

# Programme Specification

## AUT-A-2015: Automotive Engineering and Technology (Automotive)

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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 Engineering and Technology (Automotive) 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>	AUT-A-2015
<b>Programme Title</b>	Automotive Engineering and Technology (Automotive)
<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 April 2017
<b>JACS Code</b>	
<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

Blackpool and the Fylde College remains committed to providing a highly responsive curriculum that is employment and future-focused and will enable students to develop the essential knowledge and skills that will prepare them for future success in work and life

The automotive industry is a strong employer in the region and our principle aim is to move students into employment. The output of motor vehicles in this country is at a record high, with 80% being exported. The government has repeatedly highlighted the need for highly qualified technicians in engineering to support and grow the economy.

Blackpool and The Fylde is committed to providing the employees with the high-end knowledge and skills that employers in the North West need to drive economic recovery.

This mature programme has existed for over ten years and has successfully provided industry ready graduates for the automotive and auto sport industries. This revalidation is an excellent opportunity to not only refine and refresh current modules to ensure industry alignment but is an opportunity to develop the programme further to contain new and innovative modules which develop skills and knowledge that the automotive industry needs.

## Admission Criteria

**Entry to Foundation Degree with Foundation Year (Yr 0) will require one of the following:**

- Level 3 Diploma in an automotive discipline
- Level 3 Diploma in a related discipline
- 'A' levels to UCAS points of 90 (with no engineering based discipline)

**Entry to Foundation Degree will require one of the following:**

- Level 3 Extended Diploma in automotive discipline
- Level 3 Extended Diploma in related discipline (such as mechanical engineering of science)
- 'A' levels to UCAS points of 120 (including engineering or science based discipline)

## Career Options and Progression Opportunities

On successful completion of the FdEng and FdEng with Foundation Year, students have two main routes for progression: (i) study the BEng (Hons) Automotive Engineering & Technology top-up; (ii) employment

Careers best suited to these awards include, but are not limited to:

- working for motor vehicle manufacturers
- working for manufacturing companies supplying motor vehicle manufacturers
- working for specialist design, research and development companies for the automotive / motorsport industry
- wholesale & retail trade; repair of motor vehicles

On successful completion of the FdEng, students progress on to this BEng (Hons) top-up degree in the equivalent topic as shown in diagram above. Graduating students from the BEng (Hons) have a high level of employability in the automotive industry and B&FC students have secured posts specific to their degrees with well known employers, including: Bentley, Triumph, Lotus, Jaguar Land Rover, Nissan, Ford Motor Company, M Sport (Cumbria), Westfield Sports Cars, Blackpool and the Fylde College.

On completing of the BEng (Hons) degree, a number of these students have gone on to study at Masters Degree level with Lancaster University.

## Programme Aims

Foundation Year (Yr0):

- To provide a sound foundation in automotive engineering knowledge and principles to support further study.
- To produce engineers with the practical and technical skills to progress to further studies.
- To develop understanding and skill in the automotive discipline which enables students to

apply and transfer knowledge to a limited range of contexts.

#### 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.

#### Bachelor Degree:

- 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 4**

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

1. Discuss key principles of automotive engineering and relate these to engineering problems.
2. Apply automotive principles and knowledge to practical situations.
3. Identify both scientific and mathematical core principles and apply these to automotive problem solving.
4. Communicate ideas , engineering, scientific and mathematical information to specified audiences.

## Level 5

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

5. Use academic and digital literacies and apply these in an automotive engineering context.
6. Identify, explain and use scientific, mathematical and statistical methods which underpin relevant automotive engineering principles and technologies.
7. Monitor, 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.
8. Apply a systems approach to solving engineering design problems which utilises technical knowledge and understanding and relevant technologies to create or adapt design solutions.
9. Use relevant materials, equipment, tools, processes or products in appropriate automotive engineering contexts incorporating codes of practice, industry standards and quality issues.
10. Examine business, customer and user needs, including considerations such as the wider automotive engineering context, public perception and aesthetics.
11. Promote sustainable development and sustainability options in automotive engineering which recognises legislative and environmental constraints.
12. Conform to 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:

13. Use 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.
14. Critically analyse and evaluate scientific principles, engineering analyses and methodologies to support the application of key engineering principles and technologies.
15. Communicate the results of work to technical and non-technical audiences which reflects knowledge and understanding of automotive engineering principles.
16. Critically examine the commercial, economic, legal, social and ethical contexts working as a professional engineer.
17. Conduct a systematic research enquiry, applying problem solving, information retrieval and communication skills; drawing relevant conclusions and making recommendations to inform future practices in the chosen specialist field of automotive engineering.

## Programme Structure

Pathway	Module	Level	Credits	Coursework	Practical	Written Exam
<b>Stage 1</b>						
<b>Stage exit award: LU Certificate of Higher Education (Awarded by Lancaster University)</b>						
All	AUT301: Automotive Mathematics (Mandatory)	3	20	70%		30%
	AUT302: Automotive Science (Mandatory)	3	20	70%		30%
	AUT303: Automotive Manufacturing (Mandatory)	3	20	70%	30%	
	AUT401: Automotive Powertrain Fundamentals (Mandatory)	4	20	70%		30%
	AUT402: Automotive Composites (Mandatory)	4	20	70%	30%	
	AUT403: Vehicle Body Design and Crash Test Technology (Mandatory)	4	20	35%	35%	30%
<b>Stage 2</b>						
<b>Stage exit award: LU Diploma of Higher Education (Awarded by Lancaster University)</b>						
All	AUT404: Engineering Mathematics 1 (Mandatory)	4	20	70%		30%
	AUT405: Computer Aided Engineering and Design (Mandatory)	4	20		70%	30%
	AUT406: Vehicle Aerodynamics (Mandatory)	4	20	50%	50%	
	AUT407: Engine Technologies and Development (Mandatory)	4	20	70%		30%
	AUT408: Chassis Performance Testing (Mandatory)	4	20	85%	15%	
	B4SCAUT-A: Introduction to Academic Study (Mandatory)	4	20	60%	40%	
<b>Stage 3</b>						
<b>Stage exit award: B&amp;FC Foundation Degree in Engineering (Awarded by Blackpool And The Fylde College)</b>						
All	AUT501: Engineering Mathematics 2 (Mandatory)	5	20	70%		30%
	AUT502: Major Project (Mandatory)	5	40	90%	10%	
	AUT511: Engine Design Analysis (Mandatory)	5	20	50%		50%
	AUT512: Vehicle Dynamics and Data Logging (Mandatory)	5	20	100%		
	BFC501-E: Work Based and Placement Learning (Mandatory)	5	20	100%		

Stage 4 Stage exit award: LU Bachelor of Engineering with Honours (Awarded by Lancaster University)						
All	AUT601: Dissertation (Mandatory)	6	40	80%	20%	
	AUT602: Dynamic Simulation (Mandatory)	6	20	30%		70%
	AUT603: Alternative Power Sources (Mandatory)	6	20	30%		70%
	AUT611: Engine Design Simulation and Analysis (Mandatory)	6	40	80%	20%	

## Programme Delivery: Learning and Teaching

The overall strategy for teaching, learning and assessment for all three years of the programme from Year 0 through to level five will allow students to become progressively more independent automotive engineers with a broad base of knowledge in the automotive area and with the skills to perform within employment. To this end the programmes are designed to become more challenging to students through the semesters and levels, with a reduction in directed learning and support, to learning that is more independent and is self-directed.

### Foundation Year (Yr 0)

In the Foundation Year students are provided with teaching sessions which encompass presentation methods through use of the interactive whiteboards for problem solving, mathematical calculations and dissemination of key concepts and principles. VLE materials and presentations are also used to create variety of stimulus and to ensure that all students are able to engage with the active learning strategies employed on the programme. In addition to the taught theory elements students are provided with opportunities to engage in group, pair and individual problem solving practical activities in workshops and classrooms to further develop knowledge, skills and attitudes which will support them when they access the Foundation Degree. Practical skills-development is supported by students engaging in practical diagnosis of engine faults and functionality through industry-standard, strip-and-rebuild facilities, working in either groups or as individuals, according to task and context. Technical skills are developed through the use of Computer Aided Engineering (CAE) software where students work with this individually in the sessions and then work independently using the VLE supported by the tutors through one to one and group tutorials.

The focus of the teaching and learning strategy for Year 0 is supporting the development of basic foundational knowledge and skills which will enable the students to achieve on the FdEng Programme. The Year 0 is characterised by more individual and group support and the teaching and learning methods reflect this being more student centred yet still quite teacher directed.

### Level 4

As students begin their Foundation Degree studies they will experience a number of different teaching and learning methods which are appropriate to the subject discipline and are accessible to students at this stage of their development.

The strategy at this level is to consolidate work completed at Level 3 and in some cases Yr0 programmes and to use this to build on and further develop understanding of automotive concepts and skills.

Students will begin to have more lecture formats, however these are interactive and involve active questioning, and group and pair work activities. Students are provided with lots of vocationally relevant tasks in the workshops where they will apply engineering principles to

solve problems; this will be done using software based simulations. Collaborative activities are a key feature of the level 4 teaching and learning strategy and as such group work is used extensively. At level 4 this builds individuals confidence and skills in a supportive group environment and gives them the opportunity to further develop independent learning skills required for progression through the programme.

## Level 5

During level 5 students are expected to engage in a major project and to engage in work based / placement learning. These two modules will be taught using tutorial, one to one and small group methods. The key to these modules is individualised learning. Students will negotiate their projects with their tutor and will be supported in their independent learning through directed activities; this may include secondary research and interrogation of data. Weekly diary sessions are used on the programme. The tutorial and the dialogue between teacher and tutor form the major teaching and learning approach for these two modules. Other teaching and learning activities at level 5 consist of lectures, seminars, workshops and practical sessions.

Independent learning is systematically developed throughout the programme and the teaching and learning methods reflect this with more tutor directed activities in level 4 and more independent, autonomous learning activities at L5. Students will be expected to review data through analysis, rather than comprehension. Presentation of analysed data - by individuals or groups - will form the basis of student-led seminar activities.

Work based learning is integrated in all levels of the programme introduced at Level 4 and developed further at Level 5. Wherever possible, work based scenarios are used in formative or summative assessment and are formally assessed in the **Work Based Learning** module.

There are links between modules and a focus on development from Level 4 (where knowledge and skills are acquired) to Level 5 where they are expanded and applied.

All delivery methods will be supported by access to electronic information through the academic staff, the college's Moodle VLE and the Learning Resource staff. Teaching and learning throughout Levels 4 and 5 will involve independent study and group work and a combination of both.

## Level 6

Teaching will be by a combination of lectures, seminars, practical laboratories and formative assignments, supported where appropriate by other methods such as guest lectures, blended learning, tutorials, industry visits and work placement.

The teaching and learning strategy for L6 is based on the assumption that students are now more skilled and accomplished independent learners able to manage and organise their own research and enquiry work and are able to work with limited supervision on a range of directed learning tasks. The predominant strategy for L6 is student centred with managed learning tasks such as research, interrogation of data, hypothesis and systems testing, models testing and critical evaluation of problem solving approaches and solutions. Students are expected to study and learn independently, and become proficient in organising their time and prioritising workload.

Individual and / or team projects will develop the students' understanding of subjects / topics through theoretical and practical applications. The combination of theoretical and practical activities will be delivered through a combination of traditional presentation and more student centred enquiry project work.

The teaching techniques, learning activities, modes of assessment and have been selected to ensure all learners who undertake these programmes are given every opportunity to achieve module outcomes.

## Programme Delivery: Assessment

Formative assessments include verbal question and answer for knowledge testing and observation of practical and workshop tasks with verbal and in some cases written feedback provided. Formative assessment opportunities are provided for all modules at appropriate times in the assessment schedule according to need and designed to enable the student to meet the requirements of the summative assessments.

Summative assessment is varied and engaging with a range of formats offered. Examinations are required through Lancaster regulation and are set to as part of the summative assessment for a number of modules. Coursework is varied and related to industry requirements.

Assessment strategies will aim to test a range of skills and knowledge and, whilst following the regulations laid out by Lancaster University, will include (but may not be limited to); unseen examinations, self and peer assessments, practical reports, subject reports, data interpretation, critical analyses of data, oral presentations, major project and portfolio.

Within each level, assessment will be co-ordinated to provide a balance of assessment strategies so as to develop knowledge and skills. These will become progressively more challenging, allowing students to demonstrate skill development and knowledge acquisition. Industry focus is an important element of summative assessment and as such employer partnerships play a role in the design of assessments ensuring the programme is aligned to the needs of industry.

### Level 6

Formative assessment at L6 consists of tutorial one to one diary meetings providing an individualised approach which enables students to discuss their progress on independent tasks and to receive detailed and targeted feedback from the tutor. Other formative assessments involve operation of software to develop models, these models are assessed and feedback is provided to enable students to progress and make improvements and minimise future errors.

Summative assessment for Level 6 consists of two exams in modules AUT602 Dynamic Simulation and Alternative Power Sources AUT603. The dissertation Module is assessed through the production of an extended dissertation enquiry with an accompanying showcase. In module Race Engine Design Simulation and Analysis an extended year long project is assessed by means of a correlational prototype project with an accompanying presentation. All other summative assessments on the L6 consist of coursework activities to include case studies, reports and simulations.

## **Programme Delivery: Work Based and Placement Learning**

The course is delivered over a two day period, giving maximum flexibility for seeking relevant work experience.

In year 2 students will have to complete the Work Based and Placement Learning module. This gives every student the opportunity to contextualise their studies in a work environment, making sense of their studies in relation to the industry they have chosen to pursue careers in. Module leaders will give guidance throughout the course as to the correct work experience which can take place during any period of study.

Further guidance of the sources and types of relevant work experience to the course is given in the module handbook.

Placements are arranged and managed by the programme team utilising their effective links with employers. Placements are arranged to take place in L5 and all students require a placement to complete the work based learning elements. Should a student for whatever reason lose their placement the team have strategies to ensure that the student can still meet the learning outcomes for the module, Alternative placement opportunities will be explored but should these not be able to be fulfilled our strategy is for students to carry out work specific work based projects and industry sponsored live briefs at the Bispham Campus.

## **Study Costs: Equipment Requirements**

A minimum of boots and full length overalls (boiler suit) are needed for the workshop sessions. A scientific calculator and A4 note pads will be needed for almost all of the modules that you will study.

For your Level 5 (FD2) and Level 6 (BEng) years it is advised to use a personal laptop or PC at home with specifications that can run the software (software is usually free but may need an application form completing to use). This will be needed for the majority of your modules, but is optional as the college does have high spec PC's for you to use during college hours (limited availability when taught sessions are happening).

## **Study Costs: Additional Costs**

There may be opportunities for field trips to conferences, exhibitions or for other interests. This is done through negotiation as new venues / locations / trips must be risk assessed and approved. There is often room in the budget to subsidise costs so discounted contributions can be made, yet this will depend on many factors, including entry fees / travel.