University of the West of England
BRISTOL

# Filton College

# FdSc Mechanical Engineering

## Programme Specification

## 2007

## Contents

**Programme Specification**

**Section 1: Basic Data**

| | |
|---|---|
| **Awarding institution/body** | University of the West of England |
| **Teaching institution** | Filton College |
| **Faculty responsible for programme** | Computing, Engineering and Mathematical Sciences |
| **Programme accredited by** | |
| **Highest award title** | FdSc Mechanical Engineering |
| **Default award title** | Cert HE Mechanical Engineering |
| **Interim award title** | Cert HE Mechanical Engineering |
| **Modular Scheme title (if different)** | |
| **UCAS code (or other coding system if relevant)** | |
| **Relevant QAA subject benchmarking group(s)** | Engineering |
| **On-going/valid until* (*delete as appropriate/insert end date)** | |
| **Valid from (insert date if appropriate)** | September 2007 |

**Authorised by…** **Date:…**

**Version Code**
**1**

## Section 2: Educational Aims of the Programme

The aims of the programme are:

1. To provide a high quality, intermediate level education in mechanical engineering for employees in the engineering sector and students from engineering and related disciplines.

2. To develop in students the higher level technological and management skills required by employers in the engineering sector.

3. To develop a range of skills, techniques and attributes essential for successful performance in working life.

4. To prepare students for progression to higher degrees in appropriate mechanical engineering and related subjects.

5. To continue the development of those generic study skills that will enable learners to become independent, lifelong learners.

6. To provide a programme developed in partnership with employers specifically tailored to the current and future needs of the engineering sector.

7. To provide a vocationally specific scheme to facilitate learning within a mechanical engineering environment.

## Section 3: Learning Outcomes of the Programme

The award route provides opportunities for students to develop and demonstrate knowledge and understanding, intellectual skills, subject-specific skills and transferable skills, as shown below.

### A. Knowledge and Understanding

| Knowledge and Understanding of: | Teaching/Learning Methods and Strategies | Assessment |
|---|---|---|
| 1. Basic mathematical techniques to analyse model and solve engineering problems.<br>2. The essential underpinning scientific principles utilised throughout the engineering sector.<br>3. The essential principles and elements of the design process and their application in engineering contexts.<br>4. Costing and financial planning techniques together with modern project management methodology.<br>5. The ability to explain how information and communications technology (ICT) is used in an engineering discipline and to critically identify the most appropriate application in different contexts. | A blended learning approach will be adopted to provide a stimulating, vocationally relevant, flexible learning experience featuring a wide variety of delivery methods. Activities may include teacher-led lectures, practical work, and group project work, case studies, portfolio building and computer-based learning supported by extensive use of college VLE.<br><br>The extensive range of professional experience of the teaching staff will be utilised to enhance the learning experience as will the growing experience of the students throughout the course. The strong links between the college and local employers will be utilised to provide a selection of lectures, class talks and workshops from visiting specialists.<br><br>Students are expected to undertake a significant amount of directed study including study of standard texts for each module.<br><br>Work based learning will feature strongly in a number of project modules and will feature engagement with managers and supervisors wherever possible. | A variety of assessment methods will be used both to assess learning and to provide constructive, formative feedback to the student.<br><br>Standard modules will include formal unseen tests in addition to portfolio and/or computer based assessment. |

## B. Intellectual Skills

| Intellectual Skills | Teaching/Learning Methods and Strategies | Assessment |
|---|---|---|
| 1. Plan, conduct and critically report on an investigation into a work-based engineering issue, by undertaking group and individual projects with limited advice from tutors and work supervisors.<br>2. Analyse, solve and critically evaluate the solution to engineering problems through the use and application of engineering knowledge and understanding. Including the use of appropriate mathematical methods and the application of scientific principles to produce solutions to relevant problems.<br>3. Synthesise parameters which affect an engineering design solution and be able to coherently justify these as the basis for the design criteria. Include the cost constraints and critically evaluate the appropriateness of different approaches to solving the problem. | Students are encouraged to bring together knowledge and skills acquired in several modules and to determine new ways of working. As the student progresses, the need to synthesise ever-greater volumes of information and approaches into a coherent output is developed.<br><br>Analysis, synthesis, evaluation and problem solving skills are developed using problems and case studies in a number of modules and in work-based learning environments. The focus is on understanding and defining the problem in order to formulate effective solutions.<br><br>The need to evaluate alternative solutions and designs and to balance conflicting objectives is also addressed through a variety of projects, group work, case studies, tutorials and work-based projects. | Engineering of complex products requires demonstration of many intellectual skills.<br><br>Intellectual skills are assessed through independent project work, assignments, assessed presentations and reports.<br><br>Independent reading is encouraged to enable students to focus on their own areas of interest. |

## C. Subject, Professional and Practical Skills

| Subject/Professional/Practical Skills | Teaching/Learning Methods and Strategies | Assessment |
|---|---|---|
| 1. Plan and safely execute a series of experiments.<br>2. Use laboratory and workshop equipment to generate data.<br>3. Analyse experimental results and determine their strength and validity.<br>4. Use computer-aided design software and other computational tools and packages.<br>5. Give technical presentations both individually and as a member of a group.<br>6. Use engineering test and measurement equipment effectively.<br>7. Apply engineering principles to the solution of practical engineering problems, including the use of appropriate mathematical methods. | Part-time students can be expected to encounter numerous opportunities in their day to day work and in WBL modules to develop and practice their professional skills. Monitoring and guidance will be provided in partnership with the employer through the use of personal development plans (PDP).<br><br>Opportunities to develop sufficient professional skills will need to be created for full-time students in the course of work experience and practical college based activities. Relevant experiences should be managed via the student's PDP. | The possession of these skills is demonstrated both by practical work experiences and during group and individual project activities.<br><br>The assessment of practical skills will include the demonstration of the relevant skill and the gathering and recording of appropriate assessment materials e.g.: photographs, video and witness statements. |

## D. Transferable Skills and Other Attributes

| Transferable Skills and Other Attributes | Teaching/Learning Methods and Strategies | Assessment |
|---|---|---|
| 1. Communication skills**:** to communicate orally, in writing and through drawings including, for instance, the results of technical investigations. | Communication skills are developed through a variety of methods and strategies including the following: workshop and laboratory exercises, assignments, group design case studies, library and other research, work-based investigations, using CAD software and personal development planning. | These skills are demonstrated in a variety of contexts including<br>• workplace activities<br>• presentations<br>• individual and group projects or assignments<br>• case studies. |
| 2. Self-management skills: to manage own time; achieve objectives to meet deadlines; to work with others having gained insights into the problems of team-based systems development. | Self and Time Management skills are encouraged and developed through a range of methods and strategies including those listed above. | |
| 3. IT Skills in Context (to use software in the context of problem-solving investigations, and to interpret findings). | Computer skills are used and developed widely throughout the programme. | |

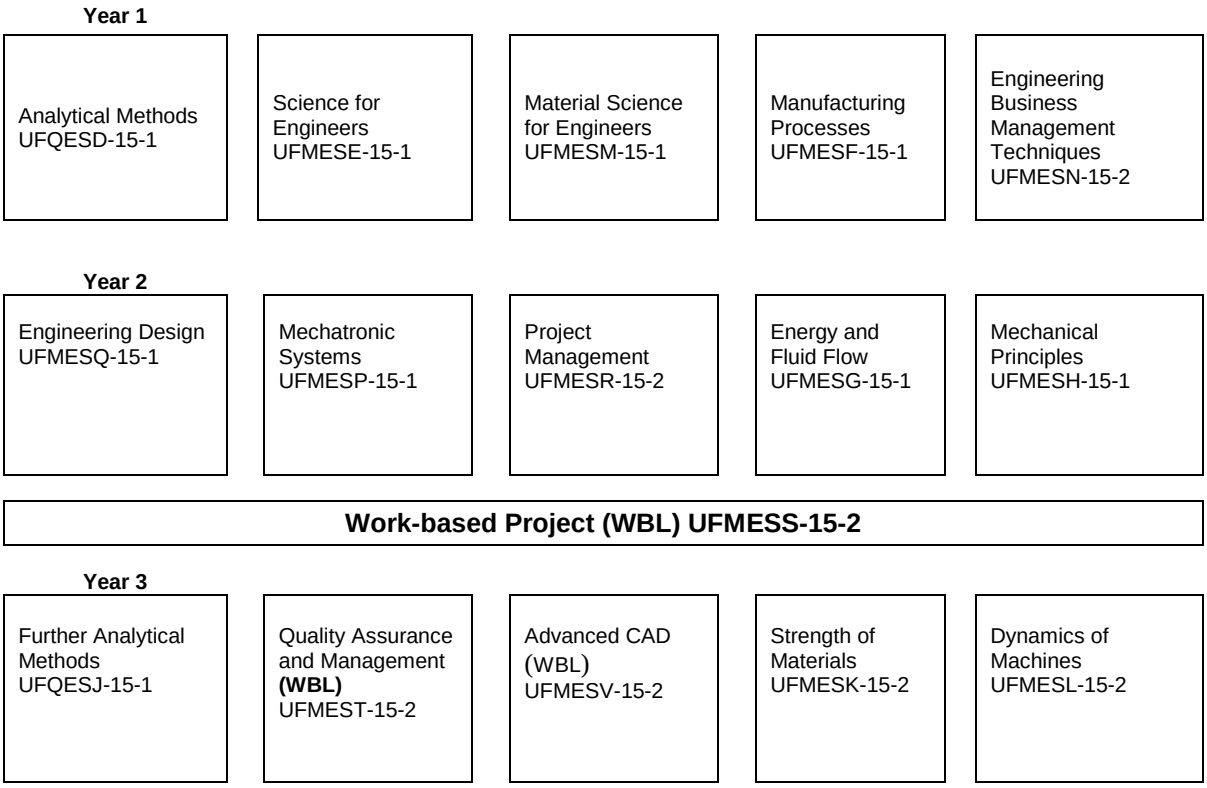
| | | |
|---|---|---|
| 4. Problem formulation: to express problems in appropriate notations. | Problem solving is encouraged and developed throughout the programme. Students learn and apply problem solving techniques in a wide variety of contexts and are encouraged to respond proactively to issues raised in projects and assignments. | |
| 5. Progression to independent learning: to gain experience of, and to develop skills in, learning independently. | Student's independence as learners is developed using the library and internet resources (including subject gateways), professional technical literature, journals, books and other relevant sources to support learning. Students are encouraged to make effective judgements about a variety of sources. | |
| 6. Team working skills**:** to be able to work as a member of a team; to be aware of the benefits and problems which teamwork can bring. | Students develop team working skills through a variety of group based projects and assignments. Active learning activities enhance the development of team working skills. | |

## Section 4: Programme Structure

The structure of this FdSc Mechanical Engineering is shown diagrammatically below. The programme learning outcomes are met by the combination of modules offered. The grid in Appendix C gives a more detailed mapping of modules against programme learning outcomes.

Wherever possible work-based learning will be incorporated into all suitable modules and will be predominant mode of learning for 3 modules.

*Programme Structure: FDSc Mechanical Engineering (Filton)*




Upon completion of this programme, students are eligible for entry onto the MEng/BEng Mechanical Engineering at UWE.

## Section 5: Entry requirements

### 5.1 Minimum entry requirements

The entry requirements for this programme are normally:

- Two A-Levels or equivalent to include maths and suitable science subject; or a BTEC Diploma or Certificate in Engineering with a significant number of units at merit.
- Appropriate employment

Applicants with relevant industrial/commercial experience will also be considered at the discretion of the college. The institution will ensure that it recruits with integrity taking into consideration the realistic expectation of success for each student.

## Section 6: Assessment Regulations

The University Modular Assessment Regulations apply to this programme.

## Section 7: Student learning: distinctive features and support

- Filton college staff teaching on the foundation degree are appropriately qualified and have significant industrial and academic experience. In addition, the college has been successfully delivering HE courses within an FE environment for local employers for a number of years.
- The programme has been designed in partnership with Rolls-Royce to provide an academic pathway for Advanced Apprentices and also technicians and supervisors within the business wishing to return to education.
- Significant effort is devoted to providing students on the programme with the problem solving and group working skills highlighted by employers as being particularly desirable in the workforce.
- Learners are also encouraged to develop a high degree of independence in their learning in order to develop a culture of lifelong learning.
- Learning strategies have been designed to reflect, wherever possible, current practice in the engineering sector particularly in the use of IT resources.
- Progression opportunities to a validated MEng/BEng program.

## Virtual Learning Environment

The engineering department intends to build on its already extensive use of the college's VLE to enhance delivery of the foundation degree programme. A significant amount of course material is currently available and some assignment submission and feedback also takes place electronically via the VLE. In addition a course forum will be available to allow communication of course and module information.

Students will also have access to the University of the West of England intranet and VLE in

the usual way.

## Engineering Facilities

The Engineering Learning Area is based at the college's Filton Avenue site. The department has three dedicated engineering workshops and its own electrical/electronic workshop located in the engineering block. A well equipped IT centre containing 18 "AutoCAD" equipped pc's is located in the adjacent teaching block.

Lectures and tutorials on the programme will be delivered in one of the engineering department's well equipped, recently updated, dedicated teaching rooms. Demand permitting, the same room is used for all formal teaching activities and is also made available to the students between lectures so as to act as a base room for the programme.

There are currently three engineering workshops, a well-equipped electrical/electronic workshop and a CAD studio dedicated to the department while standard science laboratories are also available within the college. Specialist and often world-leading facilities are also available through the partnership with the university and the employer. Apprentices are also routinely placed in departments such as materials testing in the course of their apprenticeship.

## Learning Resources

The Learning Resource Centre (LRC) has continually improved and updated the text based HE resources for engineering over several years. Networked IT resources suitable for engineering use are also available centrally in the LRC.

Rolls-Royce employees also have access to specialist resources via the company.

## Support by UWE

The course will be fully supported by UWE in accordance with its partnership agreement framework. Students will be enrolled as UWE students and have access to all facilities on the University campus including physical and on-line access to the library, IT facilities and all professional services provided by the University.

## Section 8 Reference points/benchmarks

The following external reference points have been used to design this programme:

### 1. The QAA Foundation Degree qualifications benchmarks (2004).

Broadly speaking, the QAA Foundation degree qualifications benchmark suggests that a Foundation degree should:

i. be designed to be highly valued in the job market. The subject content will be vocational and key skills will be developed through work experience and accredited;
ii. be of high quality, designed to appeal to a wide range of students including the most able, and drawing on and developing best practice in higher education;
iii. be developed through collaboration between universities, colleges and employers, including the leaders in their field;
iv. focus on identifying and developing the key skills and knowledge which graduates need in order to contribute to their full potential in all sectors of the labour market, so meeting the needs of employers;
v. emphasise work experience, exploiting that experience to enrich students' learning, and giving recognition wherever possible to students' previous learning and experience;
vi. be capable of being delivered on both a part-time and full-time basis, with flexible delivery to suit the needs of people combining study with a job;
vii. encourage smooth progression. The Foundation Degree should be a widely recognised qualification in its own right. But for those people who wish to progress on to an honours degree there will be clearly defined transition arrangements;
viii. stimulate lifelong learning, including through clearly defined credit accumulation and transfer schemes.

This particular development exactly meets all most of these criteria. In particular, given that the proposal has been developed as part of the training for apprentices of an industrial partner and designed to allow progression in to UWEs MEng/BEng Mechanical Engineering degree, points 1,2,3,4,5 and 7 are precisely addressed. In relation to point 6, at the time of writing, the programme is unlikely to run in full-time mode, given the requirements of work-based learning. It is however possible that, for example someone who had very recently been made redundant, might be able to study this programme full-time. Such an applicant would be considered individually, taking in to account his/her particular circumstances. The programme also offers potential for life-long learning (point 8) since will be possible to take individual modules from the programme without studying the full diet but this consideration has not been the primary focus of the design of the award.

### 2. The QAA Guidelines for preparing programme specifications.

This specification is written with the required aim of clarity for potential student readers. In it's production the authors have been mindful of the various purposes for which the QAA guidelines suggest it might be used.

**3. The QAA Framework for Higher Education Qualifications in England, Wales and Northern Ireland**.

The QAA Framework categorises a Foundation degree as an intermediate level award in which:

"Holders of qualifications at this level will have developed a sound understanding of the principles in their field of study, and will have learned to apply those principles more widely. Through this, they will have learned to evaluate the appropriateness of different approaches to solving problems. Their studies may well have had a vocational orientation, enabling them to perform effectively in their chosen field. "

We are confident that this programme is consistent with this statement. Our collaboration with staff at UWE, coupled with our experience of delivering (HNC) material at HE level leaves us confident that the material is presented at a level appropriate to a Foundation degree.

**4. The QAA Benchmark Statement for Engineering (2006).**
The QAA Subject Benchmark Statement for Engineering outlines a set of skills expected of a graduate in an engineering discipline (Section 4 of the Statement refers), while noting that they should be interpreted in the context of the particular engineering discipline which is being studied. These skills map closely to the skills contained in the learning outcomes for this programme, and hence we have confidence that the programme is in accordance with the precepts of the Statement

**5. UWE Learning & Teaching Strategy.**

**6. UWE Regulations on assessment (section 2.3 of the general regulations).**
This proposal is consistent with these documents.

**7.Feedback and advice from Rolls-Royce**
The requirements of our industrial collaborator have driven this proposal forward.

**8. Programme Structure for MEng/BEng Mechanical Engineering**

This programme has been designed to ensure that students are properly prepared for entry into the equivalent of stage 2 of the above-named degree at UWE.