

## Programme Specification

---

### MSc Sound and Vibration Studies

1.	<b>Awarding Institution</b>	University of Southampton
2.	<b>Teaching Institution</b>	University of Southampton (Highfield campus)
	<b>School</b>	Institute of Sound and Vibration Research
3.	<b>Accreditation details</b>	MSc programme accredited by IMechE as Further Learning contribution for CEng registration for intakes 2010-2014. PG Diploma accredited as Further Learning for IEng registration.
4.	<b>Final award</b>	MSc/PG Diploma in Sound and Vibration Studies Engineering Acoustics Structural Dynamics Applied Digital Signal Processing PG Certificate in Sound and Vibration Studies
5.	<b>Programme title</b>	Sound and Vibration Studies
6.	<b>UCAS code:</b>	N/A
7.	<b>QAA Subject Benchmark</b>	N/A
8.	<b>Date revised</b>	14 September 2010
	<b>Programme organiser</b>	Professor DJ Thompson

### 9. 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.

Specific 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.
- To develop your ability to apply the academic knowledge gained to practical situations in your chosen discipline.
- Through a substantial open-ended research project, to develop your 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.
- To 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.

### 10. Learning Outcomes

---

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

## 10.1 Knowledge and Understanding

On successful completion of the MSc programme, you are expected to have gained:

- (a) A thorough understanding of the fundamental scientific aspects of your chosen field, and the interrelationships between them;
- (b) Critical ability, as demonstrated by a dissertation which advances a specific area of research;
- (c) Sufficient breadth of technical background to permit study of the current literature, identification of gaps in information, and engagement in discussion with peers.

For a PG Diploma you are expected to reach equivalent levels under items (a) and (c).

For a PG Certificate you are expected to acquire knowledge in the field of sound, vibration and signal processing, sufficient to work under supervision.

## 10.2 Intellectual and Research Skills

On successful completion of the MSc programme, you should be able to:

- (a) Approach problem solving by identifying information needs and assembling information from different sources, in order to build a clear overall picture of a complex problem and potential solutions;
- (b) Evaluate different types of information critically in a variety of formats (including current research, technical manuals, and standards);
- (c) Make use of existing theories and concepts, and be able to apply them independently to new problems and situations;
- (d) 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 (a), (b) and (c).

For a PG Certificate you are expected to develop skills (b) and (c) within the limited range of subjects studied.

## 10.3 Practical Skills

MSc students develop the following practical skills:

- (a) You will develop practical laboratory skills through the taught module in Advanced Measurement Techniques, and in laboratories associated with other modules.
- (b) There is a module on Matlab programming and its use in mathematical modelling.
- (c) All one-week modules contain practical laboratory sessions to develop associated practical skills.
- (d) You will also develop skills in technical writing, research planning and execution through full-time work on a research project.

PG Diploma and PG Certificate students have the same opportunities for items (a) to (c), but do not do a research project. (PG Diploma students may opt for the Project Development module or replace it with another module).

## 10.4 Transferable and Generic Skills

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

- (a) Learning: independent study and skills development;
- (b) Problem solving: recognition, definition, analysis and solution;
- (c) Awareness of your present knowledge limitations, and readiness to gain new knowledge through further study and teamwork in your professional field.
- (d) Information processing (including IT skills): literature searching, abstracting documents, and collating information for the purposes of technical writing;
- (e) Data manipulation (including IT skills): analysis of data, application of statistical methods, interpretation of results;
- (f) Communication: oral and written presentation of information, technical writing, communicating across disciplines;
- (g) Individual: decision-making, initiative-taking, self-motivation and direction, personal responsibility;
- (h) Management: safe and effective project planning and execution, time management (more highly developed for MSc through research project).

## 10.5 Teaching and Learning Methods

### (a) Semester 1

A range of introductory modules are taught in parallel during the first semester (see Appendix 1). These are taught via whole-class lecture (2 lectures/week). The modules “Fundamentals of Acoustics”, “Fundamentals of Vibration”, “Signal Processing” and “Digital Signals and Systems” include hands-on demonstrations and exercises in small groups. You normally take six modules (60 credit points [CP]; 30 ECTS) in Semester 1.

### (b) Semester 2

You normally take 5 other modules (50 CP; 25 ECTS) in Semester 2 (plus Project Development, see below): delivery is either via conventional weekly lectures, or as one-week full-time modules (see Appendix 1).

- 12-week modules are lectured to the whole class,
- “Advanced Measurement Techniques” is taught in small groups in the laboratory.
- 1-week modules are a combination of class lectures and group laboratory instruction (see below).

### (c) One-week modules

A programme of one-week modules is available in specialist subjects, particularly in Applied Digital Signal Processing (see Appendix 1). This especially suits part-time students who are in full-time employment. Each module (worth 10 CP, 5 ECTS) comprises a one-week (normally 3½ days) residential taught component followed by an assignment and/or examination. In advance of each module you will be referred to recommended texts. If in doubt you can contact the module coordinator for further information. Each module is followed by an in-depth assignment to consolidate and assess your learning. You may take any combination of one-week modules and conventional 12-week modules. Modules are listed in Appendix 1. Not all modules will run in any particular year.

### (d) Project Development

The Project Development module (10 CP, 5 ECTS) includes instruction on the use of the library facilities and training in technical writing and more specific training in research planning at the start of the second semester. This is followed by individual directed study. PG Diploma students may opt to take an additional taught module in Semester 2 in place of Project Development.

### (e) Full-time project work

You work individually on a research project (60 CP, 30 ECTS), under the direction of your project supervisor. An interview with the External Examiner is held at an early stage in the project, and a formal progress review takes place at around the mid point.

## 10.6 Assessment Methods

Method	Learning outcomes tested
Formal written examination	Knowledge and understanding: 10.1 (a), (c)
	Intellectual skills: 10.2 (c)
Formal written assignments	Knowledge and understanding 10.1 (a), (c)
	Intellectual skills: 10.2 (c), (d)
	Transferable skills 10.4
Assessment of project work	Knowledge and understanding: 10.1 (a), (b), (c), (d)
	Intellectual skills: 10.2 (a), (b), (c), (d)
	Practical and transferable skills 10.3, 10.4
Laboratory reports	Practical and transferable skills 10.3, 10.4

The following reference points have been used in designing the programme:

- University Teaching and Learning Strategy
- QAA National Qualifications Framework
- Liaison with Industry
- Staff research
- Student feedback
- EPSRC Integrated Graduate Development Scheme (IGDS) framework and meetings (ADSP modules)

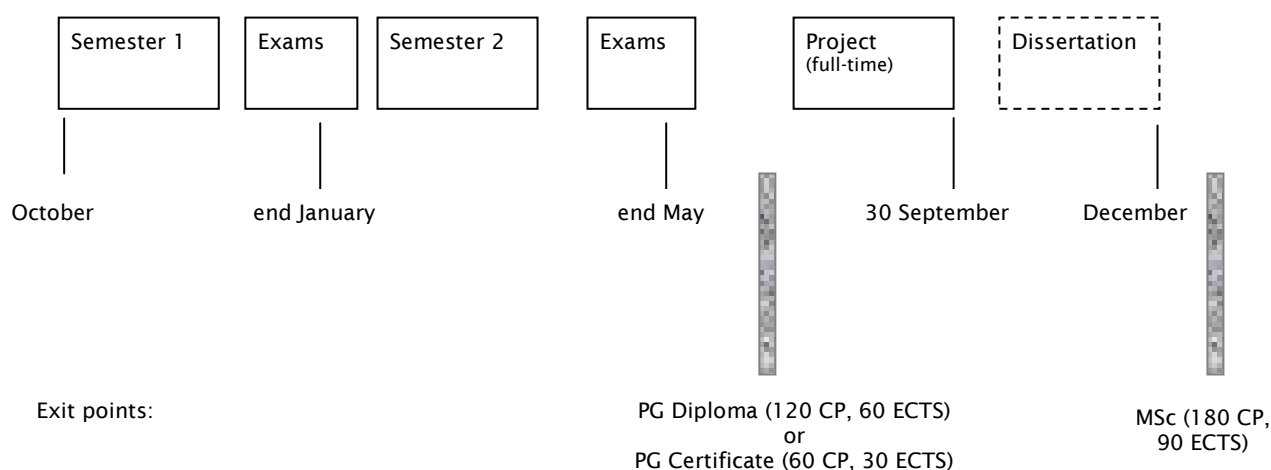
## 11. Programme Structure

---

### 11.1 Full-time MSc

The full-time MSc programme lasts for 12 months, during which you will be in continuous residence at the University apart from the Christmas and Easter closure periods. The first 8 months are spent mainly on the taught component, with lectures divided into two 12-week periods (Semesters 1 and 2), and with exams at the end of each semester. The modules are listed in Appendix 1. The final 4 months are spent full-time on a research project, for which some preparation is done in Semester 2. You are encouraged to commence project work before the Semester 2 exams to allow yourself maximum time, especially where practical work 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 alternative exit points.



(Note - CP = credit points)

### 11.2 Part-time MSc

The taught component of the MSc programme can be studied by arrangement on a part-time basis. Similar arrangements apply to the PG Diploma (120 CP, 60 ECTS total) and PG Certificate (60 CP, 30 ECTS total).

Part-time MSc students may only begin practical work on the MSc research project after successful completion of at least 60 CP (30 ECTS) plus the Project Development module. 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.

## 12. Support for students and learning

---

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

In the School the following is provided:

- Induction programme for orientation, introduction of the programme and staff, and dissemination of materials.
- Student Handbook, including guidance on selection of study programmes.
- You will be allocated a personal tutor to assist with organisational and personal matters. This role is taken over by your project supervisor when the research project starts.
- Careers advice and dissemination of available job advertisements.
- ISVR library and study resources.
- Access to ISVR cluster of computers with relevant specialist software.
- Out of hours access to facilities including weekends.
- Formal progress monitoring during research project.

In addition the University provides:

- Personal e-mail account and e-mail access to staff.
- Access to university Learning and Teaching Support Services.
- Careers service.

### **13. Information about assessment and progression**

---

The following summary contains details specific to the Sound and Vibration Studies programme. It should be read in conjunction with the University Regulations as specified in the Calendar.

#### **13.1 Taught component**

The progression rules described in the Calendar apply and can be found here:  
<http://www.calendar.soton.ac.uk/sectionIV/progression-regs.html>

Referral examinations may be offered to students who fail to achieve the required aggregate, or fail individual modules and do not qualify to progress under the compensation scheme, following academic counselling from the School. These are normally set in early July.

Retake procedures will be available to candidates not achieving the aggregate pass mark or failing at referral, and who have not previously retaken. You will normally be required to retake the full set of examinations at the usual times in the following year.

#### **13.2 Research project**

Your project work is independently assessed by two individuals: the supervisor and another internal examiner. In addition, the External Examiner may be asked to read and comment on any dissertation.

A dissertation is awarded a grade based on the average of the marks given by the two examiners. Where their marks differ by more than 10%, the examiners will be asked to review their marks following discussion. If this does not resolve the discrepancy a moderator will be appointed to determine the final mark.

#### **13.3 Awards and Degree Classification**

On successful completion of both the taught component and the research component, you will be awarded a Master of Science in Sound and Vibration Studies from the University of Southampton. The following alternative degree titles are available subject to completion of appropriate modules (see Appendix 1) and a project in an appropriate area:

- Master of Science in Engineering Acoustics
- Master of Science in Structural Dynamics
- Master of Science in Applied Digital Signal Processing

For intermediate exit points, see section 13.4.

#### **13.4 Intermediate Exit Points**

The pass requirements for intermediate exit points are:

PG Certificate in Sound and Vibration Studies – Aggregate mark of 50% on taught modules totalling 60 credit points (30 ECTS) in value.

PG Diploma in Sound and Vibration Studies – Aggregate mark of 50% on taught modules totalling 120 credit points (60 ECTS) in value. The following alternative degree titles are available subject to completion of appropriate modules (see Appendix 1):

- PG Diploma in Engineering Acoustics
- PG Diploma in Structural Dynamics
- PG Diploma in Applied Digital Signal Processing

Each module must be passed at the level set in the progression rules described in the Calendar, subject to the provisions of section 13.1 above concerning compensation.

## 14. Monitoring and Quality Assurance

---

### 14.1 QA procedures

The Education Sub-Committee requires annual reporting of compliance with standards set in the University QA Handbook. Further information on QA processes adopted within the School is given in Section 15.

### 14.2 Taught component

Each of the modules (lectures plus laboratories) that make up the programme will be taught at the University of Southampton, with a named member of academic staff as coordinator. Where non-academic staff (e.g. visiting lecturers, postdoctoral assistants) contribute to the teaching, the academic coordinator is responsible for ensuring appropriate quality and content.

Assessment procedures for each module will be administered by the School, and overseen by the Faculty of Engineering and the Environment to ensure compliance with University policy.

### 14.3 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 ISVR; in the case of projects carried out externally, the co-supervisor may be from the institution offering project facilities. The supervisor and co-supervisor conduct a formal progress review with the student, normally during July/August.

Each project student is interviewed by the External Examiner to evaluate early progress, and final dissertations are made available to the External Examiner for comment on standards.

### 14.4 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.

## 15. Methods for evaluating the quality of the programme

---

There are three basic ways in which the programme is monitored and evaluated:

- By feedback from students;
- By periodic internal review (programme committee) and continuous monitoring (individual lecturers);
- By the External Examiner.

More information is provided under the three headings below.

### 15.1 Feedback from students

- The Programme Organiser meets regularly with students during the taught component in order to deal informally with problems as they arise.
- There is a regular Staff-Student Liaison meeting for all ISVR students at which issues of student concern are aired, with responsible academics present.
- Student ratings of individual modules are sought via anonymous questionnaire at the end of each module.
- An elected programme representative attends School Board and Programme Committee meetings and brings comments and suggestions.

### 15.2 Internal Review

In addition to continuous monitoring of their own modules by individual lecturers, the following processes operate within the ISVR:

- Programme Committee meetings twice per year take note of student feedback. In addition, a subject area is identified each year for detailed review by a working group.
- Examination question papers are all moderated by a second academic staff member before being sent to the External Examiner.

### 15.3 External Examiner

The External Examiner for the Sound and Vibration Studies postgraduate programme acts as Programme Examiner. He/she

- Ensures that the taught component is of an appropriate level, by moderating the examination papers and assignments.
- Monitors the level of difficulty of projects, by interviewing all project students at an early stage in their projects.
- Ensures that assessment procedures are properly carried out, by attending the Examiners' Board in June and by checking scripts as appropriate.
- Carries out a formal check on marking standards by examining a sample of scripts and assignments.

In addition, he/she has the opportunity to read and comment on each submitted dissertation.

The objective in each case is to validate the level of the programme, and the achievement of the students, against internationally-recognized standards of excellence in the field of Sound and Vibration Studies.

### 15.4 Summary of mechanisms

- Programme Committee meetings and annual subject area review meetings
- ISVR Staff-Student Liaison meetings held regularly
- Student participation in programme committees and annual review process
- Student representation on School Board
- External Examiner monitors teaching and assessment standards of taught component, and research projects.
- Module reviews and Programme Review submitted annually
- Peer teaching observation (internal and external staff)
- Annual staff appraisal (internal staff)
- University Training and Development Programme for staff support

## 16. Entry requirements

---

The standard of the programme is that expected of an honours graduate (or post-qualification professional) who has successfully completed a programme of study in a field that provides an appropriate foundation of prior knowledge and skills.

Typical entry requirements for the programme are a good honours degree (typically at least second class) in a relevant subject. However, applications are assessed individually, and any candidates who do not match the standard profile but who have appropriate academic qualifications and industry experience are encouraged to apply.

In accordance with the University's Equal Opportunities Policy, the programme is open to anyone regardless of age, class, creed, disability, ethnic origin, gender, marital status, nationality, sexual orientation or caring responsibilities.

### 17. Contact information

Professor D J Thompson		Mrs S J Brindle
Programme Organiser		Programme Secretary
djt@isvr.soton.ac.uk		mcsvs@isvr.soton.ac.uk
(Tel. No. +44 (0)23 8059 2510)		(Tel. No. +44 (0)23 8059 2291)

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.

## Revision History

1. Version 1.3: 28 August 2002 (CLM, Final version after drafting process)
2. Version 2.3: 13 July 2004 (DJT, Changes to include reflect amalgamation of MSc Applied Digital Signal Processing into Sound and Vibration Studies and availability of alternative degree titles)
3. Version 2.4: 5 May 2005 (DJT)
4. Version 2.5: 9 August 2006 (DJT)
5. Version 2.6: 30 August 2007 (DJT)
6. Version 2.7: 7 August 2008 (DJT)
7. Version 2.8: 17 September 2008 (DJT; rebranding)
8. Version 3.0: 17 September 2008 (DJT/CJJ, draft including MSc Biomedical Signals and Systems)
9. Version 3.1: 21 July 2009 (CJJ/DJT)
10. Version 3.2: 14 September 2010 (DJT; MSc Biomedical Signals and Systems removed, changes to reflect new progression rules)

## APPENDIX 1: 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. Each module carries 10 CP (5 ECTS)

**MSc in Sound and Vibration Studies 2010-11**

SEMESTER 1: normal load = 6 modules

code	Level	Module title	Sem	Exam	Assignment
ISVR6030	M	Fundamentals of acoustics	S1	70%	30%
ISVR6031	M	Fundamentals of vibration	S1	80%	20%
ISVR6032	M	Signal processing	S1*	70%	30%
ISVR6033	M	Noise control	S1*	0%	100%
ISVR6035	H	MATLAB computation	S1	0%	100%
ISVR6036	M	Human responses to sound and vibration	S1¶	25%	75%
ISVR6037	M	Underwater acoustics 1	S1*	100%	0%
ISVR6045	M	Digital signals and systems	S1*	80%	20%
ISVR3007	H	Musical instrument acoustics	S1*	0%	100%

SEMESTER 2: normal load = 5 modules (any mix of 12- or 1-week modules†)

Code	Level	Module title	Sem	Exam	Assignment
ISVR6038	M	Analytical and numerical acoustics	S2*	50%	50%
ISVR6094	M	Advanced measurement techniques	S2	0%	100%
ISVR6042	M	Environmental & transportation noise	S2*	0%	100%
ISVR6043	M	Structural vibration	S2	75%	25%
ISVR6044	M	Finite element vibration analysis	S2*	0%	100%
ISVR6048	M	Electroacoustics	S2*	100%	0%
ISVR6050	M	Underwater acoustics 2	S2*	100%	0%
ISVR6102	M	Fundamentals of aeroacoustics	S2*	70%	30%
ISVR6103	M	Audio signal processing	S2*	50%	50%
ISVR6117	M	Architectural and building acoustics	S2	0%	100%
ISVR6071	M	Project development	S2	0%	100%

\* = Joint lectures with Year 3/4 (BEng/MEng)

¶ = Joint with Civil MSc in Env. &amp; Transportation Eng.

† see also 1-week stand-alone modules below.

INTENSIVE MODULES: offered subject to places being available. Not all modules run each year.

Code	Level	Module title		Exam	Assignment
ISVR6053	M	Vibration control	S2§	50%	50%
ISVR6041	M	Human response to vibration	S2§	0%	100%
ISVR6016	M	Sonar and array signal processing	S2§	0%	100%
ISVR6020	M	Adaptive Methods ( <i>not available in 2010/11</i> )	S2§	0%	100%
ISVR6027	M	Introduction to random signals	S2§	0%	100%
ISVR6046	M	Active control of sound and vibration	S2§	0%	100%
ISVR6074	M	Biomedical applications of signal processing	S2§	0%	100%
ISVR3041	H	Audio recording	S2§	0%	100%

§ = 'One-week' modules (or equivalent)

**Engineering Acoustics theme**

Modules totalling 120 credit points (60 ECTS), of which at least 100 credit points (50 ECTS) must be from the following list:

code	Level	Module title	Sem	Exam	Assignment
ISVR6030	M	Fundamentals of acoustics	S1	70%	30%
ISVR6031	M	Fundamentals of vibration	S1	80%	20%
ISVR6032	M	Signal processing	S1	70%	30%
ISVR6033	M	Noise control	S1	0%	100%
ISVR6035	H	MATLAB computation	S1	0%	100%
ISVR6036	M	Human responses to sound and vibration	S1	25%	75%
ISVR6037	M	Underwater acoustics 1	S1	100%	0%
ISVR6046	M	Active control of sound & vibration	S2§	0%	100%
ISVR6094	M	Advanced measurement techniques	S2	0%	100%
ISVR6038	M	Analytical and numerical acoustics	S2	50%	50%
ISVR6117	M	Architectural and building acoustics	S2	0%	100%
ISVR6048	M	Electroacoustics	S2	100%	0%
ISVR6042	M	Environmental & transportation noise	S2	0%	100%
ISVR6102	M	Fundamentals of aeroacoustics	S2	70%	30%
ISVR6050	M	Underwater acoustics 2	S2	100%	0%
ISVR6071	M	Project development	S2	0%	100%

**Structural Dynamics theme**

Modules totalling 120 credit points (60 ECTS), of which at least 100 credit points (50 ECTS) must be from the following list:

code	Level	Module title	Sem	Exam	Assignment
ISVR6030	M	Fundamentals of acoustics	S1	70%	30%
ISVR6031	M	Fundamentals of vibration	S1	80%	20%
ISVR6032	M	Signal processing	S1	70%	30%
ISVR6033	M	Noise control	S1	0%	100%
ISVR6035	H	MATLAB computation	S1	0%	100%
ISVR6036	M	Human responses to sound and vibration	S1	25%	75%
ISVR6046	M	Active control of sound & vibration	S2§	0%	100%
ISVR6094	M	Advanced measurement techniques	S2	0%	100%
ISVR6043	M	Structural vibration	S2	75%	25%
ISVR6044	M	Finite element vibration analysis	S2	0%	100%
ISVR6053	M	Vibration control	S2§	50%	50%
ISVR6071	M	Project development	S2	0%	100%

§ = One-week intensive module offered subject to availability of places.

**Applied Digital Signal Processing theme**

Modules totalling 120 credit points (60 ECTS), of which at least 100 credit points (50 ECTS) must be from the following list (at least 50 credit points (25 ECTS) must be from those modules marked ♣):

code	Level	Module title	Sem	Exam	Assignment
ISVR6030	M	Fundamentals of acoustics	S1	70%	30%
ISVR6031	M	Fundamentals of vibration	S1	80%	20%
ISVR6032	M	Signal processing ♣	S1	70%	30%
ISVR6045	M	Digital signals and systems ♣	S1	80%	20%
ISVR6033	M	Noise control	S1	0%	100%
ISVR6035	H	MATLAB computation	S1	0%	100%
ISVR6036	M	Human responses to sound and vibration	S1	25%	75%
ISVR6037	M	Underwater acoustics 1	S1	100%	0%
ISVR6094	M	Advanced measurement techniques	S2	0%	100%
ISVR6046	M	Active control of sound & vibration ♣	S2§	0%	100%
ISVR6048	M	Electroacoustics	S2	100%	0%
ISVR6050	M	Underwater acoustics 2	S2	100%	0%
ISVR6103	M	Audio signal processing ♣	S2	50%	50%
ISVR6016	M	Sonar and array signal processing ♣	S2§	0%	100%
ISVR6020	M	Adaptive methods ♣	S2§	0%	100%
ISVR6027	M	Introduction to random signals ♣	S2§	0%	100%
ISVR6074	M	Bio-medical applications of signal processing ♣	S2§	0%	100%
ISVR6071	M	Project development	S2	0%	100%

§ = One-week intensive modules (or equivalent), offered subject to availability of places. Not all modules run each year.