

# Programme Specification

## AMT-2020: Automotive and Motorsport Engineering Technology

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LU Foundation Degree in Engineering awarded by Lancaster University (FHEQ Level 5)

LU Bachelor of Engineering with Honours (Top-up) awarded by Lancaster University (FHEQ Level 6)

Programme Status: Approved | Version: 1

## Introduction

This programme specification provides a summary of the main features of the Automotive and Motorsport Engineering Technology programme and the learning outcomes that you as a student might reasonably be expected to achieve and demonstrate on successful completion of the programme.

Further detailed information related to this programme and the College can be found in the following resources:

- Programme Handbook
- B&FC Student Handbook
- B&FC Admissions Policy
- Work based and placement learning handbook (for foundation degrees)
- Student guide to assessment and feedback

## Key Programme Information

<b>Programme Code</b>	AMT-2020
<b>Programme Title</b>	Automotive and Motorsport Engineering Technology
<b>Teaching Institution</b>	Blackpool and The Fylde College
<b>Professional, Statutory and Regulatory Body (PSRB) Accreditation</b>	None
<b>UCAS Code</b>	
<b>Language of Study</b>	English
<b>Version</b>	1
<b>Approval Status</b>	Approved
<b>Approval Date</b>	27 March 2020
<b>JACS Code</b>	Other: Other
<b>Programme Leader</b>	Wayne Hargreaves

## Programme Awards

<b>Award</b>	<b>Award Type</b>	<b>Level</b>	<b>Awarding Body</b>
LU Foundation Degree in Engineering	Foundation Degree (240 credits)	Level 5	Lancaster University
LU Bachelor of Engineering with Honours (Top-up)	Honours Top-up Degree (120 credits)	Level 6	Lancaster University

## Programme Overview

This innovative programme has been designed for those who want to transform their passion for automotive or motorsport vehicle engineering into a rewarding career in this fast-moving sector.

The programme has been developed in collaboration with local, national and global employers and is validated by Lancaster University. Graduates can be confident they will be entering the job market with a qualification and the essential skills and knowledge in high demand as the sector continues to transform with its move away from fossil fuels and the advent of autonomous vehicles.

As well as technical skills and knowledge, our supportive team will help you to develop broader skills in communication, creative problem solving and critical thinking, ensuring you enter the workplace ready to make an immediate impact.

Investment both in the world of mass-production and motorsport vehicle development in the research of alternative power sources is increasing. The most basic family cars are rolling off the production line with a plethora of advanced driver assisted technologies. Manufacturers are competing to be the leaders in fully connected and autonomous vehicles. There has rarely been a more exciting time to be involved in the transformation of a well-established sector.

## Admission Criteria

You are required to have a minimum of 64 UCAS points (excluding Functional Skills) from an appropriate discipline: Motor Vehicle Level 3 Extended Diploma; Motorsport Level 3 Extended Diploma; Vehicle Body/Paint Level 3 Extended Diploma; Other Engineering related Level 3 Extended Diploma; A-level qualifications (including engineering or science based discipline). Applicants who are able to demonstrate relevant work/life skills or knowledge will also be considered on an individual basis for direct entry to the Foundation Degree

The Foundation Year requires a minimum of 36 UCAS points from an appropriate Diploma in Motor vehicle / Motorsport Maintenance and Repair, Vehicle Body and Paint Operations and applicants who are able to demonstrate relevant work/life skills or knowledge will also be considered on an individual basis.

Entry requirement for the BEng Honours Top-up requires the successful completion of our Foundation Degree in Automotive & Motorsport Engineering Technology, or equivalent Lancaster University validated degree with modules that can be mapped to the BEng content.

## Career Options and Progression Opportunities

On the successful completion of this degree you will have gained a globally recognised Lancaster University qualification. During your time on the course the teaching team will assist you in researching and discovering career opportunities.

As the course is an engineering-based degree you can be sure that the skills you acquire will make you an extremely versatile individual who can achieve success in many engineering disciplines.

This degree will enable you to become operational as a graduate in a number of automotive related sectors. These include, but are not limited to, motorsport engineering, computer aided design, automotive manufacturing, crash safety testing and research and development.

This qualification will give you the opportunity to gain graduate employment on both a national and potentially global scale. Automotive manufacturing and design is now prevalent on many continents including mainland Europe, Asia and America, so there is clear scope to gain relevant employment wherever in the world you want to work. Some of our most recent graduates are currently working in automotive engineering roles have in China, Germany, America and the UK.

The possibilities for employment include companies such as, Rolls Royce, Bentley Motors, Jaguar Land Rover, McLaren, Aston Martin, Helical Technologies, MAHLE Powertrain and BAE Systems.

## Programme Aims

Foundation Degree

- To produce professional engineers who have the capacity to work successfully within the automotive sector, producing sustainable outcomes for the success of the industry and to take responsibility for lifelong learning necessary to build a successful career.

- To provide the opportunity for students to develop understanding of scientific principles, mathematical and statistical methods necessary to support application of key automotive engineering principles and technology in the workplace.
- To explore developments in the automotive field of design, engine design and technologies in order to apply problem solving skills and technical knowledge to either create or adapt design solutions that are fit for purpose.
- To provide students with the opportunity to monitor acquire, analyse and, evaluate new developments in the sector as they occur and to apply these appropriately to their chosen specialist field.
- To provide students with the opportunity to gain transferable knowledge and skills to enable them to play a full part in the Automotive/Motorsport research and development industry, commerce and the wider community.

#### BEng Hons Top-up

- To prepare students for their future careers by providing them with the requirements of a professional engineer together with a suitable range of transferable and management skills appropriate to the practices of automotive engineering.
- To provide a programme of study which develops core knowledge and understanding of engineering principles, mathematics and computation appropriate to the field of the automotive industry.
- To enable students to develop specialist knowledge, intellectual and practical skills which will enable them to analyse, investigate and develop robust solutions to automotive engineering problems
- To develop relevant study, personal and employability skills so that students progressively take responsibility for their own learning to become independent learners.

### Programme Learning Outcomes

#### Level 5

Upon successful completion of this level, students will be able to:

1. Apply academic and digital literacies in an automotive engineering context
2. Explain and Discuss scientific, mathematical and statistical methods which underpin relevant automotive engineering principles and technologies
3. Critically analyse, interpret and apply quantitative methodology using the results of analysis and modelling in order to bring about continuous improvement of performance of systems and components.
4. Apply a systems approach to solving engineering design problems which utilises technical knowledge and understanding and relevant technologies to create or adapt design solutions.
5. Apply relevant materials, equipment, tools, processes or products in appropriate automotive engineering contexts incorporating codes of practice, industry standards and quality issues.
6. Investigate business, customer and user needs, including considerations such as the wider automotive engineering context, public perception and aesthetics
7. Apply sustainable development and sustainability options in automotive engineering which recognises legislative and environmental constraints.

8. Manage correctly health and safety and professional working conditions within the context of the subject specialisms.

#### **Level 6**

Upon successful completion of this level, students will be able to:

9. Critically evaluate established techniques of modelling, critical, statistical and mathematical analysis and enquiry to solve problems and to arrive at working solutions within the field of automotive engineering.
10. Critically analyse and evaluate scientific principles, engineering analyses and methodologies to support the application of key engineering principles and technologies.
11. Communicate the results of work to technical and non-technical audiences which reflects knowledge and understanding of automotive engineering principles.
12. Critically evaluate the commercial, economic, legal, social and ethical contexts working as a professional engineer.
13. Communicate complex information about a systematic research enquiry.
14. Apply problem solving, information retrieval and various communication skills.
15. Draw relevant conclusions and make recommendations to inform future practices in the chosen specialist field of automotive/motorsport engineering.

## Programme Structure

Module	Level	Credits	%	Category	Description	Length/Word Count	Grading Method
<b>Stage 1</b>							
AMT301: Automotive Mathematics (Mandatory)	3	20	25%	Coursework: Assignment	Mathematical Application	1000	Percentage Grade
			25%	Coursework: Assignment	Problem solving	1000	Percentage Grade
			50%	Written Exam: Formal Written Examination	Math principles and problem solving	120	Percentage Grade
AMT302: Automotive Science (Mandatory)	3	20	35%	Coursework: Assignment	Scientific principles	1200	Letter Grade
			35%	Coursework: Assignment	Scientific principle & engineering principles	1200	Letter Grade
			30%	Written Exam: Formal Written Examination	scientific principles	120	Percentage Grade
AMT303: Vehicle Aesthetics & Technologies (Mandatory)	3	20	60%	Coursework: Report	Finishing systems and technologies	1500	Letter Grade
			40%	Practical: Practical Skills Assessment	systems and practice	20	Letter Grade
AMT401: Automotive Powertrain Fundamentals (Mandatory)	4	20	70%	Coursework: Project	Project research	3000	Letter Grade
			30%	Practical: Presentation	Powertrain developments	10	Letter Grade
AMT402: Automotive Composites (Mandatory)	4	20	70%	Coursework: Report	Carbon Fibre Technology	2500	Letter Grade
			30%	Practical: Presentation	Individual presentation	10	Letter Grade
AMT403: Automotive Manufacturing (Mandatory)	4	20	70%	Coursework: Report	Manufacturing company report	3000	Letter Grade
			30%	Practical: Presentation	Manufacturing	10	Letter Grade
<b>Stage 2</b>							
AMT404: Engineering Principles (Mandatory)	4	20	35%	Coursework: Assignment	Applied Principles,	1500	Letter Grade
			35%	Coursework: Assignment	Further applied principles	1500	Letter Grade
			30%	Written Exam: Formal Written Examination	Theories and Mathematical formula	120	Percentage Grade
AMT405: Computer Aided Engineering and Design (Mandatory)	4	20	20%	Coursework: Report	Design process and techniques	1000	Letter Grade
			80%	Coursework: Project	CAED project	3000	Letter Grade
AMT406: Vehicle Aerodynamics and Computational Fluid Dynamics (Mandatory)	4	20	100%	Coursework: Project	Aerodynamic Case Study	6000	Letter Grade
AMT407: Combustion Engine Development (Mandatory)	4	20	70%	Coursework: Report	Combustion engine development	3000	Letter Grade

AMT407: Combustion Engine Development (Mandatory)	4	20	30%	Written Exam: Formal Written Examination	Engine Theory and Design	120	Letter Grade
AMT408: Engineering Practical Applications (Mandatory)	4	20	100%	Coursework: Critical Review	practical engineering applications	3800	Letter Grade
B4SCAMT: Introduction to Academic Study (Mandatory)	4	20	60%	Coursework: Other	Written piece and reflection	2000	Letter Grade
			40%	Practical: Other	Case study, analysis, interpretation and poster presentation	15	Letter Grade
<b>Stage 3</b>							
AMT501: Major Project (Mandatory)	5	40	10%	Coursework: Plan	Project plan	1200	Letter Grade
			80%	Coursework: Project	Major project final report	6800	Letter Grade
			5%	Practical: Presentation	Interim Project review	10	Letter Grade
			5%	Practical: Presentation	Final showcase presentation	10	Letter Grade
AMT502: Advanced Engineering Principles (Mandatory)	5	20	25%	Coursework: Report	applied engineering	2000	Letter Grade
			25%	Coursework: Report	Engineering principles	2000	Letter Grade
			50%	Written Exam: Formal Written Examination	Advanced Mathematics	120	Percentage Grade
AMT503: Hybrid Powertrain Design (Mandatory)	5	20	60%	Coursework: Project	Simulation and analysis	3500	Letter Grade
			40%	Practical: Timed Assessment	Advanced powertrain fundamentals	120	Letter Grade
AMT504: Vehicle Dynamics and Data Logging (Mandatory)	5	20	60%	Coursework: Report	Vehicle dynamics	3000	Letter Grade
			40%	Practical: Timed Assessment	Data logging analysis & Strategies	3000	Letter Grade
B5AMT-16: Work Based Learning (Mandatory)	5	20	70%	Coursework: Report	Project	3000	Letter Grade
			30%	Practical: Presentation	Poster - Critical Reflection & Target Setting	2000	Letter Grade
<b>Stage 4</b>							
AMT603: Dissertation (Mandatory)	6	40	15%	Coursework: Plan	Project Plan	1800	Letter Grade
			80%	Coursework: Dissertation	Final Dissertation report	9600	Letter Grade
			5%	Practical: Presentation	Final showcase presentation	10	Letter Grade
AMT604: Advanced Vehicle Design, Simulation and Analysis (Mandatory)	6	40	80%	Coursework: Project	Critical analysis	9600	Letter Grade
			20%	Coursework: Group Project	individual report project analysis	2000	Letter Grade
AMT605: Dynamic Simulation (Mandatory)	6	20	30%	Coursework: Report	Simulation, critical analysis	2000	Letter Grade

AMT605: Dynamic Simulation (Mandatory)	6	20	70%	Written Exam: Formal Written Examination	Dynamic simulation theories	120	Percentage Grade
AMT606: Sustainable Vehicle Technologies (Mandatory)	6	20	30%	Coursework: Evaluative/ Reflective Report	Sustainable vehicle technologies	3000	Letter Grade
			70%	Written Exam: Formal Written Examination	Sustainable vehicle engineering theories and principles	120	Letter Grade

## Study Workload

Ensuring you achieve success on the Automotive and Motorsport Engineering degree course means consistently maintaining suitable study patterns to maximise your marks and ensure you meet all deadlines.

On the degree course studying can take place in a variety of formats, these include:

### Scheduled Learning

Scheduled time relates to the time you spend in directed study with the guidance and support of our academic tutors. Scheduled learning can take a variety of forms and will vary from one course to the next, but may include lectures, seminars, tutorials, project supervision, demonstrations, studio or workshop time, fieldwork and external visits.

### Independent Study

Higher education courses rely on students undertaking work outside of formal, scheduled sessions and this is generally categorised as independent study. Independent study might include preparation for scheduled sessions, follow-up work, wider reading or practice, completion of assessment tasks and revision.

### Career development

Time allocated for your career development will provide you with an opportunity to focus on applying your learning and experiences to the development of graduate attributes, your professional practice and career intentions. A range of self-paced digital resources to support work based and independent learning will also be made available to you on your VLE.

## Programme Delivery: Learning and Teaching

We aim to maintain small class sizes to maximise interaction between you and your tutors. Teaching incorporates whole class taught sessions and directed independent study to enable you to obtain the information you need to complete assignment work in a timely manner. We have developed a culture of ensuring all our students can access and receive levels and types of support that maximises technical, academic and broader knowledge and skills development.

You will have opportunities to attend guest lectures, delivered by industry experts and participate in interactive seminars, where you will be invited to discuss and share thoughts and ideas relating to your modules.

Teaching is inclusive and interactive and incorporates lectures, seminars and practical application. We ensure you have every opportunity to put your theories into practice and positively promote the use of our outstanding and extensive, state-of-the-art workshop facilities and automotive engineering laboratories.

Our continued success converts to continued investment in facilities, equipment, software and staff, meaning our students graduate with the confidence that they will make a positive contribution as soon they enter the world of work.

The Automotive and Motorsport Engineering Technology Degree is assessed through a combination of written coursework, presentations, practical assessments and examinations. Each assessment has its own percentage weighting depending on the module and the Level / Stage.

### Written Coursework

Written coursework can be completed during the timetabled sessions and as part of your independent study. This type of assessment ensures you are completing work to a high standard in terms of referencing, formatting and presentation. Written coursework provides opportunities for your tutors to assess, and where required, help you to develop your spelling, punctuation and grammar.

### Examination

The examinations are formal, timed, written assessments, carried out in a controlled environment overseen by one or more invigilators. Examinations assess your grasp of the theory and underpinning knowledge related to your chosen career area. The opposite of practical assessments, they require you to set out your practical understanding within an academic context. Some of the modules have no exams and these modules require different forms of assessments identified above.

### Practical Assessments

Practical assessments identify your technical ability to apply theory to hands-on tasks in your chosen career area. They can be timed or non-timed and involve observation of your practical skills and competencies. Specific practical based modules often involve practical assessments to ensure you enhance your skills and relate these skills to a practical setting. Being observed completing practical tasks is industry relevant and allows you to gain further employability skills.

### Presentations

A variety of the modules have a presentation as one of their assessments. You will have the opportunity acquire a variety of presentation skills and identify how to effectively implement a range of different media and resources to produce an industry relevant presentation. This type of assessment will assist you in preparing for graduate employment presentations once you have completed your degree. The presentations are completed in front of the teaching team. Immediate verbal supportive and constructive feedback will be given on a one-to-one basis to discuss performance.

### Work based learning

The Automotive and Motorsport Engineering degree incorporates a work based learning module. This module will provide you with the opportunity to link your studies to relevant professional practice in the working environment. Our programme teams are able to offer support in identifying appropriate work based learning activities to form part of your studies, and will work closely with you to ensure that the activities allow you to develop personally, professionally and academically.

## Programme Delivery: Work Based and Placement Learning

At level 5 there is an emphasis on the nature of contemporary work based learning opportunities that can occur in different contexts in terms of where you are in your professional career or learning journey. The practice of work based learning relates to your academic and professional development to prepare you for graduate employment and career development.

We recognise that for some students, work-based learning will be linked directly to their employment or a structured work placement, for others, it may relate to a specific live-brief or scenario which has been co-created with an employer. Your work-based learning experience may fall in to one of the following categories or it could be a combination of all three.

**Learning through work:** structured work placements or internships undertaken for a minimum of 30 hours (equivalent to a 5-day industry placement) as part of the module to provide you with an experience of an employment situation where the work you undertake will provide a key source for your learning, including remote working and work undertaken in non-employed settings i.e. volunteering

**Learning at work:** if you are employed in an appropriate setting and your subject discipline is embedded in the workplace.

**Learning for work:** live work-based project which involves employers in the commissioning of industry briefs, projects or research. Similar to learning through work, it provides you with a work-based experience of your industry, where the work you undertake will provide an opportunity to connect theory and practice to work-based learning.

### Work-based learning activities

There are a variety of work-based learning activities which you can engage, including (where required) work placements. In order for you to learn from your experiences it is recommended that you should engage in a minimum of 30 hours of work based learning activities. These activities can include:

- Researching a company or organisation a student may wish to join as an employee
- Attending a careers interview, job application and interview skills
- Understanding the job market, skills and attributes sought by employers.
- Developing a graduate employability profile e.g. LinkedIn
- Career planning, professional development and target setting
- Evaluating role and responsibilities in the workplace
- Incorporating formative and summative feedback in to professional and academic targets
- Live-briefs or scenarios related to industry
- Work placement activities

You can discuss the range of activities available to you and these can be incorporated to your learning experience with your Work-based Learning Module Tutor and Progress Tutor.

## Programme Delivery: Graduate Skill Development

The programme offers you the opportunity to experience and develop a range of skills related to your personal preference of Automotive / motorsport discipline. These include accessing and evaluating information from a range of technical sources and communicating findings in a range of ways suitable to engineering.

Modules are designed to develop your existing skills to enable you to become independent researchers and will provide the basis for a lifelong learning roadmap supported and developed through industry and academic research and enquiry. Further skills in technical information analysis and application will be developed during the delivery of the programme content through

lectures, guest speakers and research into engineering systems, sub-systems and approaches.

There is a strong emphasis on employability in all years of the programme. From the start of the programme, personal development plans (PDP's) will be driven through a progress tutorial system and will focus on identifying the skills and attributes of graduate engineers as employees, with the formulation and setting of action plans to achieve them. Teaching, learning and assessment methods allow development of key transferable skills such as problem solving and communication, team work and individual performance.

The production of assessment work in varied formats such as engineering reports, essays, oral presentations and discussions will contextualise the communication and cognitive requirements of modern employable engineers.

We encourage you to develop personally during the programme and provide a range of opportunities to develop the additional attributes that will make you a highly employable graduate. These are:

#### *A commitment to lifelong learning and career development*

Personal and professional development planning is emphasised throughout the programme so that you can plan for career and skills development including post-graduate study or employment opportunities

#### *Collaborative teamwork and leadership skills*

You are encouraged to work in groups to present research, design investigations and solve problems, building your communication and organisational skills

#### *Personal and intellectual autonomy*

The programme encourages you to work independently and offers an element of choice in selecting topics for research, culminating in the choice of the final year dissertation project

#### *Ethical, social and professional understanding*

Automotive and Motorsport research often presents ethical and social issues which are discussed in a range of modules. We encourage you to act professionally throughout the programme and to follow guidance on professional development from professional bodies such as the Institute of the Motor Industry (IMI) and Motorsports UK (formally MSA)

#### *Communication, information and digital literacies*

You will develop your communication skills through sharing research in a variety of ways including presentation and you will use statistical packages to analyse and share data

#### *Global citizenship*

As an Engineer you are encouraged to look at the whole world wide focus of Automotive and or Motorsport issues and ensure that your focus compliments the way forward particularly with environmental pressures found in this industry.

#### *Research, scholarship and enquiry skills*

Throughout the programme you are encouraged to begin to ask your own questions and to perform the research required to answer them, culminating in the development of your dissertation research project

#### *Enterprise and entrepreneurial awareness and capabilities*

Development of your project ideas at Level 5 and 6 encourages you to think strategically to plan

work, liaise with staff and develop a budget for the project, as well as to meet required deadlines

### **Study Costs: Equipment Requirements**

#### **The college will provide:**

Workrooms with high performance PC's for software use.

Remote access to your college desktop (software can run slow)

Software packages, such as Star CCM+\*, CAD\*

Library facilities and HE common rooms.

Special PPE

(Download through your own Internet provider)

#### **You will need to provide:**

Pens, pencils, rulers, protractor, compass, scientific calculator (£20), note pads (£5)

Set of overalls (£10-20) and boots (£20-30),

The above list is a 'must have' in order to complete the course.

A laptop or home PC (£500-1000) would be advantageous so you can work with the software and your assignments but is not essential.

The above costs are approximate, your tutor can advise where to purchase the PPE and your module tutor will advise on PC specifications.

### **Study Costs: Additional Costs**

Visits to Autosport International show (NEC) (£50)\*

Visits to Automotive related companies (free)\*

Visits to Track side (free)\*

The above mentioned will be optional, but are a great experience.

\*you may need money for refreshments

## Related Courses

The successful completion of the Foundation Year of the Automotive and Motorsport Engineering degree will enable you to progress onto a number of Engineering based Foundation Degrees within the college as the core subjects such as mathematics and science will have been studied on the Foundation Year. The Foundation Year also enables you to identify how to successfully complete a range of academic writing and academic based presentations, which are also transferable skills.

On the successful completion of each stage of the Foundation degree there is potential to progress onto another engineering discipline to continue your studies within the School of Engineering and Science. For example, the successful completion of Foundation Degree Year One and Year Two would enable you to complete a BEng Honours top up in another engineering discipline.

On successful completion of the BEng Honours Top-up, you will then have the opportunity to progress onto the Masters Degree at Lancaster University. There is also the option to progress onto many other postgraduate qualifications such as the Post Graduate Certificate in Education.