EST 1892 LSBU

Course Specification

A. Course Information

Final award title(s)	BEng (Hons) Building Services Engineering Apprenticeship		
Intermediate exit award title(s)	N/A		
UCAS Code		**Course Code(s)**	Part time**: 5124**
Awarding Institution	London South Bank University		
School	☐ ASC ☐ ACI ☒ BEA ☐ BUS ☐ ENG ☐ IHSC ☐ LSS		
Division	Civil and Building Services Engineering		
Course Director	Dr Shazia Farman Ali		
Delivery site(s) for course(s)	☒ Southwark ☐ Havering ☐ Croydon ☐ Other: (please specify)		
Mode(s) of delivery	☐Full time ☒Part time ☐Other (please specify)		

Length of course/start and finish dates

Mode	Length years	Start -month	Finish - month
Part time	4.5 years	September	Jan / Feb

Is this course suitable for a Visa Sponsored Student?	☐ Yes ☒ No Students are advised that the structure/nature of the course is not suitable for those on a Tier 4 visa.	
Approval dates:	Course Validation date	Revalidated September 2023
	Course Review date	September 2028
	Course Specification last updated	September 2023
Professional, Statutory &	• Chartered Institution of Building Services Engineers (CIBSE) • The Energy Institute (EI)	

Regulatory Body accreditation		
Link to Institute of Apprenticeship	https://www.instituteforapprenticeships.org/apprenticeship-standards/building-services-design-engineer-degree-v1-0 **ST0372**	
Reference points	Internal	• Corporate Strategy 2020-2025 • Academic Quality and Enhancement Website • LSBU Curriculum Framework • School Strategy • LSBU Academic Regulations
	External	• QAA The UK Quality Code for Higher Education 2018 • Framework for Higher Education Qualifications • FHEQ Outcome Classification Descriptions for Level 6 • Subject Benchmark Statements (Dated) • OfS Guidance • Professional Statutory and Regulatory Bodies PSRBs • SEEC Level Descriptors 2021 • Competitions and Markets Authority • Engineering Council's Accreditation of Higher Engineering Programmes document (AHEP4), Fourth Edition (August 2020) • Institute for Apprenticeships and Technical Education EQA Framework Apprenticeship Standard ST0372 • The EPAOs for EPA and On-the-Job training programme • Industrial Advisory Panel for programme support • The course is informed by the CIBSE Guidelines for Developing Higher and Degree Programmes, January 2018 (Version 1 – Revision 2)

B. Course Aims and Features

Distinctive features of course	LSBU has almost 70+ years' expertise in running Building Services Engineering courses and it produces around 50% of graduates in the industry. Our BEng (Hons) course is designed to equip apprentices with the technical, management and communication skills needed to be an effective leader of teams and innovator in the design of building services and energy conservation in buildings. UK buildings are currently responsible for about 30% of the total energy consumption and approximately 19% of the total CO_2 emissions. The pressing need of implementing climate change act and a commitment to decrease fossil fuel usage and thus carbon emissions in the UK requires urgent action. Energy conservation and sustainability therefore form an

	increasingly important theme in our course. The awareness of sustainability and carbon footprint considerations are embedded in teaching and assessment across the course. This makes this course unique in the UK at the undergraduate level producing skilled, competent, and highly employable graduates. This course is actively supported by an Industrial Advisory Board comprising of members from national employers who play a vital role in keeping our course updated and of relevance with recent trends. A distinctive feature of the course is that the full-time mode is timetabled for two days-a-week (depending on the level) while the part-time mode of this course is timetabled as one-day-a-week to support students already in employment. The first year (Level 4) of the course starts with the development of communication and professional skills alongside the fundamental scientific principles that support the mechanical and electrical building services. Subsequently it introduces the basic building services such as water services, heating, ventilation and an appreciation of the space planning and safety in buildings. The module of engineering mathematics focuses on consolidating the mathematical knowledge that is appropriate for this course while the heating and ventilation systems module considers the innovative and design aspects of the systems, ensuring the use of intellectual skills for energy efficient, sustainable heating and ventilation system design towards net zero. Internal Environment & Comfort module introduces the concept of comfort in a building indoor environment (in terms of the thermal, lighting and acoustics) and the ways of satisfying comfort requirements. The course work of the module provides an opportunity for practical application of theory in a group work setting, develop independent learning, project management with implementation of health and safety risk management. An introduction to the use of commercial software packages is introduced at this point within the Construction Practice module and further practice of these packages is facilitated within the coursework's of the module. The second year (Level 5) focuses on the application in advanced mathematics, building services specific scientific principles and in-depth study of the building services systems used such as air conditioning, refrigeration, and electrical services. Project and Business Management module is also introduced at this stage of the course. The module introduces innovation and enterprise topics along with the development of a business plan. A number of topics cut across both the business and project management areas such as risk management, budgeting, cash flow and other financial considerations in running a business are presented. The module of Intergraded Building Design provides the opportunity to practice the knowledge gained of building services systems, along with the use of commercial software packages and further develop skills in understanding and communicating with other professionals in the built environment whenever possible. In the third year (Level 6), the emphasis is on sustainability. A specialization option is offered at this final stage of the course between mechanical and electrical routes. The mechanical option offers two modules offering the study of advanced heat transfer & mass transfer in the systems along with the dynamic thermal performance of buildings, in depth study of low energy systems and resources. The electrical option focuses on lighting, electrical systems, and power distribution. Alongside these are the two modules that are common, and these are Energy Control & Management and Passive Building Design. Earlier examines the controls and processes that are necessary for efficient and effective operation of buildings and their engineering services while in later students analyses a building and its (world-wide) location and

	propose novel and effective passive methods to reduce energy consumption and improve occupant comfort. The last or final stage of the course is dedicated to the self- managed work done under tutor supervision for the Design Project module. The module culminates the knowledge and skills developed during the course. The projects may be research or design based but with the same theme of energy savings and sustainability. As a BEng course, this course encourages apprentices to acquire a deeper understanding of the essential facts, concepts, theories and principles of mechanical and electrical engineering and its underpinning science and mathematics. These core skills of mathematics, science and management are needed to meet the requirements of Chartered Engineer status. It is important to note that this academic course is one component of a higher apprenticeship. All other requirements to complete the occupational standard can be found in Appendix D.
Course Aims	The general aim of the course is to develop the apprentices' technical, management, innovation, and communication skills in accordance with the requirements of a Chartered Engineer; the emphasis being on developing skills appropriate to a multidisciplinary, integrated building services, sustainability and energy engineering environment. Chartered engineers will be expected to have good technical and management competence, with critical self-awareness and confidence in applying appropriate design solutions. They will be forward looking and able to make independent decisions based on professional judgment. They will be expected to rise to positions of top management and to lead the industry. They will require good analytical and communication skills, to be able to lead design teams, departments, and companies, whilst also being able to work independently. The course is specifically relevant to those wishing to join the Chartered Institution of Building Services Engineers (CIBSE) and/or the Energy Institute (EI). Regarding CIBSE the course provides the management, design and technical skills for those working within the building services industry. The interests of the Energy Institute are represented by the emphasis on energy management, low energy design and an awareness of the relationship of buildings to energy resource and supply issues. The BEng (Hons) Building Services Engineering aims to: 1. Produce graduate Building Services Engineers satisfying the academic requirements at BEng (Hons) leading towards becoming a Chartered Engineer. 2. Produce graduates who are trained in the core discipline of Building Services Engineering with emphasis on design and application and the progress of technology through innovation, creativity, and change. 3. Develop graduate's knowledge of mathematics, applied science and engineering methods and also of economics, finance and sustainability in support of the overall aim of the course. 4. Promote the development of research skills, analysis and evaluation of data and the ability to draw conclusions and introduce new concepts and ideas. 5. Promote the development of presentation and communication skills and the ability to argue rationally, draw conclusions and introduce new ideas based on a rigorous and analytical approach to data and systems. 6. Develop students' problem-solving and practical and transferable skills expected of a graduate who will lead multidisciplinary teams with technical, commercial and management staff in industrial and other occupations.

	7. Produce graduates capable of leading the profession of Energy and Building Services Engineering in the context of modern practice and sustainable development by introducing and promoting advanced techniques and methods and by developing and extending current technologies. 8. Provide opportunities to those in full-time employment to study towards a degree in Building Services engineering on a part-time basis. Further create an educational environment for full-time students that may benefit from the practical experience of mature and part-time students. 9. Produce engineers who will have the core competencies and enthusiasm to continue lifelong learning and development.
Course Learning Outcomes	Course learning outcomes with reference to Engineering Council's Accreditation of Higher Engineering Programmes document (AHEP4), Fourth Edition (August 2020) are summarised here and mapped to individual modules in Appendix A. The codes in brackets (C1 to C18) refer to the Learning Outcomes described in the AHEP4 documentation. **C1** Apply knowledge of mathematics, statistics, natural science, and engineering principles to the solution of complex problems. Some of the knowledge will be at the forefront of the particular subject of study. **C2** Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. **C3** Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed. **C4** Select and evaluate technical literature and other sources of information to address complex problems. **C5** Design solutions for complex problems that meet a combination of societal, user, business, and customer needs as appropriate. This will involve consideration of applicable health and safety, diversity, inclusion, cultural, societal, environmental, and commercial matters, codes of practice and industry standards. **C6** Apply an integrated or systems approach to the solution of complex problems. **C7** Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts. **C8** Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. **C9** Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity. **C10** Adopt a holistic and proportionate approach to the mitigation of security risks. **C11** Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity, and inclusion.

C12 Use practical laboratory and workshop skills to investigate complex problems.

C13 Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

C14 Discuss the role of quality management systems and continuous improvement in the context of complex problems.

C15 Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights.

C16 Function effectively as an individual, and as a member or leader of a team.

C17 Communicate effectively on complex engineering matters with technical and non-technical audiences.

C18 Plan and record self-learning and development as the foundation for lifelong learning/CPD.

Also undertaken is the exercise of mapping for compliance of the Apprenticeship Standard based on knowledge, skills and behaviours (KSBs). These KSBs are mapped against the AHEP4 learning outcomes (Appendix A).

Standard Reference Number ST0372.

Knowledge

A Building Services Design Engineer will require a comprehensive and in-depth knowledge of:

K.1 The mathematical, scientific, and engineering principles, methods and modelling that underpin the design of complex building services systems including the quantitative methods used to understand the performance of systems and components and current and emerging technologies. Examples include comfort criteria, heat transfer calculations, building management systems, fluid dynamics theory for ventilation and water flow, electrical power theory, lighting engineering theory. Using psychrometric charts to determine cooling and humidification loads. Using fan/pump characteristics to determine operating capability.

K.2 The digital solutions used to model, design, analyse and evaluate building services systems. Examples include Using building information modelling to design heating, ventilation and air-conditioning systems, and integrate system components with architectural and structural elements. Using computer programs for heating load assessments. Using dynamic thermal modelling programs to calculate carbon emissions and demonstrate compliance with Building Regulations Part L criteria. Using spreadsheet techniques for calculating and summating electric power loads.

K.3 The research techniques used to improve the performance of building services systems and components with particular reference to sustainability and reduced carbon emissions and including the use of market intelligence and evidence from best practice. Examples include: Using post-occupancy evaluation outcomes indicating the specific

occupancy patterns, space usage and behavioural characteristics and their impacts on energy consumption and carbon emissions, so that future designs can be improved.

K.4 The quality standards, codes of practice, legal and regulatory frameworks such as building regulations and construction and design management regulations that govern the design of building services systems with particular reference to health, safety and welfare and environmental impact. Examples include: Building Regulations Part L Conservation of Fuel and Power and Part F Ventilation; Electricity at Work Regulations, air quality.

K.5 The principles and techniques of whole life evaluation in the design of building engineering services systems taking into account critical constraints, including due concern for safety and sustainability. Examples include: Running costs for mechanical and electrical systems, including fuel costs and operation and maintenance costs; carbon usage assessments including both operational carbon from energy usage and embodied carbon from materials usage, including replacements and upgrades; mechanical and electrical equipment replacement strategies.

K.6 The principles and techniques of effective project management including resources, cost and risk assessment. Examples include: project programmes for the building services design activities; resources planning against project stages and 'deliverables' schedules for producing mechanical and electrical drawings and specifications. Using stage-by-stage cost allocation and expenditure profiles and cumulative schedules of risks.

K.7 How to manage teams and develop staff to meet changing technical and managerial needs. Examples include: building teams, briefing and providing direction, reviewing and appraising performance in relation to delivery of building services projects. Using change management techniques to address client/architect changes and impacts on building services design loads, layouts, and plant spaces.

K.8 How to communicate effectively through reports, drawings, specifications, presentations, and discussions with both technical and non-technical people. Examples include: Contributions to proposals reports for building services solutions to meet the client brief; concept diagrams for explaining the design principles of complex mechanical and electrical systems in layman's terms; specifications for mechanical and electrical installations.

K.9 Examples include: Dealing in a fair and honest way in activities such as selection of suppliers/contractors for tender lists for building services contracts; and in reviewing tenders and making recommendations for award of contracts.

Skills

A Building Services Design Engineer will be able to:

S.1 Use a sound, evidence-based approach to problem solving to develop building services engineering design solutions which maintain and enhance the quality of the environment and community and meet client, financial and safety objectives. Examples included: Use feedback from previous projects, and in use data from operational buildings, and

incorporate lessons learnt into building services designs and management systems with cost benefit analysis.

S.2 Identify, review and select techniques, procedures and methods best suited to undertake the design of complex building services systems and components. Examples included: comparison and selection of methods for equipment sizing for power systems; assessing the suitability of computational fluid dynamics for understanding thermal and ventilation dynamic characteristics in complex scenarios.

S.3 Promote the continuous improvement of the design of building services systems and components. This includes using market intelligence and best practice and participating in design reviews and evaluation. Examples include maintaining awareness of technical developments in equipment such as chillers, boilers and generators, and good practice methods for system configurations and control. Participating in design critiques for the building services strategy at the concept design stage.

S.4 Manage and apply safe systems of work including responsibility for own obligations for health, safety and welfare issues, assessing and controlling risk, working with health, safety and welfare legislation and best practice. Examples include: Undertaking hazard identification and risk assessment for building services systems involving electricity, gas, rotating plant, refrigerants, hot surfaces, testing and commissioning. Planning suitable access and facilities for operation and maintenance of mechanical and electrical equipment.

S.5 Managing the planning, budgeting and organization of tasks, people and resources through the use of appropriate management systems, working to agreed quality standards, project programme and budget, within legal, contractual and statutory requirements. Examples include: Use employer's quality management system for stage-by-stage project delivery; assessing required person-hours for design, site visits, inspections and witnessing in relation to fees.

S.6 Manage teams and develop staff to meet changing technical and managerial needs. Examples include: Provide team briefings and guidance on interpretation and application of new energy regulations or employer/institutional design guidance on lighting design.

S.7 Communicate effectively through reports, drawings, specifications, presentations, and discussions with both technical and non-technical people. Examples include: Presenting building services design concepts and proposals to a client using diagrams, data in context and interactive discussions on the intended operational performance and user benefits.

S.8 Carry out and record the continuing profession development needed to maintain and enhance knowledge and competence as a building services design engineer. Examples include: Learning and evidence records from project activities, such as mechanical/electrical systems design calculations; heating, cooling and power load assessments; lighting calculations; equipment capacities and selection; schematic and layout drawings for mechanical and electrical services; witness reports from commissioning; writing reports; and attendance at seminars, lectures and workshops.

Behaviours

A Building Services Design Engineer will:

	B.1 Be aware of the needs and concerns of others, especially in relation to diversity and equality. B.2 Demonstrate reliability, integrity, and respect for confidentiality. B.3 Be confident and flexible in dealing with new and changing interpersonal situations. B.4 Create, maintain, and enhance productive working relationships. B.5 Demonstrate a strong commitment to health, safety, and welfare. B.6 Demonstrate a personal commitment to professional and ethical standards, recognizing one's obligation to society, the profession, and the environment. B.7 Take responsibility for personal development, demonstrate commitment to learning and self-improvement and be open to feedback.

C. Teaching, Learning and Assessment Strategy

This course is taught by delivering lectures, tutorials, individual and group works, laboratories, computer laboratories, and any other activity the module leaders consider relevant and useful for student learning.

LSBU provide access to laboratories, computer rooms, a library, equipment, and many other resources that can be found by visiting the Student Life Centre or talking to the academics and personal tutors.
Information about resources can also be found on Home Page - London South Bank University (lsbu.ac.uk). Further, student can contact staff via Salesforce and the student services via MyAccount. In the case of MyAccount, students can do live Chat from the bottom right corner to get a prompt response. Students are supported throughout this strategy and the activities involved primarily through SAL and MyAccount as the default, with additional support offered via our VLE moodle, Microsoft Teams, emails, and direct face-to-face meetings.Every academic provides surgery hours (in person and/or on Teams) and can be contacted by email, Teams messages and in person during the classes.

When necessary, due to professional, personal, health or other circumstances, hourly paid lecturers, PhD students, or any other qualified person can cover part of the lectures and activities of this course. They will be always supervised by academics covering the role of module leaders and course directors.

This course is delivered by a blended approach. This means the material and the delivery of the teaching include physical notes in many cases but electronic notes, recorded videos, and multimedia as well. All of this is offered to boost the learning process of students.

It is important to understand, however, that this course involves an understanding of concepts by attempting all the tutorial questions, watching videos, and reading notes, articles, and books. To succeed in this course, the student must invest a minimum private study time of 3,000 hours. This time, of course, is variable depending on the previous knowledge of the student (background).

The effort must be continuous and steady throughout the academic year
In the next paragraphs, a detailed teaching strategy is provided in connection with the modules and learning outcomes established previously. Alongside the AHEP4 learning outcomes, Apprenticeship Standard based on knowledge, skills and behaviours (KSBs) are also given as codes in brackets (K1 to K9, S1 to S8 and B1 to B7)

To acquire knowledge and understanding of the relevant principles in this course, engagement in class and a pro-active approach of self-study is crucial. For each module, a module guide is provided to the student at the start of the semester in the course that introduces the module, associated assessments, the content, its timeline with core material as well as the additional reading materials. Students are strongly encouraged to use these core and optional resources for self-study, to enhance their understanding and knowledge of the subject matter.

The scientific principles and mathematical methods relevant to building services engineering **(C1; K1, S1)** are taught at all levels. The Engineering Mathematics at level 4 introduces methods, tools and notation necessary in understanding and quantifying scientific principles which is further developed to level 5 Advance Engineering Mathematics. The scientific principles are developed from level 4; Introduction to Building Services, Building Services Engineering Principles, and Internal Environment & Comfort at level 4, extended to level 5 Thermofluid Engineering, Electrical services in Buildings augmented by Energy Management and Control, Lighting & Electrical Systems and Heat and Mass Transfer Applications at level 6. Teaching techniques such as lectures, tutorials, group activities, laboratory experiments, computing, and online materials for self-directed learning are used in delivering knowledge and understanding. The laboratory work is done alongside formal lectures further reinforcing science, mathematics, and system performance. The understanding of these scientific principles and mathematical methods is through written examination and in-class test while competency will be demonstrated through design and project work.

The professional and ethical codes of practice, regulatory framework, and the principles of management **(C8; K9, B5, B6 and C15; K6, S5)** are taught by formal lectures in Construction Practice, Project and Business Management and subsequently applied in the design application modules Integrated Building Design, Passive Building Design and Energy Management and Controls. Throughout these modules student will learn to recognize ethical issues and make well-considered decisions that are guided by the professional codes of conduct. They will become familiar with the interrelation between engineering, environment, and society and the effects of their actions on the environment and its significance for society.

The context of engineering within the commercial, economic, and social setting as well as legal and contractual issues including intellectual property rights **(C15; K6, S5)** are also taught in Construction Practice, Project and Business Management, Energy Management and Control & Major Project. The theoretical principles are complemented by case studies and practical examples in these modules. They will also learn to apply risk management procedure to recognize, assess, and minimize potential risks **(C9; K5, S4, B2)** in their group coursework's. In this scenario, students at the start identify potential risks (conflicting schedules, disagreements, and lack of communication), severity of the risks and develop a plan (clear communication, deadlines, establish deliverables, assign specific responsibilities to each member to ensure everyone contributes equally) to mitigate them. By following this, students will learn to apply risk management principles to mitigate potential issues and improve the chances of success in their project.

Through the modules of Introduction to Building Services Engineering, Heating & Ventilation Systems, Refrigeration Air Conditioning and Heat Pumps Engineering, Integrated Building Design and Passive Building Design, students gain a comprehensive understanding of sustainability principles alongside the application of quantitative analysis **(C7; K4, S1)** that govern building services energy systems and Low or Zero Carbon (LZC) technologies. They will learn to assess the environmental and societal consequences of their solutions and will identify measures to minimise any unfavourable effects.

The students are taught to understand engineering principles, apply them to analyse engineering processes **(C2; K1, S1)** interpret and assess their results in Building Services Engineering Principles, Internal Environment and Comfort, & Heating and Ventilation Systems at level 4 and in Electrical Services in Buildings and Thermo-fluids Engineering modules of level 5. At the level 6, these skills are further developed via appraising the given design problem in coursework's and considers its broad environmental implications in Thermal Energy Systems, Electrical Power Systems and Distribution and Design Project.,

The students are taught how to apply quantitative and computational methods to solve engineering problems and to implement appropriate action **(C1; S1)** in Engineering Mathematics and Building

Services Engineering Principles at level 4 and later in Advanced Engineering Mathematics of level 5 and in most level 6 modules.

The ability to Identify, classify and describe the performance of systems and components using analytical methods and modelling techniques **(C3; K3, S2)** is taught in Heating & Ventilation Systems at level 4, further developed in Thermo-fluids Engineering and subsequently applied in Intergraded Building Design, Heat and Mass Transfer Applications and Electrical Power Systems and Distribution. At level 6 this takes the form of open-ended design problems, utilising pertinent knowledge and information in modelling and predicting performance.

Students are taught to identify problems, associated constraints and understand the importance of interpreting client/end users' expectations **(C5; K2, K4, S1)** in Construction Practice and Internal Environment & Comfort modules at level 4 and further develops in level 5 in Refrigeration Air Conditioning and Heat Pumps and Intergraded Building Design and learn how to manage the design process. At level 6 in Passive Building Design and Major Design Project modules, student undertake design problems with limited data, design solution and that are suitable for a variety of stakeholders alongside communicate **(C17; K8, S7**) their work to the client/end user.

The students are taught to understand and apply, an integrated or systems approach in solving engineering problems **(C6; K2, K5, S3)** in Building Services Engineering Principles, Heating & Ventilation Systems, Thermo-fluids Engineering, Advanced Engineering Mathematics, Energy Management and Control.

Students will come to appreciate the significance of implementing quality management systems and striving for continuous improvement (**C14; K5, S4, S5)** from the beginning at level 4 in Internal Environment & Comfort. At level 5 in Electrical Services in Buildings and Project and Business Management, they will be able recognise the significance of quality management systems in ensuring consistent product quality and reducing waste. At level 6 in the modules of Lighting and Electrical Systems, Heat and Mass Transfer Applications they will learn to develop a deep understanding of how continuous improvement initiatives can lead to increased efficiency and productivity.

The communication skills **(C17; K8, S7)** are taught throughout the course starting from level 4 in Construction Practice (writing, AutoCAD) and Internal Environment & Comfort and at level 5 in Refrigeration Air Conditioning and Heat Pumps, Lighting, and Integrated Building Design. These are further enhanced at level 6 Electrical Systems, Thermal Energy Systems, Energy Management and Control allowing the student to evidence knowledge and understanding. Written examinations, laboratory reports, design coursework's and presentations are the main means of assessing.

All aspects of practical skills are assessed through laboratory work reports and the course works. All coursework's are marked for the critical approach to problem solving and project management with the Major Design Project giving evidence of the Level 6 attainment.

Throughout the course, students learn to use related technical literature (Handbooks, Guides, Standard, Codes, journals etc) **(C4; K3, S1)**. At level 4 they are taught in Introduction to Building Services Engineering and Building Services Engineering Principles, then developed at level 5 in Integrated Building Design and Project and Business Management with help design issues and case studies and finally evidenced in all the modules at level 6.

The modules of Construction Practice, Internal Environment & Comfort, Intergraded Building Design, Passive Building Design and Major Design Project incorporates relevant studies with technical uncertainty; experiments that require safety measures to be implemented (**C5; K2, K4, S1**) to develop students' ability to work under these conditions. Further relevant industry standards and codes of practice are communicated through guest lectures to support students understand the practical implications of these considerations in a professional context and they remain up to date with latest industry standard and best practices.

Team working skills including equality, diversity, and inclusion **(C11; B1, B3 B4)** are encouraged throughout the course. Students are introduced to group coursework's at level 4 in Heating and Ventilation Systems, Introduction to Building Services Engineering & Construction Practice. At level 5 they further develop team working and communication skills in Intergraded Building Design and Refrigeration Air-conditioning and Heat Pump Engineering. During the course they will be taught to

appreciate the differences and do collaborative work to realise the significance of upholding equality, diversity, and inclusion and will demonstrate the associated benefits and responsibilities in teamwork. At individual level they will realize the value of educating and guiding others to foster personal and professional growth.

The students are taught via lectures, tutorials, and laboratories.to select suitable materials, machinery and apply processes while acknowledging their constraints **(C13; K5, S2)** in the modules of Introduction to Building Services Engineering, Heating & Ventilation Systems at level 4, Electrical Services in Buildings, Integrated Building Design & Refrigeration Air Conditioning and Heat Pumps Engineering at level 5. **(C13; K5, S2)** is further developed by the open-ended design/ sizing/ selection coursework's in Thermal Energy Systems and Lighting and Electrical Systems at level 6. The students gain additional familiarity with laboratory practice **(C12; K3, S2)** in modules of Internal Environment & Comfort, Electrical Services in Buildings, Refrigeration Air Conditioning and Heat Pumps Engineering and Passive Building Design, further a holistic approach is implemented to mitigate risks (the effect of uncertainty) associated with these activities **(C10; B2)**.

Students are introduced to quality issues in Internal Environment & Comfort experiments where they examine the root causes, at level 5 students further develop a deeper understanding of quality issues and the importance of effective quality management **(C14; K5, S5, S6)** in preventing quality problems from recurring in Electrical Services in Buildings and Project and Business Management. At level 6, in Lighting and Electrical Systems & Heat and Mass Transfer Applications modules, invited guest speakers share their experiences about quality issues and their experiences with quality management. This provides students with real-world perspectives on quality issues and help them understand how quality management is applied in different areas, preparing students for careers in the industries where quality management is critical to success.

At level 4 students are introduced to the context of engineering **(C15; K6, S5)** in Construction Practice & Heating and Ventilation Systems, then subsequently taught and fostered in Project and Business Management in level 5 and developed by the open-ended design coursework's in Energy Management and Controls and other level 6 modules. At level 6, some modules further cover topics such as occupational safety and health regulations, and environmental policies and regulations that emphasis conservation of energy that helps student how to develop solutions that comply with legal and contractual requirements where their compliance is critical to success.

Transferable skills **(C5; K2, K4, S1)** are taught, developed, and assessed throughout the course. At level 4, communication skills are introduced in the Construction Practice, Internal Environment & Comfort while problem solving is taught in Heating and Ventilation Systems, Refrigeration Air Conditioning and Heat Pumps and Electrical Power Systems and Distribution. The computing / IT skills and information retrieval are developed with the coursework's at level 5 and 6 in Intergraded Building Design and Heat and Mass Transfer Applications while the Passive Building Design and Major Project provides the evidence of attainment of all transferable skills at Level 6.

Further while students are encouraged to plan, develop, and record their self-learning **(C18; S8, B7)** and exercise personal responsibility **(C16; K7, S6, B3, B4)** throughout the course, they are introduced to this at level 4 in Construction Practice, subsequently at level 5 in Project and Business Management and in Major Project. The last or final stage of the course is dedicated to the self-managed work done **(C16; K7, S6, B3, B4 and C18; S8, B7)** under tutor supervision for the Design Project module (level 6). The module culminates the knowledge and skills developed during the course. The students will develop an understanding of the importance of continuing professional development and cultivating a transparent, collaborative safety culture that promotes questioning and innovation. They will acquire self-directed learning abilities, comprehend the boundaries of their technical proficiency in understanding intricate issues, develop analytical reasoning and competent decisions.

D. Assessment Methods

General definitions

The assessment in this course is made by coursework (CW) and exams (EX).

CW can be in the form of tests, reports, quizzes, etc. (individual or in groups; on-campus and/or online via Moodle).

Exams are individual assessments and can be in the form of on-campus written exercises or online.

There are modules which are CW 100%, there are others with different weights on CW and exams. CW can have several components.

The modality is defined module by module in the module guides.

Details about weights can be found at **H. Course Modules** in these specifications.

This course, through its modules, includes summative and formative assessments for students to prepare for their exams.

Summative assessments are the assessments that define the student's official marks on coursework and exams.

A formative assessment is like a summative assessment, but the marks obtained (if any) are not part of the official assessment. These marks are just a tool for the student to test themselves. A formative assessment can be a previous year's coursework or exam paper, an original coursework or an original exam paper, quizzes, tests, etc. This will be decided and designed by the module leader.

Summative assessments can be reviewed and clarified after the students' requirements by the academic judgment will prevail (principle of academic judgment independence). When students are dissatisfied with their marks, they have an official appeal process to follow.

E. Academic Regulations

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

https://www.lsbu.ac.uk/about-us/policies-regulations-procedures

Since this course is accredited, there are some extra regulations defined by the requirements by CIBSE and EI that in some cases can be more restrictive than the LSBU regulations. They are stated in these specifications and the course guide.

Compensation

A compensated pass could be awarded under the criteria of the exam board if a minimum of 30% is achieved at a component level (CW and/or EX) and a minimum of 30% is achieved at the module level (Module Mark). Compensation is only considered when students exhausted their four attempts to pass the module.

A maximum of 20 credits can be compensated, throughout the whole course, excluding the Final Year Project.

Condonement

No Condonement of modules is allowed in this course.

F. Entry Requirements

Year 1 entry (full-time)

- A Level BBC - Must include Mathematics and preferably a Science in either Chemistry or Physics (UCAS points: 112)
- T-level (Merit or above) in Construction: Design, Surveying and Planning. (UCAS points: 120)
- BTEC Level 3 Extended Diploma DDM in an Engineering subject area, with a minimum of merit in Mathematics and advanced Mathematics. (UCAS points: 128)
- Building Services Engineering Technician level 3 apprenticeship DD (UCAS points: 96) alongside grade Pass or Distinction at EPA
- Access to Engineering qualifications with 15 Distinctions and 30 Merits including Maths and Physical Science credit.
- Applicants must hold 5 GCSEs A-C including Maths and English or equivalent (reformed GCSEs grade 4 or above).

Year 2 entry (Advanced Entry: part-time)

- BTEC HNC/D - six Merit passes at Level H. Must include passes in Mathematics and should preferably include Heating Services Design, Ventilation and Air-conditioning (i.e., Construction and the Built Environment).
- A qualification deemed to be the equivalent of the above.
- Student with an HNC from CBSE, LSBU will need an ALL pass at Level 4 to be accepted at year 2 part-time course.
- Student with an HND from CBSE, LSBU will need an ALL pass at Level 5 to be accepted at year 3 part-time course.
- Students with an HNC, HND, BEng, BSc, or any other degree in other fields different to Building Services Engineering from LSBU will need a pass mark (40 marks or above) at Level 4 for modules that cover all the learning outcomes of the BEng (Hons) Building Services Engineering at LSBU. In some cases, could be necessary to take modules at level 4 at the same time the student starts the BEng course to cover the learning outcomes up to a maximum of two modules at level 4 (40 credits).
- Any other student with an HNC, HND, BSc or qualification will be deemed to be the equivalent of the above with agreement with the course director.

Credit for prior learning (APL)

Applicants may be able to use their learning or other life experiences to gain academic credit towards their course of study. Applicants need to demonstrate that their learning is equivalent to formal learning on the course and produce satisfactory evidence. If an applicant has gained a qualification from a professional body or another institution this may be credited towards the University qualification via our transfer credit scheme. The course director will be consulted before approving the access.

G. Course Structure(s)

Course overview

Building Services Engineering at London South Bank University is studied at HNC, HND and BEng (Hons) levels. To facilitate transfer paths from the HNC and HND courses to BEng (Hons) course ensuring the realisation of students' aspirations, our HNC and HND course are deliberately designed using many of the original BEng modules to facilitate 'ladders and bridges' between the courses and opportunities were taken to lecture HND & BEng students together where appropriate. External

examiners and accreditation panels have expressed general approval with the operation of mixed classes since first used in 1999.

Professional recognition is an important, if not essential, attribute of the course. This is governed by the Engineering Council AHEP for Incorporated (IEng) and Chartered (CEng) Engineers. Students completing a BEng (Hons) are required to undertake further learning to meet the academic requirements of CEng such as an accredited MSc. Alternatively, students may undertake an independent personal development route outside of the University. The BEng (Hons) course contains two routes: a Mechanical Services route and Electrical Services route.

All Level 5 modules are common to both routes and contain a broad mixture of mechanical and electrical services together with management and supporting maths and science.120 credits must be fulfilled at each level. Of the Level 6 modules, two (40 credits) are dedicated to the specialist route with the remainder being a mix of mechanical and electrical and management. 120 credits must be fulfilled at level 6, where 40 of them are fully dedicated to the Major Project. Details of module content may be derived from individual module guides.

The course is delivered in the part time mode, code: 5124

It is provided on a semester pattern; each semester is 12 weeks in duration with an additional week for exam. The table below show the modules delivered in each term for each year. The letter 'C' or 'O' in brackets by the side of the module code indicates whether the module is CORE or OPTIONAL.

(BEng (Hons) Building Services Engineering Apprenticeship) – Part time

- The part time course is delivered over 4.5 years (9 semesters).
- Students study 2 No. of 20 credit- modules in each semester, as shown below.
- Note that; the Major Project is a double module (i.e., 40 credits).
- The course will run one day per week for 4 years.
- The 5th year semester 1 is dedicated to the self- managed / tutor supported major project.
- The students will be expected to have 5 meetings with their tutor; they will have to arrange the meetings with their tutor at a time that suits both parties.

	Semester 1 (O-optional, C-compulsory)		**Semester 2 (O-optional, C-compulsory)**	
Year 1	Engineering Mathematics (C)		Engineering Mathematics (C)	20
	Building Services Engineering Principles(C)	20		
	Construction Practice B (C)		Construction Practice B (C)	20
			Introduction to Building Services (C)	20
Year 2	Internal Environment and Comfort (C)	20		
			Heating and Ventilation Systems(C)	20
	Electrical Services(C)	20		
			Thermofluids Engineering(C)	20
	Advanced Engineering Mathematics(C)	20		

Year 3			Refrigeration Air Conditioning and Heat Pumps(C)	20
	Integrated Building Design(C)		Integrated Building Design(C)	20
	Project and Business Management(C)		Project and Business Management(C)	20
Year 4	Energy Management and Control(C)		Energy Management and Control(C)	20
	Passive Building Design(C)		Passive Building Design(C)	20
	ELECTRICAL OPTION:			
	Lighting and Electrical Systems**(O)**	20		
			Electrical Power Systems and Distribution**(O)**	20
	MECHANICAL OPTION:			
	Heat and Mass Transfer Applications**(O)**	20		
			Thermal Energy Systems**(O)**	20
Year 4.5	Design Project	40		

Placements information

n/a

H. Course Modules

The first column 'three character – number-3 digit number' under each module gives the reference code of the module along with name. The letter 'C' or 'O' in brackets by the side of the module code indicates whether the module is CORE or OPTIONAL.

Module Code	Module Name	Level	Semester	Credit value	CW/Exam Weight
BEA-4-450	Engineering Mathematics (C)	**4**	**1 - 2**	**20**	**50/50**
BEA-4-485	Construction Practice (C)	**4**	**1 - 2**	**20**	**0/100**
BEA-4-455	Introduction to Building Services Engineering (C)	**4**	**1**	**20**	**0/100**
BEA-4-451	Building Services Engineering Principles (C)	**4**	**2**	**20**	**100/0**
BEA-4-456	Internal Environment & Comfort (C)	**4**	**1**	**20**	**30/70**
BEA-4-457	Heating & Ventilation Systems (C)	**4**	**2**	**20**	**100/0**

CBE_4_GW1	Gateway Preparation (C)	**4**	**1 - 2**	**N/A**	**N/A**
BEA-5-460	Advanced Engineering Mathematics (C)	**5**	**1**	**20**	**50/50**
BEA-5-461	Thermo-fluids Engineering	**5**	**2**	**20**	**0/100**
BEA-5-466	Electrical Services (C)	**5**	**1**	**20**	**30/70**
BEA-5-462	Refrigeration Air Conditioning and Heat Pumps Engineering(C)	**5**	**2**	**20**	**30/70**
BEA-5-464	Intergraded Building Design (C)	**5**	**1 - 2**	**20**	**100/0**
BEA-5-465	Project and Business Management (C)	**5**	**1 - 2**	**20**	**100/0**
CBE_5_GW2	Gateway Preparation (C)	**5**	**1 - 2**	**N/A**	**N/A**
	Common:				
BEA-6-476	Design Project (C)	**6**	**1**	**40**	**100/0**
BEA-6-474	Passive Building Design (C)	**6**	**1 - 2**	**20**	**100/0**
BEA-6-473	Energy Management and Control (C)	**6**	**1 - 2**	**20**	**60/40**
	Electrical option:				
BEA-6-470	Lighting and Electrical Systems (O)	**6**	**1**	**20**	**30/70**
BEA-6-472	Electrical Power Systems and Distribution (O)	**6**	**2**	**20**	**30/70**
	Mechanical option:				
BEA-6-471	Heat and Mass Transfer Applications (O)	**6**	**1**	**20**	**50/50**
BEA-6-475	Thermal Energy Systems (O)	**6**	**2**	**20**	**50/50**

CBE_6_GW3	Gateway Preparation (C)	**6**	**1 - 2**	**N/A**	**N/A**

I. Timetable Information

The course runs on one day per week for 4.5 years.

Once students are fully enrolled, they will have access to the Moodle Site, MS Teams and the official timetable. This is usually available ONLINE in the second half of September before the start of the academic year. Students will be notified by Moodle alerts of any changes to the timetable by course director.

J. Costs and Financial Support

Course related costs

N/A

Tuition fees/financial support/accommodation and living costs.

Information on tuition fees/financial support can be found by clicking on the following link:
http://www.lsbu.ac.uk/study/undergraduate/fees-and-funding or
http://www.lsbu.ac.uk/study/postgraduate/fees-and-funding
https://www.lsbu.ac.uk/international/fees-and-funding

Information on living costs and accommodation can be found by clicking the following link:
https://www.lsbu.ac.uk/student-life/our-campuses/southwark/cost-of-living

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Appendix A: Curriculum Map

This map provides a design aid to help course teams identify where course outcomes are being developed, taught and assessed within the course. It also provides a checklist for quality assurance purposes and may be used in validation, approval/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. **(A: Summative Assessment)**

	Module	AHEP4 Learning Outcome Code																	Year	
		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	FT	PT
LEVEL 4	BEA-4-450 Engineering Mathematics	TDA																TDA		1	1
	BEA-4-485 Construction Practice					TDA			TDA		TDA	TDA				TDA			TDA		
	BEA-4-455 Introduction to Building Services Engineering				TDA			TDA						TDA							
	BEA-4-451 Building Services Engineering Principles	TDA	TDA		TDA		TDA														
	BEA-4-456 Internal Environment & Comfort					TDA							TDA		TDA		TDA				
	BEA-4-457 Heating & Ventilation Systems			TDA			TDA	TDA		TDA				TDA							2
LEVEL 5	BEA-5-466 Electrical Services in Buildings		TDA										TDA	TDA	TDA					2	
	BEA-5-461 Thermo-fluids Engineering	TDA	TDA				TDA														
	BEA-5-460 Advanced Engineering Mathematics	TDA		TDA			TDA														3
	BEA-5-462 Refrigeration Air Conditioning and Heat Pumps Engineering					TDA		TDA					TDA	TDA				TDA			
	BEA-5-464 Intergraded Building Design			TDA		TDA		TDA	TDA			TDA					TDA				
	BEA-5-465 Project and Business Management				TDA					TDA	TDA				TDA	TDA			TDA		
LEVEL 6	BEA-6-470 Lighting and Electrical Systems								TDA						TDA			TDA		3	4
	BEA-6-472 Electrical Power Systems and Distribution		TDA	TDA										TDA			TDA				
	BEA-6-471 Heat and Mass Transfer Applications			TDA	TDA												TDA				
	BEA-6-475 Thermal Energy Systems		TDA						TDA					TDA				TDA			
	BEA-6-473 Energy Management and Control	TDA			TDA		TDA									TDA		TDA			
	BEA-6-474 Passive Building Design					TDA		TDA			TDA	TDA	TDA								
	BEA-6-476 Design Project		TDA		TDA	TDA				TDA	TDA								TDA		5

(X: Formative assessment to contribute to the fulfilment of the occupational standard. The summative assessment is undertaken by the EPAO during the EPA process)

Building Services Design Engineer Standard ST0040																		
APPRENTICESHIP STANDARD	KSB	Learning Outcomes AHEP4																
		Science and mathematics	Engineering Analysis			Design and innovation		The engineer and society					Engineering practice					
			Problem Aanalysis	Analytical tools and Techniques	Technical Literature	Design and innovation	Integrated /Systems Approach	Sustainability	Ethics	Risk	Security	EDI	Practical and Workshop Skills	Material, Equipment, Technologies and Processes	Quality Management	Engineering and Project Management	Teamwork	Communication	Lifelong Learning
	Knowledge	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18
	K1	X			X	X													
	K2		X	X		X													
	K3															X			
	K4														X		X		
	K5														X	X			
	K6										X						X	X	
	K7															X			
	K8																X	X	
	K9																X	X	
	K10						X		X	X				X	X				
	K11					X		X											
	K12						X						X	X					
	Skills																		
	S1	X			X	X													
	S2		X	X		X													
	S3											X		X	X	X	X		
	S4													X		X			
	S5								X	X									
	S6					X		X											
	S7											X					X	X	
	S8						X						X	X	X				
	Behaviour																		
	B1								X								X		
	B2		X	X															
	B3								X										
	B4																		X

Appendix B: Terminology

(Please review the definitions and add those according to your course and context to help prospective students who may not be familiar with terms used in higher education.)
Some examples are listed below:

accelerated degree	accelerated degrees (also known as two-year degrees) are full bachelor's degrees (undergraduate courses) you can complete in a condensed time.
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
end-point assessment	End-point assessment (EPA) tests the knowledge, skills and behaviours that an apprentice has gained during their training. Unique to each standard, EPA demonstrates the competence of an apprentice in their role. Only approved End-Point Assessor Organisations (EPAOs) can carry out assessments as set out in the assessment plan.
extended degree	an extended degree provides a bridging route for students who don't meet the initial entry requirements for the undergraduate degree. The first year provides the necessary knowledge and skills before students begin the degree-level course.
extracurricular	Activities are 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, progress in their studies and prepare for summative assessment; formative assessment does not contribute to the final mark, grade or class of degree awarded to students

foundation	foundation year programmes are designed to develop skills and subject-specific knowledge to ensure a student can advance to a degree course. They may be offered as stand-alone one-year courses or integrated into degree programmes.
gateway	gateway takes place before an End-Point Assessment (EPA) can start. The employer and LSBU will review their apprentice's knowledge, skills and behaviours to see if they have met the minimum requirements of the apprenticeship set out in the apprenticeship standard and are ready to take the assessment. Usually includes off-the-job training and reviews.
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
integrated	an integrated master's degree combines undergraduate and postgraduate study. About Apprenticeships, integrated would usually mean that the End-Point Assessment (EPA) is integrated with the academic award
intensity of study	the time taken to complete a part-time course compared to the equivalent full-time version: for example, the 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
material information	information students need to make an informed decision, such as what and where to study
mode of study	different ways of studying, such as full-time, part-time, e-learning or work-based learning
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 '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
non-integrated	about Apprenticeships, non-integrated would usually mean that the End-Point Assessment (EPA) is not integrated with the academic award
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
pre-registration (HSC only)	a pre-registration course is designed for students who are not already registered with an independent regulator such as the Nursing and Midwifery Council (NMC)

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 / regulatory body	a course that is regulated by a regulatory body, which is an organisation recognised by the 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	A formal assessment of students' work, contributes to the final result.
term	any of the parts of an academic year that are divided into three or more for purposes of teaching and assessment (in contrast to division into semesters)
top-up degree	A top-up degree is the final year (Level 6) of an undergraduate degree course. It allows students to top-up an existing qualification to a full BA, BSc, or BEng.
total study time/workload	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 skills, knowledge or understanding as part of their course
written examination	a question or set of questions relating to an area of study to which candidates write answers usually (but not always) under timed conditions

Appendix C: The Apprenticeship Standard for (BEng (Hons) Building Services Engineering Design Apprenticeship (PT))

An apprenticeship is aligned to a standard which is referred to as an 'apprenticeship standard'. An apprenticeship standard is designed by groups of employers known as 'trailblazer groups' to meet skill shortages in their sectors and is linked to an occupational profile. Apprenticeship standards are designed by industry and lay out which Knowledge, Skills and Behaviours (KSBs) must be mastered by the Apprentice by the end of apprenticeship programme in order to successfully achieve the apprenticeship qualification. Note that this degree programme is non-integrated.

The academic element of the apprenticeship programme is mapped to the apprenticeship standard. A list of KSBs that must be evident in additional to the degree programme. LSBU e-portfolio system will allow Apprentice to set tasks to address any outstanding elements of the Standard and to ensure that the progress is tracked regularly. Evidence for the Skills and Behaviours should be collected and stored on LSBU e-portfolio. For example: A Witness Testimony, from your employer, detailing a task that you have undertaken whilst at work, which meets a criterion of the Standard.

Completing the academic element only partly satisfy the requirements of the Apprenticeship Standard, there are also skills and behaviours that need to be addressed at the workplace. Details of your Standard can be located on the Institute of Apprentices website and also via e-portfolio.

Link to Institute of Apprenticeship (IoA) Standard and Assessment Plan:

https://www.instituteforapprenticeships.org/apprenticeship-standards/building-services-design-engineer-degree-v1-0

20% off-the-job Training

Apprentices are required to spend 20% of the contracted hours on off-the-job activities that directly relate to your apprenticeship. It is the responsibility for the Apprentice and the employer to create a working plan to show 20% off-the-job training.

ESFA Definition
"Off-the-job training is defined as learning which is undertaken outside of the normal day-to-day working environment and leads towards the achievement of an apprenticeship. This can include training that is delivered at the apprentice's normal place of work but must not be delivered as part of their normal working duties."

Off-the-job training can include:	Off-the-job training does not include:
The teaching of theory (for example: lectures, role playing, simulation exercises, online learning or manufacturer training)	Preparing for Functional Skills English and Maths (If applicable)
Practical training (for example: Shadowing, job rotation, industry visits and attendance at competitions)	Progress Reviews
Group discussions & Tutorials	On-programme assessment required for the apprenticeship standard
Learning Support (If applicable)	Training which takes place outside of your paid working hours
Time spent writing assessments / assignments	Induction into university or work place

The 20% off-the-job activity cannot be part of the normal work, however, the employer can utilise some of this 20% by undertaking projects within the organisation, so long as it would not be part of normal role. The 20% hours must be logged on LSBU e-portfolio to provide evidence, which will be used in the progress reviews and End Point Assessment. It's important to note that an apprenticeship is not solely an academic programme; the academic programme and corresponding qualification is just one element of an apprenticeship. There are different and additional commitments and expectations required of both the apprentice and the employer.

Apprenticeship Progress Reviews (APRs)

It is important that the progress are made and tracked throughout the course and it is written on record. Progress reviews are conducted at the end of each semester between LSBU, the apprentice and the employer via meetings or conference call and LSBU e-portfolio. The attendance and results will be uploaded when the review is due for employer to access.

THE FULFILLMENT OF THE KNOWLEDGE, SKILLS AND BEHAVIOURS WILL BE ACHIEVED WITH THE COLLABORATION OF THE EPAO UNDER THEIR ON PROGRAMME ASSESSMENT AND END-POINT ASSESSMENT.

Gateway Preparation Module

The Gateway is the entry point to End-Point Assessment (EPA). It is the point at which the apprentice has completed their learning, met the requirements of the standard, 20% off-the-job (OJT) training, and that they, alongside their employer and LSBU agree that they are ready to enter their EPA.

The Gateway Preparation module is a pass/fail, zero credit module designed to support apprentices to identify and work towards meeting the Gateway criteria from an early stage in their apprenticeship, particularly those that sit outside of an academic qualification. The module will be completed each year throughout the duration of the apprenticeship up to passing the Gateway.

The Gateway

LSBU will be required to submit evidence of the following in order to progress onto the final stages of the EPA, this will include:

- English & Maths
- Degree
- 20% off the job training requirement met.
- Academic qualification

End-Point Assessment (EPA) (Completion) Module

End-point assessment (EPA) is the final stage of an apprenticeship and must be completed after the apprentice successfully passes through Gateway. It is an assessment of whether the apprentice has developed the skills, knowledge and behaviours outlined in the apprenticeship standard.

The End Point Assessment (Confirmation) module is a pass/fail, zero-credit module that facilitates achievement and progress of the non-integrated End Point Assessment. It is assessed and confirmed by the End Point Assessment Organisation (EPAO) as set out in the assessment plan for the standard. The grade is confirmed by the EPOA.

End Point Assessment

To successfully complete your apprenticeship, you will need to achieve in the End Point Assessment (EPA), during which your competence of the KSBs, as set out in the apprenticeship standard, is assessed. The EPA plan is a document which was created by the trailblazer group which sets out the requirements, assessment methods and grading criteria for the EPA. All current apprenticeship standards and assessment plans can be found on the Institute for Apprenticeships website. There is a certain period once you have completed the degree to complete the EPA.

To know about the EPA assessment plan, please refer to the link provided.

For further details, please refer to the Apprentice Team at apprenticeships@lsbu.ac.uk