Programme Specification

Section 1: Basic Data

Awarding institution/body	University of the West of England
Teaching institution	University of the West of England
Faculty responsible for programme	Computing, Engineering and Mathematical Sciences
Programme accredited by	N/A
Highest award title	MSc Mechanical Engineering
Default award title	MSc Mechanical Engineering
Interim award title	Postgraduate Diploma in Mechanical Engineering Postgraduate Certificate in 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)	1st September 2006

Authorised by… **Date:…**

Version Code

For coding purposes, a numerical sequence (1, 2, 3 etc.) should be used for successive programme specifications where 2 replaces 1, and where there are no concurrent specifications. A sequential decimal numbering (1.1; 1.2, 2.1; 2.2 etc) should be used where there are different and concurrent programme specifications

Section 2: Educational Aims of the Programme

The educational aims of the faculty's taught postgraduate programmes are:

- to provide an intellectual experience of advanced study, underpinned by staff expertise, research, and experience;
- to enable the student to further and deepen his/her knowledge, understanding and analytical abilities in a stimulating and challenging academic environment;
- to prepare the student for further professional development in his/her chosen field;
- to develop the student's ability to conduct research in their chosen field;
- to offer postgraduate opportunities for part-time students in employment.

After completion of this programme students should be able to:

- Apply established and novel mechanical analysis concepts to the solution of engineering problems. involving design, simulation and modelling.
- Simulate mechanical engineering systems so as to be able to judge the efficacy and implications of design proposals.
- Make considered judgements and decisions on complex engineering issues in which not all facts and consequences are accurately known;
- After completion of this award students will be able to evaluate the importance of innovation and critically assess the key of operations management strategies.

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 The principles governing the behaviour of mechanical components and systems. 2 The properties, characteristics and selection of materials used in mechanical components and systems. 3 Engineering science and technology with particular emphasis on areas related to mechanical systems. 4 The principles and practice of operations management. 5 The complexity of large-scale engineering systems and projects, with particular emphasis upon mechanical systems.	Acquisition of 1 to 5 is through a combination of formal lectures, tutorials, laboratory work, guided project work, group assignments, independent projects and case studies. The programme of study is designed to enhance basic knowledge and understanding of the technologies underpinning engineering, design and product development through a range of modules. This knowledge is integrated through group design and project work. Advanced tools and technologies are used and the programme as a whole is integrated through the MSc Dissertation. Throughout the student is encouraged to undertake independent reading both to supplement and consolidate what is being taught/learnt and to broaden their individual knowledge and understanding of the subject. Students on the MSc. programme are required to demonstrate in-depth understanding and analysis of technical topics, and to carry out a comprehensive literature review in their group design and dissertation work.	Testing of the knowledge base is through assessed course work, through tasks undertaken under examination conditions, through oral presentations and assessed practical work done in various laboratories.

B. Intellectual Skills

Intellectual Skills	*Teaching/Learning Methods and Strategies*	*Assessment*
1 The ability to produce solutions to problems through the application of engineering knowledge and understanding. 2 Be able to use scientific principles in the modelling and analysis of engineering systems, processes and products. 3 The ability to select and apply appropriate methods for modelling and analysing relevant problems. 4 The ability to understand issues relating to innovation and operations management. 5 A professional attitude to the responsibilities of engineering practitioners. 6 The ability to use independent thinking and analysis in the development of engineering solutions. 7 Critically review available literature on topics related to engineering.	Students are required to bring together knowledge and skills acquired in several modules and hence determine new ways of working. As the student progresses, the need to synthesise ever-greater volumes of information and approaches into a coherent approach is developed and consequently so is their critical thinking. Students will be guided through small-scale problems to the design and analysis of larger scale systems. With this comes the need to evaluate alternative methods and designs and to balance conflicting objectives. Students will be given specific application examples and will develop an appreciation of problem contexts as well as striking the right balance when facing conflicting objectives. Work at level M requires independent thinking, information gathering and analysis. This is delivered through a combination of specialist taught modules plus group and individual project work.	The development of engineering solutions requires demonstration of a wide range of intellectual skills, covering analysis, evaluation and problem solving. These skills are assessed through a combination of coursework assessments, projects and examinations.

C. Subject, Professional and Practical Skills

Subject/Professional/Practical Skills	***Teaching/Learning Methods and Strategies***	***Assessment***
Students will be able to: **1** Use relevant design, test and measurement equipment. **2** Use experimental methods in the laboratory relating to engineering design and test. **3** Demonstrate practical testing of engineering ideas through laboratory work or simulation with technical analysis and critical evaluation of results. **4** Use a wide range of computing and information technology systems. **5** Demonstrate the ability to apply engineering techniques taking account of industrial and commercial constraints. **6** Execute and manage multi-disciplinary projects.	Throughout the programme, the skills listed are developed through a combination of theoretical discussion, practical laboratory based work, classroom based tutorial exercises and directed self-study. The general teaching/learning method is to impart these practical/professional skills by a process of moving from an overview of what is required to a specific application of an individual skill at a higher level. Students on this award will integrate with students on the Faculties M.Eng award for Group Design work. This will give a multi-disciplinary theme to the work and students will be required to communicate and cooperate with group members from other engineering disciplines.	The possession of these skills is demonstrated by the development of practical laboratory work, coursework, presentations and examinations. The practical nature of the skills to be acquired means that some are specifically addressed by particular modules, whilst the more generic skills are assessed across a range of modules.

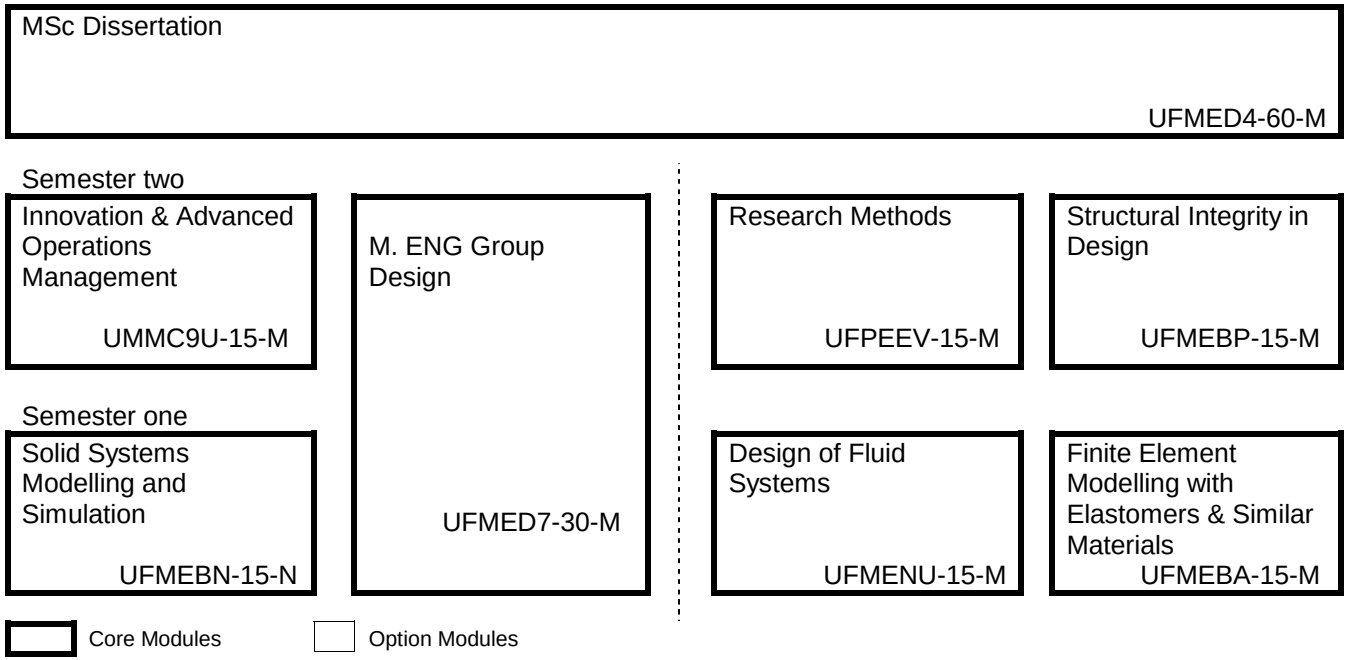
D. Transferable Skills and Other Attributes

Transferable Skills and Other Attributes	***Teaching/Learning Methods and Strategies***	***Assessment***
1. Communication skills**:** to communicate orally or in writing, including, for instance, the results of technical investigations, to peers and/or to "problem owners".	Skill one is developed through a variety of methods and strategies including the following: ♦ Students participate in electronic conferences, workshops, and group work sessions. ♦ Students participate in discussion tutorials ♦ Students present research topic findings in tutorials ♦ Students participate in individual tutorials	These skills are demonstrated in a variety of contexts including • examination • poster presentation. individual and group projects • practical assignments • portfolio of exercises In addition skill two is assessed by both peers and tutors.
2. Self-management skills: to manage one's own time; to meet deadlines; to work with others having gained insights into the problems of team-based systems development.	Skill two is developed through a variety of methods and strategies including the following: ♦ Students conduct self-managed practical work ♦ Students participate in practically-oriented tutorial laboratory sessions ♦ Students work through practical work-sheets in teams ♦ Students practice design and analysis	
3. IT Skills in Context (to use software in the context of problem-solving investigations, and to interpret findings)	Skill three is developed widely throughout the programme.	
4. Problem formulation: To express problems in appropriate notations.	Skill four is developed through a variety of methods and strategies including the following: ♦ Students develop problem solving algorithms ♦ Students practice design and simulation ♦ Students investigate designs of larger systems	

5. Progression to independent learning: To gain experience of, and to develop skills in, learning independently of structured class work. For example, to develop the ability to use on-line facilities to further self-study.	Skill five is developed through a variety of methods and strategies including the following: ♦ Students practice problem solving to extend their skills ♦ Students research relevant topics ♦ Students are encouraged to use online facilities to support research into relevant topics.	
6. Comprehension of professional literature: to read and to use literature sources appropriate to the discipline to support learning activities.	Skill six is developed through a variety of methods and strategies including the following: ♦ Students access online material ♦ Students carry out a literature review	
7. Working with Others**:** to be able to work as a member of a team; to be aware of the benefits and problems which teamwork can bring.	Skill seven is developed through a variety of methods and strategies including the following: ♦ Students work as part of a team on the group design project.	

Section 4: Programme Structure

MSc Mechanical Engineering



Part-time students in year one take modules to the left of the dotted line and in year two to the right of the dotted line

PLEASE NOTE: REFER TO THE FACULTY ON-LINE INFORMATION SYSTEM FOR UP-TO-DATE STRUCTURE INFORMATION
http://www.cems.uwe.ac.uk/exist/index.xql

Section 5: Entry Requirements

The University's general requirements for entry to a postgraduate programme are described in the University Academic Regulations. These are available from the UWE's web site, or on request, and apply to this programme. In addition, an Honours degree in Mechanical Engineering, Aerospace Engineering, Motorsport Engineering or a similar subject will normally be required. Applicants with first degrees in other disciplines will be considered if they have relevant professional experience and an in-depth understanding of:

- Degree level engineering mathematics
- Degree level dynamics and stress analysis

Degree level fluid and thermo dynamics

Section 6: Assessment Regulations

The Modular Assessment Regulations apply to this programme

Section 7: Student Learning: Distinctive Features and Support

Class Activities The mode of delivery of a module is determined by its Module Leader, and typically involves a combination of one or more lectures, tutorials, laboratory classes, group activities and individual project work. Students on this award will integrate with students on the M.Eng programme for group design work. This will entail weekly meetings and discussions to analyse design proposals and develop solutions to a multi-disciplinary engineering project. We have extensive experience of operating this mode of project with our existing M.Eng students. Full and part-time students have successfully worked together to produce comprehensive design solutions encompassing considerable technical depth and breadth.

Academic Support Academic advice and support is the responsibility of the staff delivering the module in question. Staff are expected to be available outside normal timetabled hours, either by appointment or during published "surgery" hours, in order to offer advice and guidance on matters relating to the material being taught and on its assessment.

Pastoral Care The faculty's offers pastoral care through its Student Advisers, a team of staff who provide comprehensive, full-time student support service on a drop-in basis or by appointment. All students on the same route are allocated to the same Adviser, who is trained to provide advice on matters commonly of concern, including regulatory and other matters; the Adviser will, when necessary, advise the student to seek advice to from other professional services including the university's Centre for Student Affairs or from members of academic staff.

Progression to Independent Study

Many modules require students to carry out independent study, such as research for projects and assignments, and a full range of facilities are available at all sites to help students with these. The philosophy is accordingly to offer students both guided support and opportunities for independent study. Guided support, mainly in the form of timetabled sessions, takes the form of lectures, tutorials, seminars and practical laboratory sessions. Students are expected to attend all sessions on their timetable..

The progression to independent study will also be assisted by the nature of the support offered in individual modules. Typically, module leaders will provide a plan for the module indicating the activities to be carried out and the forms of learning to be undertaken during the delivery of the module, with a view to encouraging students to plan ahead and to take responsibility for managing their time and resources.

Engineering Facilities The School of Mechanical, Manufacturing and Aerospace Engineering has extensive faciliteies to support postgraduate study in Mechanical Engineering. These include Unix workstations with advanced modelling, simulation and analysis software. Laboratories equipped with stuructural and dynamic analysis experimentation, modelling and simulation hardware and software. A fluid dynamics laboratory and software for CFD modelling/analysis. Extensive facilities for FE modelling, including non-linear analysis and the analysis of the physical properties of elastomers. Design and design evaluation are supported through a range of CAD modelling systems and extensive rapid prototyping facilities (including STL, FDM and Thermojet printing).

Computing Facilities The Faculty offers a specialised computing facility along side the general University provisions. There are nine general PC computing laboratories of 20 plus seats all running Windows2000, along with four Unix based laboratory and 10 specialist computing labs. The specialist laboratories are equipped with the specific software for CEMS students; including Software Design Tools development environment, CAD, finite element analysis, mathematics and statistics packages to support the taught program. The specialist Computing laboratories are designed to target the discipline taught in that area. Amongst these, is the Computer Systems Architecture and Linux laboratory. The Unix labs offer the latest web development and programming tools.

One of the most popular areas within the Faculty is the Open Access laboratory. This area is never time-tabled and gives students the opportunity to access machines at all times during opening hours. This is a mixed environment consisting of PCs and Unix workstations.

Due to the extensive computing facility provided within the Faculty, and the specialist nature of this facility, the need for user support is necessary. The Faculty provides a user support Helpdesk. The Helpdesk provides first line support to the user base, uniquely supported by both permanent staff and students that are in their second or final year of study (employed on a part time basis) until 20.00hrs every day. These general purpose and specialist laboratories are available to students up until midnight, seven days per week.

Access to Specialist Facilities

We have very extensive Mechanical Engineering laboratories at UWE; ranging from industrial robotics and mechatronics to state of the art rapid prototyping and modelling, including advanced workstations for computational fluid dynamics and kinematic modelling/simulation. These laboratories were initially developed for our undergraduate programmes in Mechanical Engineering and, more recently, updated and expanded to meet the needs of students on M.Eng programmes. Recent accreditation panels from the professional institutions (I.Mech.E, RAeS and IEE) praised the level and quality of laboratory provision in these areas. Although these laboratories are in regular and frequent use by undergraduate students, the period during which MSc projects are being undertaken coincides with the period when UG students are making little or no use of laboratory facilities. Consequently, there is more than adequate capacity to facilitate access for MSc students

Section 8 Reference Points/Benchmarks

This programme has been prepared with reference to a number of external benchmarks, including the QAA Subject Benchmark Statement for Engineering, the QAA Framework for HE Qualifications and the university's Learning & Teaching Strategy.

The QAA Framework for HE Qualifications defines a programme at masters level as:
"at, or informed by, the forefront of an academic or professional discipline. Students will have shown originality in the application of knowledge, and they will understand how the boundaries of knowledge are advanced through research. They will be able to deal with complex issues both systematically and creatively, and they will show originality in tackling and solving problems"

The 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 many of the skills contained in the learning outcomes for the proposed programme of study. The MSc in Mechanical Engineering has been designed to enhance and develop these skills to postgraduate level. In particular this programme requires students to demonstrate skills at a postgraduate level relating to the specification, management and solution of engineering problems. There is also considerable emphasis on the analysis and design of engineering solutions at postgraduate level, and the ability to research and critically evaluate alternative proposals. Consequently, we believe that the MSc award will build on and enhance the skills in the Subject Benchmark Statement for Engineering.