Course Specification

A Course Information

Final award title(s)	MSc Environmental and Architectural Acoustics	**Course Code(s)**	**January** 5227 FT 5229 PT
Intermediate award title(s)			
Awarding Institution	London South Bank University		
School	☐ ASC ☐ ACI ☒ BEA ☐ BUS ☐ ENG ☐ HSC ☐ LSS		
Division	Civil and Building Services Engineering		
Delivery site(s) for course(s)	☒ Southwark ☐ Havering ☐ Other: please specify		
Mode(s) of delivery	☒ Full-time ☒Part-time ☐ Both		

Length of course

Mode	Length years	Start - month	Finish - month
Full-time (Jan)	16 months	January	May
Part-time (Jan)	28 months	January	May

Is this course generally suitable for students on a Tier 4 visa?

Please complete the International Office questionnaire

Yes No ✓

Students are advised that the structure/nature of the course is suitable for those on a Tier 4 visa but other factors will be taken into account before a CAS number is allocated.

Approval dates:	Course(s) validated	September 2019
	Course specification last updated and signed off	September 2021
Professional, Statutory & Regulatory Body accreditation	• Chartered Institute of Building Service Engineers Accredited to 2023 intake	
Reference points:	Internal	- LSBU Mission Statement and Strategic Plan; - LSBU Core Skills Policy; - LSBU Academic Regulations
	External	- Engineering Council, Accreditation of Higher Education Programmes (Third Edition 2014);

B Course Aims, Features and Outcomes

Distinctive features of course	This course prepares students for a career as an acoustician. The course embraces recent industry developments, in particular, the inclusion of the ECUK UK Standard for Professional Engineering Competence (UK-SPEC) and gives students the opportunity to achieve the professional status of Chartered Engineer.

	The curriculum emphasises the development of traditional engineering numerical strengths coupled with an enquiring creative approach as required by employers. Developing the latter approach is sometimes culturally difficult but it is our aim to get students to eventually approach with relish a blank sheet of paper and an ill-defined, uncertain brief to which they can develop a rational solution. The principles of good acoustic design, environmental assessment, and noise control are studied in a thread of modules and applied in lab work, presentations, group projects, written assessments and by examination. We do seek to educate, rather than to merely train. Because acoustics is such a broad area, there is a wide range of different specialisms for students to consider after graduating, but our degree gives to our students a solid background and expertise for entering any of them. This course can be taken on the basis of a taught two day per week attendance or as a part-time course timetabled on one-day-a-week attendance.
Course Aims	**The MSc in Environmental and Architectural Acoustics aims to:** 1. Produce graduates who are committed to a career in acoustics with a range of employers in a variety of countries. 2. Produce graduates equipped for research at the PhD level and to take up responsible professional employment both in the construction industry, consultancy, or design and become lifelong learners with an appreciation of the value to society of an education in engineering, physics or architecture. 3. Produce graduates who have a breadth and depth of knowledge and understanding of the key aspects of acoustics. 4. Allow students to acquire and develop analytical and problem-solving skills, and subject-specific skills. To acquire and develop the ability to evaluate evidence, arguments and assumptions, to reach sound judgements and communicate effectively. 5. Develop students who approach design problems creatively and who have the technical skills to see their ideas through to realisation. 6. Provide opportunities to those in full-time employment to study towards a post graduate degree in acoustics on a part-time basis. 7. Create an educational environment that may benefit from the practical experience of mature and part-time students. 8. Provide an engineering education, centred within the built environment that recognises the important roles of other professions in the development of the built environment and cultivates interaction and teamwork with these other professionals. 9. Provide students with the necessary academic qualification suitable to meet the requirements of further learning of a Chartered Engineer.
Course Outcomes	The course outcomes have been developed with reference the Learning Outcomes described in Engineering Council Documentation (Appendix C). The curriculum map showing the modules in which the material that each of the learning outcomes covers is taught, developed and assessed is in Appendix A. **a) Students will have knowledge and understanding of:** A1: How humans perceive sound. A2: How noise can be assessed as a physical agent and controlled by the application of appropriate techniques to produce a safe, comfortable and productive environment. A3: Recent advances in acoustic equipment, particularly add-ons to desktop and mobile computers. A4: The latest computer software for prediction of the behaviour of sound in buildings and the built environment. A5: Standards, codes of practice and regulatory instruments relating to acoustics in the UK and European Union.

	A6: Knowledge and understanding of management techniques, including project management that may be used to achieve engineering objectives. A7: Awareness of relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues. A8: Knowledge and understanding of risk issues, including health & safety, environmental and commercial risk, and risk assessment and risk management techniques. **b) Students will develop their intellectual skills such that they are able to:** B1: Identify and access key sources of information. B2: Use and adapt specific design and control methodologies for effective noise control. B3: Analyse complex problems and synthesise information. B4: Develop rational arguments in order to support a particular strategy. B5: Apply good management practices. B6: Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards. B7: Work with information that may be incomplete or uncertain and quantify the effect of this on the design. B8: Apply advanced problem-solving skills, technical knowledge and understanding, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including sustainability, production, operation, maintenance and disposal. B9: Plan and manage the design process, including cost drivers, and evaluate outcomes. B10: Communicate their work to technical and non-technical audiences. c) **Students will acquire and develop practical skills such that they are able to:** C1 Construct and use mathematical models to analyse multi-variable problems. C2 Design an acoustic environment fit for purpose. C3 Use design guidance materials appropriately. C4 Select and specify appropriate equipment to fulfil specific design functions. C5: Knowledge of relevant legal and contractual issues. Understanding of appropriate codes of practice and industry standards (P5b and P6b) C6: Awareness of quality issues and their application to continuous improvement. C7: Ability to work with technical uncertainty. Understanding of, and the ability to work in, different roles within an engineering team. d) **Students will acquire and develop transferrable skills such that they are able to:** D1 Research and collect literature from a wide range of sources including the internet. D2 Write reports that convey complex information and concepts both concisely and informatively. D3 Use advanced techniques in spreadsheets and other software for data handling and manipulation. D4 Communicate effectively with other disciplines in the built environment or building services industries.

b

C Teaching and Learning Strategy

A Knowledge and understanding

Scientific principles underpinning Acoustics & Noise Control (outcome SM1b) are taught. Environmental assessment and surveys are taught as practical subjects. Teaching methods include lectures, tutorial, laboratory experiments, computing and online sources for self-study.

Understanding of scientific principles is developed in *Architectural Acoustics*, *Masterclass in Acoustics* and in *Subjective & Environmental Acoustics* through computer workshops and laboratory work with both individual and group.

Students are taught about wider scientific methods and techniques in *Research Methods* with a particular focus on risk assessment, health and safety management and project management (EL6b). Students are also taught professional and ethical conduct (outcome EL1b) in Research Methods, as well as the commercial, economic and social context of engineering (outcome EL2b).

Sustainability principles and the ability to apply quantitative techniques (outcome EL4b) are taught across all modules but is one of the focuses of the *Energy and Engineering Project* module.

Teaching is through lectures, tutorials, laboratory work, field work and practical sessions. The application of health and safety is through risk assessment, which students are constantly introduced to in laboratory and field works. (Outcomes EL1b-EL6b) are developed in research and group design in Measurement and Control of Sound at level 7.

Throughout the course students have module guides relevant to each topic of study, giving additional reading material which students are encouraged to use for private study to consolidate the formal learning process, and both broaden and deepen their knowledge and understanding in the subject area. All students are encouraged to become student members of the professional institutions, use their libraries and resources, and attend meetings.

B Intellectual skills

Students are taught to interpret and assess their results and to understand engineering principles and to apply them to *analyse* key engineering processes (outcome EA1b) in *Measurement and Control of Sound*.

The student's skills are further developed in the *Masterclass in Acoustics,* and in Semester 2 to solve real world engineering problems (EA4b).
The ability to Identify, classify and describe the impact of noise through the use of analytical methods and modelling techniques (outcome EA2b) is taught in *Subjective and Environmental Acoustics*.

Students are taught how to apply quantitative and computational methods in order to solve engineering problems and to implement appropriate action (outcome EA3b and D4b)) in *Architectural Acoustics*.

Students are taught the necessity to understand end users' needs (outcome D1b) in the *Research Methods* module and develop this through the group design projects in the later module *Masterclass in Acoustics*.

The skill of defining the problem and its various constraints (outcome D2b) is taught in *Architectural Acoustics* at level 7 and is developed later in the *Energy and Engineering Module*.

The students learn how to deal with uncertainty and incomplete information (outcome D3b) in *Research Methods*. This is developed in the *Masterclass in Acoustics* module.

In the project students learn how to manage the design process (outcome D5b) and also to communicate their work (outcome C6). The communication skills are taught in *Research Methods* (writing, Sketch up, presenting) Outcomes D1b-D6b are developed during *Energy and Engineering Project*.

C Practical Skills

Students appreciate the context of engineering (outcome P1b) in *Measurement and Control of Sound* and during the *Acoustics Laboratory* Module. This is then taught and developed in most of the level 7 modules.
Understanding of materials, equipment etc. (outcome P2b) and the laboratory practice (outcome P3b) are largely taught and developed during the *Acoustics Laboratory* module but are further explored in *Architectural Acoustics* using tutorials, laboratories and computer workshops.

In their study, students are taught to use technical literature related to a specific discipline (outcome P4b). This knowledge is developed in project work at level 7.

Relevant standards and guidance are used throughout the course (outcome P5b) are taught in *Research Methods* and developed further in *Masterclass in Acoustics* as well as in *Energy and Engineering Project* at level 7.

Quality issues (outcome P7b) are introduced in *Measurement and Control of Sound*, in relation to the laboratory experiments taken in *Acoustics Laboratory*. The quality awareness is developed in Research Methods and in *Masterclass in Acoustics*.

Students' ability to work with technical uncertainty (outcome P8b) is developed in all modules while it is also taught in research methodologies lectures in *Research Methods*.

Group working skills (outcome P9b) are taught in *Subjective and Environmental Acoustics* and in *Masterclass in Acoustics modules*.

D Practical Skills

Students acquire their (outcome G1b) related skills of communication in *Research Methods*, problem-solving in *Measurement and Control of Sound*, *Masterclass in Acoustics*, computing in *Research Methods* and in *Architectural Acoustics,* information retrieval in *Research Methods* and working with others in *Masterclass in Acoustics.* Self-learning and personal development (outcome G2b) are taught across all the modules and developed in the *Energy and Engineering Project* module*.*

The ability to carry out a personal programme of work (outcome G3b) is taught in *Research Methods*. Exercising personal responsibility (outcome G4b) is part of *Acoustic Laboratory* and the *Energy and Engineering Project.*

D Assessments

A Knowledge and understanding

The understanding of the knowledge base of scientific principles (SM1b) is assessed through *unseen written examinations* and *in-class test* in the disciplines of *Measurement and Control of Sound* and in *Subjective and Environmental Acoustics*.

Coursework is also used, comprising: *laboratory, computing and design reports.* Mathematics (SM2b) is informally assessed during *Measurement and Control of Sound* through *phase tests.* Students are assessed in their understanding of other engineering disciplines (outcome SM3b) in *Architectural Acoustics* through *reports* and individual and group projects in *Masterclass in Acoustics* and the final assessment of *Measurement and Control of Sound.*

Professional and ethical conduct (EL1b) is assessed in *Research Methods* and during *Energy and Engineering Project*. Financial and social context (EL2b) is assessed in *Research Methods* through a *design exercise coursework*.

Legal aspects (EL5b) are assessed in *Masterclass in Acoustics* through an *essay-based coursework.*

Knowledge of management (EL3b) and health and safety principles (EL6b) is assessed in *Research Methods* again through *written assignments.*

The understanding of sustainability (EL4b) is assessed *in laboratory reports* in *Acoustics Laboratory* and in *Architectural Acoustics* through report based *coursework*.

B Intellectual skills

The interpretation of results (EA1b) is assessed in laboratory reports where results from two or more different approaches are compared and recommendation given, as initially taken in *Acoustics Laboratory*. This occurs in *Subjective and Environmental Acoustics* and in *Measurement and Control of Sound modules*.

The ability to use analytical methods and modelling techniques (EA2b) is assessed through reports in *Architectural Acoustics* and later analysis and design modules in particular *Energy and Engineering Project*. How to apply quantitative and computational methods (EA3b) is assessed in *Architectural Acoustics* in the form of reports based *coursework*. Group Design Project assesses a variety of skills and knowledge combined to solve a complex engineering problem in an integrated and systematic approach (EA4b) and are used *in Measurement and Control of Sound* and in *Masterclass in Acoustics*.

Identifying end users' needs (D1b) is assessed in project work in *Energy and Engineering Project* and in group design project work. The skill of defining the problem (D2b) is assessed in most modules.

Statistics and probability are part of the phase tests in *Research Methods*, but general dealing with uncertainty (D3b) is assessed in laboratory *coursework, Acoustics Laboratory*. Problem-solving skills (D4b) and their application to multi-disciplinary problems are assessed through group design projects. The management of the design process (D5b) is assessed in the presentations given in *Measurement and Control of Sound* and in *Masterclass in Acoustics* modules.

The communication skills (D6b) are assessed in *Research Methods*, *Measurement and Control of Sound*, and in *Masterclass in Acoustics*, as a group design project as well as group design projects at level 7.

C Practical Skills

Understanding of materials, equipment etc. (P2b) and the laboratory practice (P3b) are assessed in *Acoustics Laboratory, and Subjective and Environmental Acoustics* using technical and computing laboratory reports. The use of technical literature related to a specific discipline (P4b) is assessed in coursework and design exercises in *Research Methods* and other modules. The P1b-P5b outcomes are also assessed in final project, *Energy and Engineering Project*.

Relevant legal and contractual issues (P5b) are assessed through reports and coursework in *Research Methods*. The use of codes of practice (Eurocode) (P6b) forms a part of in-class tests in design modules in all modules. The appreciation of quality issues (P7b) such as the quality of results is included in lab reports in *Acoustics laboratory, Subjective and Environmental Acoustics and Measurement and Control of Sound*. The quality awareness is assessed in coursework and lab reports the aforementioned modules.

Students' ability to work with technical uncertainty (P5b) is assessed in *Measurement and Control of Sound* and further examined in *Masterclass in Acoustics*.

D Practical Skills

(G1b) is tested in a variety of ways. *Communication in Research Methods* is assessed by presentation, and again in *Measurement and Control of Sound* and *Masterclass in Acoustics*. *P*roblem-solving skills are part of the assessment in most modules. Self-learning and personal development (G2b) is assessed in *Measurement and Control* through *coursework* and in the *Energy and Engineering Project.*

The ability to carry out a personal programme of work (G3b) is a part of *Masterclass in Acoustics* assessment. Exercising personal responsibility (G4b) is assessed as part of the presentations given in the aforementioned modules.

E Academic Regulations

The University's Academic Regulations apply for this course. Any course specific protocols will be identified here.

http://www.lsbu.ac.uk/__data/assets/pdf_file/0008/84347/academic-regulations.pdf

F Entry Requirements

Applicants for admission to the course should normally possess one of the following qualifications:

In order to be considered for entry to the programme applicants will be required to have the following qualifications:

(i) A first degree in an appropriate discipline. Normally a lower second class would be considered a minimum, but third class may be acceptable depending on age and experience.

(ii) Cognate degrees in appropriate disciplines (e.g. physics, chemistry or mathematics) will be accepted provided the candidate demonstrates some knowledge of acoustics. For example, graduates recently transferring into the industry.

(iii) Other qualifications may be accepted depending on age and experience. This category would normally be reserved for mature candidates who have had several years of experience in acoustics.

(iv) An exemption from up to 4 modules is possible if a student has passed, or is about to pass the Institute of Acoustics (IoA) Diploma in Acoustics and Noise Control. The exemptions will depend on the specialist units chosen on the Diploma course.

G Course Structure

Course Overview
The Course is delivered on a semester pattern; each semester is 15 weeks in duration.
Students study six modules at Level 7.

Semester 1		**Semester 2**	
Measurement and Control of Sound	(L7)		
Acoustics Laboratory	(L7)	Architectural Acoustics	(L7)
Subjective and Environmental Acoustics	(L7)	Masterclass in Acoustics	(L7)
Research Methods	(L7)	Energy and Engineering Project	(L7)

FULL TIME

Year	Semester 1	Credits	Semester 2	Credits	Level	
1	Measurement and Control of sound	20			7	Core
	Acoustics Laboratory	20	Architectural Acoustics	20	7	Core
	Subjective + Environmental Acoustics	20	Masterclass in Acoustics	20	7	Core
	Research Methods	20	Energy and Engineering Project	60	7	Core

PART TIME

Year	Semester 1	Credits	Semester 2	Credits	Level	
1	Measurement and Control of sound	20			7	Core
	Acoustics Laboratory	20	Architectural Acoustics	20	7	Core
2	Subjective + Environmental Acoustics	20	Masterclass in Acoustics	20	7	Core
	Research Methods	20	Energy and Engineering Project	60	7	Core

H Course Modules

M. Code	Module Title	Level	Semester	Credit value	Assessment Ex/Cw
EUB_7_122	Measurement and Control of Sound	7	1	20	50/50
EUB_7_135	Acoustic Laboratory	7	1	20	-/100
EUB_7_126	Research Methods	7	1	20	-/100
EUB_7_123	Subjective and Environmental Acoustics	7	1	20	50/50
EUB_7_121	Architectural Acoustics	7	2	20	-/100
BEA_7_527	Masterclass in Acoustics	7	2	20	-/100
EUB_7_205	Energy and Engineering Project	7	2	60	-/100

J Costs and financial Support

Information on tuition fees/financial support can be found by clicking on the following link –

http://www.lsbu.ac.uk/courses/undergraduate/fees-and-funding or
http://www.lsbu.ac.uk/courses/postgraduate/fees-and-funding

Information on living costs and accommodation can be found by clicking the following link-

https://my.lsbu.ac.uk/my/portal/Student-Life-Centre/International-Students/Starting-at-LSBU/#expenses

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Appendix A: Curriculum Map

This map provides a design aid to help course teams identify where course outcomes are being taught (T), developed (D), assessed (A) within the course. It also provides a checklist for quality assurance purposes and may be used in validation, accreditation and external examining processes. Making the learning outcomes explicit will also help students to monitor their own learning and development as the course progresses.

T: taught, D: developed and A: assessed

	Programme Outcomes																											
	A1	A2	A3	A4	A5	A6	A7	A8	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	C1	C2	C3	C4	C5	C6	C7	D1	D2	D3	D4
Measurement and Control of Sound	T D A				T D	T D			T D	T A	D A	T			D A	T	D A	D A	T	D A	D A	D A			D A		D A	T D	D A
Acoustics Laboratory	T A	T D	T D A						T D A	T D A	T D A	T		D A	T D A	T			T	T D A	T D A	D A		T D A			D A	D A	
Subjective and Environmental Acoustics	T D A								D A	T		T D			D A	T					D A	D A					D A	D A	
Research Methods	T D A	T D A	T D A	T D A	T D	T D	T D A	T D A			T	T	T D A	T D	T D A	T	T	T D A	T			T D A	T D A		T D A	T D A	T D A	T D A	T D A
Masterclass in Acoustics						D			D A	D A				D A	D A	D	T D A	D A	D		D A	D A			D A	T D A	T D A		T D A
Architectural Acoustics									D A		T D A	T D A			D A	D A	T		D A		D A	D A				D	D	D A	D
Energy and Engineering Project	D A	D A		D A	D A		D A		D A	D A		D A	D	D A	D A	D A	D A	D A	D A	D A		D A				D A	D A	D A	D A

Appendix B: Personal Development Planning

A variety of terms are used in higher education to describe a process undertaken by individuals to gather evidence on, record and review their own learning and achievement, and identify ways in which they might improve themselves academically and more broadly. The term Personal Development Planning (PDP) is proposed to describe a structured process undertaken by an individual to reflect upon their own learning, performance and/or achievement and to plan for their personal educational and career development. The purpose of this tool is to help HE
teaching staff to explain where PDP is being used within a course or portfolio of modules.

Approach to PDP	Level 7
1 Supporting the development and recognition of skills through the personal tutor system.	The Year Tutor is the personal tutor of a specific year The next person to support the student's issues is the Course Director who is responsible for all the students or the course (full-time and part-time Course). The Course Director works together with the year tutors to solve issues and support the development and recognition of the student effort. This is brought to the attention of all students at induction and regularly during the year. There are open surgeries offered by all staff for two hours per week in each semester.
2 Supporting the development and recognition of skills in academic modules/modules.	All modules are structured so that, over the course of the study, the combination of coursework introduces and develops the technical skills at postgraduate level in the fields of experimentation, hands-on computer modelling, structural/traffic/coastal design exercises, critical analysis, analysis methodologies, data interpretation and verification, and research methodologies. Assessed coursework, in stages, provides the feedback for the consolidation and improvement of these academic skills.
3 Supporting the development and recognition of skills through purpose designed modules/modules.	The main technical skills required for a postgraduate acoustics course are covered in all the taught core modules over the year. In particular, the application of design and analyses skills runs throughout the course in the subjects of Measurement and Control through to Architectural Acoustics and the Masterclass in Acoustics.
4 Supporting the development and recognition of skills through research projects and dissertations work.	The Project module covers the literature gathering and review, referencing techniques, technical writing, results presentation, and research methodologies. The LSBU Librarian (Engineering Section) demonstrates the in-house facilities available for off-line and online searches for papers, journals and articles. The Project module is based on an individual work undertaken over a period of four months (FT). A student meets with the supervisor on a term-time weekly session of about fifteen minutes to discuss and monitor progress.
5 Supporting the development and recognition of career management skills.	An academic staff member, who is the Liaison Officer for the Institution of Acoustics or the Chartered Institute of Building Services Engineers, briefs the students on the benefits of the student membership of both the institutions. Visits to the local branch of the Institution of Acoustics are organised outside of the main course, local activities are offered, and routes to Chartered Engineering are discussed. Students are encouraged to use the LSBU Careers Office for CV preparation, interview skills and job vacancies.

6 Supporting the development and recognition of career management skills through work placements or work experience.	Students are encouraged to take internships in the Summer.
7 Supporting the development of skills by recognising that they can be developed through extracurricular activities.	Students are directed to some of the wealth of resources available in London, such as exhibitions, museums, fairs, lectures and conferences.
8 Supporting the development of the skills and attitudes as a basis for continuing professional development.	Notices of lectures and presentations at the Institution of Acoustics and Chartered Institute of Building Services Engineers are brought to the students' attention.
9 Other approaches to personal development planning.	Any lecturer can guide the student about his or her personal development planning.
10 The means by which self-reflection, evaluation and planned development are supported e.g. electronic or paper-based learning log or diary.	Weekly meetings for the Project between the student and the supervisor. Written and/or verbal feedback on assessed coursework.

Appendix C: Engineering Council AHEP Mappings of the Learning Outcomes for the modules on MSc Environmental and Architectural Acoustics (CEng)

YEAR	COURSES	O or C?	SM7M	SM8M	SM9M	EA6M	EA5m	EA7M	D9M	D10M	D11M	ELM8M	ELM9M	EL10M	EL11M	EL12M	EL13M	P12M	P9m	P10m	P11m	G1	G2	G3m	G4
YEAR 1	Acoustics Laboratory	C	□		✓	✓	✓	✓								✓	✓		✓		✓	✓			✓
	Architectural Acoustics	C	✓	✓	✓	✓		✓	✓							✓		✓							
	Environmental Management	C		✓			✓			✓	✓	✓	✓	✓		✓	✓								
	Measurement and Control of Sound	C	✓	✓	✓	✓		✓	✓	✓	✓					✓		✓			✓	✓		✓	✓
	Research Methods	C					✓		✓			✓			✓	✓	✓		✓	✓			✓		
	Subjective and Environmental Acoustics	C	✓	✓	□	✓	✓					✓			✓	✓				✓		✓			
	Energy Engineering Project	C	✓	✓	✓	✓	✓	✓	✓			✓	✓		✓	✓	✓		✓			✓	✓	✓	✓

Science and Maths (SM)	
SM7M	A comprehensive understanding of the relevant scientific principles of the specialisation
SM8M	A critical awareness of current problems and/or new insights most of which is at, or informed by, the forefront of the specialisation
SM9M	Understanding of concepts relevant to the discipline, some from outside engineering, and the ability to evaluate them critically and to apply them effectively, including in engineering projects
Engineering Analysis (EA)	
EA6M	Ability both to apply appropriate engineering analysis methods for solving complex problems in engineering and the ability to assess their limitations
EA5m	Ability to use fundamental knowledge to investigate new and emerging technologies
EA7M	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 (D)	
D 9 M	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
D 10 M	Knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
D 11 M	Ability to generate an innovative design for products, systems, components or processes to fulfil new needs
Economic, legal, social, ethical and environmental context (EL)	
EL 8 M	Awareness of the need for a high level of professional and ethical conduct in engineering
EL 9 M	Awareness that engineers need to take account of the commercial and social contexts in which they operate
EL 10 M	Knowledge and understanding of management and business practices, their limitations, and how these may be applied in the context of the particular specialisation
EL 11 M	Awareness that engineering activities should promote sustainable development and ability to apply quantitative techniques where appropriate
EL 12 M	Awareness of relevant regulatory requirements governing engineering activities in the context of the particular specialisation
EL 13 M	Awareness of and ability to make general evaluations of risk issues in the context of the particular specialisation, including health & safety, environmental and commercial risk
Engineering Practice (P)	
P 12 M	Advanced level knowledge and understanding of a wide range of engineering materials and components
P 9 m	A thorough understanding of current practice and its limitations, and some appreciation of likely new developments
P 10 m	Ability to apply engineering techniques, taking account of a range of commercial and industrial constraints
P 11 m	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
Additional General Skills (G)	
G 1	Apply their skills in problem solving, communication, information retrieval, working with others, and the effective use of general IT facilities
G 2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
G 3 m	Monitor and adjust a personal programme of work on an on-going basis
G 4	Exercise initiative and personal responsibility, which may be as a team member or leader

Appendix D: Terminology

awarding body	a UK higher education provider (typically a university) with the power to award higher education qualifications such as degrees
bursary	a financial award made to students to support their studies; sometimes used interchangeably with 'scholarship'
collaborative provision	a formal arrangement between a degree-awarding body and a partner organisation, allowing for the latter to provide higher education on behalf of the former
compulsory module	a module that students are required to take
contact hours	the time allocated to direct contact between a student and a member of staff through, for example, timetabled lectures, seminars and tutorials
coursework	student work that contributes towards the final result but is not assessed by written examination
current students	students enrolled on a course who have not yet completed their studies or been awarded their qualification
delivery organisation	an organisation that delivers learning opportunities on behalf of a degree-awarding body
distance-learning course	a course of study that does not involve face-to-face contact between students and tutors
extracurricular	activities undertaken by students, outside their studies
feedback (on assessment)	advice to students following their completion of a piece of assessed or examined work
formative assessment	a type of assessment designed to help students learn more effectively, to progress in their studies and to prepare for summative assessment; formative assessment does not contribute to the final mark, grade or class of degree awarded to students

higher education provider	organisations that deliver higher education
independent learning	learning that occurs outside the classroom that might include preparation for scheduled sessions, follow-up work, wider reading or practice, completion of assessment tasks, or revision
intensity of study	the time taken to complete a part-time course compared to the equivalent full-time version: for example, half-time study would equate to 0.5 intensity of study
lecture	a presentation or talk on a particular topic; in general lectures involve larger groups of students than seminars and tutorials
learning zone	a flexible student space that supports independent and social earning
material information	information students need to make an informed decision, such as about what and where to study
mode of study	different ways of studying, such as full-time, part-time, e-learning or work-based learning
modular course	a course delivered using modules
module	a self-contained, formally structured unit of study, with a coherent and explicit set of learning outcomes and assessment criteria; some providers use the word 'course' or 'course unit' to refer to individual modules
national teaching fellowship	a national award for individuals who have made an outstanding impact on student learning and the teaching profession
navigability (of websites)	the ease with which users can obtain the information they require from a website
optional module	a module or course unit that students choose to take
performance (examinations)	a type of examination used in performance-based subjects such as drama and music
professional body	an organisation that oversees the activities of a particular profession and represents the interests of its members
prospective student	those applying or considering applying for any programme, at any level and employing any mode of study, with a higher education provider

regulated course	a course that is regulated by a regulatory body
regulatory body	an organisation recognised by government as being responsible for the regulation or approval of a particular range of issues and activities
scholarship	a type of bursary that recognises academic achievement and potential, and which is sometimes used interchangeably with 'bursary'
semester	either of the parts of an academic year that is divided into two for purposes of teaching and assessment (in contrast to division into terms)
seminar	seminars generally involve smaller numbers than lectures and enable students to engage in discussion of a particular topic and/or to explore it in more detail than might be covered in a lecture
summative assessment	formal assessment of students' work, contributing to the final result
term	any of the parts of an academic year that is divided into three or more for purposes of teaching and assessment (in contrast to division into semesters)
total study time	the total time required to study a module, unit or course, including all class contact, independent learning, revision and assessment
tutorial	one-to-one or small group supervision, feedback or detailed discussion on a particular topic or project
work/study placement	a planned period of experience outside the institution (for example, in a workplace or at another higher education institution) to help students develop particular skills, knowledge or understanding as part of their course
workload	see 'total study time'
written examination	a question or set of questions relating to a particular area of study to which candidates write answers usually (but not always) under timed conditions