

PROGRAMME SPECIFICATION

Master of Engineering in Building Services Engineering

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| Awarding institution | Liverpool John Moores University |
| Teaching institution | LJMU |
| UCAS Code | K290 |
| JACS Code | K200 |
| Programme Duration | Full-Time: 4 Years, Sandwich Thick: 5 Years |
| Language of Programme | All LJMU programmes are delivered and assessed in English |
| Subject benchmark statement | Engineering (2015) |
| Programme accredited by | Chartered Institution of Building Services Engineers (CIBSE) Chartered Association of Building Engineers (CABE) |
| Description of accreditation | Accredited by the Chartered Institution of Building Services Engineers (CIBSE) on behalf of the Engineering Council for the purposes of fully meeting the academic requirement for registration as a Chartered Engineer. CABE - https://www.cbuilde.com/careers/accredited-universities/list-of-accredited- |
| Validated target and alternative exit awards | <p>Master of Engineering in Building Services Engineering</p> <p>Master of Engineering (SW) in Building Services Engineering</p> <p>Bachelor of Engineering with Honours in Building Services Engineering</p> <p>Bachelor of Engineering Honours (SW) in Building Services Engineering</p> <p>Diploma of Higher Education in Building Services Engineering</p> <p>Diploma in Higher Education (SW) in Building Services Engineering</p> <p>Certificate of Higher Education in Building Services Engineering</p> |
| Programme Leader | Badr Abdullah |

Educational aims of the programme

The overall aim of the programme is to develop knowledge, understanding and intellectual and practical skills appropriate to a variety of roles within the Building Services Engineering sector. The intention is to provide a stimulating and challenging programme of study that accurately reflects the activities in the Building Services Engineering industry and prepares students for effective, productive and responsible employment in the sector.

The programme will offer the appropriate type and level of support as students build their knowledge, understanding and skills to become independent learners for the future.

Since the programme has a bias towards providing students with engineering skills and knowledge and the design of engineering services systems for buildings, it is suited to those employed in or seeking employment in the design and consultancy arm of the Building Services Engineering industry. To facilitate study for employed students the programme is offered in part-time as well as full-time attendance mode.

Students participating in the Sandwich placement option will develop, in addition to those skills they acquire as part of the main programme, a range of skills and knowledge suitable for immediate employment in the Building Services Engineering industry.

Students studying part-time whilst employed in the industry, will develop, in addition to those skills they acquire as part of the main programme, a range of skills and knowledge suitable for continued employment in the Building Services Engineering industry and higher levels of responsibility.

The specific aims of the programme are to provide:

1. A programme of study in Building Services Engineering which facilitates acquisition of the essential skills and knowledge of the subject supported by industry.
2. The appropriate learning experiences to enable students to develop their skills and attitudes as independent researchers and innovative problem solvers to the fullest potential in the Building Services Engineering Sector.
3. An awareness of existing and future issues in the construction and property industry and how they are likely to impinge on the role and function of the Building Services Engineer.
4. Opportunities for development of the student's interpersonal and communication skills, with special reference to aspects of Engineering, Technology, Design and Management.
5. Opportunities for development of the student's professional attitude commensurate with that of the practicing Building Services professional and to permit them to specialise in selected areas of Building Services Engineering.
6. Raised awareness of the responsibilities of the Building Services professional in relation to sustainability, energy efficiency and environmental issues within the built environment.
7. To ensure that successful graduates will have the potential to contribute to significant advances in engineering and technological issues associated with their chosen industry.
8. To provide students with appropriate learning experiences to enable them to develop their skills and attitudes as independent researchers and innovative and creative problem solvers to the fullest possible potential in the Building Services Engineering sector.
9. To prepare students for the transition from Higher Education to employment within a professional context; and develop those transferable, specialist and employability skills that all stakeholders could reasonably expect of students who successfully complete a Building Services Engineering programme.
10. To encourage students to engage with the development of employability skills by completing a self-awareness statement.

Alternative Exit/ Interim Award Learning Outcomes - Certificate of Higher Education

A student who is eligible for this award will be able to:

Demonstrate a knowledge of the underlying concepts and principles associated with Building Services Engineering, and an ability to evaluate and interpret these within that context.

Demonstrate an ability to present, evaluate and interpret qualitative and quantitative data, in order to develop lines of argument and make sound judgments in accordance with basic theories and concepts of Building Services Engineering.

Evaluate the appropriateness of different approaches to solving problems related to Building Services Engineering.

Communicate the results of their study accurately and reliably using structured and coherent arguments.

Undertake further training and develop new skills within a structured and managed environment.

Demonstrate the qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility.

Alternative Exit/ Interim Award Learning Outcomes - Diploma of Higher Education

A student who is eligible for this award will be able to:

Demonstrate knowledge and critical understanding of the well-established principles of Building Services Engineering, and of the way in which those principles have developed an ability to apply underlying concepts and principles outside the context in which they were first studied, including, where appropriate, the application of those principles in an employment context.

Demonstrate knowledge of the main methods of enquiry in subject(s) relevant to Building Services Engineering, and ability to evaluate critically the appropriateness of different approaches to solving problems in this field of study.

Use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to effectively communicate information, arguments and analysis.

Effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively.

Undertake further training, develop existing skills and acquire new competences that will enable them to assume

significant responsibility within organisations.

Alternative Exit/ Interim Award Learning Outcomes - Bachelor of Engineering Honours (SW)

A student who is eligible for this award will be able to:

Demonstrate a systematic understanding of key aspects of Building Services Engineering, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of the discipline.

Demonstrate an ability to deploy accurately established techniques of analysis and enquiry within the Building Services Engineering discipline.

Demonstrate a conceptual understanding that enables the student to devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of the Building Services Engineering discipline, and to describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline.

Demonstrate an appreciation of the uncertainty, ambiguity and limits of knowledge within the Building Services Engineering discipline.

Demonstrate an ability to manage their own learning, and to make use of scholarly reviews and primary sources (for example, refereed research articles and/or original materials appropriate to the discipline).

Utilise the skills and knowledge gained from a supervised period spent in industry and demonstrate an ability to cope with the rigours and demands of a typical workplace.

Alternative Exit/ Interim Award Learning Outcomes - Bachelor of Engineering with Honours

A student who is eligible for this award will be able to:

Demonstrate a systematic understanding of key aspects of Building Services Engineering, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of the discipline.

Demonstrate an ability to deploy accurately established techniques of analysis and enquiry within the Building Services Engineering discipline.

Demonstrate a conceptual understanding that enables the student to devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of the Building Services Engineering discipline, and to describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline.

Demonstrate an appreciation of the uncertainty, ambiguity and limits of knowledge within the Building Services Engineering discipline.

Demonstrate an ability to manage their own learning, and to make use of scholarly reviews and primary sources (for example, refereed research articles and/or original materials appropriate to the discipline).

Target award Learning Outcomes - Master of Engineering

A student successfully completing the programme of study will have acquired the following subject knowledge and understanding as well as skills and other attributes.

A student who is eligible for this award will be able to:

1. Apply mathematical and scientific skills that are relevant to the various disciplines within the Building Services Engineering industry.
2. Apply the fundamental concepts, principles and theories of Building Services Engineering.
3. Apply appropriate legal, economic, design, environmental business and management techniques that are relevant to Building Services Engineers and other professionals working within the construction and building services industries.
4. Demonstrate a detailed knowledge and critical understanding of the essential facts, concepts, principles and theories relevant to the Building Services Engineering profession.
5. Apply technical solutions to complex design problems.
6. Demonstrate an understanding of the limits of their knowledge of their own specialist area together with other associated engineering fields and how this influences analysis and interpretations based on that knowledge.
7. Apply project management skills related to Building Services Engineering projects in the construction sector.
8. Apply the legal, economic, design, environmental, business and management techniques that are relevant to Building Services Engineers and other professionals working within the construction industry.
9. Identify and solve complex problems.

10. Critically evaluate the appropriateness of different approaches to solving problems.
11. Critically analyse and evaluate complex concepts and theories.
12. Critically analyse and integrate information and data from a variety of sources.
13. Apply appropriate Engineering solutions to real industrial needs.
14. Use standard as well as specialist building services engineering, commercial or construction computational tools and packages effectively.
15. Analyse surveys, reports, data, information and experimental results accurately.
16. Prepare technical reports/drawings appropriate for a range of technical and non-technical purposes.
17. Make technical presentations to specialist and non-specialist audiences.
18. Use construction and building services engineering literature effectively.
19. Work as an effective member of a team.
20. Use appropriate mathematical methods for analysing Building Services Engineering problems.
21. Use industry best practice procurement and managerial techniques.
22. Take a leading role in commerce and industry in a range of situations.
23. Develop a client's brief with regard to performance criteria and selection of appropriate Building Services Engineering solutions.
24. Use information and communication technology to generate and manage project information.
25. Manage the communication of data and information between the various participants in the design and construction process in a form which is relevant to its ultimate user.
26. Apply appropriate economic and environmental principles to Building Services Engineering design.
27. Identify ways to improve their own learning.
28. Use information and communications technology effectively.
29. Manage resources and time effectively.
30. Transfer techniques and solutions from one field of engineering to another.
31. Manipulate and sort data.
32. Present data in a variety of ways.
33. Use scientific evidence based methods in the solution of problems.
34. Use creativity and innovation in problem solving.
35. Work with limited or contradictory information.
36. Develop their own communication skills.
37. Demonstrate team-working and leadership skills.
38. Work effectively with others.

Teaching, Learning and Assessment

The methods used to enable outcomes to be achieved and demonstrated are as follows:

The programme will be delivered using a mixture of lectures, tutorials, workshops, laboratory practical classes and design studio sessions. All aspects of the programme will seek to develop vocationally relevant skills and knowledge. Assessment will be carried out using a mixture of examinations and coursework; specifically assessments could consist of formal unseen examinations, in-class open book tests, online multiple choice tests, technical and/or research based written reports, and simulated design projects.

Programme structure - programme rules and modules

The programme is offered in full-time and full-time sandwich attendance modes. Entry to the programme is normally at level 4 for suitably qualified candidates.

The programme will offer the opportunity of 60 credits of study abroad at Level 5. Students will be enrolled on a 480 credit honours with study abroad programme. A 60 credit Level 5 study abroad module [5300BESASE] will normally replace the semester 2 modules on the standard programme. This study abroad should cover the same learning outcomes as the modules being replaced. The modules to be studied in the host institution must be agreed in advance. The Level 5 mean for the final award will be calculated based upon the 120 credits at Level

5.

Students have the option to undertake a placement year. The placement year, module 5200BESWSE, will follow Level 5 and students will be enrolled on a 600 credit Sandwich programme. The Level 5 mean for the final award mark will be calculated based upon the 240 credits at Level 5. Students successfully completing the assessment of the placement year are eligible for the Sandwich award. Students not undertaking a placement year are registered on the non Sandwich version of the programme and will have the opportunity of an additional study year abroad following Level 5. Students will be enrolled on a 600 credit honours with study abroad programme. Of those 600 credits, 120 will be taken via a Level 5 study abroad module 5200BESASE. The modules to be studied in the host institution must be agreed in advance. The Level 5 mean for the final award mark will be calculated based upon the 240 credits at Level 5.

The programme adheres to the University Academic Framework with 480 credits needed to achieve the MEng award in Building Services Engineering. Students who do not attain 480 credits may be eligible for alternative exit awards in accordance with the Academic Framework.

| Level 7 | Potential Awards on completion | Master of Engineering |
|--|--------------------------------|--|
| Core | Option | Award Requirements |
| 7200BEUG ENERGY AND ENVIRONMENT (20 credits) 7201BEUG COMMISSIONING, MAINTENANCE AND FACILITIES MANAGEMENT (20 credits) 7202BEUG SENSORS, CONTROL AND APPLICATIONS (20 credits) 7204BEUG BUILDING ENGINEERING RESEARCH AND DESIGN PROJECT (60 credits) | | 120 core credits at level 7 0 option credits at level 7 |
| Level 6 | Potential Awards on completion | |
| Core | Option | Award Requirements |
| 6220BEUG CONSTRUCTION SITE MANAGEMENT (20 credits) 6221BEUG ENVIRONMENTAL ANALYSIS (20 credits) 6222BEUG BUILDINGS, ENERGY AND SUSTAINABILITY (20 credits) 6223BEUG BUILDING SERVICES ENGINEERING PROJECT 3 (20 credits) 6226BEUG BUILDING ENGINEERING RESEARCH PROJECT (40 credits) | | 120 core credits at level 6 0 option credits at level 6 |
| Level 5 | Potential Awards on completion | |
| Core | Option | Award Requirements |
| 5202CIV APPLIED MATHEMATICS (10 credits) 5216BEUG MECHANICAL ENGINEERING FOR BUILDINGS (20 credits) 5217BEUG ELECTRICAL ENGINEERING FOR BUILDINGS (20 credits) 5218BEUG BUILDING SERVICES ENGINEERING PROJECT 2 (20 credits) 5220BEUG SITE PRODUCTION MANAGEMENT (20 credits) 5221BEUG BUILDING ENGINEERING COLLABORATIVE PROJECT 2 (20 credits) 5223BEUG BUILDING ENGINEERING RESEARCH METHODS (10 credits) | | 120 core credits at level 5 0 option credits at level 5 |

| Level 4 | Potential Awards on completion | |
|--|--------------------------------|--|
| Core | Option | Award Requirements |
| 4200BEUG CONSTRUCTION TECHNOLOGY 1 (20 credits) 4201BEUG COLLABORATIVE INTERDISCIPLINARY PROJECT 1 (10 credits) 4204BEUG SCIENCE AND MATERIALS (20 credits) 4205BEUG ACADEMIC AND DIGITAL LITERACY (10 credits) 4215BEUG BUILDING SERVICES ENGINEERING PROJECT 1 (20 credits) 4216BEUG ENGINEERING PRINCIPLES (20 credits) 4227BEUG ENGINEERING MATHEMATICS (20 credits) | | 120 core credits at level 4 0 option credits at level 4 |

Information about assessment regulations

All programmes leading to LJMU awards operate within the University's Academic Framework.
<https://www.ljmu.ac.uk/about-us/public-information/academic-quality-and-regulations/academic-framework>

Opportunities for work-related learning (location and nature of activities)

The part-time course is designed specifically for students in employment in the Building Services industry. The modules and assessments have been carefully planned to mimic real projects that the student would encounter in the workplace.

Criteria for admission

A/AS Level

128 UCAS points: Minimum Two A2 levels (inc Maths, Physics, Chemistry or Biology)

BTEC National Diploma

128 UCAS points

Irish Leaving Certificate

Level 4: 128 UCAS points; minimum 3 subjects at Higher level

Scottish Higher

Level 4: 128 UCAS points; minimum 2 subjects at Advanced Higher level

International Baccalaureate

Level 4: 128 UCAS tariff points

Higher national diploma

HNC/HND (Non-cognate) Level 4 Entry: Pass

HNC/HND (Cognate) Level 4 Entry: Pass

HNC (Cognate) Level 5 Entry: Pass

HND (Cognate) Level 6 Entry: Pass

Other

Foundation degree from LJMU Partner College

Level 6 entry: Foundation Degree in Building Services Engineering (electrical or mechanical route) from a LJMU partner college with a mean award mark of at least 55%.

Foundation degree from other institutions

Level 5 entry: Foundation Degree in Building Services Engineering or other related subject discipline from other institutions with a mean award mark of at least 55%.

Progression from LJMU B.Eng Building Services Engineering

Level 6 entry: available for LJMU students who have completed level 5 LJMU BEng in Building Services Engineering with a capped mean mark from all level 5 modules of at least 55%.

Mature entry

Applicants will normally be expected to hold one of the above qualifications. In exceptional circumstances, candidates with non-standard qualifications, may qualify for entry to the course on the basis of considerable experience deemed appropriate by the Faculty which would be subject to scrutiny under the RPEL regulations.

Overseas qualifications

Overseas student applicants must have the equivalent qualifications as UK students. In addition they must have achieved an IELTS score of at least 6.

External Quality Benchmarks

All programmes leading to LJMU awards have been designed and approved in accordance with the UK Quality Code for Higher Education, including the Framework for Higher Education Qualifications in the UK (FHEQ) and subject benchmark statements where applicable.

The University is subject to periodic review of its quality and standards by the Quality Assurance Agency (QAA). Published review reports are available on the QAA website at www.qaa.ac.uk

Programmes which are professionally accredited are reviewed by professional, statutory and regulatory bodies (PSRBs) and such programmes must meet the competencies/standards of those PSRBs.

Support for students and their learning

The University aims to provide students with access to appropriate and timely information, support and guidance to ensure that they are able to benefit fully from their time at LJMU. All students are assigned a Personal Tutor to provide academic support and when necessary signpost students to the appropriate University support services.

Students are able to access a range of professional services including:

- Advice on practical aspects of study and how to use these opportunities to support and enhance their personal and academic development. This includes support for placements and careers guidance.
- Student Advice and Wellbeing Services provide students with advice, support and information, particularly in the areas of: student funding and financial matters, disability, advice and support to international students, study support, accommodation, health, wellbeing and counselling.
- Students studying for an LJMU award at a partner organisation will have access to local support services

Methods for evaluating and improving the quality and standards of teaching and learning

Student Feedback and Evaluation

The University uses the results of student feedback from internal and external student surveys (such as module evaluations, the NSS and PTES), module evaluation questionnaires and meetings with student representatives to improve the quality of programmes.

Staff development

The quality of teaching is assured through staff review and staff development in learning, teaching and assessment.

Internal Review

All programmes are reviewed annually and periodically, informed by a range of data and feedback, to ensure quality and standards of programmes and to make improvements to programmes.

External Examining

External examiners are appointed to programmes to assess whether:

- the University is maintaining the threshold academic standards set for awards in accordance with the FHEQ and applicable subject benchmark statements
- the assessment process measures student achievement rigorously and fairly against the intended outcomes of the programme(s) and is conducted in line with University policies and regulations
- the academic standards are comparable with those in other UK higher education institutions of which external examiners have experience
- the achievement of students are comparable with those in other UK higher education institutions of which

the external examiners have experience

and to provide informative comment and recommendations on:

- good practice and innovation relating to learning, teaching and assessment observed by external examiners
- opportunities to enhance the quality of the learning opportunities provided to students

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 he/she takes full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes, content, teaching, learning and assessment methods of each module can be found in module and programme guides.