**Programme Specification**

**Programme Title: MEng in Mechanical Engineering**

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|---|---|---|---|
| **Awarding Institution:** | The University of Bolton | | |
| **Teaching Institution:** | University of Bolton | | |
| **Division and/or Faculty/Institute:** | Faculty of Advanced Engineering & Sciences | | |
| **Professional accreditation** | Professional body | Professional body URL | Status of graduates |
| | | | |
| **Final award(s):** | MEng | | |
| **Interim award(s)** | | | |
| **Exit or Fallback award(s)** | BEng (Hons) in Mechanical Engineering<br>Diploma of Higher Education in Mechanical Engineering<br>Certificate of Higher Education in Mechanical Engineering | | |
| **Programme title(s)** | Mechanical Engineering | | |
| **UCAS Code** | H300 | | |
| **JACS Code** | H300 | | |
| **University Course Code(s)** | Full time - ENG0003<br>Part-time – ENG 5003 | | |
| **QAA Benchmark Statement(s)** | Engineering (2010)<br><br>UK Standards for Professional Engineering Competences (UK-SPEC): The Accreditation of Higher Education Programmes (2010)'. | | |
| **Other internal and external reference points** | QAA Academic Infrastructure, including the Framework for Higher Education Qualifications and the Code of Practice.<br><br>UK Quality Code for Higher Education<br><br>University of Bolton awards framework | | |

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|---|---|
| **Language of study** | English |
| **Mode of study and normal period of study** | Full Time – 4 years<br>Part Time – 6 years (with possible exemptions for prior learning at HE4) |

**Admissions criteria**

You should have a minimum of two GCE A2-level passes (or equivalent), including Maths and a Science; and five GCSEs at grade C or above (or equivalent), including English Language

If English is not your first language you will need to complete a Secure English Language Test at IELTS 6.0 or equivalent.

**Additional admissions matters**

Non-standard and mature student entry to Part-Time or Full-Time:

- (HND/C) will be considered for direct entry to HE5 Level given good results in Level 5 Mathematics and Science.
- Engineering related work experience and interview (essential for those applying with non-standard entry routes qualifications).

Interviews or informal discussions may be used for Part Time entry students to assess suitability and/or entry point onto the programme.

The first two years of the programme are common to both the MEng and BEng(Hons) routes; hence, given exceptional academic performance at HE4 and into HE5, students may have the opportunity to be counselled for transfer from the BEng(Hons) to the MEng route. However, Masters students who are not able to satisfy the requirements for continuation on the Masters programme, may be counselled to transfer to the BEng(Hons).

**Fitness to practise declaration**

Not applicable

**Aims of the programme**

This Masters in Mechanical Engineering (PT/FT) route is one of four engineering routes within an integrated Masters/BEng (Hons) programme of study. The broad aims of this Masters programme are to:

- Provide a broad educational base for prospective Chartered Engineers encompassing leadership, social and environmental awareness and economic context together with specialist knowledge and industrial application.

- Educate and develop prospective mechanical engineers to the academic requirements (UK Standards for Professional Engineering Competences (UK-SPEC)) leading to Chartered Engineer status with the Institute of Mechanical Engineers (IMechE).
- Prepare prospective engineers for meaningful professional employment in the Mechanical Engineering sector of industry.
- Prepare prospective engineers for a fruitful and responsible life in society and their community.
- Complete a programme of professional development and training (PDP).
- Provide an integrated programme to achieve delivery efficiency and integration of subject matter. Hence, this Mechanical route integrates with the Automobile routes and BEng(Hons), resulting in combined teaching and timetabling.

The principal aims of the programme are to produce graduates that are:

- motivated to practice engineering
- enthusiastic, articulate, questioning and open-minded
- recognised nationally and internationally as highly competent engineering graduates
- aware of the financial, moral, legal, economic, environmental and cultural constraints in which they operate
- aware of current management practice
- committed to and prepared for lifelong learning

In doing so, the programme aims to:

- establish the relevance of engineering to real world problems
- use design as an integrative element in the whole of the degree
- incorporate health and safety, environmental issues and sustainability
- ensure content matches the needs and developments in modern industry and society
- encourage reflection on learning experiences
- develop modelling and analytical skills and the application of those skills
- involve breadth and depth of coverage to meet the needs of industry and society in technical, management and business topics
- encourage and develop a process of Personal Development Planning (PDP)

**Distinctive features of the programme**

- A purpose-designed route ready for accreditation with IMechE to satisfy CEng registration that is internationally recognised.
- The entire first year cohort joins the IMechE as Affiliate members.
- Projects supported through grants by Royal Academy of Engineering as following the Engineering Gateway programme endorsed by the Engineering Council.
- Project-based learning (PBL) at every stage, either in groups or as individuals, linked to ePDP.
- Opportunity to exercise leadership roles in the execution of projects.
- ‘Hands-on’ Project type modules at all levels of the programme.
- Industrial visits.

- Group and individual industrially relevant projects. Possible 'live' industrial projects.
- 1st Yr IMechE Design Challenge for Undergraduate Engineers.
- The British Model Flying Association's University Challenge.
- Opportunity to participate in the IMechE/SAE "Formula Student" challenge.
- Study of a foreign language.
- Open access and skills development in quality CAD, Analysis, Optimisation, CAM and CAE software.

**Programme learning outcomes**

UK-SPEC **General** Learning Outcomes:
On completion of this programme you will:

**Understanding & Knowledge**

- demonstrate knowledge and understanding of facts, concepts and theories and underpinning mathematics and science. (K1)
- have an appreciation of the wider multidisciplinary engineering context and its underlying principles (K2)
- appreciate the social, environmental, ethical, economic and commercial considerations affecting the exercise of their engineering judgement (K3)
- have the ability to learn new theories, concepts, methods etc in unfamiliar situations (K4)

**Intellectual Ability**

- apply quantitative science and engineering tools to analyse problems (C1)
- be able to demonstrate creative and innovative ability in the synthesis of solutions and in formulating design (C2)
- be able to comprehend the broad picture and thus work with an appropriate level of detail (C3)
- have the ability to develop, monitor and update a plan, to reflect a changing operating environment (C4)

**Practical Skills**

- possess practical engineering skills acquired through, for example, work carried out in laboratories and workshops, in industry through supervised work experience, in individual and group project work, in design work and in the development and use of computer software in design, analysis and control (P1)
- demonstrate group working and participation skills in a major project (P2)
- have an understanding of different roles within a team, and the ability to exercise leadership (P3)

**General Transferable Skills**

- have developed transferable skills including problem solving, communication,

leadership, and working with others, as well as the effective use of general IT facilities and information retrieval skills that will be of value in a wide range of situations (T1)
- apply the QCA Higher Level Key Skills and include problem solving, communication, and working with others, as well as the effective use of general IT facilities and information retrieval skills (T2)
- develop PDP and self learning skills. (T3)
- have the ability to monitor and adjust a personal programme of work on an ongoing basis, and to learn independently. (T4)

(See General Outcomes mapping matrix below)

UK-SPEC **Specific** Learning Outcomes:
(UKSpec coding in brackets)

**Underpinning Science & Mathematics and Associate Disciplines**
- have a comprehensive understanding of the scientific principles of mechanical and related engineering disciplines. (US1m)
- have a comprehensive knowledge and understanding of mathematical and computer models relevant to the mechanical and related engineering disciplines, and an appreciation of their limitations. (US2m)
- have an understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in engineering projects. (US3m)
- have an awareness of developing technologies related to mechanical engineering. (US4m)

**Engineering Analysis**
- have the ability to use fundamental knowledge to investigate new and emerging technologies. (E1m)
- have the ability to extract data pertinent to an unfamiliar problem, and apply its solution using computer based engineering tools when appropriate. (E2m)
- have the ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases. (E3m)
- have an understanding of and ability to apply a systems approach to engineering problems. (E40)

**Design**
- have a wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations. (D1m)
- understand customer and user needs and the importance of considerations such as aesthetics. (D2)
- identify and manage cost drivers. (D3)
- have the ability to generate innovative designs for products, systems, components or

processes to fulfil new needs. (D4m)
- ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal. (D5)
- manage the design process and evaluate outcomes. (D6)

**Economic, social and environmental context**

- have the ability to make general evaluations of commercial risks through some understanding of the basis of such risks. (S1m)
- have extensive knowledge and understanding of management and business practices, and their limitations, and how these may be applied appropriately to strategic and tactical issues. (S2m)
- have an Understanding of the requirement for engineering activities to promote sustainable development. (S3)
- have an awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues. (S4)
- have an understanding of the need for a high level of professional and ethical conduct in engineering. (S5)

**Engineering Practice**

- have a thorough understanding of current practice and its limitations and some appreciation of likely new developments. (P1m)
- have an extensive knowledge and understanding of a wide range of engineering materials and components. (P2m)
- have an understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology, development, etc). (P3)
- understand the use of technical literature and other information sources. (P4)
- have an awareness of nature of intellectual property and contractual issues. (P5)
- have an understanding of appropriate codes of practice and industry standards. (P6)
- have an awareness of quality issues. (P7)
- have the ability to apply engineering techniques taking account of a range of commercial and industrial constraints. (P8m)

(See Specific Learning Outcomes mapping matrix below)

**Programme structure**

This 4 year full time/6 year part time route requires 480 credits to be achieved for the award MEng in Mechanical Engineering; 120 credits at HE4, 120 credits at HE5, 120 credits at HE6 and 120 credits at HE7.

Part time students study 80 credits-worth of modules/year, thus, taking a minimum of six years to complete the route.

All modules are Core modules and are 20 credit value, apart from the 40 credit Project-type modules (one at each level) required for assimilation and integration of topics and material.

| Module Code | Module title | Core/ Option/ Elective (C/O/E) | Credits | Length (1, 2 or 3 periods) |
|---|---|---|---|---|
| AME4051 | Engineering Environment | C | 20 | 1 |
| AME4052 | Engineering Principles 1 | C | 20 | 1 |
| AME4053 | Engineering Principles 2 | C | 20 | 1 |
| AME4054 | Projects & Systems | C | 40 | 2 |
| AME4055 | Graphical Communication & Computer Modelling | C | 20 | 1 |
| AME5001 | Engineering Applications | C | 40 | 2 |
| AME5002 | Mechanics of Materials & Machines | C | 20 | 1 |
| AME5003 | Thermofluids & Control Sys | C | 20 | 1 |
| AME5004 | Engineering Modelling & Analysis | C | 20 | 1 |
| AME5005 | Automobile/Mechanical Design | C | 20 | 1 |
| AME6000 | MEng Design & Individual Project | C | 40 | 2 |
| AME6002 | Advanced Materials & Structures | C | 20 | 1 |
| AME6004 | Life Cycle Management | C | 20 | 1 |
| AME6005 | Advanced Thermofluids & Control Sys | C | 20 | 1 |
| AME6006 | Finite Element & Difference Solutions | C | 20 | 1 |
| AME7000 | MEng Group Project | C | 40 | 2 |
| AME7001 | Language and International Communications for Engineers | C | 20 | 1 |
| AME7002 | Managing Product Development | C | 20 | 1 |
| AME7003 | STORM | C | 20 | 1 |
| AME7006 | Design of Advanced Composites | C | 20 | 1 |

**Learning and teaching strategies**

The diverse nature of this engineering programme necessitates the use of a variety of teaching and learning methods in order to ensure the acquisition and development of appropriate concepts, knowledge and skills. Many of these methods will be experienced during formal timetabled classes. Other methods, which are also demanded by professional body accreditation requirements, will be experienced through opportunities to develop

creativity and innovative skills. This is predominantly achieved through open-ended project and design, make and test activity, where application, assimilation and integration of course material are realised. As projects, design activity and assimilation is extremely important and time dependent, all project modules are 40 credit value and run over two semesters. Also, as you progress through the programme, your studies will become less structured and more open-ended in nature.

**Learning activities (KIS entry)**

| | Course Year | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| Scheduled learning and teaching activities | 34 | 31 | 24 | 20 |
| Guided independent study | 66 | 69 | 76 | 80 |
| Placement/study abroad | | | | |

**Assessment strategy**

The assessment strategy for the programme is designed to ensure that the overall aims and learning outcomes of the programme are assess and achieved. To accomplish this, a range of assessment methods are used and applied, depending upon the learning outcome in question and the type of module content being assessed. Assessment and feedback may be Formative or Summative.

In line with the University of Bolton Curriculum Framework, Summative Assessment (that leading to assignment/project mark, module grade and hence to overall performance classification) constitutes a maximum of two pieces of assessed work per 20 credit module. The aggregate pass module mark is 40%. You must achieve a pass in all elements of assessment for each module. Summative Assessment may consist of:

- Project, Assignment and/or Design reports
- Written Examinations
- Module Portfolios
- Presentations
- Viva Examination

**Assessment methods (KIS entry)**

| | Course Year 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Written exams | 33% | 36% | 35% | 10% |
| Coursework | 63% | 60% | 56% | 66% |
| Practical exams | 4% | 4% | 9% | 24% |

**Assessment regulations**

- Assessment Regulations for Undergraduate Modular Programmes

The mark awarded will be made up, where specified, of the weighted average of the examination and coursework assessment marks. You must achieve a mark of 40% or above in all assessments to show that you have achieved the Learning Outcomes for each module and achieved an overall average of 40 percent to pass a module.

For the full and current version of the Assessment Regulations, refer to the document "*Assessment Regulations for Undergraduate Modular Programmes (Main Document)"* at the following university intranet site:
http://www.bolton.ac.uk/Quality/QAEContents/APPR/Home.aspx

**Grade bands and classifications Grade Bands**

| **Grade Description** | **Mark %** |
|---|---|
| Work of exceptional quality | 70+ |
| Work of very good quality | 60-69 |
| Work of good quality | 50-59 |
| Work of satisfactory quality | 40-49 |
| Borderline fail | 35-39 |
| Fail | Below 35 |

**Grading**

The award of integrated Masters with Distinction may be made where your overall average mark is at least 70%, normally calculated from modules worth at least 120 credits at Level HE7.

**Role of external examiners**

External examiners are appointed for all programmes of study. They oversee the assessment process and their duties include: approving assessment tasks, reviewing assessment marks, attending assessment boards and reporting to the University on the assessment process.

**Support for student learning**

- The programme is managed by a programme leader
- Induction programme introduces the student to the University and their programme
- Each student has a personal tutor, responsible for support and guidance
- Personal Development Planning (PDP) integrated into all programmes
- Feedback on formative and summative assessments
- A Student Centre providing a one-stop shop for information and advice
- University support services include housing, counselling, financial advice, careers and a disability
- A Chaplaincy
- Library and IT services
- Student Liaison Officers attached to each Faculty
- The Students' Union advice services
- Faculty and Programme Handbooks which provide information about the programme and University regulations
- The opportunity to develop skills for employment
- English language support for International students
- Specialist teaching facilities/resources
- Support from professional bodies by student membership of IMechE

**Methods for evaluating and enhancing the quality of learning opportunities**

- Programme committees with student representation
- Module evaluations by students
- Students surveys, e.g. National Student Survey (NSS)
- Annual quality monitoring and action planning through Programme Quality Enhancement Plans (PQEPs), Data Analysis Report (DARs) Subject Annual Self Evaluation Report (SASERs), Faculty Quality Enhancement Plans (FQEPs), University Quality Enhancement Plan (UQEP)
- Peer review/observation of teaching
- Professional development programme for staff

- External examiner reports

**Other sources of information**

Student portal: www.bolton.ac.uk/Students/Home.aspx

Students Union www.ubsu.org.uk/

Faculty or similar Handbook: http://www.bolton.ac.uk/Students

Programme Handbook:

Student Entitlement Statement:
http://www.bolton.ac.uk/Students/AdviceAndSupport/HomeOLD.aspx

Module database: http://modules.bolton.ac.uk

Moodle (for the programme?): http://elearning.bolton.ac.uk

External examiners reports:
www.bolton.ac.uk/Quality/QAEContents/ExternalExaminersReports/Home.aspx

**Document control**

| | |
|---|---|
| **Author(s)** | Peter J Atkinson |
| **Approved by:** | Sarah Riches<br>Chair, University Validation Panel |
| **Date approved:** | |
| **Effective from:** | 2012/13 |
| **Document History:** | |

# UKSpec General Learning Outcomes Map – Masters in Mechanical Engineering

| Module title | Mod Code | Status C/ O/E | K1 | K2 | K3 | K4 | C1 | C2 | C3 | C4 | P1 | P2 | P3 | T1 | T2 | T3 | T4 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Level 4** | | | | | | | | | | | | | | | | | |
| Engineering Environment | AME4051 | C | | tda | tda | td | | | d | d | | d | td | tda | d | tda | td |
| Engineering Principles 1 | AME4052 | C | tda | | | td | tda | | | | | | | d | d | | |
| Engineering Principles 2 | AME4053 | C | tda | | | td | tda | | | | | | | d | d | | |
| Projects & Systems | AME4054 | C | d | td | | d | d | da | d | d | tda | td | td | td | td | td | td |
| Graphical Comms & Computer Modelling | AME4055 | C | | d | | d | | | | | td | | | td | d | | |
| **Level 5** | | | | | | | | | | | | | | | | | |
| Engineering Applications | AME5001 | C | d | td | | d | d | da | da | da | tda | tda | tda | td | tda | tda | tda |
| Mechanics of Materials & Machines | AME5002 | C | tda | | | tda | tda | | | | | | | | | | |
| Thermofluids & Control Systems | AME5003 | C | tda | | | tda | tda | | | | | | | | | | |
| Engineering Modelling & Analysis | AME5004 | C | tda | | | tda | tda | | | | | | | | | | |
| Auto/Mech Design | AME5005 | C | d | td | d | td | da | tda | da | d | da | d | td | d | da | td | d |
| **Level 6** | | | | | | | | | | | | | | | | | |
| MEng Design & Individual Project | AME6000 | C | d | tda | da | | da | tda | da | tda | td | tda | td | tda | da | tda | tda |
| Advanced Materials & Structures | AME6002 | C | tda | | | tda | tda | | | | | | | | d | | |
| Life Cycle Management | AME6003 | C | | td | | | | | da | d | | | | d | | | d |
| Advanced Thermofluids & Control Systems | AME6005 | C | tda | | | tda | tda | | | | | | | | d | | |
| Finite Element & Difference Solutions | AME6006 | C | tda | | | tda | tda | | | | tda | | | | d | | |
| **Level 7** | | | | | | | | | | | | | | | | | |
| MEng Group Project | AME7000 | C | d | tda | d | | da | da | da | tda | da | da | tda | tda | d | da | tda |
| Language & International Comms for Engineers | AME7001 | C | | d | tda | | | | | | | d | | tda | tda | tda | d |
| Managing Product Development | AME7002 | C | | d | d | | | | d | da | | | tda | | d | | |
| STORM | AME7003 | C | d | d | d | | | | d | da | | | td | | d | | |
| International Comms & Environmental Issues | AME7005 | C | | d | tda | | | | | | | d | | tda | tda | tda | d |
| Design of Advanced Composites | AME7006 | C | tda | | | tda | tda | da | | | tda | | | | | tda | |

# UKSpec Specific Learning Outcomes Map – Masters in Mechanical Engineering

d – developed; a – assessed; t - taught

| MEng in Mechanical Engineering Modules | | Engineering Environment | Engineering Principles 1 | Engineering Principles 2 | Projects & Systems | Graph'l Comms & Computer Modelling | Engineering Applications | Mechanics of Material & Machines | Thermofluids & Control Systems | Engineering Modelling & Analysis | Auto/Mechanical Design | MEng Design & Individual Project | Advanced Materials & Structures | Life-Cycle Management | Advanced Thermofluids & Control | Finite Element & Difference Solutions | MEng Group Project | Language & International Comms for Engineers | Managing Product Development | STORM | International Comms & Environmental Issues | Design of Advanced Composites |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Learning Outcome** | **UKSpec Code** | AME4051 | AME4052 | AME4053 | AME4054 | AME4055 | AME5001 | AME5002 | AME5003 | AME5004 | AME5005 | AME6000 | AME6002 | AME6004 | AME6005 | AME6006 | AME7000 | AME7001 | AME7002 | AME7003 | AME7005 | AME7006 |
| Underpinning Science & Mathematics and Associate Disciplines | | | | | | | | | | | | | | | | | | | | | | |
| A comprehensive understanding of the scientific principles of mechanical and related engineering disciplines | US1m | | dta | dta | | | | dta | | dta | | d | dta | | | d | tda | | | | | dt |
| A comprehensive knowledge and understanding of mathematical and computer models relevant to the mechanical and related engineering disciplines, and an appreciation of their limitations. | US2m | | d | dta | | | d | dta | | dta | | d | | | | dta | tda | | | | | dta |
| An understanding of concepts from a range of areas including some outside engineering, and the ability to apply them effectively in engineering projects. | US3m | d | | | dta | | da | | | | d | tda | | | | | tda | | td | d | d | |
| An awareness of developing technologies related to mechanical engineering. | US4m | d | | | dt | | d | | d | | d | tda | da | | d | dta | tda | | | d | d | dta |
| **Engineering Analysis** | | | | | | | | | | | | | | | | | | | | | | |
| Ability to use fundamental knowledge to investigate new and emerging technologies. | E1m | d | dta | dta | dt | | | | dat | | | tda | | tda | dat | | | d | | d | d | dt |
| Ability to extract data pertinent to an unfamiliar problem, and apply its solution using computer based engineering tools when appropriate | E2m | d | dta | dta | da | | dt | dta | dt | dta | dt | tda | | | dat | | tda | d | | d | d | dt |
| Ability to apply mathematical and computer-based models for solving problems in engineering, and the ability to assess the limitations of particular cases. | E3m | | | d | da | | dt | dta | dt | dta | dt | td | dta | | dat | dta | | | td | | | dta |
| Understanding of and ability to apply a systems approach to engineering problems | E4 | d | | | dta | | dta | | d | | d | td | | | dt | | | d | | da | d | dt |
| **Design** | | | | | | | | | | | | | | | | | | | | | | |
| Wide knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations | D1m | | | | d | d | da | | | | dta | tda | | | | d | tda | | | | | dta |
| Understand customer and user needs and the importance of considerations such as aesthetics | D2 | | | | d | d | da | | | | d | td | | | | | | | | | | |

| | | AME4051 | AME4052 | AME4053 | AME4054 | AME4055 | AME5001 | AME5002 | AME5003 | AME5004 | AME5005 | AME6000 | AME6002 | AME6004 | AME6005 | AME6006 | AME7000 | AME7001 | AME7002 | AME7003 | AME7005 | AME7006 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Identify and manage cost drivers | D3 | | | | da | dta | d | | | | t | d | | | | | | | | da | | |
| Ability to generate an innovative design for products, systems, components or processes to fulfil new needs. | D4m | | | | dta | | da | | | | d | dta | | | | | | | | d | | dta |
| Ensure fitness for purpose for all aspects of the problem including production, operation, maintenance and disposal | D5 | | | | | d | | | d | | dta | td | | | d | dta | | | td | d | | |
| Manage the design process and evaluate outcomes | D6 | | | | dta | | dta | | | | dta | d | | | | | | | tda | d | | |
| **Economic, social and environmental context** | | | | | | | | | | | | | | | | | | | | | | |
| The ability to make general evaluations of commercial risks through some understanding of the basis of such risks | S1m | dta | | | | | | | | | | | | dta | | | | d | tda | d | dt | |
| Extensive knowledge and understanding of management and business practices, and their limitations, and how these may be applied appropriately to strategic and tactical issues. | S2m | dt | | | | | | | | | | | | | | | tda | dta | tda | da | dta | |
| Understanding of the requirement for engineering activities to promote sustainable development | S3 | dta | | | | | dt | | dt | | d | d | | | dta | | | d | | d | dt | |
| Awareness of the framework of relevant legal requirements governing engineering activities, including personnel, health, safety, and risk (including environmental risk) issues. | S4 | dta | | | | | | | dt | | d | d | | | dta | | | d | | d | dta | d |
| Understanding of the need for a high level of professional and ethical conduct in engineering | S5 | dt | | | | | | | | | | d | | | | | | d | | | dta | |
| **Engineering Practice** | | | | | | | | | | | | | | | | | | | | | | |
| A thorough understanding of current practice and its limitations and some appreciation of likely new developments | P1m | dt | | d | | | d | | | | | dta | | | | | tda | dt | | | dt | dt |
| Extensive knowledge and understanding of a wide range of engineering materials and components | P2m | dt | | dt | d | d | dta | dt | | | dta | dta | dta | | | tda | tda | dt | | | dt | |
| Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, technology, development, etc) | P3 | dt | d | d | d | dta | dta | | d | | | d | | | dt | d | | dta | | da | dt | |
| Understanding use of technical literature and other information sources | P4 | dt | | | | dt | | | | | dt | td | | | | dt | | dta | | | dt | d |
| Awareness of nature of intellectual property and contractual issues | P5 | dt | | | | | | | | | | d | | | | | | dt | | da | dt | |
| Understanding of appropriate codes of practice and industry standards | P6 | dt | | | | dt | | dt | | | tda | d | | | | d | | dt | dt | | dt | d |
| Awareness of quality issues | P7 | dt | | | | dt | | d | | | | d | | | | | | dt | | | dt | d |
| Ability to apply engineering techniques taking account of a range of commercial and industrial constraints | P8m | dt | | | | | | | | | | dta | | tda | | | tda | dt | | d | dt | |

**d – developed; a – assessed; t - taught**

# Module listing MEng in Mechanical Engineering

| Module title | Mod Code | New? ✓ | Level | Credits | Type | Core/Option/Elective C/O/E | Pre-requisite module | Assessment 1 | | | Assessment 2 | | | Assessment 3 | | | Assessment 4 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Assessment type | Assessment % | Add Y if final item | Assessment type | Assessment % | Add Y if final item | Assessment type | Assessment % | Add Y if final item | Assessment type | Assessment % | Add Y if final |
| Engineering Environment | AME4051 | | HE4 | 20 | S | C | | CW | 50 | | CW | 50 | Y | | | | | | |
| Engineering Principles 1 | AME4052 | ✓ | HE4 | 20 | S | C | | CW | 40 | | EX | 60 | Y | | | | | | |
| Engineering Principles 2 | AME4053 | ✓ | HE4 | 20 | S | C | | CW | 40 | | EX | 60 | Y | | | | | | |
| Projects & Systems | AME4054 | | HE4 | 40 | P | C | | CW | 30 | | PRA | 20 | | CW | 50 | Y | | | |
| Graphical Communication & Computer Modelling | AME4055 | | HE4 | 20 | S | C | | EX | 45 | | CW | 55 | Y | | | | | | |
| Engineering Applications | AME5001 | | HE5 | 40 | P | C | | CW | 30 | | PRA | 20 | | CW | 50 | Y | | | |
| Mechanics of Materials & Machines | AME5002 | | HE5 | 20 | S | C | AME4052 AME4053 | CW | 40 | | EX | 60 | Y | | | | | | |
| Thermofluids & Control Systems | AME5003 | | HE5 | 20 | S | C | | CW | 40 | | EX | 60 | Y | | | | | | |
| Engineering Modelling & Analysis | AME5004 | | HE5 | 20 | S | C | AME4052 AME4053 | CW | 40 | | EX | 60 | Y | | | | | | |
| Auto/Mech Design | AME5005 | | HE5 | 20 | S | C | AME4052 AME4053 AME4055 | CW | 50 | | CW | 50 | Y | | | | | | |
| MEng Design & Individual Project | AME6000 | | HE6 | 40 | P | C | AME5002 AME5005 | CW | 35 | | CW | 45 | Y | PRA | 10 | | PRA | 10 | |
| Advanced Materials & Structures | AME6002 | | HE6 | 20 | S | C | | CW | 25 | | EX | 75 | Y | | | | | | |
| Life Cycle Management | AME6003 | | HE6 | 20 | S | C | | CW | 75 | Y | PRA | 25 | | | | | | | |
| Advanced Thermofluids & Control Systems | AME6005 | | HE6 | 20 | S | C | AME5003 | CW | 40 | | EX | 60 | Y | | | | | | |
| Finite Element & Difference Solutions | AME6006 | | HE6 | 20 | S | C | AME5002 AME5004 | CW | 60 | | EX | 40 | Y | | | | | | |
| MEng Group Project | AME7000 | | HE7 | 40 | P | C | AME6000 | CW | 70 | Y | PRA | 15 | | PRA | 15 | | | | |

| | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Language & International Comms for Engineers | AME7001 | | HE7 | 20 | S | C | | CW | 50 | | PRA | 50 | Y | | | | | |
| Managing Product Development | AME7002 | | HE7 | 20 | S | C | | PRA | 40 | | CW | 60 | Y | | | | | |
| STORM | AME7003 | | HE7 | 20 | S | C | | CW | 30 | | CW | 70 | Y | | | | | |
| International Comms & Environmental Issues | AME7005 | | HE7 | 20 | S | C | | CW | 50 | | PRA | 50 | Y | | | | | |
| Design of Advanced Composites | AME7006 | | HE7 | 20 | S | C | | CW | 50 | | EX | 50 | Y | | | | | |

# Bolton Values Map – Masters in Mechanical Engineering

| MEng in Mechanical Engineering Modules | Engineering Environment | Engineering Principles 1 | Engineering Principles 2 | Projects & Systems | Graph'l Comms & Computer Modelling | Engineering Applications | Mechanics of Material & Machines | Thermofluids & Control Systems | Engineering Modelling & Analysis | Auto/Mechanical Design | MEng Design & Individual Project | BEng Design & Individual Project | Advanced Materials & Structures | Management & Enterprise in Engineering | Life-Cycle Management | Advanced Thermofluids & Control | Finite Element & Difference Solutions | MEng Group Project | Language & International Comms for Engineers | Managing Product Development | STORM | International Comms & Environmental Issues | Design of Advanced Composites |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Value** | AME4051 | AME4052 | AME4053 | AME4054 | AME4055 | AME5001 | AME5002 | AME5003 | AME5004 | AME5005 | AME6000 | AME6001 | AME6002 | AME6003 | AME6004 | AME6005 | AME6006 | AME7000 | AME7001 | AME7002 | AME7003 | AME7005 | AME7006 |
| **Employability** | | | | | | | | | | | | | | | | | | | | | | | |
| Communication | dta | d | d | da | tda | da | d | td | d | td | tda | tda | tda | dt | td | | | tda | dta | da | dt | dta | d |
| Team Work | d | | | da | | da | | | | td | | | | dt | | | | tda | d | d | d | d | d |
| Organisation & Planning | d | | | dt | | d | | | | | tda | tda | | dta | | | | tda | d | tda | dta | d | dt |
| Numerical Interpretation | | dta | dta | da | d | da | dta | tda | dta | tda | tda | tda | tda | | tda | tda | tda | tda | | | | | dta |
| Problem Solving | | dta | dta | da | | da | dta | tda | dta | tda | tda | tda | tda | | tda | tda | tda | tda | | t | da | | dta |
| Flexibility & Adaptability | d | | | | | | | | | | d | d | | dt | | | | | dt | | d | d | |
| Action Planning | d | | | dt | | d | | | | | tda | tda | | dt | | | | da | d | tda | d | d | d |
| Self Awareness | dta | | | | | | | | | | d | d | | dt | | | | d | d | | | d | |
| Initiative | d | | | d | | d | | | | | d | d | | dt | | | | d | dt | | | d | d |
| Personal Impact & Confidence | d | | | | | | | | | | d | d | | dt | | | | d | dt | tda | d | d | |
| **Internationalisation** | | | | | | | | | | | | | | | | | | | | | | | |
| International content or international comparative approach | d | | | | | | | | | | | | | dt | | | | | dt | | dt | dt | |
| Preparation for international profession | d | d | d | | | | | d | | d | d | d | td | dt | d | d | d | d | dt | d | | dt | d |
| Foreign language or cross-cultural communication | | | | | | | | | | | | | | | | | | | dta | | | | |
| Preparation for internationally recognised qualification | d | d | d | dt | | dt | | d | | t | d | d | d | dt | d | d | d | d | dt | d | | dt | dt |
| **Environmental Sustainability & Awareness** | | | | | | | | | | | | | | | | | | | | | | | |
| Globalisation & the global context | d | | | | | | | d | | | | | | dta | d | | | d | d | | dta | dta | d |
| Consumer culture and the free market | d | | | | | | | | | | d | | | dt | | | | | d | | | dt | d |
| Carbon reduction | | d | d | | | | | d | | | d | | d | | dt | tda | d | | | | | dt | dta |
| Systems, control mechanisms and environments | d | | | da | | da | | dt | | | | | | dt | dta | tda | d | | d | | dt | dt | d |
| Energy, consumption, waste and technology | d | dt | dt | d | | | | dt | | d | d | d | d | dt | dta | tda | d | | | | dt | dt | d |
| Business impact and business practices on the environment | d | | | | | | | | | td | | | | dt | | | | d | d | td | dta | dta | |
| Instrumentation and stewardship | | | | | | | | | | | | | | | | | | | | d | | | d |
| **Social, Public & Ethical Responsibility** | | | | | | | | | | | | | | | | | | | | | | | |
| Professional standards and practice | d | dt | dt | d | td | | dt | | dt | d | d | | | dt | | | | d | d | d | | dt | d |
| Ethics | d | | | | | | | | | | d | | | dt | | | | | d | | | dt | |
| Political or social judgement | d | | | | | | | | | | d | | | dt | | | | | d | d | | dt | |
| Cultural or moral issues | d | | | | | | | | | | d | | | dt | | | | | d | d | dta | dt | |

Programme specification: MEng in Mechanical Engineering

Date: Feb 2012