

## MEng Mechanical Engineering

UCAS code: H303

Awarding Institution:	The University of Reading
Teaching Institution:	The University of Reading
Relevant QAA subject benchmarking group(s):	Engineering
Faculty of Science	Programme length: 4 years
For students entering Part 1 in October 2003	Date of specification: June 2004
Programme Director: Prof. A. G. Atkins	
Programme Advisers: Prof. A. G. Atkins and Dr. J. C. A. Ellick	
Board of Studies: Mechanical Engineering	
Accreditation: Institution of Mechanical Engineers (under review)	

### Summary of programme aims and learning outcomes

The MEng programme aims to provide students with up-to-date professional and academic training across a wide range of mechanical engineering topics. Topics related to Management and Business are introduced at Part 1 but the main themes of the programme are on design, and engineering research and development. Compared with the BEng programme it provides an extended education in the wider aspects of mechanical engineering as well as extended depth of knowledge in advanced mechanical topics, which take advantage of the research interests of the school in Materials Mechanics, Biomimetics, Renewable Energy, and Construction Management. The MEng qualification should also satisfy all the academic requirements to proceed to full chartered engineer status (currently under review).

(For a full statement of the programme aims and learning outcomes see below)

### Transferable skills

The University's Strategy for Teaching and Learning has identified a number of generic transferable skills which all students are expected to have developed by the end of their degree programme. By the end of this programme students are expected to be competent at: using evidence-based methods in analysis; using creativity and innovation as part of engineering design and problem solving; using information technology; written and oral communication; working in a team; time and resource management; critical self-evaluation. These competencies, as well as business awareness and career management, are embedded within modules in the programme.

### Programme content

The following profile states which modules must be taken (the compulsory part), together with one or more lists of modules from which the student must make a selection (the 'selected' modules). Students must choose such additional modules as they wish, in consultation with their programme adviser, to make 120 credits in each Part.

#### Part 1 (three terms)

##### Compulsory modules

		<i>Credits</i>	<i>Level</i>
CE1CIC	<i>Information and Communication</i>	10	C
CE1CM1	<i>Management 1</i>	10	C
CE1EA2	<i>Structures and Materials 1</i>	20	C
CE1EB2	<i>Energy 1</i>	20	C
CE1EC2	<i>Introduction to 3D modelling</i>	10	C
CE1ED2	<i>Software for Engineers</i>	10	C
EC103	<i>Economics for Construction &amp; Engineering</i>	10	C
EG1C2	<i>Engineering Mathematics</i>	20	C
LW1A05	<i>General Introduction to Law</i>	10	C

<b>Part 2 (three terms)</b>		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules</i>			
CE2CM2	<i>Management 2</i>	10	I
CE2CS1	<i>Sustainability 1</i>	10	I
CE2EA2	<i>Structures and Materials 2</i>	20	I
CE2EB2	<i>Energy 2</i>	20	I
CE2EC2	<i>Analytical Methods and their application</i>	20	I
CE2ED2	<i>Design and Manufacture</i>	20	I
CE2EE2	<i>Power Systems and Drives</i>	10	I
CE2EF2	<i>Systems and Services</i>	10	I

<b>Part 3 (three terms)</b>		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules</i>			
CE3EB2	<i>Energy 3</i>	20	H
CE3EC2	<i>Quality and Manufacturing</i>	10	H
CE3EE2	<i>Sensors and NDT</i>	10	H
CE3EP3	<i>MEng Group Project</i>	30	M
CE3ES4	<i>Structures and Materials 3</i>	20	H

*Choose modules totalling 30 credits from:*

CE3CFM	<i>Facilities Management</i>	10	H
CE3EG2	<i>Energy and the Environment</i>	20	H
CE3ER4	<i>Ancient Technology</i>	10	H
XXXXX	<i>Foreign Language</i>	20	C or I
XXXXX	<i>Open Option</i>	20	H or M

**NB** The “Open Option” can be chosen from inside the school (in which case it must be a Part 3 module) or from elsewhere but choice may be restricted by timetabling or availability

<b>Part 4 (three terms)</b>		<i>Credits</i>	<i>Level</i>
<i>Compulsory modules</i>			
CE4EA2	<i>Reliability</i>	10	M
CE4EK2	<i>Project Report Writing and Assessment</i>	10	M
CE4EP3	<i>Industrial Project</i>	60	M

*Optional modules (choose four from the following eight modules). This list of special options may vary from year to year.*

CE4EB2	<i>Creative Problem Solving</i>	10	M
CE4ED2	<i>Advanced Rope Technology</i>	10	M
CE4EE2	<i>Numerical Tools</i>	10	M
CE4EF2	<i>Integrated CAD</i>	10	M
CE4EG2	<i>Computational Fluid Dynamics</i>	10	M
CE4EH2	<i>Advanced Renewable Energy</i>	10	M
CE4EJ3	<i>Biomimetics</i>	10	M
CE4XXX	<i>Other School Options</i>	10	H or M

### **Progression requirements**

To proceed to Part 2 it is necessary to obtain at least:

- An overall average of 40% in 120 credits
- 30% in each module in Part 1

To proceed to Part 3 it is necessary to obtain at least:

- An overall average of 60% in 120 credits
- 30% in each module in Part 2

MEng students who do not achieve the overall average of 60% may transfer to the BEng programme in Mechanical Engineering, provided they have satisfied the progression rules for BEng.

To qualify for the award of the degree, it is necessary to pass overall. To pass with honours it is necessary to obtain at least 40% in module CE4EP3 and achieve a minimum satisfactory standard (30%) in every module.

The final degree assessment is based on Parts 4, 3 and 2 with weightings of 2 to 2 to 1 respectively.

### **Summary of teaching and assessment**

Teaching is organised in modules that typically involve both lectures and practical work. Most modules are assessed by a mixture of coursework and formal examination. Some modules are assessed only as coursework

### **Admission requirements**

Entrants to this programme are normally required to have obtained:

A Level: 300 points with grade B in A Level Mathematics and Physics or Design and Technology; or

International Baccalaureat: 30 points including 5 in Higher Mathematics; or

Advanced GNVQ: Merit in one of the following subject areas: Engineering, Information Technology or Science, accompanied by A Level Mathematics Grade C; or

Scottish Advanced Highers: Grade B in Mathematics and Bs in two other subjects; or

Irish Leaving Certificate: Grade B in Mathematics and Bs in four other subjects; or

BTEC: with mostly distinctions in individual subjects but including at least a distinction in Mathematics for Higher Education.

Two AS grades are accepted in place of one A-Level (except for Mathematics), provided the subjects have not been taken at A Level.

### **Support for students and their learning**

University support for students and their learning falls into two categories. Learning support includes IT Services, which has several hundred computers and the University Library, which across its three sites holds over a million volumes, subscribes to around 4,000 current periodicals, has a range of electronic sources of information and houses the Learning Resource Centre with some 200 workstations. There are language laboratory facilities both for those students studying on a language degree and for those taking modules offered by the Institution-wide Language Programme. Student guidance and welfare support is provided by Personal Tutors, the Careers Advisory Service, the University's Special Needs Advisor, Study Advisors, Hall Wardens and the Students' Union.

Within the providing School support is given through practical classes and tutorial classes linked to lecture programmes. There is a Course Adviser to offer advice on the choice of modules within the programme. The School also provides computing facilities dedicated to support of Engineering students.

## **Career prospects**

In recent years the majority of students who have followed this programme have gone into careers in the engineering industry, through companies typically manufacturing motor vehicles, aircraft and computer products. Others have joined research groups in university and industry and the public service. Others have opted for careers in the business world, in finance or in commerce. Graduates of this programme may expect to rise quickly to positions of responsibility.

## **Opportunities for study abroad**

The Department of Engineering participates in the Socrates exchange scheme under which students may spend time at a selected University in Europe, particularly in relation to module CE4EP3. Assessments of work undertaken during these periods will always remain in the hands of staff at Reading. There are formal links with the Universities of Poitiers in France, Twente in the Netherlands and the University of Trento in Italy.

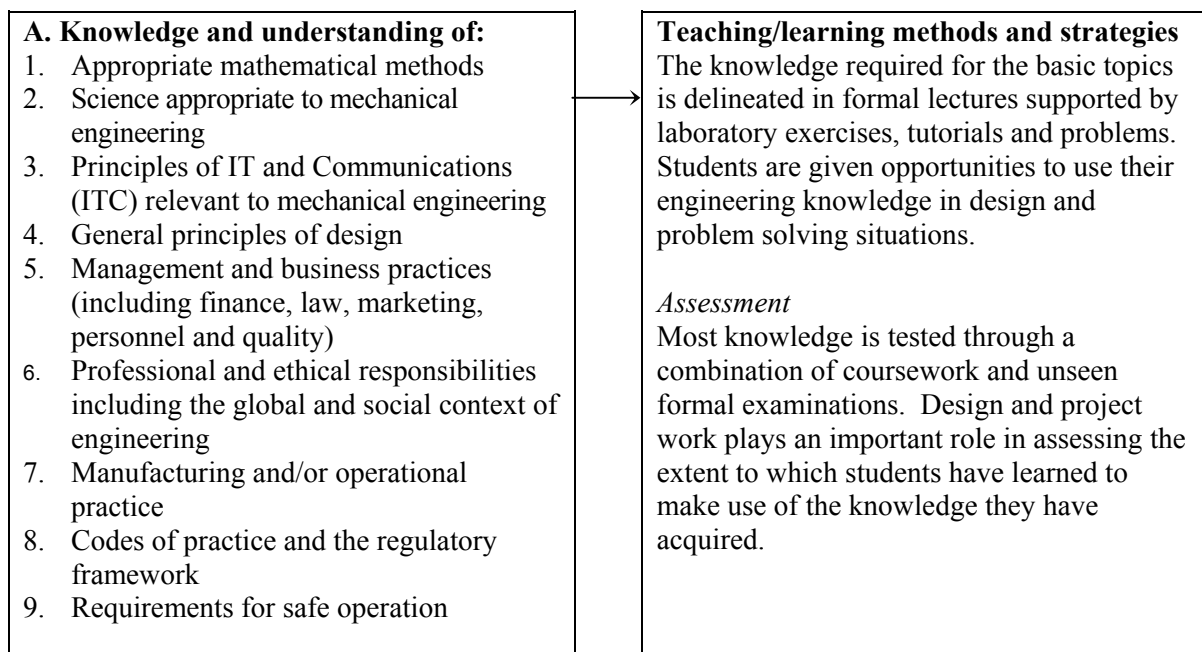
## **Educational aims of the programme**

The MEng programme aims to provide students with up to date professional and academic training in mechanical engineering that is relevant to the needs of the engineering profession and industry. The programme places a strong emphasis on mechanical engineering design, but is also structured to prepare graduates to rise to senior positions in the engineering industry.

## **Programme Outcomes**

The programme provides opportunities for students to develop and demonstrate knowledge and understanding, skills, qualities and other attributes in the following areas:

### ***Knowledge and Understanding***



## *Skills and other attributes*

### **B. Intellectual skills:**

1. Ability to select and apply appropriate mathematical methods for modelling and analysing engineering problems
2. Use of scientific principles in the development of engineering solutions to practical problems
3. Use of scientific principles in the modelling and analysis of engineering systems, processes and products
4. Ability to select and apply appropriate computer based methods for modelling and analysing engineering problems
5. Analysis of systems, processes and components requiring engineering solutions
6. Creation of new processes or products through synthesis of ideas from a wide range of sources
7. Commercial risk evaluation
8. Ability to produce solutions to problems through the application of engineering knowledge and understanding
9. Ability to undertake technical risk evaluation

### **Teaching/learning methods and strategies**

Design and project work are an important part of the processes whereby students develop their intellectual skills. Exercises are designed to develop different aspects of these skills.

#### *Assessment*

Whilst the more theoretical intellectual skills are assessed through formal examination, the more applied aspects are tested in design and project work.

### **C. Practical skills:**

1. Skill in the use of appropriate mathematical methods for modelling and analysing mechanical engineering problems
2. Use of relevant test and measurement equipment
3. Experimental laboratory work
4. Use of engineering IT tools
5. Design of a component
6. Practical testing of design ideas in laboratory or through simulation, with technical analysis and critical evaluation of results
7. Research for information to develop ideas further
8. Ability to apply engineering techniques taking account of industrial and commercial constraints
9. Project management

### **Teaching/learning methods and strategies**

Students obtain practical skills relating to manufacturing and assembly in special sessions with a coordinating theme, while scientifically based skills will be developed in the laboratory, and in evaluating results of experiments. There are many activities which require students to design at different levels.

Design work and a design perspective are apparent throughout the programme.

#### *Assessment*

These skills are assessed through coursework, although some “workshop” skills are only formally assessed in qualitative terms.

**D. Transferable skills:**

1. Manipulation and sorting of data
2. Presentation of data in a variety of ways
3. Use of scientific evidence based methods in the solution of problems
4. Use of general IT tools
5. Use of creativity and innovation in problem solving
6. Working with limited or contradictory information
7. Effective communication
8. Life long learning
9. The engineering approach to the solution of problems
10. Time and resource management
11. Teamwork and leadership
12. Career Management

**Teaching/learning methods and strategies**

The various different project and laboratory exercises which are distributed though the curriculum are structured to instil the transferable skills identified. A specific module has been defined for Career Management, but its delivery is embedded in other parts of the programme, and it is not listed in the Programme Content above.

*Assessment*

Because of the integration of this aspect of learning within other elements, much of the assessment is indirect, and achievement of these outcomes implicit in the achievement of other objectives. Thus, for example, submission of a project work by a required deadline after many months of work requires effective planning; or satisfactory completion of a group task in which a student has participated depends upon effective teamwork, and so on.

*Please note:* This specification provides a concise summary of the main features of the programme and the learning outcomes that a student will achieve and demonstrate upon participation in the learning opportunities that are provided. More detailed information on the learning outcomes, content and teaching, learning and assessment methods of each module can be found in module descriptions in the programme handbooks.