

## Programme Specification

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### MEng, BEng (Hons) Mechanical Engineering 2019/20

This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided.

Awarding Institution	University of Southampton
Teaching Institution	University of Southampton, University of Southampton Malaysia Campus (international students for Parts I and II only)
Mode of study	Full time
Duration	5 years (MEng with Industrial Placement Year), 4 years (MEng), (BEng with Industrial Placement), 3 years (BEng)
Accreditation details	Institution of Mechanical Engineers - PENDING MEng accredited for registration as a Chartered Engineer for graduates with a 2.2 and above BEng (Honours) accredited for registration as a Chartered Engineer subject to the completion of approved additional learning
Final award	Bachelor of Engineering (with Honours) (BEng) Bachelor of Engineering with Industrial Placement Year (with Honours) (BEng) Master of Engineering (MEng)
Name of award	Mechanical Engineering Mechanical Engineering / Acoustical Engineering Mechanical Engineering / Advanced Materials Mechanical Engineering / Aerospace Mechanical Engineering / Automotive Mechanical Engineering / Biomedical Engineering Mechanical Engineering / Computational Engineering and Design Mechanical Engineering / Engineering Management Mechanical Engineering / Mechatronics Mechanical Engineering / Naval Engineering Mechanical Engineering / Sustainable Energy Systems  All of the MEng degrees above may also be taken with an Industrial Placement Year and will then have 'with Industrial Placement Year' appended to the degree title
Interim Exit awards	Certificate of Higher Education Diploma of Higher Education Bachelor of Science (Ordinary)
FHEQ level of final award	Level 6 (BEng), Level 7 (MEng)
UCAS code	H300, BEng Mechanical Engineering H30P, BEng Mechanical Engineering with Industrial Placement Year (2018/19)

UCAS code	H301, MEng Mechanical Engineering 4R23 Mechanical Engineering/Acoustical Engineering HJ35, MEng Mechanical Engineering/Advanced Materials HH34, MEng Mechanical Engineering/Aerospace H390, MEng Mechanical Engineering/Automotive 4R29, MEng Mechanical Engineering/Biomedical Engineering 5P01 Mechanical Engineering/Computational Engineering and Design HN32, MEng Mechanical Engineering/Engineering Management HH37, MEng Mechanical Engineering/Mechatronics HH35, MEng Mechanical Engineering/Naval Engineering HH32, MEng Mechanical Engineering/Sustainable Energy Systems  30HH, MEng Mechanical Engineering with Industrial Placement Year H34H Mechanical Engineering/Acoustical Engineering with Industrial Placement Year H3H1, MEng Mechanical Engineering/Advanced Materials with Industrial Placement Year H3H4, MEng Mechanical Engineering/Aerospace with Industrial Placement Year H3H3, MEng Mechanical Engineering/Automotive with Industrial Placement Year H316, MEng Mechanical Engineering/Biomedical Engineering with Industrial Placement Year H3H6, Mechanical Engineering/Computational Engineering and Design with Industrial Placement Year HH31, MEng Mechanical Engineering/Engineering Management with Industrial Placement Year H3H2, MEng Mechanical Engineering/Mechatronics with Industrial Placement Year H3H5, MEng Mechanical Engineering/Naval Engineering with Industrial Placement Year H3J7, MEng Mechanical Engineering/Sustainable Energy Systems with Industrial Placement Year
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QAA Subject Benchmark or other external reference	Engineering, Engineering Council, UK-SPEC
Director of Programme	Professor Martyn Hill
Programme Lead	Professor Suleiman Sharkh
Date specification was written	March 2003 (N.G. Stephen) and June 2013 (M.J. Starink) Amended January 2016 to include Industrial Placement Year for MEng (A Barney/H Glasspool)
Date programme was validated	July 2014*
Date specification last updated	July 2018

As a research-led University, we undertake a continuous review of our programmes to ensure quality enhancement and to manage our resources. As a result, this programme may be revised during a student's period of registration; however, any revision will be balanced against the requirement that the student should receive the educational service expected. Please read our [Disclaimer](#) to see why, when and how changes may be made to a student's programme.

Programmes and major changes to programmes are approved through the University's programme validation process which is described in the University's quality handbook.

## Educational Aims of the Programme

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As defined by the Institution of Mechanical Engineers (IMechE), Mechanical Engineering is concerned with “the innovative application of engineering and management sciences that underpin existing and emerging technologies to the complete life cycle of all mechanical devices, machines and systems.” A Mechanical Engineer needs to be skilled in the application of a knowledge based on mathematics, science, design, materials and manufacturing, integrated with business and management to develop sustainable and environmentally compatible technological solutions that provide the infrastructure, goods and services needed by society.

The aims of the BEng and MEng Mechanical Engineering (Mech Eng) programmes are to:

(Blue = both BEng & MEng Mech Eng; black = BEng only; *green italics* = MEng only, orange = Industrial Placement Year for BEng and MEng)

- Provide you, in Parts I and II, with a sound understanding of the fundamental principles, methods, analysis and synthesis in engineering design and applications appropriate to the discipline of Mechanical Engineering.
- Provide you, in Part III with opportunities to study specialist modules integrated within the structured learning environment, reflecting the internationally renowned research expertise within the Faculty
- *Provide you, in Part III and IV (MEng) with a range of specialist modules integrated within the structured learning environment, reflecting the internationally renowned research expertise within the Faculty, in order to broaden and deepen your educational experience.*
- Train you to enable you to become professional engineers that meet many of the educational requirements of the Engineering Council (i.e. UK-SPEC), and to have a broad range of knowledge and skills (including IT and communication) capable of meeting the present and future demands of industry and commerce.
- *Train you to enable you to become professional engineers that meet the educational requirements of the Engineering Council (i.e. UK-SPEC), and to have a broad range of knowledge and skills (including IT and communication) capable of meeting the present and future demands of industry and commerce.*
- Offer you a degree structure that is relevant to industry and responsive to changes in technology and the needs of the community.
- Provide you with a supportive and intellectually stimulating environment that encourages an attitude of independent learning and enquiry, and fosters an ethos of lifetime learning and professional development.
- Offer you an individual project and group assignments which are supported by the research activities within the Faculty and stimulate individual innovation and self-assessment required in engineering design.
- *Offer you an individual and a group design project which are supported by the research activities within the Faculty and stimulate individual innovation, self-assessment and teamwork skills required in engineering design.*
- Offer you an opportunity to apply the knowledge you have developed during your studies in Parts I and II and gain experience of working within an engineering based organisation

## Programme Learning Outcomes

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The programme provides opportunities for you to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the following areas. The programme outcomes have been developed with reference to the Accrediting Institution guidelines and the UK-SPEC Degree Output Standards General and Specific Learning Outcomes.

### Knowledge and Understanding

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Having successfully completed this programme you will be able to demonstrate knowledge and understanding of:

(Blue = both BEng & MEng Mech Eng; black = BEng only; *green italics* = MEng only)

1. Mathematics and science that are relevant to Mechanical Engineering.
- 2.
3. The fundamental concepts, principles and theories of Mechanical Engineering, and an appreciation of their limitations.  
*The fundamental and advanced concepts, principles and theories of Mechanical Engineering, and an appreciation of their limitations.*
4. Concepts from a range of areas from other engineering disciplines and outside engineering, and the ability to apply them effectively in engineering projects.
5. The principles of engineering design and manufacture and their application to conceptual and detailed design.

6. Information and communication technology (ICT) relevant to the practice of Mechanical Engineering.
7. Management and business practices that are relevant to Mechanical Engineering.  
*Advanced management and business practices that are relevant to Mechanical Engineering.*
8. Health and safety issues, risk assessment and regulatory frameworks.
9. The social and professional responsibilities of Mechanical engineers.
10. Environmental issues and the importance of Mechanical Engineering to the quality of the environment.  
*Environmental issues, advanced environmental aspects of engineering and the importance of Mechanical Engineering to the quality of the environment.*
11. The role of the engineer in society and the constraints within which their engineering judgement will be exercised.
12. *Material relevant to your specialist theme at an advanced level.*

### Teaching and Learning Methods

**Acquisition of 1** is through a combination of lectures, tutorials (small group teaching), example classes, laboratory experiments, coursework and projects.

**Acquisition of 2 - 5** is through a combination of lectures, tutorials, example classes, laboratory experiments, coursework and individual and group projects at all Levels.

**Acquisition of 6, 7, 9 and 11** is through a combination of formal and special lectures, coursework and projects throughout the programme. Acquisition of 6 is further enhanced when you opt for the Engineering Management theme.

**Acquisition of 8** is through lectures and coursework throughout the programme.

Throughout the programme students are encouraged to use additional recommended reading material for private study to consolidate the formal learning process, and to broaden and deepen their understanding. All students are encouraged to become student members of the professional institution, to use their libraries and resources, and attend meetings.

**Acquisition of 10** is through lectures and coursework in Part I and the project activities at level 6 (BEng and MEng) and 7 (MEng only).

**Acquisition of 11** is through the compulsory specialist level 6 and level 7 modules in Parts III and IV (MEng only).

### Assessment Methods

Testing of the knowledge base and understanding is through a combination of unseen written examinations (1, 2, 5, 6, 11) and assessed coursework in the form of problem solving exercises (1-4), laboratory reports (2-4), design exercises (4, 6-9), essays (7-9) and individual and group projects (2-10, 11).

### Subject Specific Intellectual and Research Skills

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Having successfully completed this programme you will be able to:

(Blue = both BEng & MEng Mech Eng; black = BEng only; *green italics* = MEng only)

1. Plan, conduct and report on an individual research programme.  
*Plan, conduct and report on individual and group research programmes.*
2. Analyse and solve engineering problems, using appropriate mathematical and software methods as necessary.  
*Analyse and solve complex engineering problems, using appropriate mathematical and software methods as necessary, demonstrating the ability to define the limitations of your chosen methods.*
3. Be creative in the solution of problems and in design development.  
*Be creative in the solution of problems, in design development showing significant originality.*
4. Design engineering elements and systems to meet a need, evaluate outcomes and make improvements.  
*Design engineering elements and integrated systems to meet a need, evaluate outcomes critically and comprehensively & make improvements.*
5. Integrate and evaluate information and data from a variety of sources.  
*Integrate and evaluate complex information and data from a wide variety of sources.*
6. Take a structured approach to solving problems and designing systems, applying professional judgement to balance risks, cost, benefits, safety, reliability, aesthetics and environmental impact.

### Teaching and Learning Methods

- Intellectual skills are developed through the teaching and learning activities.
- Analysis and problem solving skills are further developed through regular problem sheets issued by module lecturers and through small group teaching.
- Experimental, research and design skills are further developed through coursework exercises, laboratory work, and design and research projects. Individual feedback is provided on all work submitted. Appreciation of the practical application of these skills (in particular skill 6) is provided by interaction with industry, through visiting lectures and industrial visits.

### Assessment Methods

- Analysis and problem solving skills are assessed through unseen written examinations and problem based exercises.
- Experimental, research and design skills are assessed through laboratory reports, coursework exercises, project reports and oral presentations.

### Transferable and Generic Skills

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Having successfully completed this programme you will be able to:

(Blue = both BEng & MEng Mech Eng; black = BEng only; *green italics* = MEng only)

1. **Communicate effectively – in writing, verbally and through drawings.**
2. **Apply mathematical skills – algebra, geometry, modelling and analysis.**  
*Apply a wide range of mathematical skills – algebra, geometry, advanced modelling and analysis.*
3. **Learn independently in familiar and unfamiliar situations with open-mindedness and self-reflection.**  
*Learn independently in familiar and unfamiliar situations with open-mindedness and in a spirit of critical enquiry.*
4. **Work constructively as a member of a team.**  
*Work constructively as a member of a team able to take a variety of roles.*
5. **Manage time and resources.**
6. **Use Information and Communications Technology.**
7. **Use the library, internet and other sources effectively.**  
*Use the library, internet and other sources effectively and critically.*
8. **Manage tasks and solve problems, transfer techniques and solutions from one area to another, apply judgement.**  
*Manage tasks and solve novel problems, transfer techniques and solutions from one area to another, apply critical analysis and judgement.*
9. **Learn effectively for the purpose of continuing professional development and in a wider context throughout their career.**
10. **Communicate in a foreign language when you select a language option.**

### Teaching and Learning Methods

Transferable skills are developed through the teaching and learning activities.

**Skill 1** is acquired and developed at all Levels through technical reports (e.g. assignments, laboratory and project reports) and presentations.

**Skill 2** is taught formally in Parts I and II, and developed throughout the course.

**Skill 4** is developed through group laboratory experiments and group project work.

**Skill 5** is developed through the setting and strict enforcement of coursework deadlines.

**Skill 6** is developed through computing modules, laboratory experiments, project work, presentations, other coursework activities and individual learning.

**Skill 7** is enhanced through the information retrieval exercise in Part II and developed through essays, individual and group projects and, for the MEng only, the group design project.

**Skill 8** is developed in the technical subject areas of the course.

**Skill 10** is cultivated when you opt to study a language or to study abroad for one semester, normally in Part III or Part IV, (not applicable to USMC students).

Although not explicitly taught, **skills 3 and 9**, as well as all other skills are nurtured and developed throughout the course, which is structured and delivered in such a way as to promote them.

### Assessment Methods

**Skill 1** is assessed through coursework and laboratory technical reports and project presentations.

**Skill 2** is assessed through unseen written examinations and coursework.

**Skill 4** is, mainly, assessed in group projects.

**Skill 5** is assessed by applying penalties for failure to meet deadlines.

**Skill 6** is assessed formally in relevant Part I and Part II modules and further assessed throughout the course where ICT is used.

**Skills 7 and 8** are assessed through unseen written examinations, coursework exercises, design work and individual and group project work.

**Skill 9** is essential for success on the course and future professional development, but is not formally assessed.

**Skill 10** is assessed through coursework and written examinations as part of the specialist language modules.

### Subject Specific Practical Skills

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Having successfully completed this programme you will be able to:

(Blue = both BEng & MEng Mech Eng; black = BEng only; *green italics* = MEng only)

1. Carry out safely a series of planned experiments.
2. Use laboratory equipment to generate data.
3. Analyse experimental results and assess their validity.  
*Analyse complex experimental results and assess their validity and applicability.*
4. Prepare technical drawings including the use of computer-aided design (CAD) and freehand sketching.
5. Prepare technical reports.  
*Prepare technical reports individually and by contributing as part of a group.*
6. Give technical presentations using a variety of media.
7. Use computer packages and write computer programs.  
*Use computer packages and write computer programs showing awareness of the limitations of such numerical methods in engineering applications.*
8. Make effective use of scientific literature.  
*Make effective use of scientific literature from various sources.*

### Teaching and Learning Methods

Practical skills are developed through the teaching and learning programme.

Experimental skills are developed through laboratory experiments and project work, if relevant.

Workshop skills are developed through workshop practice in Part I.

**Skill 4** is taught in the Design module in Part I and further developed through design coursework exercises.

**Skills 5 and 6** are acquired through guidelines set out in relevant course books and reports and project presentations throughout the programme.

**Skill 7** is taught in relevant modules in Parts I and II and further developed through coursework exercises and project work.

**Skill 8** is acquired through information retrieval in preparation for project work.

### Assessment Methods

Practical skills are assessed through laboratory experiment reports, coursework exercises, project reports and presentations.

### Programme Structure

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The University uses the European Credit Transfer Scheme (ECTS) to indicate the approximate amount of time a typical student can expect to spend in order to complete successfully a given module or programme, where 1 ECTS indicates around 20 nominal hours of study. Previously, Credit Accumulation and Transfer Scheme (CATS) points were used for this purpose where 1 CATS credit was 10 nominal hours of study. The University credit accumulation and transfer scheme is detailed at <http://www.calendar.soton.ac.uk/sectionIV/cats.html>.

The teaching is structured on a semester pattern. You study modules comprising 60 ECTS (120 CATS) in each of Parts I (level 4), II (level 5) and III (level 6), and 75 ECTS (150 credits) in Part IV (level 7). There are several degree possibilities in the programme of study:

- Three years full-time, leading to a Bachelor of Engineering (BEng) with Honours.
- Four years full-time, leading to a Bachelor of Engineering (BEng) with Industrial Placement Year with honours
- Four years full-time, leading to a Master of Engineering (MEng).
- Five years full-time, leading to a Master of Engineering with Industrial Placement Year (MEng with IPY)

In addition there are the following exit points:

- Certificate of Higher Education, following successful completion of Part I.
- Diploma of Higher Education, following successful completion of Part II.
- Bachelor of Science (Ordinary Degree) following successful completion of at least 150 ECTS (300 CATS), including 30 ECTS (60 CATS) at level 6.

Each module is a self-contained part of the programme of study and carries a credit rating.

The duration of all the programmes, (with the exception of the Industrial Placement Year programmes) may be extended by one year through enrolment on the Engineering Foundation Year.

The MEng / BEng Mechanical Engineering Programme Structure is outlined in Appendix 1.

All students on the MEng programme are registered on themes which are associated with UCAS entry codes and award titles as shown in the below table. Parts I and II are common for all themes and all MEng students are invited to consider changing or selecting themes at the conclusion of Part II. The theme details for Part III and IV module selection are outlined in Appendix 2.

<b>MEng Theme</b>	<b>UCAS code and UCAS name</b>	<b>Award Title</b>
Acoustical Engineering	4R23 Mechanical Engineering / Acoustical Engineering	Mechanical Engineering / Acoustical Engineering
	H34H Mechanical Engineering / Acoustical Engineering with Industrial Placement Year	Mechanical Engineering / Acoustical Engineering with Industrial Placement Year
Advanced Materials	HJ35, MEng Mechanical Engineering / Advanced Materials	Mechanical Engineering / Advanced Materials
	H3H1, MEng Mechanical Engineering / Advanced Materials with Industrial Placement Year	Mechanical Engineering / Advanced Materials with Industrial Placement Year
Aerospace	HH34, MEng Mechanical Engineering / Aerospace	Mechanical Engineering / Aerospace
	H3H4, MEng Mechanical Engineering / Aerospace with Industrial Placement Year	Mechanical Engineering / Aerospace with Industrial Placement Year
Automotive	H390, MEng Mechanical Engineering / Automotive	Mechanical Engineering / Automotive
	H3H3, MEng Mechanical Engineering / Automotive with Industrial Placement Year	MEng Mechanical Engineering / Automotive with Industrial Placement Year
Biomedical Engineering	4R29, MEng Mechanical Engineering / Biomedical Engineering	Mechanical Engineering / Biomedical Engineering / Mechanical Engineering /
	H316, MEng Mechanical Engineering / Biomedical Engineering with Industrial Placement Year	Biomedical Engineering with Industrial Placement Year
Computational Engineering and Design	5P01 Mechanical Engineering / Computational Engineering and Design	Mechanical Engineering / Computational Engineering and Design

	H3H6 Mechanical Engineering / Computational Engineering and Design with Industrial Placement Year	Mechanical Engineering / Computational Engineering and Design with Industrial Placement Year
Engineering Management	HN32, MEng Mechanical Engineering / Engineering Management  HH31, MEng Mechanical Engineering / Engineering Management with Industrial Placement Year	Mechanical Engineering / Engineering Management  Mechanical Engineering / Engineering Management with Industrial Placement Year
Interdisciplinary	H301, MEng Mechanical Engineering  30HH, MEng Mechanical Engineering with Industrial Placement Year	Mechanical Engineering  Mechanical Engineering with Industrial Placement Year
Mechatronics	HH37, MEng Mechanical Engineering / Mechatronics  H3H2, MEng Mechanical Engineering / Mechatronics with Industrial Placement Year	Mechanical Engineering / Mechatronics  Mechanical Engineering / Mechatronics with Industrial Placement Year
Naval Engineering	HH35, MEng Mechanical Engineering / Naval Engineering  H3H5, MEng Mechanical Engineering / Naval Engineering with Industrial Placement Year	Mechanical Engineering / Naval Engineering  Mechanical Engineering / Naval Engineering with Industrial Placement Year
Semester in Industry (not applicable to USMC students)	H301, MEng Mechanical Engineering  30HH, MEng Mechanical Engineering with Industrial Placement Year	Mechanical Engineering  Mechanical Engineering with Industrial Placement Year
Study Abroad (not applicable to USMC students)	H301, MEng Mechanical Engineering 30HH, MEng Mechanical Engineering with Industrial Placement Year	Mechanical Engineering  Mechanical Engineering / with Industrial Placement Year
Sustainable Energy Systems	HH32, MEng Mechanical Engineering / Sustainable Energy Systems  H3J7, MEng Mechanical Engineering / Sustainable Energy Systems with Industrial Placement Year	Mechanical Engineering / Sustainable Energy Systems  Mechanical Engineering / Sustainable Energy Systems with Industrial Placement Year

The additional title 'with Industrial Placement Year' will be added for BEng/MEng students successfully completing the optional Industrial Placement Year.

### Special Features of the programme

The programme is delivered at the University of Southampton, Southampton, UK, with all Programme Boards, Subject Panels, Exam Boards and Faculty Programme meetings held at Southampton. All module activities are based at or close to the Highfield Campus, Southampton, except for the following. Parts I and II are also delivered at University of Southampton Malaysia Campus (USMC), south Johor, Malaysia. You can elect to study one or both parts at USMC. (For UK and EU nationals, Government funding/loan for fees may be restricted.) The Study Abroad themes involve a semester study at a university in France, the USA, New Zealand or Sweden. International study opportunities may be dependent on visa requirements. The Semester in Industry theme includes a 5 month period at a company. Study Abroad and Semester in Industry themes are not applicable to USMC students.



## Programme details

The programme follows university guidelines for inclusivity and flexibility and provides an array of teaching and learning approaches that will enable any student who meets the entry requirements to access the curriculum and demonstrate achievement of all the intended learning outcomes.

## Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. Costs that students registered for this programme typically also have to pay for are included in Appendix 4.

## Progression Requirements

The programme follows the University's regulations for *Progression, Determination and Classification of Results: Undergraduate and Integrated Masters Programmes* as set out in the University Calendar <http://www.calendar.soton.ac.uk/sectionIV/sectIV-index.html>

Additional regulations applying to the assessment of Part I of your programme, the Industrial Placement Year and our other BEng (Hons)/MEng regulations may be found here: <http://www.calendar.soton.ac.uk/sectionVIII/sectVIII-index.html>

## Intermediate exit points

You will be eligible for an interim exit award if you complete part of the programme but not all of it, as follows:

Qualification	Minimum overall credit in ECTS credits	Minimum ECTS Credits required at level of award
Bachelor of Science (Ordinary)	at least 150	30
Diploma of Higher Education	at least 120	45
Certificate of HE	at least 60	45

## Programme outcomes for different exit points

Level 4 (Part I)	You will have a sound knowledge of the basic concepts in Mechanical Engineering, and will have learned how to take different approaches to solving problems. You will be able to communicate accurately, and will have the qualities needed for employment requiring the exercise of some personal responsibility.
Level 5 (Part II)	You will have developed a sound understanding of the principles involved in a range of core Mechanical Engineering subjects, and will have learned to apply those principles more widely. Through this, you will have learned to evaluate the appropriateness of different approaches to solving problems. You will have the qualities necessary for employment in situations requiring the exercise of personal responsibility and decision-making.
Level 6 BEng	You will have developed an understanding of a complex body of knowledge relevant to Mechanical Engineering, some of it at the forefront of current developments. Through this, you will have developed analytical techniques and problem-solving skills that can be applied to a range of engineering problems, and learned to communicate these effectively. As an Honours graduate you will be able to evaluate evidence, arguments and assumptions, and to reach sound judgements. You should have the qualities needed for employment in situations requiring the exercise of personal responsibility, and decision-making in complex and unpredictable circumstances.
Level 7 MEng	Much of the study undertaken at Masters level reflects research at the forefront of Mechanical Engineering. You will have shown originality in the application of knowledge, and you will understand how the boundaries of knowledge are advanced through research. You will be able to deal with

	complex issues both systematically and creatively, and show originality in tackling and solving problems individually and as part of a team. You will have the qualities needed for employment in circumstances requiring sound judgement, personal responsibility and initiative, in complex and unpredictable professional environments.
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## Support for Student Learning

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There are systems for the support of student learning in the Faculty as well as available from central University facilities.

In the Faculty and your Discipline you will be able to access:

- Student handbook for the programme.
- Introductory sessions for the programme.
- Library information retrieval seminar.
- Workshop training.
- Small group tutorials in Part I of the programme.
- Student Design Resource Room.
- Engineering Development and Manufacturing Centre (EDMC) equipped with a range of workshop equipment, CAD / computer-aided manufacturing (CAM).
- Engineering and general software available on all computers.
- Extensive well equipped Engineering laboratories.
- Advice from engineers in the Research Institute *for* Industry (RI<sup>fi</sup>) on specialised subject areas, including Design.
- Personal tutors to assist you with personal problems and to advise on academic issues (contact maintained during periods of studying abroad).
- Access to academic staff through an open door policy as well as timetabled tutor meetings, appointment system and e-mail.
- Research Seminars and invited lectures.
- IMechE Young Members panel, organised by students on the programme.
- Faculty Student Office for the administration of your programme.

The University provides:

- Public workstations providing a comprehensive range of computer packages including dedicated engineering software, access to databases and e-books, supported by a range of user advisory services.
- Well-stocked library.
- University Counsellors.
- Health Centres.
- Learning Differences Centre for support for dyslexia and other learning differences.
- Enabling Services providing support for student with disabilities.
- Adviser to overseas students.
- Careers Destinations for careers advice.
- Language Centre providing support for English and other languages.
- Student services centre providing advice and support on all aspects of student life.

## Methods for Evaluating the Quality of Teaching and Learning

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You will have the opportunity to have your say on the quality of the programme in the following ways:

- Anonymous evaluation questionnaires for each module of the programme.
- Acting as or represented by Student Representatives, for each year of the programme, on the Staff-Student Liaison Committee. You are also represented on the Faculty Programmes Committee.
- Meetings, either individually or as group, with the programme external examiner.

It should be noted that meetings with your personal academic tutor can also be used to comment on quality related issues.

Feedback on the changes implemented following your input will be provided through the following:

- For each module, changes following the module review, which includes the module survey, will be published on line (through Blackboard).
- The main changes to programme are discussed at the Staff-Student Liaison Committee.
- Student representatives are invited to the faculty and discipline programme meetings.

The ways in which the quality of your programme is checked, both inside and outside the University, are:

- Evaluation for each module of the programme based on your feedback from evaluation questionnaires and carried out by lecturer(s) involved in the module and a colleague acting as advisor.
- Cross-faculty Subject Panels and an Education Board responsible for the programme, which each year consider the outcomes of each module's evaluation.
- Moderation of examination papers, coursework and projects, both internally and externally.
- Comments by external examiners, who produce an annual report.
- Annual examiners' meetings and examiners' boards.
- Annual programme and module reviews considering your feedback from all sources, feedback from Subject Panels, external examiners and other bodies and student performance.
- Periodic meetings of the Faculty Industrial Advisory Board.
- Evaluation of results from the National Student Survey and university student surveys by the Mechanical Engineering Education Board.
- Accreditation by professional institutions.
- Periodic Programme Review by the University.

Note that quality assurance of part of the programme taken abroad, where applicable, is subject to the quality procedures of the relevant institutions. These procedures are subject to periodic monitoring by members of staff of the Faculty of Engineering Physical Sciences.

## External Examiners(s) for the programme

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**Name:** Dr Rachel Tomlinson  
**Institution:** University of Sheffield

Students must not contact External Examiner(s) directly, and external examiners have been advised to refer any such communications back to the University. Students should raise any general queries about the assessment and examination process for the programme with their Course Representative, for consideration through Staff-Student Liaison Committee in the first instance, and Student representatives on Staff: Student Liaison Committees will have the opportunity to consider external examiners' reports as part of the University's quality assurance process.

External examiners do not have a direct role in determining results for individual students, and students wishing to discuss their own performance in assessment should contact their personal tutor in the first instance.

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**Please note:** This specification provides a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if s/he takes full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook at <http://www.southampton.ac.uk/student-services/academic-life/faculty-handbooks.page> and at [http://www.southampton.ac.uk/engineering/undergraduate/courses/mechanical\\_engineering\\_list.page](http://www.southampton.ac.uk/engineering/undergraduate/courses/mechanical_engineering_list.page).

### Revision History

October 2004 (M. Hill). October 2005 (M. Hill). September 2006 (S.M. Sharkh) September 2007 (S.M. Sharkh)  
April 2008 (S.M. Sharkh)  
February 2012 (A Barney) July 2012 (B. Leigh)  
June 2013 (M.J. Starink) (AY2014-15 specifications, incl a complete rewrite of programme content)  
23 Nov 2013 (M.J. Starink)\_CQA  
18 Feb & 7 May 2014 (M.J. Starink)\_CQA\_150714  
Update to Programme Overview (CMA Changes) – 14 September 2015  
Addition of Industrial Placement Year and annual textual changes - August 2016  
Addition of information for summative assessment of part I – CQA July 2017  
Updated to reflect 201819 version and removal of Admissions Criteria – CQA March 2018  
Update to Appendix – CQA June 2018  
Updated Faculty name to Faculty of Engineering and Physical Sciences July 2018

# Appendix 1

## Programme Structure

The information within this Appendix is liable to change in minor ways from year to year. It is accurate at the time of writing.

## Part 1 Modules Assessment

Module	Title	CATS	Teamwork	Report	Essay	Exam	Other	LO info	Repeat internal only
<b>FEEG1001</b>	Design and Computing	30	√	√			100%		√
<b>FEEG1002</b>	Mech, Structures & Materials	30				100%			
<b>FEEG1003</b>	ThermoFluids	15				100%			
<b>FEEG1004</b>	Elec and Electronic Syst	15				100%			
<b>SESM1015</b>	Prof Eng & Func Materials	15		√					
<b>MATH1054</b>	Math for E and E	15				100%			
				√				G1, G2, G3b	√
					√			G1, G2, G3b	

## MEng and BEng Part I

The first year provides a background in engineering science, emphasising mechanical engineering aspects. The induction programme in the first week provides the opportunity to get to know fellow students and gain hands-on experience.

All modules below are at level 4 and are core, i.e. all required assessments must be taken and passed at the required pass mark. They total 60 ECTS (120 CATS). No option modules will be undertaken in Part I. All modules in Part I are taught over two semesters with any formal examinations held at the end of semester 2. Feedback on progress is provided throughout the year in many ways including via laboratory work, example sheets, tests and coursework.

For information on summative assessment of Part I please see Appendix 3

Over both semesters	Credit Points (ECTS/CATS)	Level
MATH1054 Mathematics for Engineering and the Environment	7.5/15	4
FEEG1001 Design and Computing	15/30	4
FEEG1002 Mechanics, Structures and Materials	15/30	4
FEEG1003 Thermofluids	7.5/15	4
FEEG1004 Electrical and Electronic Systems	7.5/15	4
SESM1016 Mechanical Systems Analysis	7.5/15	4

## MEng and BEng Part II

The second year covers the main mechanical engineering subjects with modules tailored to the mechanical engineering discipline. It includes a total of 60 ECTS (120 CATS) across two semesters. No optional modules will be undertaken in Part II. Feedback on progress is provided throughout the year in many ways including via laboratory work, example sheets, tests and coursework.

### Modules at level 5 totalling 60 ECTS (120 CATS) credits; all modules compulsory

Module Code	Module Name	Semester	Credit Points (ECTS/CATS)	Level
FEEG2001	Systems Design and Computing	Full year	7.5/15	5
FEEG2002	Mechanics, Machines and Vibration	2	7.5/15	5
FEEG2003	Fluid Mechanics	2	7.5/15	5
FEEG2004	Electronics, Drives and Control	1	7.5/15	5
FEEG2005	Materials and Structures	2	7.5/15	5
FEEG2006	Engineering Management and Law	Full year	7.5/15	5
MATH2048	Mathematics for Engineering and the Environment	1	7.5/15	5
SESM2017	Thermodynamics	1	7.5/15	5

At the end of Part II students progressing to Part III MEng will select themes, each with a distinct programme in Parts III and IV (see subsequent section). Students progressing to Part III BEng will not select themes.

Students selecting the Industrial Placement Year theme will take the placement module FEEG3009 between Parts II and III. They may not start their placement until Part II has been passed. Should the placement not be passed students can transfer back to the substantive programme.

## Part III BEng

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Part III Total 60 ECTS (120 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from

<http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

Part III contains the following compulsory modules.

Module Code	Module Name	Credit Points (ECTS/CATS)	Semester	Level
FEEG3003	Individual Project	15/30	Full year	6
SESG3024	Manufacturing and Materials	7.5/15	1	6
SESM3029	Engineering Design with Management	7.5/15	2	6
SESM3032	Heat Transfer	7.5/15	2	6

The individual project is a core module, i.e. no compensation is possible when the pass mark is not achieved.

## Part III and IV MEng

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Part III and IV contain compulsory and a broad range of optional modules. For all MEng students (all themes) the following modules are compulsory:

Module Code	Module Name	Credit Points (ECTS/CATS)	Part	Semester	Level
FEEG3003	Individual Project	15/30	III	Full year	6
SESG3024	Manufacturing and Materials	7.5/15	III or IV	1	6
SESM3029	Engineering Design with Management	7.5/15	III or IV	2	6
FEEG6013	Group Design Project	22.5/45	IV	Full year	7
MANG6318	Advanced Management	7.5/15	IV	2	7

There are two exceptions to the above table. In the MEng Mechanical Engineering with Engineering Management the module Advanced Management is not offered, and is replaced by a selection of other level 7 management modules. In the Semester in Industry theme, (not applicable to USMC students), instead of the Individual Project module, the students take a Project in Industry module (22.5 ECTS, 45 CATS) credit points, which includes a report and a presentation.

The individual project and the group design project are core modules, i.e. no compensation is possible when the pass mark is not achieved. In addition, the theme that you have chosen will contain compulsory and theme specialist modules. You will select optional modules to reach a total of:

Part III: total 60 ECTS (120 CATS) credit points.

Part IV: total 75 ECTS (150 CATS) credit points.

## Part III/IV Specialist MEng Themes

Acoustical Engineering	Advanced Materials
Aerospace	Automotive
Biomedical Engineering	Computational Engineering and Design
Engineering Management	Mechatronics
Naval Engineering	Semester in Industry (not applicable to USMC students)
Study Abroad (including ESTACA, Linköping) (not applicable to USMC students)	Sustainable Energy Systems

### Acoustical Engineering Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

### Advanced Materials Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

### Aerospace Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

### Automotive Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

### Biomedical Engineering Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

### Computational Engineering and Design Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.



## Engineering Management Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Interdisciplinary Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Mechatronics Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Naval Engineering Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Semester in Industry Theme (available by application only)

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Study Abroad (ESTACA, France)

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Study Abroad (Linkoping, Sweden)

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Study Abroad (University of Canterbury, New Zealand)

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Study Abroad (Pennsylvania State, USA)

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Sustainable Energy Systems Theme

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Part III Total 60 ECTS (120 CATS) credit points, including options.

Part IV Total 75 ECTS (150 CATS) credit points, including options.

To find links to broad generic descriptions of the programmes and modules follow links to your programme starting from <http://www.southampton.ac.uk/engineering/undergraduate/index.page>.

## Appendix 2 Programme Content of Parts III and IV

The below contains the full programme for all MEng themes and the BEng programme including all optional (O) and compulsory (C) modules.

*To view the programme content information in a more user friendly format students and staff are referred to the 'online programme catalogue' which allows viewing of full content for each theme for each year and contains hyperlinks to online module specifications.*

### BEng Mechanical Engineering

#### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3032	Heat Transfer and Applications	7.5/15	C	2	6

total: 37.5/75

#### Part III Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3002	Vehicle Powertrain, Noise and Vibration	7.5/15	O	2	6
FEEG3004	Human Factors in Engineering	7.5/15	O	1	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
ISVR6136	Fundamentals of Acoustics	7.5/15	O	1	7
MATH3083	Advanced Partial Differential Equations	7.5/15	O	1	6
SESM3028	Biomaterials	7.5/15	O	2	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3031	Automobile Systems	7.5/15	O	1	6
SESM3033	Orthopaedic Biomechanics	7.5/15	O	1	6
LANGxxxx	Language	7.5/15	O	1/2	6

### MEng Mechanical Engineering with Acoustical Engineering

#### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
ISVR3064	Noise Control Engineering	7.5/15	C	1	6
ISVR6136	Fundamentals of Acoustics	7.5/15	C	1	7
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6

total: 45/90

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3002	Vehicle Powertrain, Noise and Vibration	7.5/15	O	2	6
FEEG3004	Human Factors in Engineering	7.5/15	O	1	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language	7.5/15	O	1/2	6
SESA3026	Aircraft Structural Design	7.5/15	O	2	6
SESM3028	Biomaterials	7.5/15	O	2	6
SESM3032	Heat Transfer and Applications	7.5/15	O	2	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 30/60

Key Part IV modules. Choose 30/60 or 37.5/75 ECTS/CATS of specialist modules; max 15/30 ECTS/CATS level 6 in total in Part IV; choose at least 7.5/15 ECTS/CATS from modules marked ^

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG6004	Aeroacoustics	7.5/15	Spec	2	7
FEEG6011	Architectural and Building Acoustics	7.5/15	Spec	2	7*
ISVR3071	Applied Audio Signal Processing	7.5/15	Spec	2	6
ISVR3061	Human Responses to Sound and Vibration	7.5/15	Spec	2	6
ISVR3063	Musical Instrument Acoustics	7.5/15	Spec	1	6
ISVR6130	Signal Processing	7.5/15	Spec	1	7
ISVR6133	Advanced Vibration	7.5/15	Spec	2	7
ISVR6137	Electroacoustics	7.5/15	Spec	1	7
ISVR6139	Active Control	7.5/15	Spec	2	7
ISVR6140	Applied Digital Signal Processing	7.5/15	Spec	2	7
ISVR6142	Numerical Methods for Acoustics	7.5/15	Spec	2	7
SESA6075	Aircraft Propulsion	7.5/15	O	1	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESM6040	Thermofluid Engineering for Low Carbon Energy^	7.5/15	O	1	7

Exceptions: cannot take SESG6036 Advanced Control Design or SESG6035 Advanced Sensors and Condition Monitoring; cannot take SESM6037 Automotive Propulsion if SESA6075 Aircraft Propulsion is chosen.

## MEng Mechanical Engineering with Advanced Materials

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3028	Biomaterials	7.5/15	C	2	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3032	Heat Transfer and Applications	7.5/15	C	2	6

total: 45/90

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3004	Human Factors in Engineering	7.5/15	O	1	6
LANGxxxx	Language	7.5/15	O	1/2	6
SESA3026	Aircraft Structural Design	7.5/15	O	2	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3031	Automobile Systems	7.5/15	O	1	6
SESM3033	Orthopaedic Biomechanics	7.5/15	O	1	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 30/60

Key Part IV modules (choose 22.5/45 or 30/60 ECTS/CATS specialist modules; choose at least 7.5/15 ECTS/CATS from modules marked ^)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
SESA6064	Aircraft Structures	7.5/15	O	2	7
SESA6075	Aircraft Propulsion	7.5/15	O	1	7
SESG6034	Surface Engineering	7.5/15	Spec	1	7
SESG6039	Composites Engineering Design and Mechanics	7.5/15	Spec	1	7
SESG6040	Failure of Materials and Components	7.5/15	Spec	2	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESG6044	Microstructural and Surface Characterisation	7.5/15	Spec	1/2	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6040	Thermofluid Engineering for Low Carbon Energy^	7.5/15	O	1	7

## MEng Mechanical Engineering with Aerospace

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESA3026	Aircraft Structural Design	7.5/15	C	2	6
SESA3029	Aerothermodynamics	7.5/15	C	1	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6

total: 45/90

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3004	Human Factors in Engineering	7.5/15	O	1	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language	7.5/15	O	1/2	6
SESA3033	Wing Aerodynamics	7.5/15	O	2	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3031	Automobile Systems	7.5/15	O	1	6
SESM3032	Heat Transfer and Applications	7.5/15	O	2	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6005	Applications of Computational Fluid Dynamics	7.5/15	C	1	7
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
SESA6075	Aircraft Propulsion	7.5/15	C	1	7
SESG6042	Microstructural Engineering for Transport Applications	7.5/15	C	1	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 52.5/105

### Key Part IV Modules (choose 15/30 or 22.5/45 ECTS/CATS of specialist (Spec) modules)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6004	Aeroacoustics	7.5/15	O	2	7
FEEG6009	Design Search and Optimisation	7.5/15	Spec	2	7
SESA6061	Turbulence: Physics and Modelling	7.5/15	Spec	1	7
SESA6064	Aircraft Structures	7.5/15	Spec	2	7
SESA6067	Flow Control	7.5/15	O	1	7
SESA6074	Hypersonic and High Temperature Gas Dynamics	7.5/15	Spec	2	7
SESA6077	Aeroelasticity	7.5/15	O	1	7
SESG6039	Composite Engineering Design and Mechanics	7.5/15	Spec	1	7
SESG6040	Failure of Materials and Components	7.5/15	Spec	2	7

## MEng Mechanical Engineering with Automotive

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3002	Vehicle Powertrain, Noise and Vibration	7.5/15	C	2	6
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3031	Automobile Systems	7.5/15	C	1	6
SESM3032	Heat Transfer and Applications	7.5/15	C	2	6

total: 52.5/105

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3004	Human Factors in Engineering	7.5/15	O	1	6
LANGxxxx	Language	7.5/15	O	1/2	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
SESM6034	Advanced Electrical Systems	7.5/15	C	2	7
SESM6037	Automotive Propulsion	7.5/15	C	2	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 45/90

Part IV Key modules (choose 15/30 or 22.5/45 ECTS/CATS from the specialist modules, choose at least 7.5/15 CATS from modules marked ^)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
SESA6072	Race Car Aerodynamics^	7.5/15	Spec	2	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	Spec	1	7
SESM6033	Tribological Engineering with Engine Tribology^	7.5/15	Spec	1	7
SESM6040	Thermofluid Engineering for Low Carbon Energy	7.5/15	Spec	1	7
SESG6042	Microstructural Engineering for Transport Applications	7.5/15	Spec	1	7

## MEng Mechanical Engineering with Biomedical Engineering

### Part III Core/Compulsory modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3028	Biomaterials	7.5/15	C	2	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3033	Orthopaedic Biomechanics	7.5/15	C	1	6

total: 45/90

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3004	Human Factors in Engineering	7.5/15	O	1	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language	7.5/15	O	1/2	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3031	Automobile Systems	7.5/15	O	1	6
SESM3032	Heat Transfer and Applications	7.5/15	O	2	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
SESM6036	Biomedical Implants and Devices	7.5/15	C	1	7
SESM6038	Computational Methods in Biomedical Engineering Design	7.5/15	C	2	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 45/90

Key Part IV modules (choose 7.5/15 or 15/30 ECTS/CATS of specialist modules; choose at least 7.5/15 ECTS/CATS from modules marked ^)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3004	Human Factors in Engineering	7.5/15	Spec	1	6
ISVR6138	Biomedical Apps. Signal and Image Processing	7.5/15	Spec	2	7
SESA6066	Biological Flow	7.5/15	Spec	2	7
SESG6040	Failure of Materials and Components	7.5/15	O	2	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6035	Bio, Nano and Modelling Aspects of Tribology	7.5/15	Spec	2	7
SESM6040	Thermofluid Engineering for Low Carbon Energy^	7.5/15	O	1	7



## MEng Mechanical Engineering with Computational Engineering and Design

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	C	1	6
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with management	7.5/15	C	2	6
SESM3032	Heat Transfer and Applications	7.5/15	C	2	6

total: 45/90

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language	7.5/15	O	1+2	6
SESA3026	Aircraft Structural Design	7.5/15	O	2	6
SESM3033	Orthopaedic Biomechanics	7.5/15	O	1	6

### Part IV Core/Compulsory Module

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6002	Adv Computational Methods I	7.5/15	C	1	7
FEEG6009	Design Search and Optimisation	7.5/15	C	2	7
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 45/90

Key Part IV modules. Choose 15/30 or 22.5/45 ECTS/CATS of specialist modules; max 15/30 ECTS/CATS level 6 in total in Part IV; choose at least 7.5/15 CATS from modules marked ^.

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6005	Applications of Computational Fluid Dynamics	7.5/15	Spec	1	7
FEEG6010	Advanced Finite Element Analysis	7.5/15	Spec	2	7
SESA3026	Aircraft Structural Design	7.5/15	O	2	6
SESA6075	Aircraft Propulsion	7.5/15	O	1	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6035	Bio, Nano and Modelling Aspects of Tribology	7.5/15	Spec	2	7
SESM6038	Computational Methods in Biomedical Engineering Design	7.5/15	Spec	2	7
SESM6040	Thermofluid Engineering for Low Carbon Energy^	7.5/15	O	1	7

## MEng Mechanical Engineering with Engineering Management

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
MANG3049	Accounting & Finance for Engineers	7.5/15	C	2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6

total: 37.5/75

### Part III Main Optional Modules (max of 7.5/15 ECTS/CATS from modules marked \*)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3004	Human Factors in Engineering*	7.5/15	O	1	6 *
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language*	7.5/15	O	1/2	6 *
MATH3081	Operational Research	7.5/15	O	1	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3031	Automobile Systems	7.5/15	O	1	6
SESM3032	Heat Transfer and Applications	7.5/15	O	2	6

### Part IV Core Module

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7

### Key Part IV modules: choose 22.5/45 ECTS/CATS of Management modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
MANG6045	Consultancy Skills	3.75/7.5	Spec	1	7
MANG6119	Introduction to Knowledge Information Systems Management	3.75/7.5	Spec	1	7
MANG6130	Strategic Management	3.75/7.5	Spec	1	7
MANG6143	Project Risk Management	7.5/15	Spec	2	7
MANG6247	Information Systems Management and Strategy	7.5/15	Spec	1	7
MANG6273	Managing within a Global Context	7.5/15	Spec	1	7
MANG6315	Principles of Supply Chain Management	3.75/7.5	Spec	1	7

### Part IV Choose 22.5/45 ECTS/CATS 'main Mechanical Engineering modules'

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG6009	Design Search and Optimisation	7.5/15	O	2	7
SESG6034	Surface Engineering	7.5/15	O	1	7

SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	O	1	7
SESG6036	Advanced Control Design	7.5/15	O	2	7
SESG6039	Composite Engineering Design and Mechanics	7.5/15	O	1	7
SESG6040	Failure of Materials and Components	7.5/15	O	2	7
SESG6044	Microstructural and Surface Characterisation	7.5/15	O	1+2	7
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3032	Heat Transfer and Applications	7.5/15	O	2	6
SESM6034	Advanced Electrical systems	7.5/15	O	2	7
SESM6037	Automotive Propulsion	7.5/15	O	2	7

Part IV Choose 7.5/15 ECTS/CATS from these modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
SESG6042	Microstructural Engineering for Transport Applications	7.5/15	O	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage	7.5/15	O	1	7
SESM6040	Thermofluid Engineering for Low Carbon Energy	7.5/15	O	1	7

## MEng Mechanical Engineering – Interdisciplinary

Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6

total: 30/60

Part III Choose 15/30 ECTS/CATS 'Interdisciplinary (Interdisc) Modules' from

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3004	Human Factors in Engineering	7.5/15	Interdisc	1	6
LANGxxxx	Language	7.5/15	Interdisc	1/2	6
LAWS3130	Industrial Law	7.5/15	Interdisc	1	6
MANG3049	Accounting & Finance for Engineers	7.5/15	Interdisc	2	6
SESM3033	Orthopaedic Biomechanics	7.5/15	Interdisc	1	6

Part III Choose 7.5/15 or 15/30 ECTS/CATS 'main mechanical engineering modules' from

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3032	Heat Transfer and Applications	7.5/15	O	2	6

Part IV Core/Compulsory modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 30/60

Part IV Choose 22.5/45 ECTS/CATS interdisciplinary modules, max 15/30 ECTS/CATS from \* (max 15/30 ECTS/CATS level 6 in total in Part IV)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3004	Human Factors in Engineering	7.5/15	Interdisc	1	6
ISVR6138	Biomedical Apps. Sig. Image Proc.	7.5/15	Interdisc	2	7
LANGxxxx	Language	7.5/15	Interdisc	1+2	6 *
MANG6247	Information Systems Management and Strategy	7.5/15	Interdisc	1	7 *
SESG3019	Teaching and Communication & the Undergrad Ambassador Scheme	7.5/15	Interdisc	1	6 *
SESM3033	Orthopaedic Biomechanics	7.5/15	Interdisc	1	6
SESM6032	Sustainable Energy Systems, Resources and Usage	7.5/15	Interdisc	1	7
SESM6035	Bio, Nano and Modelling Aspects of Tribology	7.5/15	Interdisc	2	7
SESM6036	Biomedical Implants and Devices	7.5/15	Interdisc	1	7
SESM6038	Computational Methods in Biomedical Engineering Design	7.5/15	Interdisc	2	7

Part IV Choose 15/30 ECTS/CATS 'main Mechanical Engineering modules'

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6009	Design Search and Optimisation	7.5/15	O	2	7
SESG6034	Surface Engineering	7.5/15	O	1	7
SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	O	1	7
SESG6039	Composite Engineering Design and Mechanics	7.5/15	O	1	7
SESG6040	Failure of Materials and Components	7.5/15	O	2	7
SESG6044	Microstructural and Surface Characterisation	7.5/15	O	1+2	7
SESM6034	Advanced Electrical systems	7.5/15	O	2	7
SESM6037	Automotive Propulsion	7.5/15	O	2	7

Part IV Choose 7.5/15 ECTS/CATS from these Compulsory Option modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6040	Thermofluid Engineering for low Carbon Energy^	7.5/15	O	1	7

## MEng Mechanical Engineering with Mechatronics

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3030	Control and Instrumentation	7.5/15	C	1	6

total: 7.5/75

Part III Specialist and Main Optional Modules (choose at least 7.5/15 ECTS/CATS from the specialist modules)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
ELEC3201	Robotic Systems	7.5/15	Spec	1	6
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	Spec	1	6
FEEG3004	Human Factors in Engineering	7.5/15	O	1	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language	7.5/15	O	1/2	6
SESM3031	Automobile Systems	7.5/15	O	1	6
SESM3032	Heat Transfer and Applications	7.5/15	Spec	2	6
SESM3033	Orthopaedic Biomechanics	7.5/15	O	1	6

### Key Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7
SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	C	1	7
SESM6034	Advanced Electrical systems	7.5/15	C	2	7
SESM6037	Automotive Propulsion	7.5/15	C	2	7

total: 52.5/105

Key Part IV modules (choose 0 to 15/30 ECTS/CATS of specialist modules, choose at least 7.5/15 ECTS/CATS from modules marked ^)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
ELEC3201	Robotic Systems	7.5/15	O	1	7
FEEG6007	Fuel Cells and Photovoltaic Systems I	7.5/15	Spec	1	7
ISVR6138	Biomedical Apps. Signal Image Proc.	7.5/15	Spec	2	7
SESA6075	Aircraft Propulsion	7.5/15	Spec	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6040	Thermofluid Engineering for Low Carbon Energy^	7.5/15	O	1	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7

## MEng Mechanical Engineering with Naval Engineering

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3030	Control and Instrumentation	7.5/15	C	1	6
SESS3024	Marine Craft Concept Design	7.5/15	C	1	6
SESS3026	Marine Structures	7.5/15	C	2	6
SESS6065	Fundamentals of Ship Science	7.5/15	C	1	7

total: 52.5/105

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3002	Vehicle Powertrain, Noise and Vibration	7.5/15	O	2	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
SESM3032	Heat Transfer and Applications	7.5/15	O	2	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7
SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	C	1	7
SESM6034	Advanced Electrical Systems	7.5/15	C	2	7
SESS3025	Marine Engineering	7.5/15	C	1	6

total: 60/120

Key Part IV modules. Choose 7.5/15 or 15/30 ECTS/CATS of specialist modules; choose at least 7.5/15 CATS from modules marked ^; no further level 6 modules can be chosen

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
SESG6040	Failure of Materials and Components	7.5/15	Spec	2	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	Spec	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	Spec	1	7
SESM6040	Thermofluid Engineering for Low-Carbon Energy^	7.5/15	Spec	1	7
SESS6063	Advances in Ship Resistance and Propulsion	7.5/15	Spec	1	7
SESS6068	Marine Safety and Environmental Engineering^	7.5/15	Spec	2	7
SESS6070	Offshore Engineering and Analysis	7.5/15	Spec	1	7

## MEng Mechanical Engineering with Semester in Industry (not applicable to USMC students)

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
SESG3024	Manufacturing and Materials (distance learning)	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3032	Heat Transfer and Applications	7.5/15	C	2	6
SESM3034	Semester in Industry Project with Reflective Engineer	22.5/45	Core	1	6

total: 45/90

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3002	Vehicle Powertrain, Noise and Vibration	7.5/15	O	2	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language	7.5/15	O	1/2	6
MATH3082	Optimisation	7.5/15	O	2	6
SESM3028	Biomaterials	7.5/15	O	2	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 30/60

Key Part IV optional modules, max 15/30 ECTS/CATS of level 6 modules; choose at least 7.5/15 ECTS/CATS from modules marked ^

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG6002	Advanced Computational Methods I	7.5/15	O	1	7
FEEG6009	Design Search and Optimisation	7.5/15	O	2	7
SESA6075	Aircraft Propulsion	7.5/15	O	1	7
SESG6039	Composites Engineering Design and Mechanics	7.5/15	O	1	7
SESG6040	Failure of Materials and Components	7.5/15	O	2	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6037	Automotive Propulsion	7.5/15	O	2	7
SESM6040	Thermofluid Engineering for Low Carbon Energy^	7.5/15	O	1	7

## MEng Mechanical Engineering with Study Abroad: Abroad in Semester 1 (not applicable to USMC students)

### Part III Core/Compulsory Module

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3005	Study Abroad modules	30/60	C	1	6
FEEG3003	Individual Project	15/30	Core	2	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3032	Heat Transfer and Applications	7.5/15	C	2	6

total: 60/120

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7
SESG3024	Manufacturing and Materials	7.5/15	C	1	6

total: 37.5/75

Key Part IV modules (choose at least 30/60 ECTS/CATS from modules marked \*, choose 7.5/15 ECTS/CATS from modules marked ^)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics*	7.5/15	O	1	6
FEEG6002	Advanced Computational Methods I*	7.5/15	O	1	7
FEEG6009	Design Search and Optimisation*	7.5/15	O	2	7
SESG6035	Advanced Sensors and Condition*	7.5/15	O	1	7
SESG6039	Composites Engineering Design and Mechanics*	7.5/15	O	1	7
SESG6040	Failure of Materials and Components*	7.5/15	O	2	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6034	Advanced Electrical Systems*	7.5/15	O	2	7
SESM6037	Automotive Propulsion*	7.5/15	O	2	7
SESM6040	Thermofluid Engineering for Low-Carbon Energy^	7.5/15	O	1	7



## MEng Mechanical Engineering with Study Abroad: Abroad in Semester 2 (not applicable to USMC students)

### Part III Core/Compulsory

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual project	15/30	Core	1+2	6
FEEG3006	Study abroad modules	30/60	Core	2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6

total: 52.5/105

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
LANGxxxx	Language	7.5/15	O	1	6
SESM3030	Control and Instrumentation	7.5/15	O	1	6
SESM3031	Automobile Systems	7.5/15	O	1	6
SESM3033	Orthopaedic Biomechanics	7.5/15	O	1	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7
SESM3029	Engineering Design with Management	7.5/15	C	2	6

total: 37.5/75

Key Part IV modules (choose at least 30/60 ECTS/CATS from modules marked \*; choose 7.5/15 CATS from modules marked ^)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6002	Advanced Computational Methods I*	7.5/15	O	1	7
FEEG6009	Design Search and Optimisation*	7.5/15	O	2	7
SESA6075	Aircraft Propulsion*	7.5/15	O	1	7
SESG6035	Advanced Sensors and Condition Monitoring*	7.5/15	O	1	7
SESG6039	Composites Engineering Design and Mechanics*	7.5/15	O	1	7
SESG6040	Failure of Materials and Components*	7.5/15	O	2	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	O	1	7
SESM3032	Heat Transfer and Applications*	7.5/15	O	2	6
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	O	1	7
SESM6034	Advanced Electrical Systems *	7.5/15	O	2	7
SESM6037	Automotive Propulsion*	7.5/15	O	2	7
SESM6040	Thermofluid Engineering for Low Carbon Energy^	7.5/15	O	1	7

## MEng Mechanical Engineering with Sustainable Energy Systems

### Part III Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3003	Individual Project	15/30	Core	1+2	6
SESG3024	Manufacturing and Materials	7.5/15	C	1	6
SESM3029	Engineering Design with Management	7.5/15	C	2	6
SESM3030	Control and Instrumentation	7.5/15	C	1	6
SESM3032	Heat Transfer and Applications	7.5/15	C	2	6

total: 45/90

### Part III Main Optional Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	O	1	6
FEEG3011	Introduction to turbulence and mixing	7.5/15	O	2	6
LANGxxxx	Language	7.5/15	O	1/2	6
SESM3031	Automobile Systems	7.5/15	O	1	6

### Part IV Core/Compulsory Modules

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7

total: 30/60

Key Part IV modules (choose 37.5/75 ECTS/CATS of specialist modules, choose at least 7.5/15 ECTS/CATS from modules marked ^)

Module Code	Module Name	Credit Points (ECTS/CATS)	Choice Type	Semester	Level
CENV6141	Bioenergy	7.5/15	Spec	2	7
FEEG6007	Fuel Cells and Photovoltaic Systems I	7.5/15	Spec	1	7
FEEG6008	Fuel Cells and Photovoltaic Systems II	7.5/15	Spec	2	7
SESG6042	Microstructural Engineering for Transport Applications^	7.5/15	Spec	1	7
SESM6034	Advanced Electrical Systems	7.5/15	Spec	2	7
SESM6032	Sustainable Energy Systems, Resources and Usage^	7.5/15	Spec	1	7
SESM6037	Automotive Propulsion	7.5/15	Spec	2	7
SESM6040	Thermofluid Engineering for Low-Carbon Energy^	7.5/15	Spec	1	7
SESS6067	Renewable Energy from Environmental Flows	7.5/15	Spec	2	7

### Optional and compulsory modules for all themes

The following modules are optional for all MEng/BEng Mechanical Engineering programmes/themes in Part III, except for those programmes/themes in which the total credit (60 ECTS / 120 CATS) is taken through compulsory and core modules.

Module Code	Module Name	Credit Points (ECTS/CATS)	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	1	6
FEEG3002	Vehicle Powertrain, Noise and Vibration	7.5/15	2	6
FEEG3004	Human Factors in Engineering	7.5/15	1	6
ISVR6136	Fundamentals of Acoustics	7.5/15	1	7
LANGxxxx	Language	7.5/15	1/2	6
MATH3081	Operational Research	7.5/15	1	6
MATH3082	Optimization	7.5/15	2	6
MATH3083	Advanced Partial Differential Equations	7.5/15	1	6
SESG3024	Manufacturing and Materials	7.5/15	1	6
SESM3028	Biomaterials	7.5/15	2	6
SESM3030	Control and Instrumentation	7.5/15	1	6
SESM3031	Automobile Systems	7.5/15	1	6
SESM3032	Heat Transfer and Applications	7.5/15	2	6
SESM3033	Orthopaedic Biomechanics	7.5/15	1	6

The following modules are compulsory for all MEng Mechanical Engineering programmes/themes in Part IV. This is in addition to the modules listed in the particular programmes. There is one exception: in the MEng Mechanical Engineering with Engineering Management the module Advanced Management is not offered, and is replaced by a selection of other management modules.

Module Code	Module Name	Credit Points (ECTS/CATS)	Core/ compulsory	Semester	Level
FEEG6013	Group Design Project	22.5/45	Core	1+2	7
MANG6318	Advanced Management	7.5/15	C	2	7

The following modules are optional for all MEng Mechanical Engineering Part IV students that have not reached the 75/150 ECTS/CATS credits required through the core and compulsory requirements for their theme. A maximum of 15/30 ECTS/CATS of level 6 modules can be chosen in Part IV.

Module Code	Module Name	Credit Points (ECTS/CATS)	Semester	Level
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	1	6
FEEG3002	Vehicle Powertrain, Noise and Vibration	7.5/15	1	6
FEEG3004	Human Factors in Engineering	7.5/15	2	6
FEEG6002	Advanced Computational Methods I	7.5/15	1	7
FEEG6005	Applications of Computational Fluid Dynamics	7.5/15	1	7
FEEG6009	Design Search and Optimisation	7.5/15	2	7
FEEG6010	Advanced Finite Element Analysis	7.5/15	2	7

ISVR3064	Noise Control Engineering	7.5/15	1	6
ISVR6136	Fundamentals of Acoustics	7.5/15	1	7
LANGxxxx	Language	7.5/15	1/2	6
LAWS3130	Industrial Law	7.5/15	1	6
MATH3081	Operational Research	7.5/15	1	6
MATH3082	Optimization	7.5/15	2	6
MATH3083	Advanced Partial Differential Equations	7.5/15	1	6
MATH6141	Numerical Methods	7.5/15	1	7
SESG6034	Surface Engineering	7.5/15	1	7
SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	2	7
SESG6036	Advanced Control Design	7.5/15	2	7
SESG6039	Composite Engineering Design and Mechanics	7.5/15	1	7
SESG6040	Failure of Materials and Components	7.5/15	2	7
SESG6042	Microstructural Engineering for Transport Applications	7.5/15	1	7
SESG6044	Microstructural and Surface Characterisation	7.5/15	1+2	7
SESM3028	Biomaterials	7.5/15	2	6
SESM3030	Control and Instrumentation	7.5/15	1	6
SESM3031	Automobile Systems	7.5/15	1	6
SESM3032	Heat Transfer and Applications	7.5/15	2	6
SESM3033	Orthopaedic Biomechanics	7.5/15	1	6
SESM6032	Sustainable Energy Systems, Resources and Usage	7.5/15	1	7
SESM6033	Tribological Engineering and Engine Tribology	7.5/15	1	7
SESM6034	Advanced Electrical Systems	7.5/15	2	7
SESM6035	Bio, Nano and Modelling Aspects of Tribology	7.5/15	2	7
SESM6036	Biomedical Implants and Devices	7.5/15	1	7
SESM6037	Automotive Propulsion	7.5/15	2	7
SESM6038	Computational Methods in Biomedical Engineering Design	7.5/15	2	7
SESM6040	Thermofluid Engineering for Low Carbon Energy	7.5/15	1	7

**Part I Summative Assessment Schedule**

The table below shows the summative assessment structure:

<b>Schedule A</b>			
	<b>Approximate Timing</b>	<b>Pass Mark</b>	<b>Repeat Assessment mode</b>
Multiple Choice Exam: Engineering Fundamentals	Semester 2 exam period. 2 hours	60%	Internal & External
Long Answer Exam: Engineering Problem Solving	Semester 2 exam period. 2 hours	40%	Internal & External
Discipline Specific Assessment	Semester 2 exam period	40%	Internal & External
Mathematics Exam	Semester 2 exam period. 2 hours	40%	Internal & External
<b>Schedule B</b>			
	<b>Timing</b>	<b>Pass Mark</b>	<b>Repeat Assessment mode</b>
Assessment in Design	End of Semester 2	40%	Internal only
Laboratory Report	End of Semester 2	40%	Internal only
Technical Essay	End of Semester 2	40%	Internal & External

## Appendix 4:

### Additional Costs

Students are responsible for meeting the cost of essential textbooks, and of producing such essays, assignments, laboratory reports and dissertations as are required to fulfil the academic requirements for each programme of study. In addition to this, students registered for this programme typically also have to pay for the items listed in the table below.

In some cases you'll be able to choose modules (which may have different costs associated with that module) which will change the overall cost of a programme to you. Details of such costs will be listed in the Module Profile. Please also ensure you read the section on additional costs in the University's Fees, Charges and Expenses Regulations in the University Calendar available at [www.calendar.soton.ac.uk](http://www.calendar.soton.ac.uk).

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
Approved Calculators		<p>Students will require a scientific calculator. This will need to be purchased by the student.</p> <p>Candidates may use calculators in the examination room only as specified by the University and as permitted by the rubric of individual examination papers. The University approved models are Casio FX-570 and Casio FX-85GT Plus. These may be purchased from any source and no longer need to carry the University logo.</p>
Stationery		<p>You will be expected to provide your own day-to-day stationery items, e.g. pens, pencils, notebooks, etc.). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile.</p>
Textbooks		<p>For FEEG1002 Mechanics, Structures and Materials it may be useful to purchase Materials Science and Engineering: An Introduction by W.D. Callister, cost circa £60, but a large number are available in the library.</p> <p>For FEEG2001 System Design and Computing it may be useful to purchase the Arduino Cookbook by M. Margolis, cost circa £20</p>

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
		<p>For FEEG2003 Fluid Mechanics it will be useful, but not necessary, to purchase the core text book Fluid Mechanics. 7th edition, by F.M. White, 2011. McGraw-Hill. These currently (17<sup>th</sup> Sept 2015) retail for £45.89 from <a href="http://www.amazon.co.uk">www.amazon.co.uk</a>. This will need to be purchased by the student although there are a limited number of these in the Hartley library.</p> <p>Where a module specifies core texts these should generally be available on the reserve list in the library. However due to demand, students may prefer to buy their own copies. These can be purchased from any source.</p> <p>Some modules suggest reading texts as <b>optional</b> background reading. The library may hold copies of such texts, or alternatively you may wish to purchase your own copies. Although not essential reading, you may benefit from the additional reading materials for the module.</p>
Equipment and Materials	Design equipment and materials:	<p>Standard construction / modelling materials will be provided where appropriate, unless otherwise specified in a module profile.</p> <p>For customisation of designs / models calling for material other than standard construction/ modelling materials, students will bear the costs of such alternatives.</p>
	Excavation equipment and materials:	N/A
	Field Equipment and Materials:	N/A
	Laboratory Equipment and Materials:	<p>Students are expected to purchase a laboratory note book in which to record laboratory observations which form part of the assessment. These can be purchased for £1.20 (thin softback) or £4.75 (thick hardback), depending on student choice (FEEG2004).</p> <p>A range of standard construction materials are provided to support the design projects within this module, however, students may wish to customise their designs and choose alternative materials at their own cost. (FEEG2001). Students are required to source and purchase their own</p>

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
		<p>batteries for the Odometry Exercise in week 6 and should be prepared to spend up to £50 per group of their own money. Receipts should be retained as expenditure may be subject to auditing (FEEG2001).</p> <p>Students should be prepared to spend up to £100 per group of their own money in relation to the purchase of components for the Part II Semester 2 Group Design Project. Receipts should be retained as expenditure may be subject to auditing (FEEG2001).</p>
IT	Computer Discs	N/A
	Software Licenses	N/A
	Hardware	N/A
Clothing	Lab Coats	N/A
	Protective Clothing: Hard hat; safety boots; hi-viz vest/jackets;	N/A
	Field course clothing:	You will need to wear suitable clothing when attending field courses, e.g. waterproofs, walking boots. You can purchase these from any source.
Printing and Photocopying Costs		<p>Students are responsible for the printing of their poster for the Poster Presentation Day. This may range from £5-£20.</p> <p>Students are expected to cover the costs associated with the printing and binding of reports and the printing of drawings and graphic presentations. These are typically expected to be of the order of £100 per group, also depending on the quality of printing and binding chosen. Note that funds from the project's budget cannot be used for this purpose (FEEG6013 MEng Only).</p> <p>In some cases, coursework and/or projects may be submitted electronically. Where it is not possible to submit electronically students will be liable for printing costs, which are detailed in the individual Module Profile and can be found in Appendix 2.</p> <p>The costs associated with the printing and binding of reports are to be covered by each student group</p>



Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
		(FEEG2006).  In addition to the experimental, computational and workshop resources available, reasonable expenses for travel and materials of up to £100 may be reclaimed through the Faculty Student Office (FEEG3003 BEng).
<b>Optional Visits (e.g. museums, galleries)</b>		Some modules may include additional optional visits. You will normally be expected to cover the cost of travel and admission, unless otherwise specified in the module profile.
<b>Travel and Subsistence</b>		FEEG3009 Industrial Placement year. You will need to find your own accommodation near to your place of work. You are responsible for travel and subsistence costs.

\*Validation is the process by which the University approves its programmes of study. Any taught undergraduate and postgraduate programme leading to a University of Southampton award, including research degrees with a taught component (for example the Engineering Doctorate), are required to go through programme validation, and, after a number of years, to undergo revalidation. The full validation process can be found in the University's Quality Handbook at [https://www.southampton.ac.uk/quality/programmes\\_and\\_modules/programmevalidation2.page](https://www.southampton.ac.uk/quality/programmes_and_modules/programmevalidation2.page)