

	External	QAA Quality Code for Higher Education 2013 Framework for Higher Education Qualifications Subject Benchmark Statements (Dated) PSRB Competitions and Markets Authority SEEC Level Descriptors 2016
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B Course Aims, Features and Outcomes	
Distinctive features of course	This course is intended for engineers who wish to enhance their skills and knowledge in the field of Building Services Engineering. It is also intended to provide the Masters level academic requirements leading to Chartered Engineer status when following on from an appropriate accredited BEng degree.
Course Aims	The MSc Building Services Engineering aims to: <ol style="list-style-type: none"> 1. Provide a broad basis of advanced understanding in the technological areas of designing, assessing and controlling the built environment. 2. Examine the interactions between built and natural environments. 3. Develop understanding of current and emerging industry approaches to improve building performance against the criteria of comfort, productivity and energy efficiency.
Course Outcomes	<p>Course learning outcomes summarised here and mapped to individual modules in Curriculum Map in Appendix A. AHEP3 learning outcomes mapped to individual modules in Appendix C.</p> <p style="text-align: center;">a) Students will have knowledge and understanding of:</p> <p>A1 How building form modifies the internal environment. A2 Design and analytical techniques to create safe, comfortable and productive environments. A3 Developments in building services systems and equipment that achieve required conditions efficiently and effectively. A4 Environmental systems, markets and external influences that have impact on the role of the building services engineer. A5 Standards, codes of practice and regulatory instruments relating to building services and energy engineering, and their limitations.</p> <p style="text-align: center;">b) Students will develop their intellectual skills such that they are able to:</p> <p>B1 Identify and access key sources of information, and evaluate this information critically. B2 Evaluate, use and adapt design methodologies for efficient building engineering systems. B3 Analyse complex problems and synthesise information.</p>

	<p>B4 Develop rational arguments in order to support a particular strategy.</p> <p>B5 Examine commercial risks and make investment appraisals.</p> <p>B6 Apply good business and management practices.</p> <p>c) Students will acquire and develop practical skills such that they are able to:</p> <p>C1 Construct and use mathematical models to analyse multivariable problems.</p> <p>C2 Design building services systems fit for their purpose.</p> <p>C3 Use and appraise design guidance materials appropriately, including application to unfamiliar situations.</p> <p>C4 Select and specify appropriate equipment to fulfil specific design functions.</p> <p>d) Students will acquire and develop transferrable skills such that they are able to:</p> <p>D1 Research and collect literature from a wide range of sources.</p> <p>D2 Write reports that convey complex information and concepts both concisely and informatively.</p> <p>D3 Use advanced techniques in spreadsheets and other software for data handling and manipulation.</p> <p>D4 Communicate effectively with other disciplines in the building services industry.</p> <p>D5 Plan and maintain a programme of individual research activity.</p>
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C Teaching and Learning Strategy

Course learning outcomes summarised here and mapped to individual modules in Curriculum Map in Appendix A. AHEP3 learning outcomes mapped to individual modules in Appendix C.

A Knowledge and understanding

A mix of formal lectures and student-centred learning is used. Formal lectures deliver core material, and use group and individual tutorial sessions to underpin understanding. Assessed coursework is major vehicle for the student to develop deep understanding of the concepts.

The University's web-based Virtual Learning Environment (VLE) service is used to provide both core and additional materials to enhance offsite learning, and provide an additional interface between student and lecturer.

B Intellectual skills

Intellectual skills will be developed using problem-centred approaches through coursework assignments backed up with appropriate tutorials to underpin the core concepts. Formal lectures will deliver the fundamental concepts and demonstrate the rationale for adopting different problem-solving strategies.

C Practical Skills

Practical skills will be developed through a mix of coursework assignments and tutorial work. Learning outcomes of specific coursework briefs will specify which techniques and problem solving methods will be required to complete the tasks. Keynote lectures and group and individual tutorial support will be given throughout.

D Transferable Skills

Transferable skills are embedded into the coursework assignments. Key IT skills will be developed through having to solve problems using specific IT tools (e.g. spreadsheets, dynamic modelling packages or bespoke design software). Communication skills will be developed by feeding back progress on coursework.

D Assessments

A Knowledge and understanding

Assessment will be predominantly through coursework marked assignments, although fundamental knowledge in fundamental modules will be assessed by formal closed book examination.

B Intellectual skills

Intellectual skills will be assessed primarily through the use of coursework assignments. The student will have to demonstrate, by written report or viva voce where appropriate, that techniques and analyses have been fully understood and have been used appropriately and to full advantage.

C Practical Skills

Practical skills will be predominantly assessed using coursework, although key skills in the fundamental modules will be assessed by formal closed book examination. Where appropriate staged coursework assessment will be adopted to ensure the appropriate techniques and methodologies are being adopted in the completion of the task.

D Practical Skills

The majority of transferable skills will be assessed through coursework and the dissertation. Marking schemes will include components for clear and effective communication and correct use of IT.

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

In order to be considered for entry to the course applicants will be required to have at least one of the following qualifications:

- BEng (Hons) 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.
- Cognate degrees in appropriate disciplines (e.g. physics, chemistry or mathematics) will be accepted provided the candidate demonstrates some knowledge of building services engineering, for example graduates recently transferring into the industry.
- Other qualifications may be accepted depending on age and experience. This category would normally be reserved for mature candidates who have had several years' experience in the building services industry.
- In addition, international students need English language qualifications equivalent to IELTS 6.5.

G Course Structure

Course overview

- The course comprises six taught 20-credit modules and a 60-credit final project. The maximum period of registration is five years.
- The course may be studied full time (one year), part time (two and half years), or by flexible learning (two to four years).
- The flexible-learning students will be directed in the first instance to follow the part-time pattern of study.
- Flexibility will be offered in the time to complete modules, so that the pattern may be adapted in agreement with the Course Director. The maximum period permitted for study of an individual module would be 18 months, and students would normally study no more than three modules concurrently.

The completion date for the Major Project is:

- Full-time students: Last Friday in October after completion of Year 1
- Part-time students: End of Semester 1 after completion of Year 2.

MSc Building Services Engineering – FULL TIME

	Semester 1		Semester 2	
Level 7	EUB-7-960 - Thermal Environment, Acoustics and Lighting - Compulsory	20	EUB-7-962 - Energy Resource and Use Analysis- Compulsory	20
	EUB-7-963 - Electrical Power - Compulsory	20	EUB-7-127 - Heating and Energy in Buildings - Compulsory	20
	EUB-7-964 - Sustainable Refrigeration - Compulsory	20	EUB-7-131 - Ventilation and Air Conditioning - Compulsory	20
	EUE-7-965 - Dissertation Project	60		

MSc Building Services Engineering – PART TIME

	Semester 1		Semester 2	
Year 1	EUB-7-960 - Thermal Environment, Acoustics and Lighting - Compulsory	20	EUB-7-962 - Energy Resource and Use Analysis- Compulsory	20
	EUB-7-963 - Electrical Power - Compulsory	20	EUB-7-127 - Heating and Energy in Buildings - Compulsory	20
Year 2	EUB-7-964 - Sustainable Refrigeration - Compulsory	20	EUB-7-131 - Ventilation and Air Conditioning - Compulsory	20
	EUE-7-965 - Dissertation Project	60		
Year 3	EUE-7-965 - Dissertation Project			

H Course Modules

M. Code	Module Title	Level	Semester	Credit value	Assessment Ex/Cw
EUB-7-963	Electrical Power	7	1	20	30% CW / 70% Exam
EUB-7-964	Sustainable Refrigeration	7	1	20	100% CW
EUB-7-960	Thermal Environment, Acoustics and Lighting	7	1	20	50% CW / 50% Exam
EUB-7-127	Heating and Energy in Buildings	7	2	20	50% CW / 50% Exam
EUB-7-962	Energy Resource and Use Analysis	7	2	20	100% CW
EUB-7-131	Ventilation and Air Conditioning	7	2	20	50% CW / 50% Exam
EUE-7-965	Dissertation Project	7	1-2	60	100% CW

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>

List of Appendices

- Appendix A: Curriculum Map
- Appendix B: Personal Development Planning
- Appendix C: Learning outcomes (Correlation between AHEP3 codes and LSBU Modules)
- Appendix D: Terminology

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

Modules		Course Learning outcomes																			
Title	Code	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	C1	C2	C3	C4	D1	D2	D3	D4	D5
Thermal Environment, Acoustics and Lighting	EUB-7-960	TDA	TDA		D	TDA	TDA		D	DA			D		TDA	DA	DA	DA	D		DA
Heating and Energy in Buildings	EUB-7-127	TDA	DA	TDA	TDA	D	TDA	TDA	TDA	DA	DA	D	TDA	TDA	DA	TDA	DA	DA	TDA		D
Energy Resource and Use Analysis	EUB-7-962				TDA	TDA	TDA		D	TDA	TDA	TDA	D				TDA	TDA	DA	TDA	TDA
Electrical Power	EUB-7-963	D			D		DA	D		TDA				TDA		TDA	DA				DA
Sustainable Refrigeration	EUB-7-964		TDA	TDA	TDA	DA		DA					DA	DA		DA	DA	DA		DA	
Ventilation and Air Conditioning	EUB-7-131	DA	DA	TDA		D	DA	TDA	TDA				TDA	TDA	DA	TDA		DA	D		D
Dissertation Project	EUE-7-965	DA	DA	DA		DA	DA		DA	DA	DA		DA	DA	DA	DA	DA	DA	DA	DA	

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.	<p>The Year Tutor is the personal tutor of a specific year</p> <p>The next person to support the student's issues is the Course Director who is responsible for all the students of 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.</p> <p>This is brought to the attention of all students at induction and regularly during the year.</p> <p>There are open surgeries offered by all staff for two hours a week in each semester.</p>
2 Supporting the development and recognition of skills in academic modules/modules.	<p>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.</p> <p>Assessed coursework, in stages, provides the feedback for the consolidation and improvement of these academic skills.</p>
3 Supporting the development and recognition of skills through purpose designed modules/modules.	<p>The main technical skills required for an postgraduate building services course are covered in all the taught core modules over the year.</p>
4 Supporting the development and recognition of skills through research projects and dissertations work.	<p>The Energy Resources and Use Analysis module covers the literature gathering and review, referencing techniques, technical writing, results presentation, and research methodologies.</p> <p>The LSBU Librarian (Engineering Section) demonstrates the in-house facilities available for off-line and online searches for papers, journals and articles.</p> <p>The module is based on an individual and group work.</p> <p>A student meets with the supervisor on a term-time sessions of about fifteen minutes to discuss and monitor progress.</p>
5 Supporting the development and recognition of career management skills.	<p>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.</p> <p>Visits to the local branch of the Energy Institute are organised outside of the main course, local activities are</p>

	<p>offered , and routes to Chartered Engineering are discussed.</p> <p>Students are encouraged to use the LSBU Careers Office for CV preparation, interview skills and job vacancies.</p>
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 Energy Institute 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.	Meetings for the Project between the student and the supervisor. Written and/or verbal feedback on assessed coursework.

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)	
D9M	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
D10M	Knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
D11M	Ability to generate an innovative design for products, systems, components or processes to fulfil new needs
Economic, legal, social, ethical and environmental context (EL)	
EL8M	Awareness of the need for a high level of professional and ethical conduct in engineering
EL9M	Awareness that engineers need to take account of the commercial and social contexts in which they operate
EL10M	Knowledge and understanding of management and business practices, their limitations, and how these may be applied in the context of the particular specialisation
EL11M	Awareness that engineering activities should promote sustainable development and ability to apply quantitative techniques where appropriate
EL12M	Awareness of relevant regulatory requirements governing engineering activities in the context of the particular specialisation
EL13M	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)	
P12M	Advanced level knowledge and understanding of a wide range of engineering materials and components
P9m	A thorough understanding of current practice and its limitations, and some appreciation of likely new developments
P10m	Ability to apply engineering techniques, taking account of a range of commercial and industrial constraints
P11m	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)	
G1	Apply their skills in problem solving, communication, information retrieval, working with others, and the effective use of general IT facilities
G2	Plan self-learning and improve performance, as the foundation for lifelong learning/CPD
G3m	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

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 assessment) (on	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 learning
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

Appendix D: Terminology

[Please provide a selection of definitions according to your own course and context to help prospective students who may not be familiar with terms used in higher education. Some examples are listed below]

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
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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

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learning zone	a flexible student space that supports independent and social learning
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
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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
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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
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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