

## Programme Specification

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### MSc in Advanced Mechanical Engineering Science 2018/19

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
Mode of study	Full time
Duration	1 year
Accreditation details	Institution of Mechanical Engineers (IMechE)
Final award	Master of Science
Name of award	Surface Engineering and Coatings/Advanced Mechanical Engineering Science Computational Engineering and Design/Advanced Mechanical Engineering Science Engineering Materials/Advanced Mechanical Engineering Science Mechatronics /Advanced Mechanical Engineering Science Propulsion and Engine Systems Engineering/Advanced Mechanical Engineering Science
Interim Exit awards	Post Graduate Diploma Post Graduate Certificate
FHEQ level of final award	Level 7
UCAS code:	N/A
QAA Subject Benchmark or other	QAA Subject Benchmark for Engineering studied at Master's Level
External reference	Engineering Council UK Standard for Professional Engineering Competence (UK-SPEC)
Programme Lead	IMechE Accreditation criteria Professor John Atkinson
Date specification was written	September 2014
Date programme was validated	May 2014
Date specification last updated	April 2018

### Programme Overview

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#### Brief outline of the programme

The programme provides an academically challenging exposure to modern issues in Advanced Mechanical Engineering Science giving you the opportunity to specialising in AMES. It is suitable for engineering, mathematics or physical sciences graduates who wish to specialise in advanced mechanical engineering science or to support continued professional development. It offers a sound understanding of the relevant fundamental science, methods, analysis and engineering applications.

### **Learning and teaching**

The different subject matter of the modules lends itself to different teaching and learning techniques but these include lectures, tutorials, individual and group planning exercises and practical exercises. You are encouraged throughout to contribute your own professional experiences and thoughts to the learning of the whole class through a free exchange of ideas. One-to-one tutorials are arranged to compensate for individual learning differences, when required.

Many modules include assessed coursework assignments which require you to carry out a substantial study of selected topics, either as individuals or in groups, leading to considerable depth of understanding and specialist knowledge. Assessment is designed to show that you can rationally use taught material and have a fundamental understanding of the subject matter. Feedback on progress is given to students on all submitted work.

### **Taught Modules**

A full list of taught modules can be found at

[http://www.southampton.ac.uk/engineering/postgraduate/taught\\_courses/engineering.page](http://www.southampton.ac.uk/engineering/postgraduate/taught_courses/engineering.page)

### **Research Project**

Research projects may concern any of the areas covered by the programme. The research project is intended to bring together the full range of skills in the programme and to provide you with an opportunity to build on all of the learning outcomes described above, while demonstrating in-depth knowledge and understanding of one or more of the areas covered by the programme. It involves information gathering and handling, critical analysis and evaluation, and presentation skills. The key requirement, however, is that the project must contain your own ideas and proposals: it should not simply be a technical design carried out to existing standards, but a problem with an element of novelty requiring the application of new information and concepts.

### **Assessment**

Testing of the knowledge base is through a combination of unseen written examinations and assessed coursework in the form of problem solving exercises, laboratory reports, design exercises, essays, and individual and group projects. 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.

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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The Mechanical Engineering Programme within the Faculty of Engineering and Physical Sciences hosts a spectrum of exciting and challenging programmes at undergraduate and postgraduate levels. Within this particular programme of study, we aim to develop and enhance your knowledge of, and enthusiasm for, Advanced Mechanical Engineering Science which can be taken in a number of themes (currently, Surface Engineering and Coatings, Mechatronics, Engineering Materials, Computational Engineering Design and Propulsion and Engine Systems Engineering).

This programme aims to provide science and engineering graduates from diverse backgrounds with an academically challenging exposure to current Advanced Mechanical Engineering Science.

The aims of the programme are to:

- Enable you to acquire advanced knowledge and practical skills needed for a professional career in your chosen specialist theme and to provide you with specialist knowledge and skills relevant to that theme.
- Provide you with a sound understanding of the fundamental principles, operation requirements, design criteria and engineering applications in advanced mechanical engineering science
- Enhance your transferable skills, including critical analysis, problem solving, project management, decision making, leadership, and communication by oral, visual and/or written means.
- Equip you with specialist knowledge, scientific and technical expertise and research skills for further research in Advanced Mechanical Engineering Science.

The programme may be taken in a full-time mode (one-year), or part-time mode (up to three years) mode.

## Programme Learning Outcomes

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The MSc programme provides opportunities for you to achieve and demonstrate the learning outcomes described below. If students opt for the shorter PG Diploma or PG Certificate, the research training element is not included.

### Knowledge and Understanding

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

1. the fundamental scientific and technical aspects of advanced mechanical engineering science relevant to your chosen theme;
2. the technical background of your discipline to enable critical analysis of the current literature, identification of gaps in information, and engagement in discussion with peers and a wide range of audiences;
3. the limitations of current knowledge and the changing nature of technologies and society, and the need to gain new knowledge through further study and team-based project work in your professional field;
4. a wide range of engineering materials and components relevant to your chosen theme;

For a PG Diploma you are expected to reach equivalent levels under items 1, 2, 3 and 4.

For a PG Certificate you are expected to acquire a broad knowledge under items 1, 2, 3 and 4, but with less rigour and depth.

### *Teaching and Learning Methods*

Acquisition of 1 and 4 is through a combination of lectures, tutorials (small group teaching), example classes, laboratory experiments, industrial visits, coursework, and projects.

Acquisition of 2 and 3 are through essays, coursework, group discussions, industrial visits and projects.

### *Assessment methods*

Assessment is through a combination of written examinations (1) and assessed coursework in the form of problem solving exercises (1,2,4), laboratory reports (1,2,3,4), essays (3), and an individual research project with a dissertation (1,2,3,4).

## Subject Specific Intellectual and Research Skills

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Having successfully completed this programme you will be able to:

1. deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate your conclusions clearly;
2. evaluate different types of information critically in a variety of formats (including current research, technical manuals, and standards);
3. make use of existing theories and concepts, and be able to apply them independently to new problems and situations;
4. synthesise and analyse information and ideas, and apply creative and original thought in order to propose appropriate new solutions to complex problems.

For a PG Diploma you are expected to reach a broadly equivalent level under items 1, 2 and 3.

For a PG Certificate you are expected to develop skills 1 and 3 within the limited range of subjects studied.

### ***Teaching and Learning Methods***

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

Acquisition of 2 is through carrying out and reporting on a major individual research project.

Acquisition of 3 and 4 is through essays, coursework, group discussions, industrial visits and projects.

### ***Assessment methods***

Assessment is through a combination of written examinations (1) and assessed coursework in the form of problem solving exercises (1,3), laboratory reports (1,3,4), essays (4), and an individual research project with a dissertation (1,2,3,4).

## Transferable and Generic Skills

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Having successfully completed this programme you will be able to:

1. learn independently and continue to develop your skills to a high level;
2. make decisions and arrive at solutions in complex situations;
3. recognise the limitations of your present knowledge and gain new knowledge through further study in your professional field;
4. process information (including IT skills), search literature, abstracting documents, and other information for the purposes of technical writing;
5. manipulate data, apply statistical methods, and interpret results;
6. communicate fluently through oral and written presentation of information;
7. exercise initiative, self-motivation and personal responsibility;
8. undertake effective project planning and execution, and manage time effectively (more highly developed for MSc through research project);
9. participate effectively in teamwork.

The levels attained by MSc/PG Diploma/PG Certificate students will reflect the differing lengths of study.

### ***Teaching and Learning Methods***

Transferable skills are developed through the learning and teaching activities.

Skills 1 and 2 are taught and developed throughout the course.

Skills 4 and 5 are taught and developed in specific modules.

Skill 6 is developed through coursework and presentations.

Skill 8 is developed through an individual research project and group projects. Skill

9 is developed through joint laboratory sessions and group projects.

Although not explicitly taught, other skills (including skill 3) are nurtured and developed throughout the course, which is structured and delivered in such a way as to promote these.

### ***Assessment methods***

Skills 1, 2 and 4-6 are assessed through coursework exercises, laboratory reports and presentations.

Skills 1, 2, 4 and 5 are assessed through unseen written examinations and coursework exercises.

Skills 1, 2 and 4-8 are assessed in individual research projects.

The other skills are essential for success on the course but are not formally assessed.

### **Subject Specific Practical Skills**

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The following skills are developed progressively throughout the MSc programme. The levels attained by MSc/PG Diploma/PG Certificate students will reflect the differing length of study.

- 1 Learning: independent study and skills development;
- 2 Problem solving: recognition, definition, analysis and solution;
- 3 Information processing (including IT skills): literature, searching, abstracting documents, and collating information for the purposes of technical writing;
- 4 Data manipulation (including IT skills): analysis of data, application of statistical methods, interpretation of results;
- 5 Communication: oral and written presentation of information, scientific writing;
- 6 Individual: decision-making, initiative-taking, self-motivation and direction, personal responsibility;
- 7 Management: safe and effective project planning and execution, time management (more highly developed for MSc through research project).

### ***Teaching and Learning methods:***

Skills (1)-(2), (4)-(6) are acquired through your individual project work associated with specific taught modules.

Skills (1)-(2), (6) are acquired through directed problem-solving exercises and your self-learning associated with taught modules, and coursework assignments set for the taught modules. Skills (1)-(7) are acquired through your research project.

### ***Assessment methods:***

Transferable skills are assessed through unseen written examinations, problem-solving exercises, individual-project reports and your individual research dissertation.

The other skills are essential for success on the course but are not formally assessed.

## Programme Structure

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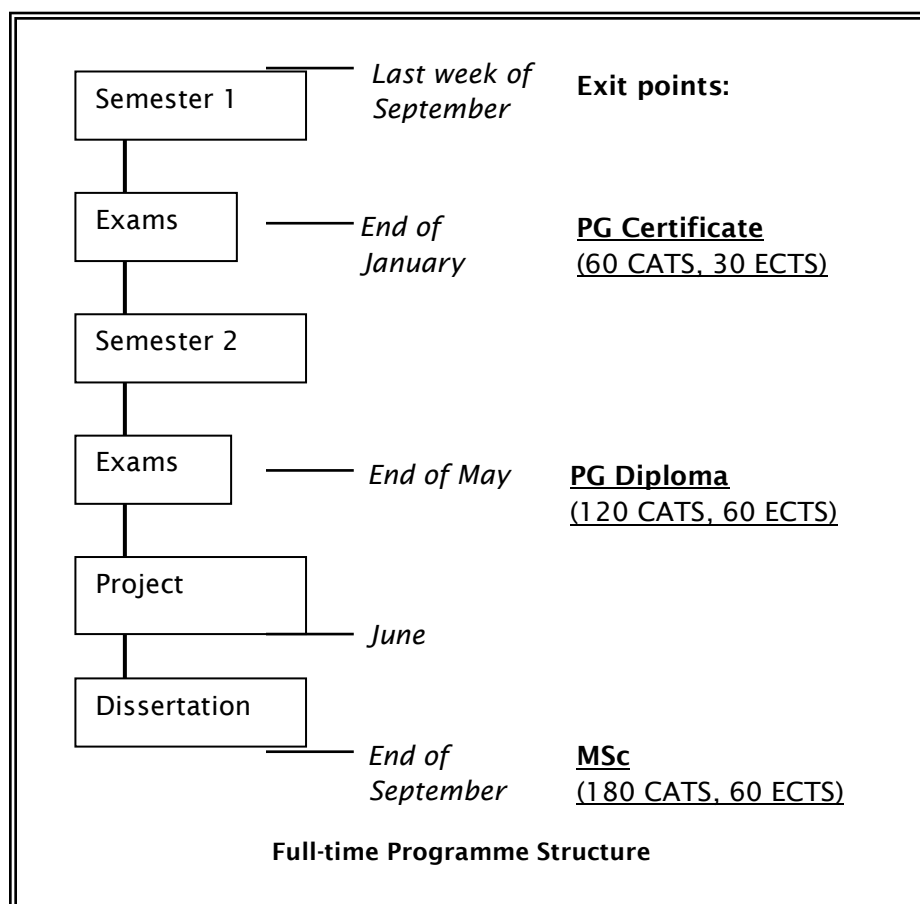
### Typical course content

The programme involves 90 ECTS/180 CATS credit points distributed between taught and research components. The taught component consists of modules worth 60 ECTS/120 CATS, of which at least 45 ECTS/90 CATS are at level 7. You will take the compulsory modules and select the remaining from a given list. The list is specific to your chosen specialisation within the themes. Details of the compulsory and option modules within the themes are shown in Appendix 1. Any of these taught modules can form part of a Postgraduate Certificate. In addition to the taught modules, the MSc also requires completion of a research project worth 30 ECTS/60 CATS. To achieve a Postgraduate Diploma 60 ECTS/120 CATS need to be completed and passed.

### Full-time MSc

The full-time MSc programme lasts for 12 months. The first 8 months are spent mainly on the taught component, with lectures divided into two 12-week periods (Semesters 1 and 2), with exams at the end of each semester. The final four months are spent full-time on a research project, for which a considerable amount of preparation is undertaken in Semester 2. A strict timetable of milestones for the starting in Semester 2 ensures maximum time is devoted to the project as the manufacture, integration and testing of physical artefacts is involved.

The MSc award depends on passing the examinations and on successful completion of a dissertation on the project. The diagram below shows the overall structure and possible exit points.



### **Part-Time MSc**

The taught component of selected themes in the MSc programme can be studied by arrangement on a part-time basis (e.g. by taking semester 1 one year and semester 2 the next). Similar arrangements apply to the PG Diploma (120 credit points (CATS), or 60 ECTS, total) and PG Certificate (60 credit points (CATS), or 30 ECTS, total). Part-time study is only possible for the Computational Engineering & Design and Mechatronics themes.

Part-time MSc students may only begin practical work on the MSc research project after successful completion of at least 60 CATS/30 ECTS. It must be recognised that you may only submit a dissertation once you have satisfactorily completed the taught element of the programme.

It is anticipated that you will complete the MSc in two to three years. You may be registered on the programme for up to five years, after which your registration will be reviewed.

### **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 2.

### **Progression Requirements**

The programme follows the University's regulations for Progression, Determination and Classification of Results: Standalone Masters Programmes as set out in the University Calendar

(<http://www.calendar.soton.ac.uk/sectionIV/sectIV-index.html>) and in particular at <http://www.calendar.soton.ac.uk/sectionIV/progression-regs-standalonemasters.html> and <http://www.calendar.soton.ac.uk/sectionIV/credit-bearing-progs.html>

Faculty specific regulations for Standalone Masters can be found here <http://www.calendar.soton.ac.uk/sectionVIII/fee-sam.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/CATS credits	Minimum ECTS/CATS credits required at level of award
Postgraduate Diploma	at least 60/120	45/90
Postgraduate Certificate	at least 30/60	20/40

## Support for students and 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 you will be able to access:

- Induction programme for orientation, introduction of the programme and staff, and dissemination of materials.
- Student Coursebook, including guidance on selection of study programmes.
- Administrative and academic material on the Faculty, Programme and individual module web sites and/or Blackboard.
- A personal tutor to assist with organisational and personal matters. This role is taken over by the project supervisor when the research project starts.
- Careers advice and dissemination of available job advertisements.
- Personal e-mail account and e-mail access to staff via University system.
- School clusters of computers with relevant specialist software.
- Formal progress monitoring during research project.
- Support for international students.

The University provides:

- Public workstations supporting a comprehensive range of computer packages, internet and email.
- Well stocked central library, including access to a wide range of paper and electronic journals and information search facilities.
- Health Centre on the campus.
- Adviser to overseas students.
- Academic skills support (see <http://www.academic-skills.soton.ac.uk> and the student portal at <http://www.sussed.soton.ac.uk>).
- Social and sporting facilities (mainly through the Students Union).
- University Counsellors.
- Enabling Services providing support for student with disabilities and learning differences e.g. dyslexia.
- Careers Destinations service 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 student evaluation questionnaires for each module.
- Student representation on the Staff-Student Liaison Committee and Faculty Board.
- National Student Survey.
- University Student Experience Questionnaire.

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

- External examiners, who produce an annual report.
- Annual review of the modules via Subject Panels, Mechanical Engineering Education Board and Module Co-ordinators.
- Annual appraisal of academic staff and staff development activity.
- Informal and Formal Examination Boards.



- Professional body accreditation visits.
- Periodic programme review.
- The Faculty Learning and Teaching Evaluation Report and Action Plan.
- Higher Education Review by Quality Assurance Agency.

### ***Taught component***

Each of the modules that make up the programme will be taught at the University of Southampton. The academic coordinator of the module is responsible for ensuring appropriate content of modules and quality of delivery.

Assessment procedures for each module will be administered by the Faculty of Engineering and Physical Sciences in accordance with University policy.

### ***Research component***

Each research project will be supervised by a member of academic staff. A co-supervisor will be allocated who will normally be an academic or senior consulting engineer from within the Faculty; in the case of projects carried out externally, the co-supervisor may be from the institution/company offering project facilities. The supervisor and co-supervisor conduct a formal progress review with the student, normally during July/August.

### ***External Examiner***

In accordance with standard University practice, the examination setting and marking procedures will be evaluated by the External Examiner at all stages. The External Examiner will be a senior academic from a UK University actively involved in teaching and research. He/she will serve a period of office of normally 3 years.

## **External Examiners(s) for the programme**

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**Name:** Professor Stephen Eichhorn  
**Institution:** University of Bristol

In accordance with standard University practice, the examination setting and marking procedures will be evaluated by the External Examiner at all stages. The External Examiner will be a senior academic from a UK University actively involved in teaching and research. He/she will serve a period of office of normally 3 years.

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/studentservices/academiclife/faculty-handbooks.page> and at [http://www.southampton.ac.uk/engineering/postgraduate/taught\\_courses/engineering.page](http://www.southampton.ac.uk/engineering/postgraduate/taught_courses/engineering.page)

## Revision History

1. February 2008 (M Hill)
2. April 2008 (JS)
3. September 2009 (JS)
4. Updated to reflect addition of 2 new themes, February 2010 (M J Starink, P B Nair, N G Stephen)
5. Updated to reflect University restructuring June 2011 A Barney
6. Updated to reflect the addition of Advanced Tribology theme and changes in modules for other themes February 2012 (M Ratoi, M J Starink)
7. Updated regulations March 2013 (D Mead)
8. Updated to reflect award, admission and project description May 2013 (M J Starink)
9. New revised programme for AY2014-15 May 2013 & May 2014 (M J Starink)\_(CQA 27112013)
10. Minor revisions to reflect Programme Validation July 2014 (M J Starink)
11. Minor revisions Sept 2014 (J.A. Wharton)
12. Update to Programme Overview (CMA changes) – September 2015
13. CQA textual updates August 2016, April 2017
14. Updated to reflect 201819 version and removal of Admissions Criteria – CQA March 2018
15. Updated Faculty name to Faculty of Engineering and Physical Sciences July 2018

# Appendix 1: Programme Content

The MSc Advanced Mechanical Engineering Science programme contains the following five themes:

- **MSc in Computational Engineering and Design / Advanced Mechanical Engineering Science**
- **MSc in Engineering Materials / Advanced Mechanical Engineering Science**
- **MSc in Mechatronics / Advanced Mechanical Engineering Science**
- **MSc in Propulsion and Engine Systems Engineering / Advanced Mechanical Engineering Science**
- **MSc in Surface Engineering and Coatings / Advanced Mechanical Engineering Science**

The taught component of each Theme consists of five compulsory modules (four for the MSc Propulsion and Engine Systems Engineering and MSc Computational Engineering and Design) plus option modules chosen to total 60 ECTS/120 CATS, at least 45 ECTS/90 CATS of which must be at level 7 (level M). The research project and dissertation are equivalent to 30 ECTS/60 CATS at level 7 (level M).

You will select all your option taught modules at the start of the programme and to achieve a balance in study commitments throughout the year it is recommended you take either four or five modules in semester 1.

The most up to date description of the content is in the on-line programme catalogue:

<https://studentrecords.soton.ac.uk>

The 'online programme catalogue' allows viewing of full content for each theme for each year and contains hyperlinks to online module specifications. 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/what\\_we\\_do/mechanical\\_engineering.page?#education](http://www.southampton.ac.uk/engineering/what_we_do/mechanical_engineering.page?#education)

The list below reflects the taught modules offered in 2018-19, and is subject to minor alteration from year to year.

## MSc Computational Engineering and Design

### Core Modules

FEEG6012	MSc Research Project	30/60	7	1&2
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Compulsory modules: 30 ECTS (60 CATS)		ECTS/CATS	Level	Sem.
FEEG6002	Advanced Computational Methods I	7.5/15	7	1
FEEG6009	Design Search and Optimisation	7.5/15	7	2
MATH6141	Numerical Methods	7.5/15	7	1
SESM6039	Introduction to Advanced Mechanical Engineering Sciences	7.5/15	7	1
Option modules: choose 30 ECTS (60 CATS) (maximum 30 CATS at level 6)				
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	6	1
FEEG6003	Advanced Computational Methods II	7.5/15	7	2
FEEG6005	Applications of CFD	7.5/15	7	1
FEEG6010	Advanced Finite Element Analysis	7.5/15	7	2
MANG6318	Advanced Management	7.5/15	7	2
MATH3083	Advanced Partial Differential Equations	7.5/15	6	1
SESA3026	Aircraft Structural Design	7.5/15	6	2
SESA6077	Aeroelasticity	7.5/15	7	1
SESM3029	Engineering Design with Management	7.5/15	6	2
SESM6038	Computational Methods in Biomedical Engineering Design	7.5/15	7	2

## MSc Engineering Materials

### Core Modules

FEEG6012	MSc Research Project	30/60	7	1&2
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Compulsory modules: 37.5 ECTS (75 CATS)		ECTS/CATS	Level	Sem.
SESG6034	Surface Engineering	7.5/15	7	1
SESG6040	Failure of Materials and Components	7.5/15	7	2
SESG6042	Microstructural Engineering for Transport Applications	7.5/15	7	1
SESG6044	Microstructural and Surface Characterisation	7.5/15	7	1&2
SESM6039	Introduction to Advanced Mechanical Engineering Sciences	7.5/15	7	1
Option modules: choose 22.5 ECTS (45 CATS) (maximum 15 ECTS (30 CATS) from level 6 modules)				
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	6	1
FEEG6007	Fuel Cells, batteries and photovoltaic systems I	7.5/15	7	1
FEEG6008	Fuel Cells, batteries and photovoltaic systems II	7.5/15	7	2
MANG6318	Advanced Management	7.5/15	7	2
SESA3026	Aircraft Structural Design	7.5/15	6	2
SESA6075	Aircraft Propulsion	7.5/15	7	1
SESG3024	Manufacturing and Materials	7.5/15	6	1
SESG6039	Composites Engineering Design and Mechanics	7.5/15	7	1
SESG6045	Experimental Mechanics	7.5/15	7	2
SESM3028	Biomaterials	7.5/15	6	2
SESM6034	Advanced Electrical Systems	7.5/15	7	2
SESM6035	Bio, Nano and Modelling Aspects of Tribology	7.5/15	7	2

## MSc Mechatronics

### Core Modules

FEEG6012	MSc Research Project	30/60	7	1&2
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Compulsory modules: 37.5 ECTS (75 CATS)		ECTS/CATS	Level	Sem.
SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	7	1
SESG6036	Advanced Control Design	7.5/15	7	2
SESM3030	Control and Instrumentation	7.5/15	6	1
SESM6034	Advanced Electrical Systems	7.5/15	7	2
SESM6039	Introduction to Advanced Mechanical Engineering Sciences	7.5/15	7	1
Option modules: choose 22.5 ECTS (45 CATS) (maximum 7.5 ECTS (15 CATS) at level 6)				
ELEC3201	Robotic Systems	7.5/15	6	1
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	6	1
FEEG6002	Advanced Computational Methods I	7.5/15	7	1
FEEG6007	Fuel Cells and Photovoltaic Systems I	7.5/15	7	1

FEEG6008	Fuel Cells and Photovoltaic Systems II	7.5/15	7	2
MANG6318	Advanced Management	7.5/15	7	2
MATH6141	Numerical Methods	7.5/15	7	1
SESM3029	Engineering Design with Management	7.5/15	6	2
SESM6037	Automotive Propulsion	7.5/15	7	2

## MSc Propulsion and Engine Systems Engineering

### Core Modules

FEEG6012	MSc Research Project	30/60	7	1&2
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Compulsory modules: 30 ECTS (60 CATS)		ECTS/CATS	Level	Sem.
SESA6075	Aircraft Propulsion	7.5/15	7	1
SESM6034	Advanced Electrical Systems	7.5/15	7	2
SESM6037	Automotive Propulsion	7.5/15	7	2
SESM6039	Introduction to Advanced Mechanical Engineering Sciences	7.5/15	7	1
Option modules: choose 30 ECTS (60 CATS) (max 15 ECTS (30 CATS) at level 6)				
CENV6016	Transport Economics	7.5/15	7	2
FEEG6005	Applications of CFD	7.5/15	7	1
FEEG6007	Fuel Cells and Photovoltaic Systems I	7.5/15	7	1
ISVR6136	Fundamentals of Acoustics	7.5/15	7	1
MANG6318	Advanced Management	7.5/15	7	2
SESA6071	Spacecraft Propulsion	7.5/15	7	1
SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	7	1
SESG6040	Failure of Materials and Components	7.5/15	7	2
SESG6042	Microstructural Engineering Transport Applications	7.5/15	7	1
SESG6044	Microstructure and Surface Characterisation	7.5/15	7	1&2
SESM3029	Engineering Design with Management	7.5/15	6	2
SESM6033	Tribological Engineering and Engine Tribology	7.5/15	7	1
SESM6040	Thermo-fluid Engineering for Low-Carbon Energy	7.5/15	7	1

## MSc Surface Engineering and Coatings

### Core Modules

FEEG6012	MSc Research Project	30/60	7	1&2
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Compulsory modules: 37.5 ECTS (75 CATS)		ECTS/CATS	Level	Sem.
SESG6034	Surface Engineering	7.5/15	7	1
SESG6044	Microstructural and Surface Characterisation	7.5/15	7	1&2
SESM6033	Tribological Engineering and Engine Tribology	7.5/15	7	1
SESM6035	Bio, Nano and Modelling Aspects of Tribology	7.5/15	7	2
SESM6039	Introduction to Advanced Mechanical Engineering Sciences	7.5/15	7	1
Option modules: choose 22.5 ECTS (45 CATS) (maximum 15 ECTS (30 CATS) at level 6)				
FEEG3001	Finite Element Analysis in Solid Mechanics	7.5/15	6	1

MANG6318	Advanced Management	7.5/15	7	2
SESG3024	Manufacturing and Materials	7.5/15	6	1
SESG6035	Advanced Sensors and Condition Monitoring	7.5/15	7	1
SESG6040	Failure of Materials and Components	7.5/15	7	2
SESG6042	Microstructural Engineering for Transport Applications	7.5/15	7	1
SESG6045	Experimental Mechanics	7.5/15	7	2
SESM3028	Biomaterials	7.5/15	6	2

Note: It is possible that module prerequisites may be omitted at the discretion of the module lecturer depending on previous experience.

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## Appendix 2:

### 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		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.
Stationery		You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc). Any specialist stationery items will be specified under the Additional Costs tab of the relevant module profile.
Textbooks		<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>

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
<b>Equipment and materials equipment</b>	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:	
	Field Equipment and Materials:	<p>A number of essential items will be provided to you e.g.: field notebook(s); compass-clinometer; geological hammer; steel tape measure; map case; pocket lens (x 10); safety helmet; safety goggles; bottle of dilute hydrochloric acid. If items provided are lost replacements can be purchased from:</p> <p>However, you will need provide yourselves with a ruler; a pair of compasses; set squares; protractor; pencils (including coloured); eraser; calculator, penknife. These can be purchased from any source.</p>
	Laboratory Equipment and Materials:	
	Photography:	
	Recording Equipment:	
<b>Clothing</b>	Lab Coats	
	Protective Clothing: Hard hat; safety boots; hi-viz vest/jackets;	
	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.



Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
	Wet Suits?	
	Uniforms?	
<b>Printing and Photocopying Costs</b>		<p>Reasonable expenses for travel and materials of up to £300 may be reclaimed through the Faculty Student Office. For project costs in excess of £300 students should discuss possible sources of funding with their supervisor and should not proceed with any expenditure until a further funding source has been agreed. The printing costs associated with dissertation are the responsibility of the student (FEEG6012)</p> <p>Students are expected to cover the costs associated with the printing and binding of reports, including any drawings and graphic presentations. Two copies will need to be submitted. Depending on the quality of printing and binding chosen students can expect to pay approximately £25-30 per copy, totalling approximately £50-60 for both copies.(FEEG6012)</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>
<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.