Programme Specification

MSc Acoustical Engineering (2020-21)

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 in years: 1
Accreditation details: Institution of Mechanical Engineers
Further Learning contribution for CEng registration for intakes 2019-2022

Final award: Master of Science (MSc)
Name of Award: MSc Acoustical Engineering
MSc Acoustical Engineering/Signal Processing
MSc Acoustical Engineering/Structural Vibration

Interim Exit awards: Postgraduate Certificate
Postgraduate Diploma

FHEQ level of final award: Level 7
Programme Code: 6961
QAA Subject Benchmark or other external reference:
QAA Subject Benchmark – Engineering 2015; Accreditation of Higher Education Programmes, Edition 3, Engineering Accreditation Board Characteristic Statement: Master’s Degree, QAA 2015
Programme Lead: Giacomo Squicciarini

Programme Overview

Brief outline of the programme

An Acoustical Engineer has to be able to:
- Understand sound and vibration
- Understand the effects of sound and vibration on people (and sometimes animals)
- Control sound for the benefit of humanity
- Use sound and vibration for the benefit of humanity

Our MSc in Acoustical Engineering is a full-time master’s degree that offers an academically challenging exposure to modern developments in sound, vibration and signal processing.

You will have the opportunity to gain a deep understanding of the physical and mathematical fundamentals of acoustics, vibration and signal processing while developing the practical and problem-solving skills to apply them in the fields of noise control, audio engineering, architectural acoustics, biomedical ultrasound and much more.

Your contact hours will vary depending on your module/option choices. Full information about contact hours is provided in individual module profiles
Please note: 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.

Your contact hours will vary depending on your module/option choices. Full information about contact hours is provided in individual module profiles.

Learning and teaching
The programme is split into two components: a 'taught' component (October to June) and a research component (February to September).

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.

Special Features of the programme

Please note: 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

This programme aims to provide science or engineering graduates from a diversity of backgrounds with an academically challenging exposure to modern developments in sound, vibration and signal processing. The range of subjects offered is linked to the internationally recognised research activities of staff, and covers engineering acoustics, noise and vibration control, human effects of sound and vibration, and applied digital signal processing.

The aims of the programme are to:

- enable you to acquire some of the advanced knowledge and practical skills needed for a professional career in sound, vibration and signal processing.
- your ability to apply the academic knowledge gained to practical situations in your chosen discipline.
- develop, through a substantial open-ended research project, critical and analytical abilities as well as project management skills.

Subsidiary aims of the MSc programme are to:

- provide a supply of well-trained and motivated graduates for research positions both in the ISVR and elsewhere.
- provide career development opportunities in the broad field of sound, vibration and signal processing, for those seeking a change in employment or enhancement of their first degree.
Programme Learning Outcomes

Disciplinary Specific Learning Outcomes

On successful completion of this programme you will be able to:

E1. Design and conduct an appropriate programme of work to set objectives for research in an Acoustical context
E2. Use scientific and technical literature in support of research
E3. Apply fundamental knowledge and understanding of essential facts, concepts and principles relevant to Acoustical Engineering in researching complex problems

Science and Mathematics

Engineering is underpinned by science and mathematics, and other associated disciplines, as defined by the relevant professional engineering institution(s). On graduation you will have achieved:

SM7. A comprehensive understanding of the relevant scientific principles of Acoustical Engineering
SM8. A critical awareness of current problems and/or new insights most of which is at, or informed by, the forefront of Acoustical Engineering
SM9. Understanding of concepts relevant to Acoustical Engineering, some from outside engineering, and the ability to evaluate them critically and to apply them effectively, including in engineering projects

Engineering analysis

Engineering analysis involves the application of engineering concepts and tools to the solution of Acoustical Engineering problems. On graduation you will have achieved:

EA5. Ability to use fundamental knowledge to investigate new and emerging technologies
EA6. Ability both to apply appropriate engineering analysis methods for solving complex problems in engineering and to assess their limitations
EA7. Ability to collect and analyse research data and to use appropriate engineering analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods

Design

Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real and complex problems. On graduation you will have the knowledge, understanding and skills to:

D9. Knowledge, understanding and skills to work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies
D10. Knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
D11. Ability to generate an innovative design for products, systems, components or processes to fulfil new needs
Economic, legal, social, ethical and environmental context

Engineering activity can have impacts on the environment, on commerce, on society and on individuals. Graduates therefore need the skills to manage their activities and to be aware of the various legal and ethical constraints under which they are expected to operate, including:

EL8. Awareness of the need for a high level of professional and ethical conduct in engineering
EL9. Awareness that engineers need to take account of the commercial and social contexts in which they operate
EL10. Knowledge and understanding of management and business practices, their limitations, and how these may be applied in the context of Acoustical Engineering
EL11. Awareness that engineering activities should promote sustainable development and ability to apply quantitative techniques where appropriate
EL12. Awareness of relevant regulatory requirements governing engineering activities in the context of Acoustical Engineering
EL13. Awareness of and ability to make general evaluations of risk issues in the context of Acoustical Engineering, including health & safety, environmental and commercial risk

Engineering practice

This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. On graduation you will have achieved:

P9. A thorough understanding of current Acoustical Engineering practice and its limitations, and some appreciation of likely new developments
P10. Ability to apply engineering techniques taking account of a range of commercial and industrial constraints
P11. Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader
P12. Advanced level knowledge and understanding of a wide range of engineering materials and components

Additional general skills

On graduation you will have developed transferable skills, additional to those set out in the other learning outcomes, that will be of value in a wide range of situations, including the ability to:

G1. Apply their skills in problem solving, communication, working with others, information retrieval, and the effective use of general IT facilities
G2. Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
G3. Monitor and adjust a personal programme of work on an on-going basis
G4. Exercise initiative and personal responsibility, which may be as a team member or leader
Programme Structure

The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

Where optional modules have been specified, the following is an indicative list of available optional modules, which are subject to change each academic year. Please note in some instances modules have limited spaces available.

Acoustical Engineering Pathway

Part I

The information in this appendix is liable to change in minor ways from year to year. It is accurate at the time of writing. For the latest information, see the programme handbook issued in September each year.

No more than 15 ECTS/ 30 CATS points at level 6 to be included in the year taught total of 60 ECTS/ 120 CATS points, all other modules and the Project (which is core) are at level 7.

Where optional modules have been specified, the following is an indicative list of available optional modules, which are subject to change each academic year. Please note in some instances modules have limited spaces available.

Part I Compulsory Modules

<table>
<thead>
<tr>
<th>Code</th>
<th>Module Title</th>
<th>ECTS</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISVR6136</td>
<td>Fundamentals of Acoustics</td>
<td>7.5</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>

Part I Compulsory/Optional modules

Semester 1: Choose a minimum of 1 and a maximum of 2 from the following 2 modules:

<table>
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</tr>
</thead>
<tbody>
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<td>ISVR6141</td>
<td>Fundamentals of Vibration</td>
<td>7.5</td>
<td>Compulsory</td>
</tr>
<tr>
<td>ISVR6130</td>
<td>Signal Processing</td>
<td>7.5</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>

Part I Core

<table>
<thead>
<tr>
<th>Code</th>
<th>Module Title</th>
<th>ECTS</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEED6012</td>
<td>MSc Research Project</td>
<td>30</td>
<td>Core</td>
</tr>
<tr>
<td>ISVR6147</td>
<td>Professional Aspects of Engineering</td>
<td>7.5</td>
<td>Core</td>
</tr>
</tbody>
</table>

Part I Optional modules

Acoustical Engineering pathway:

Semester I Options (all 7.5 ECTS/ 15 CATS points): Choose 1 or 2 from the list below.

<table>
<thead>
<tr>
<th>Code</th>
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</tr>
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<tbody>
<tr>
<td>ISVR6137</td>
<td>Electroacoustics</td>
<td>7.5</td>
<td>Optional</td>
</tr>
<tr>
<td>ISVR3064</td>
<td>Noise Control Engineering</td>
<td>7.5</td>
<td>Optional</td>
</tr>
<tr>
<td>ISVR3070</td>
<td>Ocean Acoustics &amp; Biomedical Ultrasound</td>
<td>7.5</td>
<td>Optional</td>
</tr>
</tbody>
</table>
Part I Optional modules all themes

Semester II Options (all 7.5 ECTS/ 15 CATS points): Remaining taught credits should be obtained from the following list of modules, with no more than 15 ECTS/ 30 CATS points at level 6 overall to be included. Choose up to 3 from the list below.

You may choose either ISVR3073 or ISVR6148.

<table>
<thead>
<tr>
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<tbody>
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<td>ISVR6139</td>
<td>Active Control of Sound and Vibration</td>
<td>7.5</td>
<td>Optional</td>
</tr>
<tr>
<td>FEEG6004</td>
<td>Aeroacoustics</td>
<td>7.5</td>
<td>Optional</td>
</tr>
<tr>
<td>ISVR3071</td>
<td>Applied Audio Signal Processing</td>
<td>7.5</td>
<td>Optional</td>
</tr>
<tr>
<td>FEEG6011</td>
<td>Architectural and Building Acoustics</td>
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<td>7.5</td>
<td>Optional</td>
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<td>ISVR3061</td>
<td>Human Responses to Sound and Vibration</td>
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<td>ISVR3063</td>
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<td>ISVR3073</td>
<td>Theoretical and Computational Acoustics</td>
<td>7.5</td>
<td>Optional</td>
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<tr>
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<td>Theoretical and Computational Acoustics</td>
<td>7.5</td>
<td>Optional</td>
</tr>
<tr>
<td>ISVR6146</td>
<td>Vibration Engineering Practice</td>
<td>7.5</td>
<td>Optional</td>
</tr>
</tbody>
</table>

The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

Where optional modules have been specified, the following is an indicative list of available optional modules, which are subject to change each academic year. Please note in some instances modules have limited spaces available.

**Signal Processing Pathway**

**Part I**

The information in this appendix is liable to change in minor ways from year to year. It is accurate at the time of writing. For the latest information, see the programme handbook issued in September each year.

No more than 15 ECTS/ 30 CATS points at level 6 to be included in the year taught total of 60 ECTS/ 120 CATS points, all other modules and the Project (which is core) are at level 7.

Where optional modules have been specified, the following is an indicative list of available optional modules, which are subject to change each academic year. Please note in some instances modules have limited spaces available.

To exit via the Signal Processing theme the candidate must undertake an Individual Project (core) which is relevant to Signal Processing and obtain 60 ECTS/120 CATS taught credits from the following modules.

**Part I Compulsory Modules**

<table>
<thead>
<tr>
<th>Code</th>
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<tr>
<td>ISVR6136</td>
<td>Fundamentals of Acoustics 2020-21</td>
<td>7.5</td>
<td>Compulsory</td>
</tr>
</tbody>
</table>
Part I Compulsory/Optional modules

Semester 1: Choose a minimum of 1 and a maximum of 2 from the following 2 modules:

<table>
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<td>ISVR6130</td>
<td>Signal Processing 2020-21</td>
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Part I Core

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<tr>
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<tr>
<td>FEEG6012</td>
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<td>30</td>
<td>Core</td>
</tr>
<tr>
<td>ISVR6147</td>
<td>Professional Aspects of Engineering</td>
<td>7.5</td>
<td>Core</td>
</tr>
</tbody>
</table>

Part I Optional modules

Signal Processing pathway:

Remaining taught credits of 37.5 ECTS/75 CATS points should be obtained from the list of modules below (Part 1 Optional modules all themes), with no more than 15 ECTS/ 30 CATS points at level 6 to be included.

<table>
<thead>
<tr>
<th>Code</th>
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<td>ISVR6137</td>
<td>Electroacoustics</td>
<td>7.5</td>
<td>Optional</td>
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<tr>
<td>ISVR3061</td>
<td>Human Responses to Sound and Vibration 2020-21</td>
<td>7.5</td>
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<td>ISVR3063</td>
<td>Musical Instrument Acoustics</td>
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The programme structure table is below:

Information about pre and co-requisites is included in individual module profiles.

Where optional modules have been specified, the following is an indicative list of available optional modules, which are subject to change each academic year. Please note in some instances modules have limited spaces available.

**Structural Vibration Pathway**

**Part I**

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No more than 15 ECTS/ 30 CATS points at level 6 to be included in the year taught total of 60 ECTS/ 120 CATS points, all other modules and the Project (which is core) are at level 7.
Where optional modules have been specified, the following is an indicative list of available optional modules, which are subject to change each academic year. Please note in some instances modules have limited spaces available.

Structural Vibration theme

To exit via the Structural Vibration theme the candidate must undertake an Individual Project (core) which is relevant to Structural Vibration and obtain 60 ECTS/120 CATS taught credits according to the following criteria.

Part I Compulsory Modules

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<thead>
<tr>
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Part I Compulsory/Optional modules

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Part I Core

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<tr>
<th>Code</th>
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<tr>
<td>FEEG6012</td>
<td>MSc Research Project</td>
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<td>Core</td>
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<td>Professional Aspects of Engn.</td>
<td>7.5</td>
<td>Core</td>
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Part I Optional modules

Structural Vibration

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Progression Requirements

The programme follows the University's regulations for *Progression, Determination and Classification of Results: Undergraduate and Integrated Masters Programmes* or *Progression, Determination and Classification of Results: Postgraduate Master's Programmes*. Any exemptions or variations to the University regulations, approved by AQSC are located in *section VI of the University Calendar*. 
Support for student learning

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular Faculty or discipline area.

The University provides:

- library resources, including e-books, on-line journals and databases, which are comprehensive and up-to-date; together with assistance from Library staff to enable you to make the best use of these resources
- high speed access to online electronic learning resources on the Internet from dedicated PC Workstations onsite and from your own devices; laptops, smartphones and tablet PCs via the Eduroam wireless network. There is a wide range of application software available from the Student Public Workstations.
- computer accounts which will connect you to a number of learning technologies for example, the Blackboard virtual learning environment (which facilitates online learning and access to specific learning resources)
- standard ICT tools such as Email, secure filestore and calendars.
- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library.
- Enabling Services offering support services and resources via a triage model to access crisis management, mental health support and counselling. Support includes daily Drop In at Highfield campus at 13.00 – 15.00 (Monday, Wednesday and Friday out of term-time) or via on-line chat on weekdays from 14.00 – 16.00. Arrangements can also be made for meetings via Skype.
- assessment and support (including specialist IT support) facilities if you have a disability, long term health problem or Specific Learning Difficulty (e.g. dyslexia)
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
- Career and Employability services, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV.
- Other support that includes health services (GPs), chaplaincy (for all faiths) and ‘out of hours’ support for students in Halls and in the local community (18.00-08.00).
- A Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students’ Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students’ views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

There are facilities and services to support your learning some of which are accessible to students across the University and some of which will be geared more particularly to students in your particular School or discipline area.

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- access to key information through the MySouthampton Student Mobile Portal which delivers timetables, Module information, Locations, Tutor details, Library account, bus timetables etc. while you are on the move.
- IT support through a comprehensive website, telephone and online ticketed support and a dedicated helpdesk in the Hartley Library.
- Enabling Services offering support services and resources via a triage model to access crisis
management, mental health support and counselling.

- assessment and support (including specialist IT support) facilities if you have a disability, long term health problem or Specific Learning Difficulty (e.g. dyslexia)
- the Student Services Centre (SSC) to assist you with a range of general enquiries including financial matters, accommodation, exams, graduation, student visas, ID cards
  - Career Destinations, advising on job search, applications, interviews, paid work, volunteering and internship opportunities and getting the most out of your extra-curricular activities alongside your degree programme when writing your CV
  - Other support that includes health services (GPs), chaplaincy (for all faiths) and 'out of hours' support for students in Halls (18.00-08.00) a Centre for Language Study, providing assistance in the development of English language and study skills for non-native speakers.

The Students’ Union provides

- an academic student representation system, consisting of Course Representatives, Academic Presidents, Faculty Officers and the Vice-President Education; SUSU provides training and support for all these representatives, whose role is to represent students’ views to the University.
- opportunities for extracurricular activities and volunteering
- an Advice Centre offering free and confidential advice including support if you need to make an academic appeal
- Support for student peer-to-peer groups, such as Nightline.

Associated with your programme you will be able to access:

- School library containing specialist acoustical engineering textbooks and theses
- 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 email account and email access to staff via University system.
- Relevant specialist software on University clusters of computers.
- Formal progress monitoring during research project.
- Support for international students.

Methods for evaluating the quality of teaching and learning

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

- Completing student evaluation questionnaires for each module of the programme.
- Acting as a student representative on various committees, e.g. Staff/Student Liaison Committees, School Programmes Committee OR providing comments to your student representative to feedback on your behalf.
- Serving as a student representative on Faculty Scrutiny Groups for programme validation.
- Taking part in programme validation meetings by joining a panel of students to meet with the Faculty Scrutiny Group.

Further details on the University’s quality assurance processes are given in the Quality handbook.

External Examiner(s) for the programme

Name: Dr Olga Umnova - University of Salford

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 Academic Tutor in the first instance.

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 they take full advantage of the learning opportunities that are provided. More detailed information can be found in the programme handbook.
Appendix 1:

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 also have to pay for:

### Additional Costs

<table>
<thead>
<tr>
<th>Type</th>
<th>Details</th>
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<tbody>
<tr>
<td>Anything else not covered elsewhere</td>
<td>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 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 <a href="http://www.calendar.soton.ac.uk">www.calendar.soton.ac.uk</a>.</td>
</tr>
<tr>
<td>Approved Calculators</td>
<td>Students 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 specifies permissible models from time to time and these may be purchased from any source.</td>
</tr>
<tr>
<td>Design equipment and materials</td>
<td>We provide a wide range of resources to support project based modules and activities and these will allow you to complete your assessed exercises to the highest standard. However, you may wish to customise your project by purchasing additional resource e.g. alternative manufacturing materials, electronic components, etc. You may also incur additional costs for printing e.g. large format</td>
</tr>
<tr>
<td>Optional Visits (e.g. museums, galleries)</td>
<td>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. For costs related to study abroad please see the relevant module profile.</td>
</tr>
<tr>
<td>Printing and Photocopying Costs</td>
<td>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. Students are expected to cover the costs associated with the printing of drawings and graphic presentations. These are typically expected to be of the order of £20 - 50 per student. The third year module FEEG3003 Individual Project requires you to print an AI portrait poster on paper at a typical cost of £20.</td>
</tr>
<tr>
<td>Stationery</td>
<td>You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc.</td>
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<tr>
<td>Textbooks</td>
<td>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. Some modules suggest reading texts as optional 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.</td>
</tr>
</tbody>
</table>

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).