

## PROGRAMME SPECIFICATION

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### Bachelor of Engineering with Honours (Fnd) in Building Services Engineering

<b>Awarding institution</b>	Liverpool John Moores University
<b>Teaching institution</b>	LJMU
<b>UCAS Code</b>	4D47
<b>JACS Code</b>	K200
<b>Programme Duration</b>	Full-Time: 4 Years, Sandwich Thick: 5 Years
<b>Language of Programme</b>	All LJMU programmes are delivered and assessed in English
<b>Subject benchmark statement</b>	Engineering (2015)
<b>Programme accredited by</b>	Chartered Institution of Building Services Engineers (CIBSE)
<b>Description of accreditation</b>	Academic requirement for Associate and Incorporated Engineer. Partial academic requirement for Member and Chartered Engineer
<b>Validated target and alternative exit awards</b>	Bachelor of Engineering with Honours (Fnd) in Building Services Engineering  Bachelor of Engineering Honours (SW) (Fnd) in Building Services Engineering  Diploma of Higher Education (Fnd) in Building Services Engineering  Diploma in Higher Education (SW) (Fnd) in Building Services Engineering  Certificate of Higher Education (Fnd) in Building Services Engineering
<b>Programme Leader</b>	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 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.
8. 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 (Fnd)**

*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 (Fnd)**

*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.

## **Target award Learning Outcomes - Bachelor of Engineering with Honours (Fnd)**

*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.

## **Alternative target awards**

A student who is eligible for the following awards will be able to:

Bachelor of Engineering Honours (SW) (Fnd) in Building Services Engineering -

Demonstrate all the outcomes of the main programme, in addition: 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.

## 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 at level 3 for suitably qualified candidates.

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 Honours 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 (inclusive of the foundation year) needed to achieve the BEng (Hons) 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 6	Potential Awards on completion	Bachelor of Engineering with Honours (Fnd)
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)		120 core credits at level 5 0 option credits at level 5

credits) 5220BEUG SITE PRODUCTION MANAGEMENT (20 credits) 5221BEUG BUILDING ENGINEERING COLLABORATIVE PROJECT 2 (20 credits) 5223BEUG BUILDING ENGINEERING RESEARCH METHODS (10 credits)		
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
Level 3	Potential Awards on completion	
Core	Option	Award Requirements
3100FNDET Algorithms and Computing (10 credits) 3101FNDET Engineering and Technology Practice (20 credits) 3102FNDET Foundation Mathematics for Engineering and Technology 1 (20 credits) 3103FNDET Foundation Mathematics for Engineering and Technology 2 (20 credits) 3106FNDET Programming (10 credits) 3107FNDET Introductory Foundation Physics (20 credits) 3108FNDET Additional Foundation Physics (20 credits)		120 core credits at level 3 0 option credits at level 3

## 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 project modules are all based on real life buildings and employed students are encouraged to use their work experiences within all modules.

The full-time course is offered in Sandwich mode so that after two years of study, students would work in Building Services design and/or consultancy for a one year placement. This would afford students the opportunity to contextualise their theoretical learning in a real life working environment.

## Criteria for admission

### **A/AS Level**

Applicants should have or expect to obtain a total of 88 UCAS points, of which at least 20 should come from A2.

### **BTEC National Diploma**

BTEC Extended Diploma

To the value of 88 UCAS points

BTEC Diploma / 90 Credit Diploma / Subsidiary Diploma /Certificate

To the value of 88 UCAS points when combined with other qualifications.

### **Irish Leaving Certificate**

Applicants should have or expect to obtain a total of 88 UCAS points overall.

### **Scottish Higher**

Applicants should have or expect to obtain a total of 88 UCAS points overall.

### **International Baccalaureate**

Applicants should have or expect to obtain a total of 88 UCAS points overall.

### **Access**

Applicants should have or expect to obtain a total of 88 UCAS points overall.

### **Other**

Qualifications deemed equivalent to the above upon completion of appropriate assessment will be considered acceptable.

Applicants should have five GCSE (or equivalent) passes of at least grade C including Mathematics and English (or IELTS 6.0).

### **Mature entry**

Qualifications deemed equivalent to the above upon completion of appropriate assessment will be considered acceptable.

Applicants should have five GCSE (or equivalent) passes of at least grade C including Mathematics and English (or IELTS 6.0).

### **Overseas qualifications**

Applicants offering other awards will be considered on an individual basis in line with the agreed entry criteria.

## 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](http://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.*