

## **Programme Specification**

### **FdEng Motorsports Engineering**

Valid from: September 2015

**Faculty of Technology, Design and Environment-  
Brooklands College**

## SECTION 1: GENERAL INFORMATION

Awarding body:	Oxford Brookes University
Teaching institution and location:	Brooklands College, Weybridge Campus
Final award:	Foundation Degree (Engineering)- FdEng
Programme title:	Motorsports Engineering
Interim exit awards and award titles:	Certificate of Higher Education (exit award only)
Brookes course code:	BR17
UCAS/UKPASS code:	H33A
JACS code:	H331
Mode of delivery:	Face-to-face
Mode/s of study:	full-time (2 years), part-time (3 years)
Language of study:	English
Relevant QAA subject benchmark statement/s:	<p>Foundation degree benchmark (2010):  <a href="http://www.qaa.ac.uk/en/Publications/Documents/Foundation-Degree-qualification-benchmark-May-2010.pdf">http://www.qaa.ac.uk/en/Publications/Documents/Foundation-Degree-qualification-benchmark-May-2010.pdf</a></p> <p>QAA Engineering benchmark (revised edition, 2010):  <a href="http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Engineering-.pdf">http://www.qaa.ac.uk/en/Publications/Documents/Subject-benchmark-statement-Engineering-.pdf</a><sup>1</sup></p> <p>Engineering Council UK-SPEC (third edition, 2013):  <a href="http://www.engc.org.uk/ukspec.aspx">http://www.engc.org.uk/ukspec.aspx</a></p>
External accreditation/ recognition: ( <i>applicable to programmes with professional body approval</i> )	<p>Partial IEng with the IET ( <a href="http://www.theiet.org/">http://www.theiet.org/</a> ) and the IMechE ( <a href="http://www.imeche.org/">http://www.imeche.org/</a> ).</p>
Faculty managing the programme:	Technology, Design and Environment
Date of production (or most recent revision) of specification:	7/27/2018

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<sup>1</sup> Strictly, this benchmark statement corresponds to threshold criteria for engineering honours degrees and does not correspond to the output standards for this foundation degree. Further, the engineering benchmark statement concedes, and refers the reader to, the UK Engineering Council's accreditation Standard for Professional Engineering Competence (UK-SPEC) and criteria for accreditation of degree programmes towards CEng and IEng status.

## SECTION 2: OVERVIEW AND PROGRAMME AIMS

### 2.1 Rationale for/distinctiveness of the programme

This programme is designed to meet the University's aims of widening participation in higher education amongst those people who are currently under-represented by providing a Foundation Degree in Motorsport Engineering. The programme is consistent with the objectives of the University's learning, teaching and assessment strategy which seeks to develop innovative approaches to e-learning and studying in the workplace, to ensure that academic programmes prepare students for employment, to optimise student progression opportunities and retention rates, and to develop graduate attributes. The programme is designed to meet regional skills gaps for adult learners, including work-based learning routes, are key deliverables.

### 2.2 Aims of the programme

The Foundation Degree in Motorsports Engineering is designed to meet the following aims:

- to provide a professional foundation for a range of technical and management careers in Motorsport Technology;
- to provide a broad range of studies directly relevant to a wide range of Motorsport related careers;
- to enable students to make an immediate contribution in their current employment through skills learnt and in particular via a work related project;
- to provide flexibility, knowledge, skills and motivation as a basis for career development and as a basis for progression to graduate and postgraduate studies;
- to develop students' ability in Motorsport Technology through effective use and combination of the knowledge and skills gained in different parts of the programme and in the workplace;
- to develop a range of skills and techniques, personal qualities and attitudes essential for reflective learning and practice leading to successful performance in working life through the integrated assessment of graduate attributes;
- to provide individuals with skills necessary to progress their career in Motorsport Technology.

## SECTION 3: PROGRAMME LEARNING OUTCOMES

On successful completion of the programme, graduates will demonstrate the following Brookes Attributes informed by the subject benchmark statements for Engineering in the form of UKSPEC 3rd Edition 2013 ([http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20\(1\).pdf](http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf)):

### 3.1 Academic literacy

3.1.1 The application of basic IT, computing and mathematical tools, including physical relationships, that are fundamental to the design and modelling of motorsport components.

3.1.2 The ability to apply basic engineering principles and the ability to work with analytic techniques for problem modelling and simulation.

3.1.3 Creative participation in the "Engineering Design Process".

- 3.1.4 Knowledge of manufacturing processes and the application of computers to manufacturing of motorsport components and assemblies including disassembly.
- 3.1.5 An understanding of good engineering practice and the properties, behaviour, fabrication and use of relevant materials and components in the Motorsport Industry.
- 3.1.6 The ability to apply scientific and engineering principles to the solution of practical problems of Motorsport systems and processes, with an appreciation and basic understanding of the relevant theory and analysis

### **3.2 Research literacy**

- 3.2.1 The ability to learn independently and apply that skill in order to extend the subject knowledge base to situations in Motorsport Engineering.
- 3.2.2 The ability to design and undertake a research oriented project.
- 3.2.3 Ability to critically evaluate and provide solutions of tasks set within the work environment.

### **3.3 Critical self-awareness and personal literacy**

- 3.3.1 The ability to develop and use interpersonal communication, presentation and team working skills along with various other enterprise skills.
- 3.3.2 Organisational skills at both the personal level and in the areas of project management and the management of human resources.
- 3.3.3 The ability to communicate effectively using a range of personal presentation skills and techniques.
- 3.3.4 The ability to self-manage and organise their work including the ability to organise, use and present information in a clear, logical and concise manner.
- 3.3.5 The ability to apply subject knowledge to problems in engineering.

### **3.4 Digital and information literacy**

- 3.4.1 The use and management of information technology within a Motorsport design environment.
- 3.4.2 An understanding of a broad range of appropriate information technology skills and their application within a technical or commercial environment.
- 3.4.3 The ability to work with and use models that simulate the behaviour of the physical world from which performance can be reliably predicted.
- 3.4.4 The ability to communicate effectively using traditional graphical techniques, reports, presentations and IT tools.

### **3.5 Global citizenship**

- 3.5.1 An understanding of critical factors in both the national and international Motorsport Technology business environment such as marketing skills and financial awareness.
- 3.5.2 An understanding of the role of engineering and specifically the role of Incorporated Engineers (IEng) in the global context of social, economic and ethical considerations.
- 3.5.3 With guidance, in relation to the field of Motorsport Engineering and within specified parameters, identify and explain issues related to ethics, health and safety, design, engineering science & applications, analytical & mathematical techniques, environmental considerations & sustainability, systems, management and economic factors.
- 3.5.4 In relation to Engineering, with clear guidance & support, work effectively within the boundaries imposed by ethical and legal issues (including standards & codes) and demonstrate respect for the ethical and legal boundaries of other disciplines.

## **SECTION 4: PROGRAMME STRUCTURE AND CURRICULUM**

#### 4.1 Programme structure and requirements:

Module Code	Module Title	Credits	Level	Status	Semester of delivery	Pre-requisites
ME401	Work Based Module	30	4	Core	1&2	N/A
ME402	Engineering Design	30	4	Compulsory	1&2	N/A
ME403	Mathematics I	15	4	Core	1	N/A
ME404	Mechanical Principles and Engineering Science	15	4	Compulsory	2	N/A
ME405	Engine Technology	15	4	Core	1	N/A
ME406	Composite Material Technology	15	4	Compulsory	2	N/A
<b>Year 2</b>						
ME501	Work Based Project	30	5	Compulsory	1&2	ME401 ME405
ME502	Vehicle Dynamics and Performance Engineering	30	5	Compulsory	1&2	ME404 ME405
ME503	Mathematics II	15	5	Optional*	1	ME403
ME504	Thermo-Fluids	15	5	Optional	2	ME403 ME404 ME405
ME505	Computer Aided Engineering	15	5	Compulsory	1	ME402
ME506	Vehicle Electrical and Electronic Systems	15	5	Compulsory	2	ME401 ME404
ME507	Manufacturing Management	15	5	Optional	1	ME401
ME508	Event Management	15	5	Optional	2	N/A

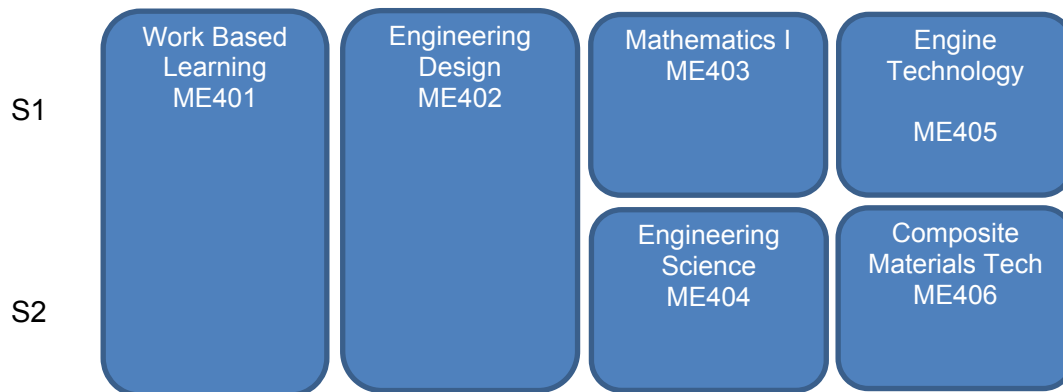
\*Mathematics II and Thermo-Fluids are compulsory for students who wish to progress to Level 6 of the BSc (Hons) Mechanical Engineering degree.

Note that the run of optional modules is dependent on student numbers.

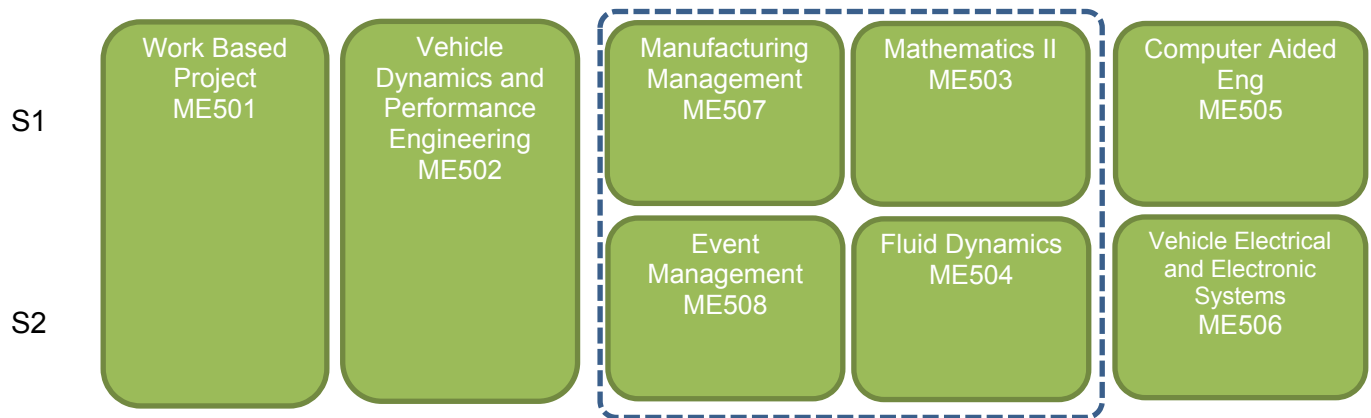
##### 4.1.1 Full time programme structure:

The structure of the full-time course is shown by the subject diagram (the dashed line means the students take 2 out of the 4 modules):

Year 1

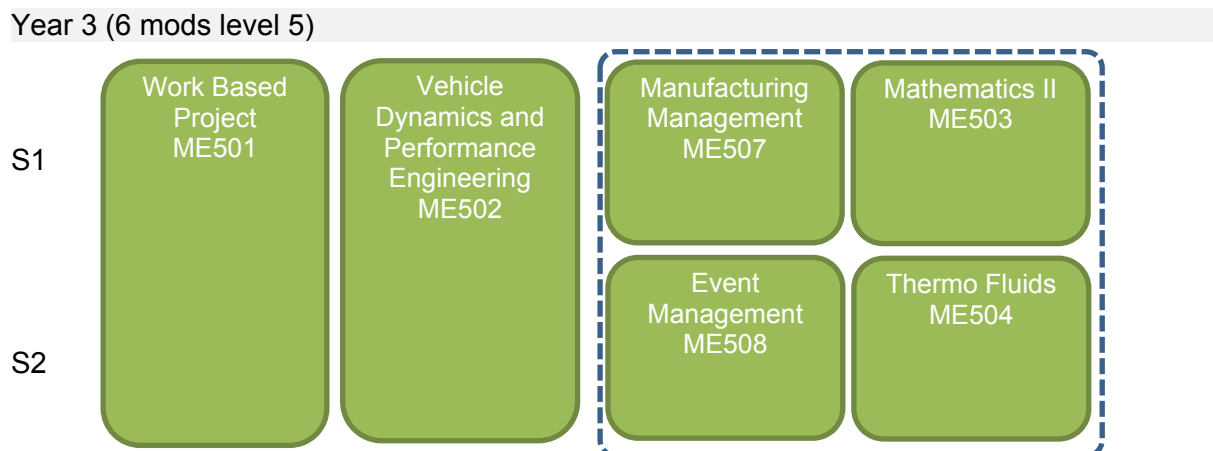
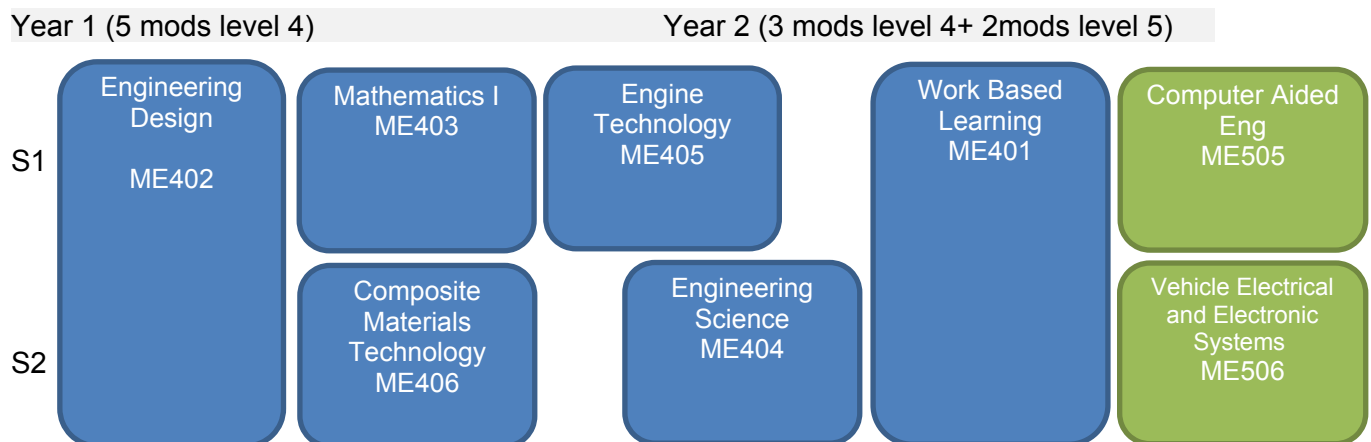


Year 2



#### 4.1.2 Part-time 3 years programme structure:

The structure for the 3 years part-time course is shown by the following diagram (the dashed line means the students take 2 out of the 4 modules):



#### Progression Rules:

To progress from Level 4 to Level 5 a student must have achieved at least 90 credits at Level 4 including the core modules. If a student does not achieve 90 credits at Level 4 or one of the core modules he/she will continue with a revised programme of studies which can include Level 5 modules for which the pre-requisites have been passed.

## **4.2 Professional requirements**

Any combination of the optional modules grants the students an accredited FdEng degree.

# **SECTION 5: PROGRAMME DELIVERY**

## **5.1 Teaching, Learning and Assessment**

The programme has been designed to meet the University's aims of widening participation, both in mode of delivery and recruitment. The programme is targeted at a group under-represented in Higher Education and aims to develop their academic achievement through practical coursework assignments, case studies, time-constrained assignments and work-based learning. The rationale for and pattern of assessment are based on the aims, learning outcomes and rationale of the course and align with the Oxford Brookes Assessment Compact. The key criteria governing assessment will be validity, reliability and fitness for purpose.

Each single undergraduate module is 150 hours of effort. Modules presently include 30 to 50 hours contact time and are delivered using a mixture of lectures, tutorial/seminar sessions and laboratories. In addition a student can expect to undertake approximately an additional 100 hours of independent work per single 15-credit module. The exception is the double weight project and work based learning modules which carry significantly more self study. In any given week a student's contact time may be as high as twenty hours or as low as ten hours depending on scheduling of laboratory and workshop timetables. The use and distribution of laboratory work varies significantly between modules and module levels on the programme and is allocated as appropriate by the subject specialist in each area.

## **Teaching and Learning Methods**

Teaching methods vary from module to module. Usually they include lectures, laboratory-based practical activities and software simulations, problem-solving classes and tutorial support, often supplemented by handouts and booklets produced by staff.

Learners will experience a range of learning environments: workplace, college and private study. During attendance at college, lectures and practical sessions are backed up with detailed notes & other resources (VLE) in addition to module handbooks (which are found in the programme handbooks) etc. The learning materials given to learners provide a structured approach and so allow learning away from the college. In addition, a strong emphasis is given to electronic resources which provide support both on- and off-campus at any time through, for example, the virtual learning environment with access to reading materials, websites, quizzes, assignment briefs, course notes, etc. to help to engage and encourage students with their learning, and to ensure that work-based learners can access materials when they are not able to attend classes. Furthermore, students have free access to relevant software such as SolidWorks. Concepts, principles and theories are generally explored in formal lectures, practised in associated tutorials, lab sessions and practicals and employment. For example, many modules provide tutorials to work through set problem sheets (requiring prior preparation) and thus offer the chance to further explore issues. Thus, lectures, tutorials & development sessions are used, amongst other elements, to

present an outline of the principal areas of learning as well as help structure the learner's development, i.e. promote learner-centred practice (LCP). Depending on the particular module, further opportunities are provided in smaller groups to consider the latest thinking, inter-relationships, areas of difficulty and depth of the knowledge and understanding of the relevant topics.

Teaching and learning methods used throughout the programme will acknowledge and encourage a range of learning styles, including development of academic, research, personal, digital literacy as well as active citizenship through assignment work. The programme aims to balance the provision of information with opportunities for learners to assimilate, apply and critically reflect. Teaching and learning strategies will also give learners the opportunity to acquire practical experience in activities related to their employment, especially through two work-based modules and a work-based project and to encourage learners to reflect critically on new knowledge and understanding and on their own learning experience.

Tutorials are fundamental to ensuring that learner's progress on the course is regularly monitored and evaluated. Formative assessment will be undertaken by tutors and will provide formative feedback, which is intended to improve performance and resolve issues that may be affecting the learner's progress. Tutorials' outcomes are recorded in the learner's personal development plan as part of the academic advising system. This results in an action plan addressing any issues that require future action for each student.

The graduate attributes are developed through a series of theoretical and practical problems or professional briefs that need to be completed or solved; this could be through practical application of theories, the implementation of existing processes or by devising new solutions to practical problems. Lectures are particularly used to furnish the foundations and framework that will enable the students to attain the knowledge and understanding outcomes for the module, also where appropriate some of the professional and transferable skills. Workshops and problem-solving sessions reinforce student acquisition of the knowledge and learning outcomes of the module. They also prepare the students for assessed work and reinforce students' ability to solve problems. Practical assignments and workplace practice further reinforce the process of acquisition of knowledge and understanding, but are also pivotal for the development of the majority of the graduate attributes. Group design exercises prepare the students for teamwork, development of interpersonal skills, working to deadlines, independent thinking and the ability to organise themselves. Tutorials are used to give formative and summative feedback on assessed work, in alignment with Brookes Assessment Compact, to support student understanding of the learning outcomes of the module and to help students to improve their future work.

Work-Based Learning (WBL) modules also aim to promote learning at work, but more importantly learning through the medium of work. These modules also involve elements of developing team-working, formatively, and other interpersonal skills since interaction within the workplace and the employer will be a strong element. The relevant modules aim to develop the higher level skills of analysis, evaluation and synthesis as well as develop as a "reflective practitioner". In undertaking, WBL, learners will be provided with a named contact (supervisor) for individual guidance & support within the workplace.

### **Assessment**

Assessment is conducted through a balance of examination and coursework, varying from module to module: for example 100% coursework in the Computer Aided Engineering module, 70% examination, 30% coursework in Mathematics. The examinations assess the understanding and consolidation of the course material. Within the Foundation Degree ethos, coursework is an important element of assessment as it provides an opportunity for authenticity and the development of professional practice and a strong mechanism to



provide valued feedback to learners. In general most modules offer a mixture of modes of assessment. Other than modules focussing upon work-based learning, most modules are assessment by a mixture of unseen written examination and/or assignments and so a large variety of assessment modes are used, depending upon the topic and the indicative syllabus such as:

- oral presentations;
- short design studies;
- problem sheets;
- open book class tests;
- write-ups of laboratory experiments;
- technical reports;
- design tasks;
- computer based exercises.

Many of the assignments will be based on modern industry practice such as using real data from the work place or using industry-standard software or the use of materials properties databases. Details and arrangements of the coursework are provided in the module descriptors and also confirmed to students at the beginning of the course and module with the assessment calendar. A key aspect of course work is to develop and assess the 'practitioner' skills (mainly practical and transferable) in their application to the workplace.

Whilst most modules are heavily directed in terms of content, work-based modules provide a structure that emphasises independent learning by the student focussing upon the workplace. Students are provided direct support by the module team and are offered the opportunity to discuss their work on an individual level. Assessment is primarily by the creation of a 'portfolio' of evidence / work or by project report in the last module (see below). Reflective approach to learning will form part of the assessment process for portfolios, e.g. promoting formative self-assessment of coursework alongside assessment criteria. The independent WBL project is aimed at providing a solution to a problem in the workplace. Assessment includes testing the skills involved in the planning as well as the dissemination of the results by oral presentation.

Examinations are commonly two hours in length where specified and held at the end of each module and are used mainly to assess knowledge and understanding of specific subjects. The examinations are generally orientated to testing the application of knowledge (analysis) and practical understanding (problem solving) in terms of interpretation of theoretical calculations / problems as well as empirical results.

## **5.2 Assessment regulations**

The programme conforms to the University Regulations which can be found at:

<http://www.brookes.ac.uk/regulations/current/specific/b1/b1-6/>

In addition, if a module has more than one element of assessment (exam/ coursework), to obtain a Pass, a minimum of 30% must be obtained in each element of the assessment and result in an overall module mark of no less than 40%.

## 6.1 Entry criteria

Typically entrants will possess

- a minimum of one pass at A-level or 6-unit Vocational A-level (in Maths, Physics or a closely related subject), plus a minimum of three passes at GCSE (grades A-C) including Mathematics at grade B or equivalent and English language.

OR

- a National Certificate or Diploma or other full equivalent Level 3 qualification, in a discipline related to Engineering, including merits in the applied units, plus a minimum of three passes at GCSE (grades A-C) including Mathematics at grade B or equivalent and English language.

Students with a minimum of two years of relevant work experience and a current role in an appropriate workplace setting that have a line manager's letter of support and recommendation are encouraged to apply.

Work-based learning is an integral part of the Foundation Degree programme. Thus, a key characteristic of a Foundation Degree is close co-operation with relevant employers. Entrants to the programme will be expected to have the support of their employer and will need to demonstrate the employer will provide the opportunity for work-based learning, e.g. a letter of employer support with the application form. For full-time students, arrangements will be made to identify appropriate work placement in advance of admission. It follows that in order to undertake the assessment on the programme, a student must have access to an appropriate work environment (voluntary or paid; full-time, part-time or work placement). If during the course of the programme a student loses their work or access to the work-place then alternative arrangements, if feasible, must be made as soon as possible. Whilst the college will facilitate as far as possible, fundamentally, it remains the learner's responsibility to secure such access in order to complete the assessment on the programme.

Applicants are normally interviewed and may be required to undertake numeracy and literacy tests as part of the assessment by the College, especially where experiential learning is used to support admission, to ensure that they possess the appropriate attributes to succeed on the programme and to check on the suitability of the work environment to which applicants have access.

Full-time students apply through UCAS, while part-time students may apply direct to the College for admission to the Foundation Degree.

### **Admission with Credit**

Applicants with prior certificated or experiential learning may be admitted with credit for up to a maximum of 120 credits at Level 4 and 30 credits at Level 5. Applications for the award of credit must be made in writing following discussion with the College programme lead and the University's Liaison Manager. Documentary evidence will be required in support of the application.

### **English Language Requirements**

Applicants whose first language is not English must also demonstrate that their level of English is acceptable, by achieving a score in a recognised test such as British Council IELTS (normally minimum Level 6.0 overall with a minimum of 6.0 in reading and writing, 5.5 in listening and speaking).

The University's English language requirements can be found at <http://www.brookes.ac.uk/international/how-to-apply/undergraduate/undergraduate-entry-requirements/>

## 6.2 DBS checks

DBS checks are not applicable to this programme.

## SECTION 7: STUDENT SUPPORT AND GUIDANCE

During induction week (week 0) students are provided with sessions that introduce the philosophy of the programme, the rationale for its design and delivery, and provide insight into what is expected of students. In addition, students are issued with handbooks and other relevant documentation explaining the how the course is structured and what will be expected of them during their studies with both Brooklands College and Oxford Brookes University. The Programme Manager and Personal Tutors are available for consultation during this first week on the course.

A number of people are available to support, guide and assist personal development during the programme. The Programme Leader and the Personal Tutor work as a team to ensure the programme runs smoothly. The Module Leaders and Module Tutors provide academic tutoring and answer subject specific queries during modules.

Brooklands College has a study advice service in the Learning Resources Centre (LRC) for anyone who wants advice on:

- Study skills – planning and writing essays, assignments and dissertations
- Finding information, literature searching
- Referencing
- E-resources
- Plagiarism

General support is available from Student Services, [www.brooklands.ac.uk/student-intranet](http://www.brooklands.ac.uk/student-intranet) (once on this site click the Student Services link).

## SECTION 8: GRADUATE EMPLOYABILITY

From a Foundation Degree level, students have gone on to further higher education to top up to BSc(Hons) or BEng (Hons) degree, both have the option of further study beyond this level. i.e. Masters.

NOTE: You must complete modules ME503 and ME504 in order to progress beyond the FdEng programme. If you do not complete these modules you may be required to complete up to two extra modules in the BSc or BEng programmes.

Students entering this course on the part-time programme may be sponsored by Industry. Other non-sponsored students are expected to work in the Motorsport Industry as Incorporated Engineers.

The College and University provide advice and careers guidance. See [www.brooklands.ac.uk/student-intranet](http://www.brooklands.ac.uk/student-intranet) once on this site click the Careers link

<http://www.brookescareerscentre.co.uk>

Your Programme team will also be able to provide support and guidance around careers interests you may wish to explore.

## SECTION 9: LINKS WITH EMPLOYERS

The College has developed close links with many motorsport employers through work experience placements. In addition the Department of Mechanical Engineering and Mathematical Sciences (MEMS) has run successful employer events such as industrial training and promotional enterprises. Throughout the year the Department may have visiting speakers as part of an “Industrial Lecture Series” to which students are invited to attend.

## SECTION 10: QUALITY MANAGEMENT

The programme adheres to the nationally accepted benchmark statements for Engineering.

Other indicators of quality are:

- Annual evaluations of the programme by the External Examiner;
- Feedback from students in the annual evaluations and at the end of each module;
- Employment success rate of current and past graduates in engineering;
- Feedback obtained from the companies who employ our students;

The programme also conforms to the structure and regulations of the University's Undergraduate Framework. The course is subject to Annual Review and University quality assurance procedures.

Brooklands College's QAA Integrated Quality and Enhancement Review (IQER) report published in June 2014 stated that:

*“The QAA review team formed the following judgements about the higher education provision at Brooklands College.*

- *The maintenance of the threshold academic standards of awards offered on behalf of degree-awarding bodies and other awarding organisations **meets** UK expectations.*
- *The quality of student learning opportunities **meets** UK expectations.*
- *The quality of the information produced about its provision **meets** UK expectations.*
- *The enhancement of student learning opportunities **meets** UK expectations.*

*The QAA review team identified the following features of **good practice** at Brooklands College.*

- *The involvement of employers in the planning and design of courses (Expectation B1).*
- *The proactive engagement with awarding bodies and other colleges to develop staff and enhance learning opportunities for students (Expectation B3, Enhancement).*
- *The comprehensive academic and pastoral support available to assist students in their learning and personal development (Expectation B4).*
- *The extensive range of learning opportunities provided to students both within and beyond the core curriculum on the higher national public services courses (Expectations B3 and B4).”*

The programmes at Brookes' Department of Mechanical Engineering and Mathematical Sciences also benefit from rigorous quality assurance procedures and regularly receive excellent feedback from external examiners, employers, students and professional bodies. Other FD programmes have also recently been subject to a rigorous accreditation visit by the IET and IMechE. Examples of how quality assurance of the programme is addressed include:

- Programme Committee meetings, held once a semester, to enable staff and students to feedback on the programme.
- A rigorous annual and periodic review process to ensure the currency of the programme.
- An external examining process that follows the University guidelines - <http://www.brookes.ac.uk/asa/apqu/handbook/introduction.html>
- Systematic end of module and end of programme monitoring and evaluation.

Other indicators of quality include:

- Academic staff who are Chartered Engineers / Chartered Physicists / Chartered Scientists.
- Academic staff who are fellows of senior fellows of the HEA
- Strong performance in the last Research Excellence Framework.
- Feedback from Industrial Advisory Board drawn from senior industrialists.
- Strong performance in the National Student Survey & Graduate Employability surveys
- The programme adheres to the nationally accepted benchmark statements for Engineering.