

## PROGRAMME SPECIFICATION

for the award of

**BEng Honours Mechanical Engineering Design**

Managed by the Faculty of Technology, Design and Environment

delivered by Department of Mechanical Engineering and Mathematical Sciences and Solihull College

Date approved:	Aug. 2017
Applies to students commencing study in:	Sep 2019

### RECORD OF UPDATES

Date amended*	Nature of amendment**	Reason for amendment**
02/08/2017	Update from old template	Required for revalidation panel
14/01/2019	Change of course name as per tracked changes	Required for major/minor changes of award type from BSc to BEng and award name from “Electronic” to “Electrical and Electronic” panel
14-01-19	Updates made to section 2	Refreshed as part of the move onto new template and to keep content current
14-01-19	Updates made to section 3	Refreshed as part of the move onto new template and to keep content current
14-01-19	Updates made to section 4.1 and 4.3	Refreshed as part of the move onto new template and to keep content current and as part of the major changes listed for course name change.
14-01-19	Updates made to section 5	Refreshed as part of the move onto new template and to keep content current
14-01-19	Updates made to Section 6	Refreshed as part of the move onto new template and to keep content current
14-01-19	Updates made to section 7	Refreshed as part of the move onto new template and to keep content

		<b>current</b>
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## SECTION 1: GENERAL INFORMATION

<b>Awarding body:</b>	Oxford Brookes University
<b>Teaching institution and location:</b>	Solihull College, Woodlands Campus
<b>Language of study:</b>	English
<b>Final award:</b>	BEng (Honours)
<b>Programme title:</b>	Mechanical Engineering Design
<b>Interim exit awards and award titles available:</b>	BEng
<b>Brookes course code:</b>	BENGH-MED-C
<b>UCAS code:</b>	H300
<b>JACS code:</b>	H300
<b>HECoS code:</b>	100190
<b>Mode of delivery:</b>	Full-time (face to face/on-campus) Part-time (face to face/on-campus)
<b>Mode/s and duration of study:</b>	1 year full time (max 4 years from first registering) 1.5 years part time (max 4 years from first registering) 2 years part time (max 4 years from first registering) (max 8 years from first registering for the prerequisite FdEng programme)
<b>QAA subject benchmark statement/s which apply to the programme:</b>	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>  Engineering Council UK-SPEC (third edition, 2013): <a href="http://www.engc.org.uk/ukspec.aspx">http://www.engc.org.uk/ukspec.aspx</a>
<b>Professional accreditation attached to the programme:</b>	N/A
<b>University Regulations:</b>	The programme conforms to the University Regulations for the year of entry as published/archived at: <a href="http://www.brookes.ac.uk/regulations/">http://www.brookes.ac.uk/regulations/</a>

## **SECTION 2: WHY STUDY THIS PROGRAMME?**

This course is a one year top-up programme designed to enable students from Foundation Degrees in Mechanical Engineering to obtain a BEng (Hons) in Mechanical Engineering Design. It was developed to provide a natural level 6 progression route for students studying the Foundation Degree in Mechanical Engineering at Solihull College.

It has been developed within the Oxford Brookes University Modular Programme and has a large project element so that students can tailor their course to the needs of industry. In addition the part-time mode has been designed so that students can continue to work whilst studying for their degree.

The programme will utilise Solihull college facilities to provide students with the same opportunities as those on the same course offered at Oxford Brookes University. Cohort size will follow a similar pattern to that of the in-house Foundation Degree allowing a natural progression in a familiar environment to that of the previous course studied.

The principal aim of this course is to provide an education in engineering and to produce graduates who are equipped with the necessary range of skills and depth of understanding to successfully pursue careers as Incorporated Mechanical Engineers. They should be able to keep pace with technological developments whilst taking an active role in the implementation of technological, administrative and business functions within an organization. To accomplish this, the programme will specifically aim to impart and develop:

The programme team will keep close contact with key employers such as The Manufacturing Technology Centre, Rolls-Royce Controls and Data Services, Brose Ltd, IAC Group, Timet UK and UTC Aerospace Systems to ensure the programme's relevance to industry and that the facilities, software and equipment is to the correct standards.

A distinguishing feature of this programme is its practical and applied emphasis, which derives from industries local to the University and the college recognizing the expertise of the University staff. You will learn the essential computer-based engineering and business skills required by industry and cover a wide range of engineering practice areas.

- An understanding of the role that dynamics, vibrations and rigid body mechanics has on the forces and stresses within Engineering components and systems, and the ability to analyse such systems.
- The ability to apply basic thermodynamic and fluid mechanics to a wide range of engineering projects in order to evaluate the forces and stresses applicable to specific problems.
- Knowledge of design methodologies, processes and the ability to apply them to engineering problems.
- The ability to select and apply economically viable manufacturing processes in a business context.
- The professional standards of an Incorporated Engineer and the role of sustainable engineering and its impact on society.

## **SECTION 3: PROGRAMME LEARNING OUTCOMES**

This course, together with the Foundation Degrees in Mechanical Engineering delivered at Oxford Brookes Partners, have been designed in accordance with the Engineering Council's policy Statement and the QAA Benchmark Statements summarised in UK-SPEC, so that a graduate with Honours in the BEng Mechanical Engineering Design will be able to meet the requirements for an Incorporated Engineer.

In particular, the course extends the student's professional knowledge of mechanical engineering by further studies in the areas of CAD/CAM and Machine Design and by applying the theoretical concepts

to practical applications in various industries; thereby enabling the students to become members of the professional community in their specialist area. These subject specific outcomes are in addition to the Oxford Brookes University general graduate attributes that all graduates must demonstrate to qualify for a Brookes award namely:

### 3.1 ACADEMIC LITERACY

- a. Critically analyse and design advanced analogue and digital systems.
- b. Apply engineering theory to complex analytical and design problems.
- c. Synthesise data or concepts to reach novel solutions.
- d. Design and critically evaluate systems using Operational Amplifier Architecture.

### 3.2 RESEARCH LITERACY

- a. Undertake and critically evaluate literature surveys for mini-projects and the main project.
- b. Formulate procedures to solve novel digital and analogue problems.
- c. Evaluate and critically present results of projects using different media.
- d. Coordinate and use engineering facilities in order to achieve specified objectives.
- e. Apply engineering principles to the solution of complex or novel problems.

### 3.3 CRITICAL SELF-AWARENESS AND PERSONAL LITERACY

- a. Organise, execute and evaluate projects with minimal supervision.
- b. Demonstrate and use advanced presentation skills.
- c. Plan effective time and workload allocations.
- d. Demonstrate initiative and creative ability.

### 3.4 DIGITAL AND INFORMATION LITERACY

- a. Design and critically evaluate analogue and digital systems using simulation software.
- b. Undertake and critically evaluate literature surveys.
- c. Demonstrate skills of planning and running an effective search strategy to identify and source information resources and documents relevant to a given to obtain the required data and information.

### 3.5 ACTIVE CITIZENSHIP

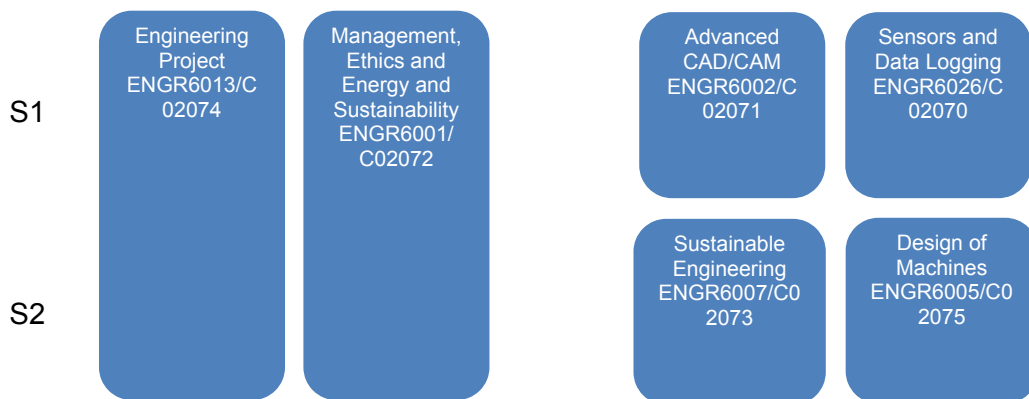
- a. Work effectively and creatively with students from different ethnic and cultural backgrounds.
- b. Produce sustainable, ethical designs for industrial and commercial use and evaluate their risks.
- c. Interface with the global scientific and engineering communities.

## SECTION 4: CURRICULUM CONTENT & STRUCTURE

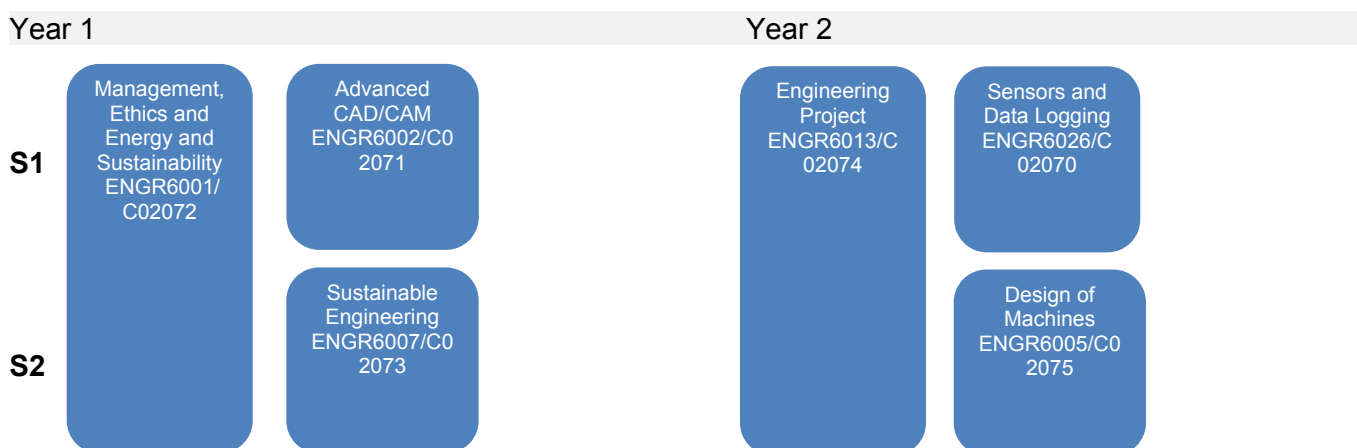
### 4.1 PROGRAMME STRUCTURE AND REQUIREMENTS:

Code	Module Title	Credits	Level	Status	Coursework: Exam ratio
ENGR6013/C0207 4	Engineering Project	30	6	compulsory	100:0
ENGR6001/C0207 2	Management, Ethics and Energy and Sustainability	30	6	compulsory	50:50
ENGR6007/C0207 3	Sustainable Engineering	15	6	compulsory	100:0
ENGR6026/C0207 0	Sensors and Data Logging	15	6	compulsory	50:50
ENGR6002/C0207 1	Advanced CAD/CAM	15	6	compulsory	100:0
ENGR6005/C0207 5	Design of Machines	15	6	compulsory	50:50

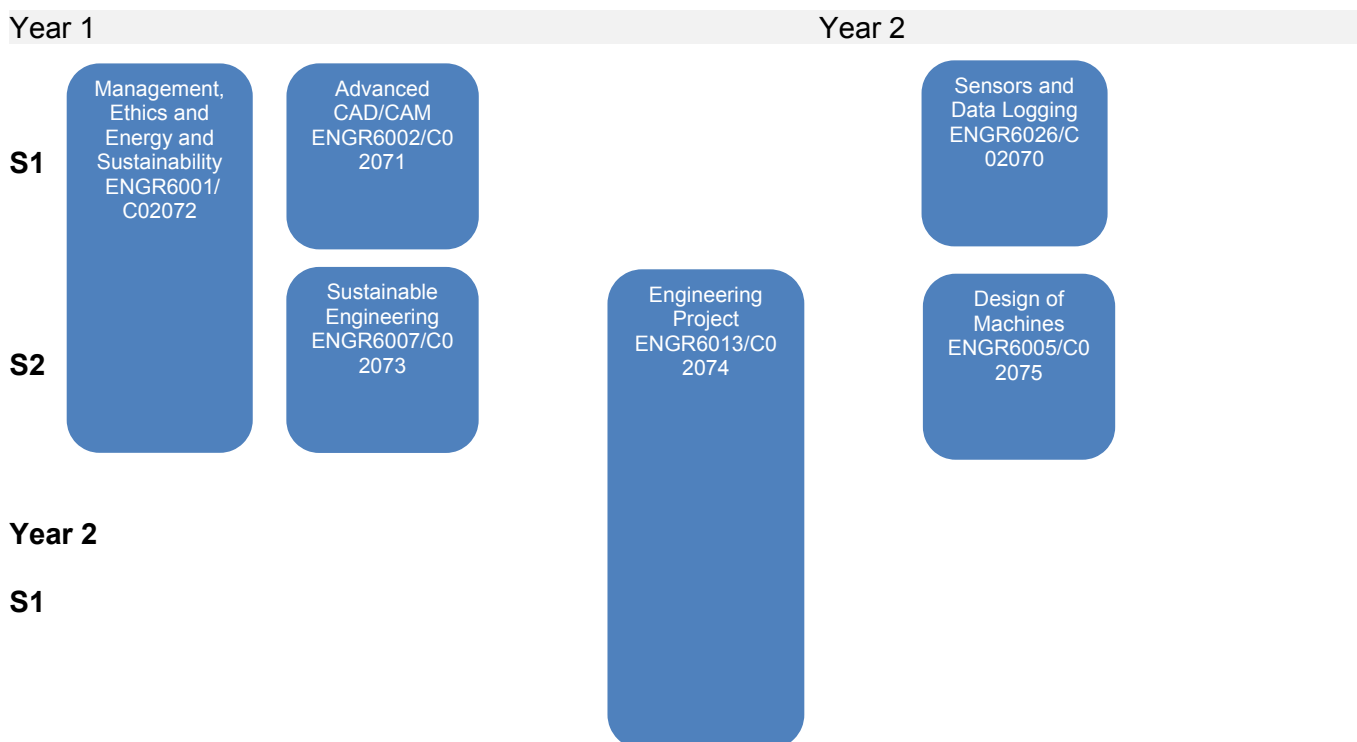
The structure of the full-time course is shown by the following subject diagram:



The structure for the 2 years part-time course is shown by the following diagram:



The structure for the 1.5 years part-time course is shown by the following diagram:



\* In this route the Project module would be taken over the summer term in year 1 and semester 1 in year 2, following a similar schedule to the one used when the module runs over semesters 1 and 2.

## 4.2 PROGRESSION AND AWARD REQUIREMENTS

The progression and award requirements are as specified in section B of the Undergraduate Modular Programme Regulations. The regulations for credit entry students are defined in section B2.14 Admission with Credit and Credit Transfer and they are different to students studying for a three year award. All modules counted for a degree must be acceptable to the SH31 programme. An Honours degree will only be awarded if all eight module credits are passed at level six. A non-Honours degree can be awarded when six of the eight module credits have been passed and at least four are at level six

## 4.3 PROFESSIONAL REQUIREMENTS

Code	Module Title	Credits	Level	Status
ENGR6013/C0207 4	Engineering Project	30	6	compulsory
ENGR6001/C0207 2	Management, Ethics and Energy and Sustainability	30	6	compulsory
ENGR6007/C0207 3	Sustainable Engineering	15	6	compulsory
ENGR6026/C0207 0	Sensors and Data Logging	15	6	compulsory
ENGR6002/C0207 1	Advanced CAD/CAM	15	6	compulsory
ENGR6005/C0207 5	Design of Machines	15	6	compulsory

## SECTION 5: TEACHING AND ASSESSMENT

A fundamental philosophy guiding the design of the course is that teaching and learning takes place among a community of students and lecturers together seeking to pass on the principles, skills and knowledge associated with the profession of engineering. In this vein every effort is made to integrate subject material and show its use, effect and application across the course. The descriptions that follow are general and should not be seen as exclusive.

### Contact time and student effort

Each single undergraduate module is 150 hours of effort. Modules presently consist of 36 hours contact time and are delivered using a mixture of lectures, tutorial/seminar sessions and laboratories. A student can expect to undertake an additional 114 hours of independent work per module.

Self-study typically consists of solving tutorial problems, writing laboratory reports or group meetings. The strategy for assessment of the learning outcomes is described in each module syllabus where the balance between analytic, design and creative skills as well as personal development and professional skills is outlined.

The assessment strategy is guided by "Brookes Assessment Compact" and details may be found at: <http://www.brookes.ac.uk/aske/brookes--assessment-compact/>

Module assessment has been designed with a division between examination and coursework that suits the subject and the module learning outcomes. All assessment is designed to be aligned with module learning outcomes and the combination of learning outcomes and individual modules combines to provide the graduate attributes for the subject.

The current assessment in the programme is as follow:

Module Code	Module Title	Coursework (KIS 1)	Exam, class test (KIS2)	Practical exam (KIS3)
ENGR6013/C02074	Engineering Project	85%		15%
ENGR6001/C02072	Management, Ethics and Energy and Sustainability	50%	50%	
ENGR6007/C02073	Sustainable Engineering	100%		
ENGR6026/C02070	Sensors and Data Logging	50%	50%	
ENGR6002/C02071	Advanced CAD/CAM	70%	30%	
ENGR6005/C02075	Design of Machines	50%	50%	
	<b>Average</b>	<b>67%</b>	<b>29%</b>	<b>4%</b>

Typically, undergraduate examinations last two hours. Coursework assignments are wide-ranging and invariably challenging, making use of strategies such as:

1. Poster presentations and Oral presentations – sometimes videoed;
2. Reports, Essays and other Descriptive Explanation;
3. Short automotive-based design studies and feasibility studies;
4. Problem sheets;
5. Class tests;
6. Written submissions of laboratory work and practical assessment of laboratory skills;
7. Detailed reports of extended laboratory exercises (mini-projects).

The Project forms a major component of the final year and builds on work undertaken during two previous years of studying electronics. It provides an opportunity for students to demonstrate their understanding of research methods and extend their knowledge of a substantive area of electronics.

All modules in the course conform to the Brookes Assessment Compact, which implies that effective assessment is fundamental to learning and that there is no distinct boundary between learning and assessment and that feedback on assignments will be returned within two weeks of the assignment submission deadline. In all modules the assignments explicitly state the learning outcomes and the manner in which these outcomes will be assessed.

The five graduate attributes are addressed through teaching and assessment across all modules. The development of academic literacy is inherent in the synthesis of relevant theories with existing knowledge and practice in a range of class-based and independent learning experiences. Research literacy also underpins each module at Level 6 and students use a range of research and evaluation strategies in order to produce scientific and engineering solutions to complex problems. One of the strengths of the course is its emphasis on critical self-awareness and personal literacy. In addition, digital and information literacy is enhanced through the use of practical and problem classes which are undertaken in all the taught elements of the course. Students are also expected to make significant use of online library resources as appropriate to their study topics. Students develop their knowledge base by specialising in Management, Ethics and Energy and Sustainability (ENGR6001/C02072). The subject specific modules being: Sustainable Engineering (ENGR6007/C02073), Sensors and Data Logging (ENGR6026/C02070), Advanced CAD/CAM (ENGR6002/C02071), Design of Machines (ENGR6005/C02075), and the double Engineering Project (ENGR6013/C02074) module. Students can expect to measure and test physical theory and relationships in the lab in parallel with the academic literacies that they are acquiring through lectures, tutorial work and self-study so following the constructive alignment described in the University Assessment Compact.

Research literacy underpins each module at Level 6 but is more explicit in ENGR6001/C02072 Management, Ethics and Energy and Sustainability and ENGR6013/C02074 the double module for Engineering Projects. In these modules students apply skills and research literacies gained in earlier modules to enable them to plan an original piece of work, carry out the necessary research to familiarise



themselves with current work and then build on the existing work to make new, original and novel contributions to the subject of study. The combination of group and individual project work give the students the necessary research and group working skills that enable them to progress being useful employees within a short period of time in their first career appointment.

The final year the project module ENGR6013/C02074, and ENGR6001/C02072 Management, Ethics and Energy and Sustainability, feature critical assessment of one's own work and the work of others while preparing and planning the projects.

Graduates of the programme necessarily have very well developed computer based analytical skills because of the large amount of computer software used in the design and analysis of engineering artefacts, for example in module ENGR6002/C02071 Advanced CAD CAM. However, the graduate attribute, 'Digital information literacy' extends beyond this to include the use of computers for more general skills such as presentations, literature reviews, preparation of design reports etc.

This graduate attribute relates to how well the graduates of the programme are prepared for work in the international and Active business context. Modules that address these learning outcomes particularly in the subject include ENGR6002/C02071 Advanced CAD CAM and ENGR6007/C02073 Sustainable Engineering.

In all modules students will develop an awareness of ethical and diversity issues. This emphasis on global citizenship is supported by an emphasis on the needs of adult learners and learning processes in a variety of contexts, plus a grounding in ethical and value management issues that arise in complex and diverse situations.

### **Assessment regulations**

The programme conforms to the University Regulations for BA, BEng and LLB Degree and Honours Degree, Graduate Diploma, DipHE, CertHE and Foundation Diploma Regulations which may be found at:

<https://www.brookes.ac.uk/regulations/current/specific/b1/>

## **SECTION 6: ADMISSION TO THE PROGRAMME**

### **6.1 ENTRY REQUIREMENTS**

Foundation Degree (Engineering) in Mechanical Engineering from Solihull College with the optional modules Mathematics II and Thermo-fluids.

Foundation Degrees from other Universities or Colleges will be admitted if their modules are equivalent.

Any other qualification deemed equivalent by the University.

### **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 AND OTHER PRE-COURSE CHECKS REQUIRED**

If applicable.

## **SECTION 7: PREPARATION FOR EMPLOYMENT**

Many students entering this course will be sponsored by industry having completed a Foundation Degree at Solihull College. Amongst these employers are The Manufacturing Technology Centre, Rolls-Royce Controls and Data Services, Brose Ltd, IAC Group, Timet UK and UTC Aerospace Systems . The

students will be working as engineers in design and development and the employers are keen that the students gain additional qualifications to enable them to perform at higher levels.

Other non-sponsored students are expected to work in the Mechanical Engineering industries as Incorporated Engineers.

The University provides advice and careers guidance. See:

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

Solihull College has extensive careers support for students and can offer you advice on further study and employment, delivered by three highly qualified CPA registered and approved professionals who can offer you advice on further study, employment and career planning.

HE learners at Solihull College are entitled to:

- Individual guidance concerning your future
- Information on education which will help you identify your next course
- Help with identifying suitable sources of employment and job search activities
- Help with preparing personal information such as a curriculum vitae (CV)
- Information and guidance on using Labour Market Intelligence
- Guidance on how to manage your Personal Career Aspirations
- Guidance on Employability (developing capability for career decision making)
- Guidance on Understanding Self (skills, values, experiences, knowledge)
- Help and support with Personal Marketing (effective interview techniques)

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

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

Solihull College currently works with twenty five local engineering companies in supporting training of their employees at levels 4 and 5 within the fields of Mechanical and Manufacturing Engineering.

The College works closely with employers to advise and run recruitment events for apprentices. In addition, the College is the Midlands hub for a Royal Academy of Engineering scheme titled “Apprentices: Accessing Untapped Talent” in partnership with WISE and The Technician Apprentice Consortium.

Close links with the Engineering Development Trust have enabled full-time students to gain useful work experience.