio	100%

Level 5

Workload

34% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	408
Directed Learning	192
Private Study	600
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Portfolio	100%

Professional Placement Year (Optional):

Workload

Activity	Number of Hours
Scheduled Learning	0
Directed Learning & Private Study	1480 hours (including all leaves and holidays)
Total Hours	1200 (minimum)

Balance of Assessment

Assessment Mode	Percentage
Portfolio	100%

Level 6

Workload

20% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	240
Directed Learning	420
Private Study	540
Total Hours	1200

Balance of Assessment

Assessment Mode	Percentage
Portfolio	100%

Appendix 1

Curriculum Mapping

Course Learning Outcomes Vs Specific Modules

Key:

D = Developing learning outcomes and partially assessed

A = Assessed that learning outcomes are being met

Course Learning Outcome (CLO)	Course Learning Outcomes (CLOs) mapping against Level 3 Modules	RE3.1: Future Manufacturing and Design	RE3.2: Mechanical Engineering Application Toolkits	RE3.3: Automotive Engineering Practice	RE3.4: Electrical and Electronic Engineering Practice
1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex mechanical engineering problems. [AHEP4, C1], [UNSDG1, 2]	D	D	D	D
2	Analyse complex mechanical engineering problems and reach substantial conclusions using principles of mathematics, statistics, natural science, and engineering. [AHEP4, C2], [UNSDG1, 2]	D			
3	Select and apply appropriate computational and analytical techniques to model complex engineering problems recognising the limitations of the techniques employed. [AHEP4, C3].	D			
4	Select and evaluate literature and other sources of information to solve complex mechanical engineering problems. [AHEP4, C4].		D	D	
5	Design solutions for complex engineering problems to meet societal, user, business and customer needs considering health and safety, diversity, inclusions, cultural, societal, environmental matters, codes of practice, and industry standards. [AHEP4, C5] [UNSDG 3, 7, 9]	D			D
6	Apply an integrated and system approach to the solution of complex mechanical engineering problems. [AHEP4, C6], [UNSDG 11],		D		
7	Evaluate the environmental and societal impact of solutions to complex engineering problems and therefore minimize adverse impacts. [AHEP4, C7], [UNSDG 13, 14, 15]			D	D
8	Identify and analyse ethical concerns and make ethical choices informed by professional codes of conduct. [AHEP4, C8], [UNSDG 16]	D			
9	Use risk management processes to identify, evaluate and mitigate risks associated with engineering projects or activities. [AHEP4, C9], [UNSDG 3, 11]		D		
10	Adopt holistic and proportionate approaches to the mitigation of security risks. [AHEP4, C10]				
11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. [AHEP4, C11], [UNSDG 5]	D			
12	Use practical laboratory and workshop skills to investigate complex mechanical engineering problems. [AHEP4, C12]	D	D	D	D

Course Learning Outcome (CLO)	Course Learning Outcomes (CLOs) mapping against Level 3 Modules	RE3.1: Future Manufacturing and Design	RE3.2: Mechanical Engineering Application Toolkits	RE3.3: Automotive Engineering Practice	RE3.4: Electrical and Electronic Engineering Practice
13	Select and apply appropriate materials, equipment, engineering technologies, and processes recognising their limitations. [AHEP4, C13], [UNSDG 8]			D	D
14	Understand the role of quality management system for continuous improvement in the context of complex engineering problems. [AHEP4, C14]				
15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matter including intellectual property rights. [AHEP4, C15], [UNSDG 16]				
16	Function effectively as an individual and as a member or leader of a team. [AHEP4, C16], [UNSDG 17]	D			D
17	Communicate effectively to a wider audience on complex engineering matters. [AHEP4, C17]		D		
18	Plan and record self-learning and development and the foundation for lifelong learning/CPD. [AHEP4, C18], [UNSDG 4]				
19	Identify, develop, and enhance interdisciplinary employability skills while exploring skill shortages in the wider engineering sector with an awareness of commercial, ethical, and sustainability issues.	D		D	
20	Explore, develop, and sharpen interdisciplinary entrepreneurship skills through interaction with multidisciplinary industrial mentors, professional bodies, wider businesses, and other stakeholders.		D		D

Course Learning Outcome (CLO)	Course Learning Outcomes (CLOs) mapping against Level 4 Modules	RE4.1: Mechatronic Systems Engineering	RE4.2: Computer Aided Design	RE4.3: Ethical Design and Manufacturing	RE4.4: Applied Mechanics and Structural Analysis
1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex mechanical engineering problems. [AHEP4, C1], [UNSDG1, 2]	D			D
2	Analyse complex mechanical engineering problems and reach substantial conclusions using principles of mathematics, statistics, natural science, and engineering. [AHEP4, C2], [UNSDG1, 2]				
3	Select and apply appropriate computational and analytical techniques to model complex engineering problems recognising the limitations of the techniques employed. [AHEP4, C3].		D		D
4	Select and evaluate literature and other sources of information to solve complex mechanical engineering problems. [AHEP4, C4].				
5	Design solutions for complex engineering problems to meet societal, user, business and customer needs considering health and safety, diversity, inclusions, cultural, societal, environmental matters, codes of practice, and industry standards. [AHEP4, C5] [UNSDG 3, 7, 9]				D
6	Apply an integrated and system approach to the solution of complex mechanical engineering problems. [AHEP4, C6], [UNSDG 11],	D	D		D
7	Evaluate the environmental and societal impact of solutions to complex engineering problems and therefore minimize adverse impacts. [AHEP4, C7], [UNSDG 13, 14, 15]			D	
8	Identify and analyse ethical concerns and make ethical choices informed by professional codes of conduct. [AHEP4, C8], [UNSDG 16]			D	
9	Use risk management processes to identify, evaluate and mitigate risks associated with engineering projects or activities. [AHEP4, C9], [UNSDG 3, 11]				
10	Adopt holistic and proportionate approaches to the mitigation of security risks. [AHEP4, C10]	A	A		
11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. [AHEP4, C11], [UNSDG 5]				

Course Learning Outcome (CLO)	Course Learning Outcomes (CLOs) mapping against Level 4 Modules	RE4.1: Mechatronic Systems Engineering	RE4.2: Computer Aided Design	RE4.3: Ethical Design and Manufacturing	RE4.4: Applied Mechanics and Structural Analysis
12	Use practical laboratory and workshop skills to investigate complex mechanical engineering problems. [AHEP4, C12]	D		D	D
13	Select and apply appropriate materials, equipment, engineering technologies, and processes recognising their limitations. [AHEP4, C13], [UNSDG 8]			D	D
14	Understand the role of quality management system for continuous improvement in the context of complex engineering problems. [AHEP4, C14]				
15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matter including intellectual property rights. [AHEP4, C15], [UNSDG 16]	D			
16	Function effectively as an individual and as a member or leader of a team. [AHEP4, C16], [UNSDG 17]		D	D	D
17	Communicate effectively to wider audience on complex engineering matters. [AHEP4, C17]	D			D
18	Plan and record self-learning and development and the foundation for lifelong learning/CPD. [AHEP4, C18], [UNSDG 4]	D	D	D	
19	Identify, develop, and enhance interdisciplinary employability skills while exploring skill shortages in the wider engineering sector with an awareness of commercial, ethical, and sustainability issues.	D		D	
20	Explore, develop, and sharpen interdisciplinary entrepreneurship skills through interaction with multidisciplinary industrial mentors, professional bodies, wider businesses, and other stakeholders.		D		D

Course Learning Outcome (CLO)	**Course Learning Outcomes (CLOs) mapping against Level 5 Modules**	RE5.10 Leadership for Engineering Excellence	RE5.1: Sustainable Machine Element Design	RE5.2: AI and Data-Driven Solutions for Engineering	RE5.4: Applied Thermal and Fluid Engineering	RE5.4: High Efficiency Power Transmission	RE5.8: Vehicle Instrumentation and Control	RE5.5: Sustainable Industrial Design	RE5.9: Intelligent Control and Automation	RE5.12: Professional Placement Year**(optional)**
1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex mechanical engineering problems. [AHEP4, C1], [UNSDG1, 2]		D		D	D	D			D
2	Analyse complex mechanical engineering problems and reach substantial conclusions using principles of mathematics, statistics, natural science, and engineering. [AHEP4, C2], [UNSDG1, 2]		D		D		D			
3	Select and apply appropriate computational and analytical techniques to model complex engineering problems recognising the limitations of the techniques employed. [AHEP4, C3].		D	D	D	D	D	D	D	D
4	Select and evaluate literature and other sources of information to solve complex mechanical engineering problems. [AHEP4, C4].	D		D				D		
5	Design solutions for complex engineering problems to meet societal, user, business and customer needs considering health and safety, diversity, inclusions, cultural, societal, environmental matters, codes of practice, and industry standards. [AHEP4, C5] [UNSDG 3, 7, 9]	D	D		D		D	D	D	D
6	Apply an integrated and system approach to the solution of complex mechanical engineering problems. [AHEP4, C6], [UNSDG 11],		D			D	D	D	D	
7	Evaluate the environmental and societal impact of solutions to complex engineering problems and therefore minimize adverse impacts. [AHEP4, C7], [UNSDG 13, 14, 15]		D		D	D		D	D	D
8	Identify and analyse ethical concerns and make ethical choices informed by professional codes of conduct. [AHEP4, C8], [UNSDG 16]	A								D
9	Use risk management processes to identify, evaluate and mitigate risks associated with engineering projects or activities. [AHEP4, C9], [UNSDG 3, 11]				D		D		D	D
10	Adopt holistic and proportionate approaches to the mitigation of security risks. [AHEP4, C10]						A		A	

Course Learning Outcome (CLO)	**Course Learning Outcomes (CLOs) mapping against Level 5 Modules**	RE5.10 Leadership for Engineering Excellence	RE5.1: Sustainable Machine Element Design	RE5.2: AI and Data-Driven Solutions for Engineering	RE5.4: Applied Thermal and Fluid Engineering	RE5.4: High Efficiency Power Transmission	RE5.8: Vehicle Instrumentation and Control	RE5.5: Sustainable Industrial Design	RE5.9: Intelligent Control and Automation	RE5.12: Professional Placement Year**(optional)**
11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. [AHEP4, C11], [UNSDG 5]	D								
12	Use practical laboratory and workshop skills to investigate complex mechanical engineering problems. [AHEP4, C12]		D				D		D	
13	Select and apply appropriate materials, equipment, engineering technologies, and processes recognising their limitations. [AHEP4, C13], [UNSDG 8]		D	D		D		D	D	
14	Understand the role of quality management system for continuous improvement in the context of complex engineering problems. [AHEP4, C14]	D		D						
15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matter including intellectual property rights. [AHEP4, C15], [UNSDG 16]	D		D				D		D
16	Function effectively as an individual and as a member or leader of a team. [AHEP4, C16], [UNSDG 17]	A				D		A		D
17	Communicate effectively to wider audience on complex engineering matters. [AHEP4, C17]	D		D	D					D
18	Plan and record self-learning and development and the foundation for lifelong learning/CPD. [AHEP4, C18], [UNSDG 4]			A						D
19	Identify, develop, and enhance interdisciplinary employability skills while exploring skill shortages in the wider engineering sector with an awareness of commercial, ethical, and sustainability issues.		D	D		D			D	D
20	Explore, develop, and sharpen interdisciplinary entrepreneurship skills through interaction with multidisciplinary industrial mentors, professional bodies, wider businesses, and other stakeholders.	A								D

Course Learning Outcome (CLO)	**Course Learning Outcomes (CLOs) mapping against Level 6 Modules**	RE6.3: Final Year Honours Project	RE6.1: Sustainable Energy Systems	RE6.2: Ai-Augmented Computer Aided	RE6.8: Lightweight Chassis and Suspension Design	RE6.9: Smart Powertrain and System	RE6.10: Operations Design and Implementation	RE6.11: Advanced Manufacturing and Innovative Materials	RE6.4: Extended Final Year Honours Project	RE6.5: Engineering Micro/Virtual Placement
1	Apply knowledge of mathematics, statistics, natural science and engineering principles to the solution of complex mechanical engineering problems. [AHEP4, C1], [UNSDG1, 2]		A			A		A		
2	Analyse complex mechanical engineering problems and reach substantial conclusions using principles of mathematics, statistics, natural science, and engineering. [AHEP4, C2], [UNSDG1, 2]		A	A		A		A		
3	Select and apply appropriate computational and analytical techniques to model complex engineering problems recognising the limitations of the techniques employed. [AHEP4, C3].			A	A		A			
4	Select and evaluate literature and other sources of information to solve complex mechanical engineering problems. [AHEP4, C4].	A								
5	Design solutions for complex engineering problems to meet societal, user, business and customer needs considering health and safety, diversity, inclusions, cultural, societal, environmental matters, codes of practice, and industry standards. [AHEP4, C5] [UNSDG 3, 7, 9]				A		A		A	A
6	Apply an integrated and system approach to the solution of complex mechanical engineering problems. [AHEP4, C6], [UNSDG 11],		A			A	A			
7	Evaluate the environmental and societal impact of solutions to complex engineering problems and therefore minimize adverse impacts. [AHEP4, C7], [UNSDG 13, 14, 15]		A			A		A		
8	Identify and analyse ethical concerns and make ethical choices informed by professional codes of conduct. [AHEP4, C8], [UNSDG 16]	A							A	A
9	Use risk management processes to identify, evaluate and mitigate risks associated with engineering projects or activities. [AHEP4, C9], [UNSDG 3, 11]	A							A	A
10	Adopt holistic and proportionate approaches to the mitigation of security risks. [AHEP4, C10]		A			A	A			

Course Learning Outcome (CLO)	**Course Learning Outcomes (CLOs) mapping against Level 6 Modules**	RE6.3: Final Year Honours Project	RE6.1: Sustainable Energy Systems	RE6.2: Ai-Augmented Computer Aided	RE6.8: Lightweight Chassis and Suspension Design	RE6.9: Smart Powertrain and System	RE6.10: Operations Design and Implementation	RE6.11: Advanced Manufacturing and Innovative Materials	RE6.4: Extended Final Year Honours Project	RE6.5: Engineering Micro/Virtual Placement
11	Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. [AHEP4, C11], [UNSDG 5]		A		A			A		
12	Use practical laboratory and workshop skills to investigate complex mechanical engineering problems. [AHEP4, C12]		A			A		A		
13	Select and apply appropriate materials, equipment, engineering technologies, and processes recognising their limitations. [AHEP4, C13], [UNSDG 8]			A	A			A		
14	Understand the role of quality management system for continuous improvement in the context of complex engineering problems. [AHEP4, C14]			A	A		A			
15	Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matter including intellectual property rights. [AHEP4, C15], [UNSDG 16]	A			A		A		A	A
16	Function effectively as an individual and as a member or leader of a team. [AHEP4, C16], [UNSDG 17]			A	A		A			
17	Communicate effectively to wider audience on complex engineering matters. [AHEP4, C17]	A						A		
18	Plan and record self-learning and development and the foundation for lifelong learning/CPD. [AHEP4, C18], [UNSDG 4]									
19	Identify, develop, and enhance interdisciplinary employability skills while exploring skill shortages in the wider engineering sector with an awareness of commercial, ethical, and sustainability issues.			A		A		A		A
20	Explore, develop, and sharpen interdisciplinary entrepreneurship skills through interaction with multidisciplinary industrial mentors, professional bodies, wider businesses, and other stakeholders.		A		A		A			A