

## Programme Specification

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### 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 (Highfield Campus)
Mode of study	Full time
Duration in years	1 year
Accreditation details	Institution of Mechanical Engineers – PENDING Further Learning contribution for CEng registration for intakes 2019-2022
Final award	Master of Science
Name of award	Acoustical Engineering Acoustical Engineering – Structural Vibration Acoustical Engineering – Signal Processing
Interim Exit awards	Post Graduate Diploma Post Graduate Certificate
FHEQ level of final award	Level 7
UCAS code	
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	Dr Emiliano Rustighi
Date specification was written	28 August 2002
Date Programme was validated	April 2019
Date specification last updated	June 2019

### Programme Overview

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#### 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

## 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.

**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

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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

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The programme provides opportunities for you to develop and demonstrate knowledge and understanding, qualities, skills and other attributes in the areas detailed below. The programme learning outcomes have been developed with reference to the Subject Benchmark Statement for engineering (<https://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/sbs-engineering-15.pdf>) and the Characteristics Statement for Master's Degrees ([https://www.qaa.ac.uk/docs/qaa/quality-code/master's-degree-characteristics-statement.pdf?sfvrsn=6ca2f981\\_10](https://www.qaa.ac.uk/docs/qaa/quality-code/master's-degree-characteristics-statement.pdf?sfvrsn=6ca2f981_10)). The former of these is aligned with the Engineering Council publication Accreditation of Higher Education Programmes (AHEP): UK Standard for Professional

Engineering Competence (third edition)

([https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20\(1\).pdf](https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20(1).pdf))

If you opt for the shorter PG Diploma the research training element is not included.

## Knowledge and Understanding

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

	<b>Science and mathematics</b> 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

	<b>Design</b> 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

	<b>Economic, legal, social, ethical and environmental context</b> Engineering activity can have impacts on the environment, on commerce, on society and on individuals. On graduation you will have the skills to manage your activities and to be aware of the various legal and ethical constraints under which you 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

	<b>Engineering practice</b> 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
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

**Teaching and Learning Methods**

Knowledge and understanding are taught principally through lectures and practical laboratories. Extensive use is made of tutorial exercises for private learning which is supported by one-to-one support in tutorial classes. At this level students are often required to find out for themselves (e.g. from libraries and e-resources) what is relevant to solving a particular problem.

**Assessment methods**

Knowledge and understanding is assessed principally by a combination of unseen written examinations and written assignments, such as laboratory and design reports. The relative weightings vary from one module to another and are summarised in Appendix 2. Essays are occasionally set for more qualitative subjects. Oral presentations are often used to assess knowledge and understanding of project work and to report information gathering and research based activities. The dissertation is the research element of the programme and constitutes one third of the award.

**Skills**

Having successfully completed this programme you will be able to:

	<b>Engineering analysis</b> Engineering analysis involves the application of engineering concepts and tools to the solution of engineering problems. On graduation you will have achieved:
EA5	Ability to use fundamental knowledge to investigate new and emerging technologies
EA6M	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

	<b>Design</b> 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:
D11	Ability to generate an innovative design for products, systems, components or processes to fulfil new needs

	<b>Engineering practice</b> 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:
P10	Ability to apply engineering techniques taking account of a range of commercial and industrial constraints

	<b>Additional general skills</b> 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

	<b>Discipline Specific Skills</b> On completion of the Acoustical Engineering Science programme you will be able to:
	Design and conduct an appropriate programme of work to set objectives for research in an Acoustical context
	Use scientific and technical literature in support of research
	Apply fundamental knowledge and understanding of essential facts, concepts and principles relevant to Acoustical Engineering in researching complex problems

### **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 applications of these skills 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. Skills are formatively assessed through written reports and oral presentations, practical and laboratory reports. Summative assessment is through unseen examinations, extended essays, written reports and oral presentations, and completion of a research project.

## **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 <https://www.southampton.ac.uk/calendar/sectioniv/index.page>.

The teaching is structured on a semester pattern.

The Programme Structure is outlined in Appendix 3.

### **Typical course content**

Every student studies Fundamentals of Acoustics in Semester 1 as well as either Fundamentals of Vibration, Signal Processing or both. Each student also studies Professional Aspects of Engineering throughout both semesters. The remaining modules are optional and can be chosen to reflect the student's interests across the breadth of sound and vibration, such as underwater acoustics, audio signal processing, biomedical applications and more.

### **Research project**

Students work individually on a research project (30 ECTS/ 60 CATS points), under the direction of a project supervisor. A planning and literature review report is submitted at an early stage in the project, and an interview/presentation with the internal examiner is held at around the mid-point. A dissertation is submitted at the end of the project.

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.

### **Progression Requirements**

The programme follows the University's regulations for [\*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](#).

### **Intermediate exit points (where available)**

Qualification	Minimum overall credits in ECTS/CATS	Minimum ECTS/CATS credits required at level of award
Postgraduate Diploma	at least 60/120	45/95
Postgraduate Certificate	at least 30/60	20/40

## Programme outcomes for different exit points

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Level 7 (MSc)	Much of the study undertaken at Masters level reflects research at the forefront of Acoustical 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.
PG Dip	You will have attained knowledge of research being undertaken by academic staff at the forefront of Acoustical Engineering. You will have shown that you are capable of applying knowledge to solve problems, 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 be able to contribute to solving problems individually and as part of a team. You will have the qualities needed for employment in circumstances requiring sound judgement and personal responsibility under the guidance of others, in complex and unpredictable professional environments.
PG Cert	You will have been exposed to research being undertaken by academic staff at the forefront of Acoustical Engineering. You will have gained experience in applying knowledge to solve problems, and you will understand how the boundaries of knowledge are advanced through research. You will be able to deal with complex issues by following existing procedures and will be able to contribute to solving problems individually and as part of a team. You will have some of the qualities needed for employment in circumstances requiring sound judgement and personal responsibility under the guidance of others, in complex and unpredictable professional environments.

### 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 1.

### Support for student learning

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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.

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.
- 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), [chaplancy](#) (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

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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 feed back on your behalf.
- Serving as a student representative on Scrutiny Groups for programme validation
- Taking part in programme validation meetings by joining a panel of students to meet with the Scrutiny Group

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

- Regular module and programme reports which are monitored by the School
- Programme validation, normally every five years.
- External examiners, who produce an annual report
- Professional body accreditation/inspection
- A national Research Excellence Framework (our research activity contributes directly to the quality of your learning experience)
- Institutional Review by the Quality Assurance Agency

## Career Opportunities

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Graduates in the field of sound and vibration technology are in great demand. Noise and vibration are increasingly important to transport, building and manufacturing industries throughout the world as government directives on machinery, factory and vehicle noise take effect. Graduates work in production and service industries, planning authorities, consultancies, central and local government authorities, health services and environmental sectors of the community.

A significant proportion of our graduates remain at the ISVR to pursue higher research degrees. The MSc Project provides an ideal training in research methods that can lead into further research for a PhD or EngD.

## External Examiner(s) for the programme

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**Name** Dr Olga Umnova  
**Institution.** 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 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/assets/sharepoint/intranet/studentservices/publicdocuments/MSc\\_Acoustical\\_Engineering\\_Handbook.pdf](http://www.southampton.ac.uk/assets/sharepoint/intranet/studentservices/publicdocuments/MSc_Acoustical_Engineering_Handbook.pdf)

# Appendix 1:

## 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		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.
Stationery		You will be expected to provide your own day-to-day stationary items, e.g. pens, pencils, notebooks, etc.). The third year module FEEG3003 Individual Project requires you to print an AI portrait poster on paper. The typical cost for this is in the range £5 to £20.
Textbooks		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 <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.

Main Item	Sub-section	PROGRAMME SPECIFIC COSTS
<b>Equipment and Materials Equipment</b>	Design equipment and materials:	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 drawings.
<b>Printing and photocopying</b>		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.
<b>Travel and subsistence</b>		For additional costs related to travel and subsistence for the Industrial Placement Year, please refer to the module profile for FEEG 3009.
<b>Optional visits</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. For costs related to study abroad please see the relevant module profile.

## Appendix 2: Learning outcomes and Assessment Mapping

COURSES	CODE	SM7M	SM8M	SM9M	EA5m	EA6M	EA7M	D9M	D10M	D11M	EL8M	EL9M	EL10M	EL11M	EL12M	EL13M	P9m	P10m	P11m	P12M	G1	G2	G3m	G4
Aeroacoustics	FEEG6004	✓	✓		✓	✓	✓		✓			✓				✓	✓	✓			✓	✓		
Architectural & Building Acoustics	FEEG6011														✓						✓			
MSc Research Project	FEEG6012	✓	✓	✓	✓	✓	✓	✓	✓						✓	✓					✓	✓	✓	✓
Human Responses to Sound and Vibration	ISVR3061				✓												✓							
Musical Instrument Acoustics	ISVR3063																							
Noise Control Engineering	ISVR3064	✓													✓		✓				✓			
Applied audio signal processing	ISVR3071	✓	✓	✓	✓																		✓	
Signal Processing	ISVR6130	✓			✓																			
Engineering Vibration Practice	ISVR6146	✓	✓																			✓		
Fundamentals of Acoustics	ISVR6136	✓																				✓	✓	
Electroacoustics	ISVR6137																							
Biomedical Applications of Signal and Image processing	ISVR6138	✓	✓	✓	✓			✓	✓	✓	✓	✓									✓	✓	✓	✓
Active Control of sound and vibration	ISVR6139	✓		✓	✓									✓			✓	✓	✓		✓	✓	✓	✓
Fundamentals of Vibration	ISVR6141	✓	✓																					
Numerical Methods of Acoustics	ISVR6142	✓	✓		✓	✓	✓		✓			✓				✓	✓	✓			✓		✓	
Professional Aspects of Engineering	ISVR6147									✓		✓	✓	✓			✓	✓	✓	✓				

### Methods of Assessment for MSc Acoustical Engineering

Module Code	Module Title	Course-work 1	Course-work 2	Course-work 3	Present-ation	Lab 1	Lab 2	Test 1	Test 2	Exam
FEEG6012	MSc Research Project	90%			10%					
ISVR6147	Professional Aspects of Engineering	20%	30%							50%
ISVR6130	Signal Processing	10%	10%							80%
ISVR6136	Fundamentals of Acoustics					10%	10%	2.5%	2.5%	75%
ISVR6141	Fundamentals of Vibration					10%	10%			80%
ISVR3063	Musical Instrument Acoustics	60%				20%	20%			
ISVR3064	Noise Control Engineering	40%	60%							
ISVR3070	Ocean Acoustics & Biomedical Ultrasound	15%	15%							70%
ISVR6137	Electroacoustics					10%				90%
FEEG6004	Aeroacoustics	15%	15%							70%
FEEG6011	Architectural and Building Acoustics	50%	50%							
ISVR3061	Human Responses to Sound and Vibration									100%
ISVR3071	Applied Audio Signal Processing	34%	33%	33%						
ISVR6146	Advanced Vibration	10%	15%	15%						60%
ISVR6138	Biomedical Applications of Signal and	60%								40%

	Image Processing									
ISVR6139	Active Control of Sound and Vibration	70%			30%					
ISVR6142	Numerical Methods for Acoustics	25%	25%							50%

## Appendix 3: Programme Structure

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.

### COMPULSORY MODULES:

Module Code	Module Name	Semester	ECTS Credit Points (CATS in brackets)	Level
FEEG6012	MSc Research Project	Semester 2 and until submission	30(60)	7
ISVR6147	Professional Aspects of Engineering	1 & 2	7.5(15)	7
ISVR6136	Fundamentals of Acoustics	1	7.5(15)	7

Semester I: Choose 1 or 2 from the following 2 modules:

Module Code	Module Name	ECTS Credit Points (CATS in brackets)	Level
ISVR6130	Signal Processing	7.5(15)	7
ISVR6141	Fundamentals of Vibration	7.5(15)	7

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

Module Code	Module Name	Level
ISVR3064	Noise Control Engineering	6
ISVR3070	Ocean Acoustics & Biomedical Ultrasound	6
ISVR6137	Electroacoustics	7

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:

Module Code	Module Name	Level
FEEG6004	Aeroacoustics	7
FEEG6011	Architectural and Building Acoustics	7
ISVR3061	Human Responses to Sound and Vibration	6
ISVR3063	Musical Instrument Acoustics	6
ISVR3071	Applied Audio Signal Processing	6
ISVR6146	Engineering Vibration Practice	7
ISVR6138	Biomedical Applications of Signal and Image Processing	7
ISVR6139	Active Control of Sound and Vibration	7
ISVR6142	Numerical Methods for Acoustics	7
ISVR3072	Mathematical Methods For Acoustics	6

## 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.

The following modules are **compulsory**:

Module Code	Module Name	Semester	ECTS Credit Points (CATS in brackets)	Level
FEEG6012	MSc Research Project	Semester 2 and until submission	30(60)	7
ISVR6146	Engineering Vibration Practice	2	7.5(15)	7
ISVR6147	Professional Aspects of Engineering	1 & 2	7.5(15)	7
ISVR6136	Fundamental of Acoustics	1	7.5(15)	7

Choose 1 or 2 from the following 2 modules:

Module Code	Module Name	ECTS Credit Points (CATS in brackets)	Level
ISVR6130	Signal Processing	7.5(15)	7
ISVR6141	Fundamentals of Vibration	7.5(15)	7

Remaining taught credits of 37.5 ECTS/75 CATS points should be obtained from the following list of modules, **with no more than 15 ECTS/ 30 CATS points at level 6** to be included.

Module Code	Module Name	Semester	ECTS Credit Points (CATS in brackets)	Level
FEEG6004	Aeroacoustics	2	7.5(15)	7
FEEG6011	Architectural and Building Acoustics	2	7.5(15)	7
ISVR3061	Human Responses to Sound and Vibration	2	7.5(15)	6
ISVR3063	Musical Instrument Acoustics	1	7.5(15)	6
ISVR3064	Noise Control Engineering	1	7.5(15)	6
ISVR3071	Applied Audio Signal Processing	2	7.5(15)	6
ISVR6130	Signal Processing	1	7.5(15)	7
ISVR6137	Electroacoustics	1	7.5(15)	7
ISVR6138	Biomedical Application of Signal and Image Processing	2	7.5(15)	7
ISVR6139	Active Control	2	7.5(15)	7
ISVR6142	Numerical Methods of Acoustics	2	7.5(15)	7

## Signal Processing theme

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.

The following modules are **compulsory**:

Module Code	Module Name	Semester	ECTS Credit Points (CATS in brackets)	Level
FEEG6012	MSC Research Project	Semester 2 and until submission	30(60)	7
ISVR3071	Applied Audio Signal Processing	2	7.5(15)	6
ISVR6147	Professional Aspects of Engineering	1 & 2	7.5(15)	7
ISVR6136	Fundamental of Acoustics	1	7.5(15)	7

Choose 1 or 2 from the following 2 modules:

Module Code	Module Name	ECTS Credit Points (CATS in brackets)	Level
ISVR6130	Signal Processing	7.5(15)	7
ISVR6141	Fundamentals of Vibration	7.5(15)	7

Remaining taught credits of 37.5 ECTS/75 CATS points should be obtained from the following list of modules, with **no more than 15 ECTS/ 30 CATS points at level 6** to be included.

Module Code	Module Name	Semester	ECTS Credit Points (CATS in brackets)	Level
FEEG6004	Aeroacoustics	2	7.5(15)	7
FEEG6011	Architectural and Building Acoustics	2	7.5(15)	7
ISVR3061	Human Responses to Sound and Vibration	2	7.5(15)	6
ISVR3063	Musical Instrument Acoustics	1	7.5(15)	6
ISVR3064	Noise Control Engineering	1	7.5(15)	6
ISVR3070	Ocean Acoustics & Biomedical Ultrasound	1	7.5(15)	6
ISVR6146	Engineering Vibration Practice	2	7.5(15)	7
ISVR6137	Electroacoustics	1	7.5(15)	7
ISVR6138	Biomedical Application of Signal and Image Processing	2	7.5(15)	7
ISVR6139	Active Control of Sound & Vibration	2	7.5(15)	7
ISVR6141	Fundamentals of Vibration	1	7.5(15)	7
ISVR6142	Numerical Methods of Acoustics	2	7.5(15)	7

### Contact information

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