

## Course Specification

Course Summary Information			
<b>1</b>	<b>Course Titles</b>		BEng (Hons) Automotive Engineering BEng (Hons) Automotive Engineering with Professional Placement Year MEng Automotive Engineering MEng Automotive Engineering with Professional Placement Year
<b>2</b>	<b>BCU Course Codes</b>	<b>UCAS Codes</b>	BEng (Hons) US0822 MEng UM0022 H330 H3H0
<b>3</b>	<b>Awarding Institution</b>		Birmingham City University
<b>4</b>	<b>Teaching Institution(s)</b> (if different from point 3)		
<b>5</b>	<b>Professional Statutory or Regulatory Body (PSRB) accreditation</b> (if applicable)		The Institution of Engineering and Technology (IET) *Please see important course accreditation information at the end of section 6, for more information about the IET accreditations.
<b>6</b>	<b>Course Description</b>		
	<p>Study our Automotive Engineering BEng degree course and join one of the select UK Universities to take part in Formula Student events at Silverstone.</p> <p>Now is a fascinating time to study automotive engineering as you'll have the chance to be at the forefront of developments within the industry. You'll get to work in advanced automotive workshops and laboratories equipped with industry-standard equipment, as well as take advantage of more traditional office-based facilities.</p> <p>We ensure you gain practical experience so that you are equipped to apply engineering science to real life situations. Plus, you'll also have the opportunity to join our BCU Formula Student racing team.</p> <p><b>What's covered in the course?</b></p> <p>Our Automotive Engineering course is designed to develop you as an engineer able to make a significant contribution to this industry as it goes through an important period of transition in the UK and globally.</p> <p>Our engineering courses focus on project-based activities, giving you lots of opportunity to work in teams on projects from design to implementation. This will give you practical experience of applying engineering science to real world problems, working in multidisciplinary teams to develop your interpersonal skills, and prepare you for a key aspect of modern engineering practice.</p> <p>You will develop key technical skills, enhance your creative thinking and learn from industry experts. As well as gaining knowledge and application skills in stress analysis, powertrain systems, suspension, body engineering, design and management.</p>		

We will provide a stimulating environment with lots of opportunity to collaborate with your colleagues, enhance your creativity and develop the attributes you need to stand out from the crowd.

Our automotive engineering degree is structured so that its themes have a direct relevance to the industry's current and expected future needs, and upon graduating you will have the intellectual, technical and personal qualities necessary to successfully implement new technologies.

Throughout your course you will benefit from our strong industry links with companies such as the Morgan Motor Company, Westfield Sportscars, Siemens, and GKN.

You will also have the opportunity to join our BCU Formula Student racing team, which designs and builds a single-seater racing car each year to race in July at the IMechE-sponsored event at Silverstone.

On completion of this course you will be able to analyse, synthesise and evaluate those engineering factors that are required to produce engineering solutions. You will explore the themes of:

- Use of general and specialist engineering knowledge and understanding.
- Application of appropriate theoretical and practical methods to appropriate application.
- Technical and commercial leadership and management at all levels.
- Effective interpersonal and communication skills using various media means and resources.
- Commitment to professional standards and recognition of obligations to society and environment in accordance with the latest benchmarks.

Specifically this course will develop your skills in the key areas of:

- Flexible learning opportunities and widening access and thus facilitate study in the discipline by learners from as broad a background as possible, and to enable students to become an independent learner, developing as individuals for the rest of their lives.
- Academic education focusing on the technology, design, project management, manufacture and health and safety pertaining to the relevant industries associated with modern automotive engineering
- Becoming a competent applications engineer by being able to tackle engineering needs and problems associated with products systems, processes and components within the automotive engineering discipline.
- Reflection on and evaluate your learning and technical achievements and performance in order to clearly identify your proposed professional intent.
- Mechanical technology including Mechanical methodologies, methods, techniques and current / developing theories and conceptual ideas.
- Mechanical Engineering Science and Applied Mathematics.

### **Course Aims:**

The content and structure of the Automotive Engineering Course are designed to provide you with an academically challenging and vocationally relevant degree, which encompasses all of the issues involved in successfully entering and progressing their career within the Automotive Engineering. Furthermore, the programmes have clearly identifiable core themes (with significant

elements of practical based learning), in which capability skills and competencies can be fostered, demonstrated and further developed.

This Automotive Engineering Course aims are to:

- Provide you with the appropriate intellectual tools in order to be able to operate effectively as principal technician or applications engineer, within the multidisciplinary engineering environment of automotive based organisations.
- To provide a challenging undergraduate programme in Automotive Engineering and to meet the needs of the relevant industries.
- Provide appropriate practical engineering opportunities, combining theory and experience, to enable students to become principal technicians or applications engineers with awareness, knowledge, skills, and an understanding of a range of experience of engineering practice, as well as the economic, social and environmental context of industrial technology within the automotive engineering area
- Extend your confidence and professionalism in high-level communication tools at and to develop interpersonal and team working skills in order to be able to contribute effectively to business activities.
- Develop your ability to reflect on and evaluate their learning and technical achievements and performance in order to clearly identify their proposed professional intent, and enables you to develop critical evaluation and apply appropriate engineering solutions
- Enables you to fulfil the role of a competent applications engineer by being able to tackle engineering needs and problems associated with products systems, processes and components. To do this you have to be able to perform the analysis necessary and to apply results to improve systems and projects.

Furthermore, through the Academic Plan (2015), the University has expressed its commitment to the following course aims to enhance your student experience in all courses:

- Pursuing excellence
- Practice-led, knowledge-applied education
- Interdisciplinary approaches
- Employability-driven
- Internationalisation

The following table articulates the course aims framed by the five themes of the Academic Plan:

1. Pursuing Excellence	You will develop knowledge, understanding and skills in stress analysis, drivetrain systems, suspension and body engineering, design and management relevant to automotive industries.
2. Practice-led, knowledge-applied	You will focus on the application of industry-standard design, modelling and simulation techniques to the analysis, specification and implementation of automotive engineering systems.
3. Interdisciplinary	In modules such as Leading Engineering Endeavour (Level 5), you will demonstrate the ability to understand the importance of developing a range of skills associated with cooperation and collaboration when working across disciplines. Engineering is recognised as embedding a range of topics linking to many disciplines.
4. Employability-driven	In addition to professional and practical skills, additional value will be delivered through group work and project based challenges that enable you to compete for a variety of employment opportunities within the mechanical engineering and associated industries.

5. Internationalisation	You will demonstrate a consideration of the wider aspects and global impact of your discipline and an ability to contribute to the engineering sector in different international contexts
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In addition, the following course aims apply:

- Essential knowledge and understanding of management principles.
- Generic management competencies including financial acumen, human capital development, emotional intelligence, knowledge management, information management and research methods in addition to the more specialised topic areas relevant to specialist area of study.
- A course of study that will extend you intellectually and practically according to your abilities and to provide the opportunity to allow you to reflect on your learning.
- An opportunity to acquire skills in response to the market need for competent project managers capable of operating across multinational organisations embracing differing cultural dimensions.
- An opportunity to distinguish between tasks, projects and processes and determine appropriate techniques to manage each.
- A knowledge and full understanding of the breadth of capability in the latest software tools for facilitating multi-site project communication.
- An opportunity to demonstrate their skills as one of a new generation of project managers, with a wider, more creative, flexible skill set, including a good understanding of internal and external customer requirements.
- The skills and knowledge of new and emerging technologies, processes and production methods, and how to apply them across differing industrial sectors.
- The project management and interpersonal skills necessary to liaise and work in project teams, structuring their work and meeting the varying demands placed on them; as they would in the work place.
- A programme with an emphasis on active and participative education, including practical learning, problem based learning and group work which will develop their skills of analysis, synthesis, decision making and the ability to cope with new and unfamiliar problems.
- An opportunity to relate practical real life problem based learning to industry and commerce, then to apply new technologies and techniques to solve present and future problems, in an international arena.
- Skills to interpret the effect on managing projects of constantly increasing legislative controls globally, with particular respect to safety, legislation and environmental issues.
- Techniques to examine appropriate methods to the analysis of human factors with regard to project management.
- Knowledge of techniques to plan and manage the project in order to achieve the specified objectives.
- An ability to handle uncertainty and ambiguity and deal with complex project management.

For students that progress to the MEng Level 7, a higher appreciation is required as outlined in UK-SPEC especially regarding leadership and team work. At this level you expected to have a more comprehensive understanding of science and mathematics, a greater degree of critical awareness of current societal problems, ability to collect data and undertake engineering analysis to solve complex issues, able to generate innovate and sustainable designs and have a higher generic skills ability as outlined in AHEP3.

The very nature of the integrated Masters degree prepares you as a graduate on your way to become future leaders in the industry and deliver new designs and new products contributing to solving societal problems.

#### **\*Important Course Accreditation Information**

Students completing an IET accredited degree are deemed to have met part or all of the academic requirements for registration as a Chartered or Incorporated Engineer and are in a strong position to move on to achieve professional engineering status after a period of initial professional development in industry.

#### **BEng Accreditation Information**

In order for you to achieve professional accreditation, you must have, on top of your academic qualifications, a minimum of 4 years relevant industrial engineering experience at the appropriate level.

Our current BEng courses are accredited at Partial CEng level, meaning that provided you have the relevant industrial experience, you may be eligible to apply for Incorporated Engineer Level.

Should you wish to apply for CEng Engineer level, there will be requirement for further learning at PG level, for example, an accredited MSc in the relevant subject. Our MSc courses are accredited at full CEng level.

#### **MEng Accreditation Information**

The accredited MEng will meet, in part, the exemplifying academic benchmark requirements for registration as a Chartered Engineer. Accredited MEng graduates who also have a BEng (Hons) accredited for CEng will be able to show that they have satisfied the educational base for CEng registration.

It should be noted that graduates from an accredited MEng programme that do not also have an appropriately accredited Honours degree, will not be regarded as having the exemplifying qualifications for professional registration as a Chartered Engineer with the Engineering Council; and will need to have their qualifications individually assessed through the Individual Case Procedure if they wish to progress to CEng.

<b>7</b>	<b>Course Awards</b>		
<b>7a</b>	<b>Possible Final Awards for the Automotive Engineering course</b>	<b>Level</b>	<b>Credits Awarded</b>
	<b>For BEng (Hons):</b> Bachelor of Engineering with Honours Automotive Engineering Bachelor of Engineering with Honours Automotive Engineering with Professional Placement Year	6 6	360 480
	<b>For MEng:</b> Integrated Masters of Engineering Automotive Engineering Integrated Masters of Engineering Automotive Engineering with Professional Placement Year	7 7	480 600
<b>7b</b>	<b>Exit Awards and Credits Awarded</b>		
	Certificate of Higher Education Automotive Engineering Diploma of Higher Education Automotive Engineering Bachelor of Engineering Automotive Engineering	4 5 6	120 240 300

<b>8</b>	<b>Derogation from the University Regulations</b>
	<ol style="list-style-type: none"> <li>1. For modules with more than one item of assessment, students must achieve a minimum of 30% (undergraduate) or 40% (postgraduate) in each item of assessment in order to pass the module</li> <li>2. Compensation of marginal failure in up to 20 credits is permitted at each level</li> <li>3. Condonement of failed modules is not permitted</li> <li>4. Students on an Integrated Masters course must achieve an overall average of 50% or above at the end of Level 5 to remain on the Integrated Masters course.</li> </ol>

<b>9</b>	<b>Delivery Patterns</b>		
	<b>Mode(s) of Study</b>	<b>Location</b>	<b>Duration of Study</b>
	BEng (Hons) Full Time	City Centre	3 years
	BEng (Hons) With Professional Placement Year	City Centre	4 years
	BEng (Hons) Part Time	City Centre	5 years
	MEng Full Time	City Centre	4 years
	MEng With Professional Placement Year	City Centre	5 years
	MEng with Foundation and Professional Placement Year	City Centre	6 years

**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 Learning Outcomes						
The following table shows how the UK SPEC Learning Outcomes mapped against the 5 University's Key Themes.						
UK SPEC Learning Outcomes		Pursuing Excellence	Practice Led Knowledge Applied	Interdisciplinary	Employability Driven	Internationalisation
<b>A. Knowledge &amp; Understanding</b>						
A1	Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology in the field of Automotive Engineering	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
A2	Engage in the creative and innovative development of automotive engineering technology and continuous improvement systems.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>B. Design and Development of processes, systems, services and products</b>						
B1	Identify potential projects and opportunities.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B2	Conduct appropriate research, and undertake design and development of engineering solutions within the design and development field.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
B3	Manage implementation of design solutions, and evaluate their effectiveness.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>C. Responsibility, management and leadership</b>						
C1	Plan for effective project implementation.	<input checked="" type="checkbox"/>				
C2	Plan, budget, organise, direct and control tasks, people and resources.	<input checked="" type="checkbox"/>				
C3	Lead teams and develop staff to meet changing technical and managerial needs.	<input checked="" type="checkbox"/>				
C4	Bring about continuous improvement through quality management.	<input checked="" type="checkbox"/>				
<b>D. Communication and interpersonal skills</b>						
D1	Communicate in English with others at all levels.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D2	Present and discuss proposals.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
D3	Demonstrate personal and social skills.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>E. Professional Commitment</b>						
E1	Comply with relevant codes of conduct.	<input checked="" type="checkbox"/>				
E2	Manage and apply safe systems of work.	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
E3	Undertake engineering activities in a way that contributes to sustainable development.	<input checked="" type="checkbox"/>				
E4	Carry out and record CPD necessary to maintain and enhance competence in own area of practice	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
E5	Exercise responsibilities in an ethical manner.	<input checked="" type="checkbox"/>				

The Course Learning Outcomes are articulated per each level in terms of:

- Knowledge and understanding;
- Intellectual skills;
- Practical/subject specific skills;
- Transferable skills.

At Level 4 you will illustrate your succession from familiarity and working understanding to a wider appreciation, application and deeper understanding at Level 5. At Level 6 you will illustrate your ability to independently apply knowledge, skills and understanding, with a focus on active and reflective practice and clear evidence of synthesis and integration of the various skills and knowledge acquired throughout the course. The Level 6 learning outcomes are designed for you to propose and carry out individual study courses in design and research that fully explore your analytical, creative and innovative problem solving potential. Your achievement of learning outcomes is an incremental and progressive by its nature as your advance through course of study, hence only Level 6 learning outcomes are listed below, demonstrating a threshold level of performance expected of all Honours graduates. At Level 7, a higher appreciation is required especially regarding leadership and team work. At this level you expected to have a more comprehensive understanding of science and mathematics, a greater degree of critical awareness of current societal problems, ability to collect data and undertake engineering analysis to solve complex issues, able to generate innovate and sustainable designs and have a higher generic skills abilities.

Appendix 1 shows the precise Level 4, 5, 6 and 7 modules alignment with the learning outcomes that is to be considered in terms of the overall progression through all levels of study.

### **Knowledge and understanding:**

#### **Level 4**

On successful completion of the course you must be able to demonstrate:

- Appropriate mathematical techniques, including algebra, trigonometry, calculus, statistics and probability
- The principle of automotive engineering and their application in simple engineering science
- Understand, apply and evaluate engineering science and engineering analysis procedure to solve the engineering problems.
- Safe working practices, risk assessment;

#### **Level 5**

On successful completion of the course you must be able to demonstrate:

- In depth Knowledge and understanding of essential facts, concepts, theories and principles of automotive engineering, and its underpinning science and mathematics.
- Appreciation of the wider multidisciplinary engineering context and its underlying principles.
- In depth Knowledge of the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement.
- Computer-Based Design and modelling include its applications.

#### **Level 6**

On successful completion of the course you must be able to demonstrate:

- Project management, business management, environmental issue and ethics as applied to professional engineering.
- Selection, critical evaluation, implementation and presentation of an engineering project

- Appraisal of the design, construction and performance envelop of automotive engineering technologies and systems.
- Critical analysis and problem solving of a automotive based project

## **Level 7**

On successful completion of the course you must be able to demonstrate:

- The scientific principles of Automotive Engineering to an advanced level.
- Further mathematical and computer models relevant to the automotive engineer to a comprehensive level and an appreciation of their limitations.
- Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers.

## **Intellectual Abilities:**

### **Level 4**

On successful completion of the course you must be able to:

- Apply appropriate quantitative science and engineering tools to the analysis of problems.
- Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs.
- Comprehend the broad picture and thus work with an appropriate level of detail.
- Investigate simple automotive problem with appropriate mathematical methods.

### **Level 5**

On successful completion of the course you must be able to:

- Analyse and use appropriate advanced automotive engineering principles to solve wide range of problems
- Use of Computer Aided Design and engineering analysis tools
- Identify and evaluate relevant practices within an appropriate professional and ethical framework
- Evaluate and apply automotive problem solving that can assist in the engineering process

### **Level 6**

On successful completion of the course you must be able to:

- Critical analysis of working practices to ensure safety, carry out risk assessment and apply appropriate safety management techniques
- Identify and critically evaluate relevant practices within an appropriate professional and ethical framework
- Ability to analyse, evaluate and recommend design solutions to meet client's requirements
- Identify the constraint of an engineering project

### **Level 7**

On successful completion of the course you must be able to:

- Use fundamental knowledge to investigate new technologies.
- Apply advanced mathematical and computer based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.
- Extract data pertinent to an unfamiliar problem, and effect solutions using computer based engineering tools when appropriate.

- Debate contemporary issues in Automotive Engineering
- Critically discuss the importance of Automotive Engineering on a global scale

### **Practical / Subject Specific skills:**

#### **Level 4**

On successful completion of the course you must be able to:

- Possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control.
- Provide evidence of group working and of participation in projects.
- Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques.
- Communicate effectively by written, visual and oral means.

#### **Level 5**

On successful completion of the course you must be able to:

- Apply safe working practices to the automotive engineering based laboratory work.
- Use a Computer Aided Design package in a design process
- Interpret written and design information for areas of more complex work

#### **Level 6**

On successful completion of the course you must be able to:

- Apply project planning techniques and scheduling methods
- Identify and critically evaluate the tasks required to complete an automotive project/product in conjunction with a customer's needs
- Manage empirically-research based project under appropriate supervision and recognise of its theoretical, practical and methodology
- Able to summarise, accurately, the arguments presented in a range of complex works within and about automotive engineering specific subject.

#### **Level 7**

On successful completion of the course you must be able to:

- Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations.
- Generate ground-breaking designs for products, systems, or components
- Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.

### **General transferable skills:**

On successful completion of the course you must be able to:

- Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.
- Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].
- Communicate effectively with other people using oral, written and graphic means
- Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques
- Have ability and competence in a range of skills on the current CAD and IT equipment in an effective and productive manner.

- Show initiative, work independently and able to work as member of a team to develop collaborative skills
- Display resourceful solutions including use of advanced engineering tools to the limitations of current Automotive Engineering practice and discuss them in a major technical report.

<b>12</b>	<b>Course Requirements: BEng / MEng</b>																																																		
<b>12a</b>	<p><b>Level 4:</b>  <i>In order to complete this course a student must successfully complete all the following CORE modules (totalling 120 credits):</i></p> <table border="1"> <thead> <tr> <th>Module Code</th> <th>Module Name</th> <th>Credit Value</th> </tr> </thead> <tbody> <tr> <td>ENG4091</td> <td>Engineering Principles 1</td> <td>20</td> </tr> <tr> <td>ENG4124</td> <td>Mathematical Modelling 1</td> <td>20</td> </tr> <tr> <td>ENG4093</td> <td>Engineering Practice</td> <td>20</td> </tr> <tr> <td>ENG4094</td> <td>Engineering Principles 2</td> <td>20</td> </tr> <tr> <td>ENG4125</td> <td>Mathematical Modelling 2</td> <td>20</td> </tr> <tr> <td>ENG4096</td> <td>Integrated Engineering Project</td> <td>20</td> </tr> </tbody> </table> <p><b>Level 5:</b>  <i>In order to complete this course a student must successfully complete all the following CORE modules (totalling 120 credits):</i></p> <table border="1"> <thead> <tr> <th>Module Code</th> <th>Module Name</th> <th>Credit Value</th> </tr> </thead> <tbody> <tr> <td>ENG5098</td> <td>Thermodynamics and Fluid Mechanics</td> <td>20</td> </tr> <tr> <td>ENG5099</td> <td>Numerical Analysis</td> <td>20</td> </tr> <tr> <td>ENG5100</td> <td>Design and Materials</td> <td>20</td> </tr> <tr> <td>ENG5097</td> <td>Leading Engineering Endeavour</td> <td>20</td> </tr> <tr> <td>ENG5101</td> <td>Design and Manufacture</td> <td>20</td> </tr> <tr> <td>ENG5102</td> <td>Mechanical Science</td> <td>20</td> </tr> </tbody> </table> <p><b>Professional Placement Year (optional)</b></p> <p><i>In order to qualify for the award of Bachelor of Engineering with Automotive Engineering with Professional Placement Year or Integrated Masters of Engineering Automotive Engineering with Professional Placement Year, a student must successfully complete all of the modules listed as well as the following Level 5 module:</i></p> <table border="1"> <thead> <tr> <th>Module Code</th> <th>Module Name</th> <th>Credit Value</th> </tr> </thead> <tbody> <tr> <td>TBC</td> <td>Professional Placement</td> <td>120</td> </tr> </tbody> </table>			Module Code	Module Name	Credit Value	ENG4091	Engineering Principles 1	20	ENG4124	Mathematical Modelling 1	20	ENG4093	Engineering Practice	20	ENG4094	Engineering Principles 2	20	ENG4125	Mathematical Modelling 2	20	ENG4096	Integrated Engineering Project	20	Module Code	Module Name	Credit Value	ENG5098	Thermodynamics and Fluid Mechanics	20	ENG5099	Numerical Analysis	20	ENG5100	Design and Materials	20	ENG5097	Leading Engineering Endeavour	20	ENG5101	Design and Manufacture	20	ENG5102	Mechanical Science	20	Module Code	Module Name	Credit Value	TBC	Professional Placement	120
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**Level 6:**

*In order to complete this course a student must successfully complete all the following CORE modules (totalling 120 credits):*

Module Code	Module Name	Credit Value
ENG6075	Computer Aided Engineering	20
ENG6076	Vehicle Electronics and Control	20
ENG6077	Body and Chassis Performance	20
ENG6078	Powertrain and Hybrid Vehicles	20
ENG6200	Individual Honours Project	40

**Level 7:**

*In order to complete this course a student must successfully complete all the following CORE modules (totalling 120 credits):*

Module Code	Module Name	Credit Value
ENG7147	Advanced Powertrains and Control	20
ENG7151	Advanced Systems Engineering	20
ENG7153	Vehicle Control Systems	20
ENG7150	Advanced Dynamics	20
ENG7207	Group Integrated Master's Project	40

## 12b Structure Diagram

<b>Level 4</b>	Engineering Practice (ENG4093)	Engineering Principles 1 (ENG4091)	Mathematical Modelling 1 (ENG4124)	Sem 1
	Integrated Engineering Project (ENG4096)	Engineering Principles 2 (ENG4094)	Mathematical Modelling 2 (ENG4125)	Sem 2
<b>Level 5</b>	Numerical Analysis (ENG5099)	Thermodynamics and Fluid Mechanics (ENG5098)	Design and Materials (ENG5100)	Sem 1
	Leading Engineering Endeavour (ENG5097)	Mechanical Science (ENG5102)	Design and Manufacture (ENG5101)	Sem 2
<b>Optional</b>	Professional Placement Year / Industrial Placement (ENG)			
<b>Level 6</b>	Individual Honours Project (ENG6200)	Vehicle Electronics and Control (ENG6076)	Computer Aided Engineering (ENG6075)	Sem 1
		Body and Chassis Performance (ENG6077)	Powertrain and Hybrid Vehicles (ENG6078)	Sem 2
<b>Level 7</b>	Group Integrated Master's Project (ENG7207)	Advanced Systems Engineering (ENG7151)	Advanced Powertrains and Control (ENG7147)	Sem 1
		Vehicle Control Systems (ENG7153)	Advanced Dynamics (ENG7150)	Sem 2

### Course Routes:

- BEng (Hons) Automotive Engineering
- MEng Automotive Engineering Route

**Part-Time Delivery - Automotive Engineering**
**Year 1**

Engineering Principles 1 (ENG4091)	Mathematical Modelling 1 (ENG4124)	Sem 1
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Engineering Principles 2 (ENG4094)		Sem 2
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**Year 2**

Engineering Practice (ENG4093)		Sem 1
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Integrated Engineering Project (ENG4096)	Mathematical Modelling 2 (ENG4125)	Sem 2
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**Year 3**

Numerical Analysis (ENG5099)	Thermodynamics and Fluid Mechanics (ENG5098)	Sem 1
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Mechanical Science (ENG5102)	Leading Engineering Endeavour (ENG5097)	Sem 2
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**Year 4**

Computer Aided Engineering (ENG6075)	Design and Materials (ENG5100)	Sem 1
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Body and Chassis Performance (ENG6077)	Design and Manufacture (ENG5101)	Sem 2
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**Year 5**

Individual Honours Project (ENG6200)	Vehicle Electronics and Control (ENG6076)	Sem 1
	Powertrain and Hybrid Vehicles (ENG6078)	Sem 2

**Top-Up Part-Time Delivery – Automotive Engineering****Year 1 – Year 3**

**Accreditation of Prior Learning (APL)  
Examples (HND; Foundation Degree, etc.)**

**Year 4**

Computer Aided Engineering  
(ENG6075)

Vehicle Electronics and Control  
(ENG6076)

Sem 1

Body and Chassis Performance  
(ENG6077)

Powertrain and Hybrid Vehicles  
(ENG6078)

Sem 2

**Year 5**

Individual Honours Project (ENG6200)

Sem 1

Sem 2

## 13 Overall Student Workload and Balance of Assessment

Overall student *workload* consists of class contact hours, independent learning and assessment activity, with each credit taken equating to a total study time of around 10 hours. While actual contact hours may depend on the optional modules selected, the following information gives an indication of how much time students will need to allocate to different activities at each level of the course.

- *Scheduled Learning* includes lectures, practical classes and workshops, contact time specified in timetable
- *Directed Learning* includes placements, work-based learning, external visits, on-line activity, Graduate+, peer learning
- *Private Study* includes preparation for exams

The *balance of assessment* by mode of assessment (e.g. coursework, exam and in-person) depends to some extent on the optional modules chosen by students. The approximate percentage of the course assessed by coursework, exam and in-person is shown below.

### Level 4

#### Workload

##### % time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	432
Directed Learning	0
Private Study	768
<b>Total Hours</b>	<b>1200</b>

#### Balance of Assessment

Assessment Mode	Percentage
Coursework	30%
Exam	47%
In-Person	23%

### Level 5

#### Workload

##### % time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	336
Directed Learning	0
Private Study	864
<b>Total Hours</b>	<b>1200</b>

#### Balance of Assessment

Assessment Mode	Percentage
Coursework	55%
Exam	33%
In-Person	12%

## Level 6

### Workload

% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	207
Directed Learning	14
Private Study	979
<b>Total Hours</b>	<b>1200</b>

### Balance of Assessment

Assessment Mode	Percentage
Coursework	68%
Exam	21%
In-Person	11%

## Level 7

### Workload

% time spent in timetabled teaching and learning activity

Activity	Number of Hours
Scheduled Learning	156
Directed Learning	18
Private Study	1026
<b>Total Hours</b>	<b>1200</b>

### Balance of Assessment

Assessment Mode	Percentage
Coursework	32%
Exam	60%
In-Person	8%

## Appendix 1

### Curriculum Mapping

#### Course Learning Outcomes Vs Specific Modules

LEVEL 4	Engineering Principles 1	Mathematical Modelling 1	Engineering Practice	Engineering Principles 2	Mathematical Modelling 2	Integrated Engineering project
<b>General Learning Outcome</b>						
<b>Knowledge and Understanding</b>						
The principle of automotive engineering and their application in simple engineering science	✓		✓	✓		✓
Apply and use appropriate mathematical techniques, including algebra, trigonometry, calculus and probability.		✓			✓	
Understand, apply and evaluate engineering science and engineering analysis procedure to solve the engineering problems.	✓	✓	✓			✓
Safe working practices, risk assessment		✓				✓
<b>Intellectual Abilities</b>						
Apply appropriate quantitative science and engineering tools to the analysis of problems.	✓	✓		✓	✓	
Demonstrate creative and innovative ability in the synthesis of solutions and in formulating designs			✓			✓
Comprehend the broad picture and thus work with an appropriate level of detail.		✓			✓	✓
Investigate simple automotive problem with appropriate mathematical methods.		✓	✓		✓	✓
<b>Practical / Subject Specific skills</b>						
Possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops; in industry through supervised work experience; in individual and group project work; in design work; and in the development and use of computer software in design, analysis and control.		✓				✓
Provide evidence of group working and of participation in a major project is expected. However, individual professional bodies may require particular approaches to this requirement.		✓				✓
Apply safe working procedures, health &safety legislation, risk assessment and risk management techniques.		✓				✓
Communicate effectively by written, visual and oral means	✓	✓	✓	✓	✓	✓

<b>LEVEL 4</b>	Engineering Principles 1	Mathematical Modelling 1	Engineering Practice	Engineering Principles 2	Mathematical Modelling 2	Integrated Engineering project
<b>General Learning Outcome</b>						
<b>General transferable skills</b>						
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.	✓	✓		✓		✓
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].			✓			✓
Communicate effectively with other people using oral, written and graphic means			✓			✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques			✓			✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.			✓			✓
Show initiative, work independently and able to work as member of a team to develop collaborative skills		✓	✓		✓	✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Automotive Engineering practice and discuss them in a major technical report.	✓			✓		

<b>LEVEL 5</b>		Thermodynamics and Fluid Mechanics	Numerical Analysis	Design and Material	Mechanical Science	Leading Engineering Endeavours	Design and Manufacture
<b>General Learning Outcome</b>							
<b>Knowledge and Understanding</b>							
In depth Knowledge and understanding of essential facts, concepts, theories and principles of your engineering discipline, and its underpinning science and mathematics.	✓	✓			✓		
Appreciation of the wider multidisciplinary engineering context and its underlying principles.						✓	
In depth Knowledge of the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement				✓		✓	
Computer-Based Design and modelling include its applications.		✓	✓				✓
<b>Intellectual Abilities</b>							
Analyse and use appropriate advanced automotive engineering principles to solve wide range of problems	✓				✓		
Use of Computer Aided Design and engineering analysis tools		✓	✓				✓
Identify, evaluate and apply relevant practices within an appropriate professional and ethical framework				✓		✓	
Evaluate and apply automotive problem solving that can assist in the engineering process	✓		✓		✓		✓

<b>LEVEL 5</b>		Thermodynamics and Fluid Mechanics	Numerical Analysis	Design and Material	Mechanical Science	Leading Engineering Endeavours	Design and Manufacture
<b>General Learning Outcome</b>							
<b>Practical / Subject Specific skills</b>							
Apply safe test to the automotive based laboratory task.				✓			✓
Use a Computer Aided Design package in a design process				✓			✓
Interpret written and design information for areas of more complex work				✓	✓		✓
<b>General transferable skills</b>							
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.	✓	✓	✓	✓	✓		✓
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].			✓			✓	✓
Communicate effectively with other people using oral, written and graphic means			✓			✓	✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques							✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.		✓	✓				✓
Show initiative, work independently and able to work as member of a team to develop collaborative skills			✓			✓	✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Automotive Engineering practice and discuss them in a major technical report.	✓						✓



<b>LEVEL 6</b>	Vehicle Electronics and Control	Computer Aided Engineering	Body and Chassis Performance	Powertrain and Hybrid vehicles	Undergraduate Individual Honours Project
<b>General Learning Outcome</b>					
<b>Knowledge and Understanding</b>					
Project management, business management, environmental issue and ethics as applied to professional engineering.					✓
Selection, critical evaluation, implementation and presentation of an engineering project		✓		✓	✓
Appraisal of the design, construction and performance envelop of automotive engineering technologies and systems.	✓		✓	✓	
Critical analysis and problem solving of automotive based project	✓				✓
<b>Intellectual Abilities</b>					
Critical analysis of working practices to ensure safety, carry out risk assessment and apply appropriate safety management techniques					✓
Identify and critically evaluate relevant practices within an appropriate professional and ethical framework	✓		✓		✓
Ability to critically analyse, evaluate and recommend design solutions to meet client's requirements	✓		✓	✓	
Identify and critically evaluate the constraint of an engineering project					✓

LEVEL 6	Vehicle Electronics and Control	Computer Aided Engineering	Body and Chassis Performance	Powertrain and Hybrid vehicles	Undergraduate Individual Honours Project
<b>General Learning Outcome</b>					
<b>Practical / Subject Specific skills</b>					
Apply project planning techniques and scheduling methods					✓
Identify and critically evaluate the tasks required to complete an automotive project/product in conjunction with a customers' needs	✓			✓	✓
Manage empirically-research based project under appropriate supervision and recognise of its theoretical, practical and methodology		✓			✓
Evaluate and critically summarise accurately the arguments presented in a range of complex works within and about automotive engineering specific subject.	✓		✓	✓	
<b>General transferable skills</b>					
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.	✓			✓	✓
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].					✓
Communicate effectively with other people using oral, written and graphic means					✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques	✓			✓	✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.	✓		✓	✓	
Show initiative, work independently and able to work as member of a team to develop collaborative skills					✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Automotive Engineering practice and discuss them in a major technical report.					✓



LEVEL 7	Advanced Powertrain and Control	Advanced Systems Engineering	Advanced Dynamics	Vehicle Control Systems	Group Integrated Masters Project
<b>General Learning Outcome</b>					
<b>Knowledge and Understanding</b>					
The scientific principles of Automotive Engineering to an advanced level.	✓	✓	✓	✓	✓
Further mathematical and computer models relevant to the automotive engineer to a comprehensive level and an appreciation of their limitations.	✓	✓		✓	
Management and business practices and their limitations as applied to strategic and tactical issues as appropriate for Chartered Engineers.					✓
Design methodology appropriate to automotive engineering	✓		✓	✓	
<b>Intellectual Abilities</b>					
Use fundamental knowledge to investigate new technologies.	✓	✓		✓	
Apply advanced mathematical and computer based models for solving complex problems in engineering, and the ability to assess the limitations of particular cases.	✓		✓	✓	
Extract data pertinent to an unfamiliar problem, and effect solutions using computer based engineering tools when appropriate.					✓
Debate contemporary issues in Automotive Engineering					✓
Critically discuss the importance of Automotive Engineering on a global scale		✓			

LEVEL 7	Advanced Powertrain and Control	Advanced Systems Engineering	Advanced Dynamics	Vehicle Control Systems	Group Integrated Masters Project
<b>General Learning Outcome</b>					
<b>Practical / Subject Specific skills</b>					
Use wide knowledge and comprehensive understanding of design processes and methodologies and apply and adapt them in unfamiliar situations.	✓		✓	✓	
Generate ground-breaking designs for products, systems, or components	✓			✓	
Evaluate the impact of regulatory, commercial and environmental constraints on processes and products.					✓
<b>General transferable skills</b>					
Have developed transferable skills that will be of value in a wide range of situations. These are exemplified by the Qualifications and Curriculum Authority Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT [information technology] facilities and information retrieval skills.	✓	✓	✓	✓	
Demonstrate evidence of planning, self-learning and improving performance, as the foundation for lifelong learning/CPD [continuing professional development].					✓
Communicate effectively with other people using oral, written and graphic means		✓			✓
Apply safe working procedures, health & safety legislation, risk assessment and risk management techniques					✓
Ability to use competent in a range of skills on the current CAD and IT equipment in an effective and productive manner.	✓			✓	
Show initiative, work independently and able to work as member of a team to develop collaborative skills					✓
Display resourceful solutions including use of advanced engineering tools to the limitations of current Automotive Engineering practice and discuss them in a major technical report.	✓	✓	✓	✓	

