



University of Plymouth

Faculty of Technology

Programme Specification

M.Eng. Mechanical Engineering

Date: 19th June 2007

Brief description of Programme

The MEng programme is a 5 year thick sandwich or 4 year full-time course leading to the award of an MEng in Mechanical Engineering.

Students commencing the BEng Mechanical Engineering programme and wishing to proceed to the MEng will normally be required to attain an aggregate Stage 2 (Level 2) mark of at least 60% with no assessments having needed to be re-taken.

The award integrates with the established BEng provision and extends students' study in technological depth and in enhanced understanding of the infrastructure of the discipline of Mechanical Engineering from a manufacturing and research & development perspective.

Distinctive Features

The MEng programme embodies all of the distinctive features of the BEng programmes which lead into it as well having its own distinctive features.

The MEng shares modules with other programme areas and therefore benefits from a broader approach to systems and engineering design than alternative more focussed MEng programmes. Students will benefit most from the programme if they have had work experience and this is strongly encouraged as an integral part of the programme.

A key feature of the programme is the major group design assignment in the final year. This carries 50 credits and is used to integrate other areas of the course while giving the students the opportunity of developing team working skills (normally working in teams of 5 - 9) including formally managing the project, with a chair, secretary and formal meetings. There is a robust system in place to ensure that students receive appropriate individual marks for the work that they do in this subject.

Students may opt to do a placement between the second and third years of academic study.

Entry requirements

Applicants wishing to join the MEng directly will need 300 points at 'A' level.

Students who are studying the BEng degree in Mechanical Engineering, Mechanical Engineering with Composites or Marine Technology, wishing to transfer to the MEng at the end of year 2 will normally be required to have achieved an aggregate percentage of 60% or more with no failed assessments needing to be re-taken.

Exceptionally applicants from a small number of colleges, which are well known to us, will be considered for entry into year 3 of the MEng, the normal requirement will be that their college aggregate mark is 80% or more.

Progression routes

The MEng programme can permit progression to a Ph.D. or other post-graduate awards.

Programme aims

The School of Engineering shares the values of the University and supports its mission through the provision of a range of courses relevant to the theory and practice of engineering aiming:

1. To be informative and challenging, and to establish a knowledge base suitable for a future career in an engineering based industry.
2. To give students with a variety of entry qualifications an opportunity to realise their potential.
3. To enrich curriculum content and teaching quality through the professional and research expertise of staff and through industrial links.
4. To encourage and support students whilst they develop and apply technical and generic skills that will facilitate life-long learning and continuing professional development.
5. To produce graduates and postgraduates who can make a significant contribution to their professional field or business.

In addition, this programme specifically aims to:

6. Produce graduates with an awareness of the current opportunities and limits of knowledge in Mechanical Engineering.
7. Produce graduates able to recognise and work within the technical and resource complexity of the engineering industry.
8. Produce graduates with technical ability considerably beyond first principles and able to apply a range of advanced skills and techniques in the solution of problems in the field Mechanical Engineering.
9. Equip graduates with a depth and breadth of knowledge and skills sufficient to enable them to work in their chosen specialist field within Mechanical Engineering.
10. To provide the opportunity to manage and execute a significant project in the field of Mechanical Engineering.

Intended Programme Learning Outcomes:

Outcomes are in accordance with the QAA/FHEQ requirements for a Masters level programme and are designed to address Knowledge and Understanding, Cognitive/Intellectual Skills, Key / Transferable Skills, Employment Related Skills and Practical Skills. See details below:

Intended programme learning outcomes	
<p>Knowledge and understanding</p> <p>On completion graduates should have developed:</p> <ol style="list-style-type: none"> 1. A competent working knowledge of the fundamental subjects used in Mechanical Engineering, e.g. Solid Mechanics; Fluids; Thermodynamics; Structures; Computer Modelling; and their application in industrial based modules, as preparation for chartered status in the profession. 2. Analytical and practical problem solving and design skills. 3. The ability to apply knowledge to new situations in design or analysis and to be innovative. 4. Computer applications in Mechanical Engineering. 	<p>Teaching and learning methods and strategies: A combination of lectures, tutorials and practical classes as appropriate for the specific subject.</p> <p>Assessment strategies: A combination of course work, unseen test and examination as appropriate for the specific subject.</p>
<p>Cognitive and intellectual skills</p> <p>On completion graduates should have developed:</p> <ol style="list-style-type: none"> 1. The ability to apply engineering principles to the solution of new problems. 2. The ability to analyse and evaluate engineering data. 3. The ability to produce innovative solutions to open ended problems. 4. The ability to synthesize information/data from a variety of sources. 	<p>Teaching and learning methods and strategies: A combination of lectures, tutorials and practical classes as appropriate for the specific subject.</p> <p>Assessment strategies: A combination of course work, unseen test and examination as appropriate for the specific subject.</p>
<p>Key and transferable skills</p> <p>On completion graduates should have</p>	<p>Teaching and learning methods and strategies: A combination of lectures, tutorials and</p>

<p>developed:</p> <ol style="list-style-type: none"> 1. The capacity to learn. 2. The ability to communicate effectively in written, verbal, and graphical form. 3. The use of numerical and mathematical skills applicable to Mechanical Engineering. 4. The ability to competently use Information Technology e.g. word processing, spreadsheets, CAD packages, databases, and specialist packages. 	<p>practical classes as appropriate for the specific subject.</p> <p>Assessment strategies: A combination of course work, unseen test, oral presentations and examination as appropriate for the specific subject.</p>
<p>Employment related skills</p> <p>On completion graduates should have developed:</p> <ol style="list-style-type: none"> 1. The ability to work independently or as part of a team. 2. A good appreciation of the effect of design on the material and production costs of artefacts and projects. 3. An appreciation of the health and safety aspects of designs and processes and procedures. 	<p>Teaching and learning methods and strategies: A combination of lectures, tutorials and practical classes as appropriate for the specific subject.</p> <p>Assessment strategies: A combination of course work, unseen test, oral presentations and examination as appropriate for the specific subject.</p> <p>In line with the University Skills Plus initiative, students are encouraged to develop their own PDPs as an aid to enhancing their employability skills. The Faculty provides a suitable template for this.</p>
<p>Practical skills</p> <p>On completion graduates should have developed:</p> <ol style="list-style-type: none"> 1. An ability to measure and evaluate data in the laboratory and field. 2. An ability to produce design drawings and schematics for artefacts or projects. 3. An ability to carry out experimental work on simple models or prototypes. 	<p>Teaching and learning methods and strategies: Practical laboratory classes.</p> <p>Assessment strategies: Course work</p>

Programme structure and pathways

Stage 1 (MEng & BEng)

	Module Code	Credits	Module Title	C/W (%)	Exam (%)	Pathway
Autumn	DSGN120	10	Engineering Drawing and CAD	100	0	All
	ROCO101	10	Electrical Principles 1	100	0	All
	A B5MFT**	0	MFT Sessions	0	0	All
All Year	MATH183	20	Engineering Mathematics I	50	50	All
	DSGN143	20	Integrated System Design	100	0	All
	MATS116	20	Manufacturing and Materials	50	50	All
	MECH108	20	Mechanics	50	50	All
Spring	BUS140	10	Business Studies	30	70	All
	THER103	10	Introduction to Thermo-Fluids	50	50	All

** Manufacturing and Fabrication Techniques - this is a 'hands on' practical workshop skills module that does not carry any credits.

Stage 2 (MEng & BEng)

Autumn	MATH256	10	Mathematics	100	0	All
	HYFM218	10	Mechanics of Fluids	100	0	All
	*DSGN223	10	Engineering Design 1	100	0	All
	*BUS228	10	Business Dynamics	100	0	All
	*PRRO202	10	Mechtronics Project	100	0	All
All Year	*DSGN215	20	Engineering Design	100	0	All
	*DSGN221	20	Engineering Design	100	0	All
	*MARN 218	20	Diving for Marine Technology	100	0	All
	STRC202	20	Engineering Structures	50	50	All
	THER205	20	Applied Thermodynamics	40	60	All
Spring	CONT215	10	Control	30	70	All
	MATS216	10	Materials	30	70	Mech & Comp
	MFRG207	10	Quality Management I	30	70	

* Students Taking Diving Option, take MARN 218 and DSGN 223.

Stage 3 – Work Experience (MEng and BEng)

All students are strongly encouraged to accomplish a minimum 44 week period of work experience.

Students who complete a placement and maintain an approved Work Experience Log Book may submit this for assessment to have their degree award endorsed as a 'sandwich' award, in recognition of their industrial experience.

Students who do a placement will take it between years 2 and 3.

Stage 4 (MEng)

Autumn	STAT353	10	Engineering Statistics	100	0	All
	MECH306	10	Failure Mechanisms and Mechanics	100	0	All
All Year	MECH338	10	Computer Aided Engineering	100	0	All
	PRME304	30	Individual Project	100	0	All
	THER 305	20	Thermal and Fluids Engineering	30	70	All
	CONT 314	20	Control and Intelligent Systems Design	30	70	All
Spring	MFRG 318	10	Manufacturing Processes	30	70	All
	MFRG 310	10	Quality Management II	30	70	All

Stage 5 – Final (MEng)

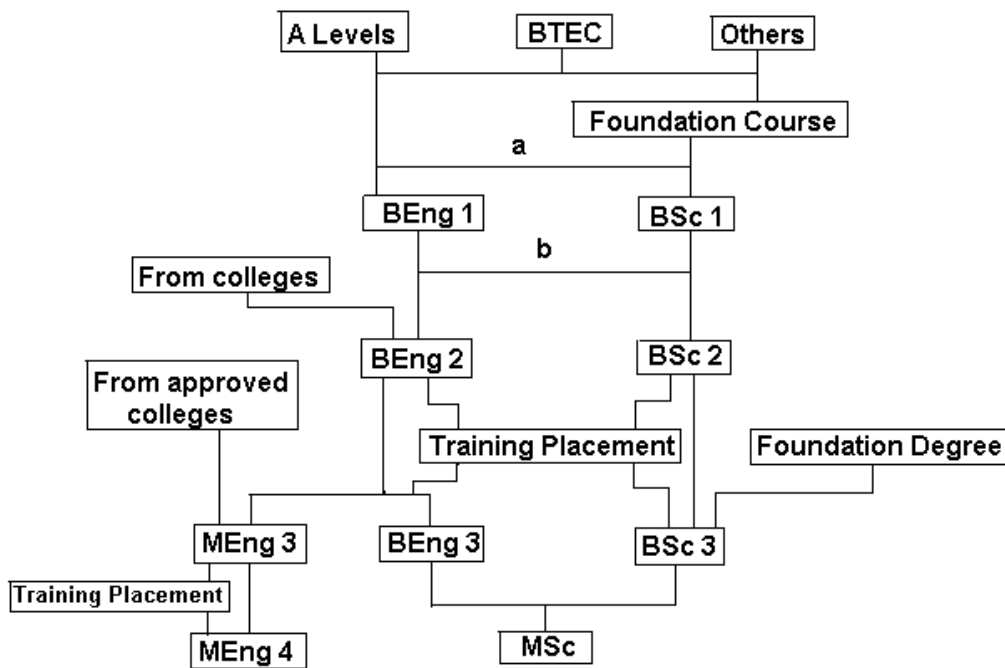
T1	*MECH 404	10	Structural Design Using the Finite Element Method I	100		* Option
T1	MECH 515	20	Robotics and Control (M)	50:50		
T1	*FTGS 505	10	Entrepreneurship (M)	100		* Option
T1	*BUS 314	10	Marketing for Engineers (C)	100		* Option
T1 +2	DSGN 501	50	Group Design	100		
T2	*BUS 322	10	International Business Studies I (C)	30	70	* Option
T2	MECH 516	10	Simulation of Engineering Systems (M)	100		
T2	*MECH 523	10	Structural Design Using the Finite Element Method 2	100		* Option
T2	*MECH 517	10	Systems Approach to Project Management (M)	50	50	* Option
T2	MGMT 501	10	Advanced Information Technology (C)	100		

(C) indicates a module shared with the MEng Civil Engineering

(M) indicates a module shared with the MSc/MRes degree

* Indicates that in Term 1 students choose 1 of the 2 modules. In Term 2 students choose 2 of the 3 modules.

NB: MECH 404 is a pre-requisite for MECH 523



a - Progression from Foundation Course depends upon marks achieved.

b - Very strong BSc students may move to BEng, weak BEng students may move to BSc

Programmes Scheme

Exceptions/special academic regulations

None.

Final award title	MEng Mechanical Engineering
Level	4
Intermediate award title	BEng Mechanical Engineering
Level	3
Awarding institution	University of Plymouth
Teaching institution	University of Plymouth
Accrediting body	<p>Institution of Mechanical Engineers*</p> <p>The IMechE were part of an accreditation visit 16/17th January 2007 (carried out under the umbrella of the Engineering Accreditation Board) to look at the associated BEng courses and were informed of this development.</p> <p>Informal verbal feedback at the end of the visit indicated that they were happy with the BEng components.</p>
Appropriate Benchmarks	Engineering, UK SPEC. latest version.
UCAS code	
JCAS code	

* This will be sought once the first cohort has graduated.

Appendix A : Mapping of intended programme learning outcomes

Date of production: 24th October 2006.

Date of most recent approval by Approval Panel: 29th November 2006.

Modified: 13th March 2007.

Appendix A

Mapping of Intended Programme Learning Outcomes

Programme Intended Learning Outcomes Map	Certificate level	
1 Graduate Attributes and Skills	2	3
<p>Programme Intended Learning Outcomes (as worded in the Programme Specification)</p> <p>NB: The first year of these courses is common and the subject area is essentially 'mechanical engineering'. Specialist modules are studied in subsequent years and the subject areas are mechanical engineering plus either marine technology or composite materials engineering. There are limited options in the courses and in the table below the core programme intended learning outcomes are the same as the programme intended learning outcomes.</p>	Aim(s)	Related Core Modules
<p>Knowledge/ Understanding i) knowledge of the underlying concepts and principles associated with mechanical engineering, and an ability to evaluate and interpret these within the context of mechanical engineering.</p> <p>* Knowledge and understanding, but not in the field of Mechanical Engineering</p>	1, 2, 3, 4	MECH 108 DSGN 143 DSGN 120 THER 103 ROCO 101* MATS 116 MATH 183. BUS 140*
<p>Cognitive / Intellectual Skills (generic) ii) an ability to present, evaluate, and interpret qualitative and quantitative data, to develop lines of argument and make sound judgements in accordance with basic theories and concepts of mechanical engineering.</p>	2, 4	MECH 108 DSGN 143 THER 103 MATS 116
<p>Key / Transferable Skills (generic) a) evaluate the appropriateness of different approaches to solving problems related to mechanical engineering; b) communicate the results of their study/work accurately and reliably, and with structured and coherent arguments;</p>	2, 3, 4	MECH 108 DSGN 143 THER 103 MATS 116 DSGN 120
<p>Practical Skills (subject specific) Carry out laboratory investigations in areas of Mechanical Engineering</p>	8	MECH 108 THER 103 MATS 116
<p>Employment-related skills c) undertake further training and develop new skills within a structured and managed environment; d) qualities and transferable skills necessary for employment requiring the exercise of personal responsibility.</p>	5, 6, 7, 8, 9	DSGN 143
Programme Intended Learning Outcomes Map	Intermediate level	
1 Graduate Attributes and Skills	2	3

Core Programme Intended Learning Outcomes (as worded in the Programme Specification)	Aim(s)	Related Core Modules
<p>Knowledge/ Understanding</p> <p>i) knowledge and critical understanding of the well established principles of mechanical engineering, marine technology and composite materials engineering, and the way in which those principles have developed;</p> <p>ii) knowledge of the main methods of enquiry in mechanical engineering, marine technology and composite materials engineering.</p> <p>iii) an understanding of the limits of their knowledge, and how this influences analyses and interpretations based on that knowledge;</p> <p>* Knowledge and understanding, but not in the field of Mechanical Engineering</p>	1, 2, 3, 4, 5, 6, 7, 8, 9	MATH 256 CONT 215 BUS 228 * MFRG 207 DSGN 215 DSGN 223 STRC 202 THER 205 HYFM 218 MATS 216
<p>Cognitive / Intellectual Skills (generic)</p> <p>ii) ability to apply underlying concepts and principles outside the context in which they were first studied**</p>	2, 3, 4, 5, 6	CONT 215 MFRG 207 DSGN 215 DSGN 223 STRC 202 THER 205 HYFM 218 MATS 216
<p>Key / Transferable Skills (generic)</p> <p>iii) continued ...* and ability to evaluate critically the appropriateness of different approaches to solving problems in the field of study;</p> <p>a) use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis;</p> <p>b) effectively communicate information, arguments, and analysis, in variety of forms, to specialist and non specialist audiences, and deploy key techniques of the discipline effectively;</p>	6, 7, 8, 9	MATH 256 CONT 215 MFRG 207 DSGN 215 DSGN 223 STRC 202 THER 205 HYFM 218 MATS 216
<p>Practical Skills (subject specific)</p> <p>Apply relevant CAE tools to solving design and simulation problems in Mechanical engineering, marine technology and composite materials engineering.</p> <p>Carry out experimental investigations in mechanical engineering, marine technology and composite materials engineering.</p>	4, 5, 6, 7, 8, 9	CONT 215 MFRG 207 DSGN 215 DSGN 223 STRC 202 THER 205 HYFM 218 MATS 216

<p>Employment-related skills</p> <p>ii) continued ...**including, where appropriate, the application of those principles in an employment context;</p> <p>c) undertake further training, develop existing skills and acquire new competencies that will enable them to assume significant responsibilities within organisations;</p> <p>d) qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision making.</p>	9	BUS 228 MFRG 207 DSGN 215 DSGN 223 MATS 216
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Programme Intended Learning Outcomes Map	Honours Degree level	
1 Graduate Attributes and Skills	2	4
Programme Intended Learning Outcomes (as worded in the Programme Specification)	Aim	Related Core Modules
<p>Knowledge/ Understanding</p> <p>i) a systematic understanding of mechanical engineering, marine technology and composite materials engineering, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of a discipline;</p> <p>ii) an ability to deploy accurately established techniques of analysis and enquiry within a discipline;</p> <p>iv) an appreciation of uncertainty, ambiguity and the limits of knowledge;</p> <p>a) apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding, and to initiate and carry out projects;</p>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	STAT 353 MFRG 318 MECH 306 MFRG 310 MECH 338 PRME 304 THER 305 CONT 314
<p>Cognitive / Intellectual Skills (generic)</p> <p>iii) conceptual understanding that enables the student:</p> <ul style="list-style-type: none"> - to devise and sustain arguments, and / or solve problems, using ideas and technique, some of which are at the forefront of a discipline; and - to describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline; <p>b) critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgements, and to frame appropriate questions to achieve a solution - or identify a range of solutions - to a problem;</p>	2, 3, 4, 5, 6, 10	MFRG 318 MECH 306 MFRG 310 MECH 338 PRME 304 THER 305 CONT 314
<p>Key / Transferable Skills (generic)</p> <p>v) the ability to manage their own learning, and to make use of scholarly reviews and primary sources (e.g. refereed research articles and/or original materials appropriate to the discipline).</p> <p>c) communicate information, ideas, problems, and solutions to both specialist and non specialist audiences;</p>	6, 7, 8, 9, 10	MFRG 318 MECH 306 MFRG 310 MECH 338 PRME 304 THER 305 CONT 314

<p>Practical Skills (subject specific)</p> <p>Carry out practical investigative work in mechanical engineering, marine technology and composite materials engineering.</p>	<p>9, 10</p>	<p>MECH 306 MECH 338 PRME 304 THER 305 CONT 314</p>
<p>Employment-related skills</p> <p>d) qualities and transferable skills necessary for employment requiring:</p> <ul style="list-style-type: none"> - the exercise of initiative and personal responsibility; - decision making in complex and unpredictable contexts and - the learning ability needed to undertake appropriate further training of a professional or equivalent nature. 	<p>4, 5, 6, 7, 8, 9, 10</p>	<p>PRME 304</p>

Programme Intended Learning Outcomes Map	Masters (M) level	
1 Graduate Attributes and Skills	2	3
Programme Intended Learning Outcomes (as worded in the Programme Specification) The FHEQ requirements are already given here in italics	Aim	Related Core Modules
<p>Knowledge/ Understanding A systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study, or area of professional practice. A comprehensive understanding of techniques applicable to their own research or advanced scholarship. Originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline.</p> <p>* Knowledge and understanding, but not in the field of Mechanical Engineering</p>	1, 2, 3, 4, 5, 6, 7, 8, 9.	MECH 514 MECH 515 FTGS 505 DSGN 501 MECH 516 MECH 517 MGMT 501 MECH 404 MECH 523 BUS 322 *
<p>Cognitive / Intellectual Skills (generic) Conceptual understanding that enables the student: - to evaluate critically current research and advanced scholarship in the discipline; - to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses.</p>	8	MECH 514 MECH 515 DSGN 501 MECH 516 MECH 523
<p>Key / Transferable Skills (generic) Typically, holders of the qualification will be able to: - deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences; - demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level; non-specialist audiences.</p>	6, 7, 8, 9	MECH 514 MECH 515 FTGS 505 DSGN 501 MECH 516 MECH 517 MECH 404 MECH 523
<p>Practical Skills (subject specific)</p>	9	MECH 515 DSGN 501 MECH 516

<p>Employment-related skills Qualities and transferable skills necessary for employment requiring:</p> <ul style="list-style-type: none"> - the exercise of initiative and personal responsibility; - decision-making in complex and unpredictable contexts; <p>and</p> <ul style="list-style-type: none"> - the independent learning ability required for continuing professional development. 	4, 5, 6, 7, 8, 9	MECH 514 MECH 515 FTGS 505 DSGN 501 MECH 516 MECH 517 MGMT 501 BUS 322
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