EST 1892 LSBU School of Engineering

Course Specification

<table>
<tr><th colspan="5">A. Course Information</th></tr>
<tr><td>Final award title(s)</td><td colspan="4">BEng (Hons) Electronic and Computer Systems Engineering</td></tr>
<tr><td>Intermediate exit award title(s)</td><td colspan="4">DipHE in Electronic and Computer Systems Engineering CertHE in Engineering</td></tr>
<tr><td>UCAS Code (BEng)</td><td>H620</td><td>Course Code ()</td><td colspan="2">Full time: 5604
Part time: 5605</td></tr>
<tr><td></td><td colspan="4">London South Bank University</td></tr>
<tr><td>School</td><td colspan="4">☐ ASC ☐ACI ☐ BEA ☐ BUS ☒ENG ☐HSC ☐LSS</td></tr>
<tr><td>Division</td><td colspan="4">Electrical and Electronic Engineering</td></tr>
<tr><td>Course Leader</td><td colspan="4">Stavros Dimitriou</td></tr>
<tr><td>Delivery site(s) for course(s)</td><td colspan="4">☒Southwark ☐Havering
☐ Other: please specify</td></tr>
<tr><td>Mode(s) of delivery</td><td colspan="4">☒Full time ☒Part time ☒other please specify-SANDWICH</td></tr>
<tr><td>Length of course/start and finish dates</td><td colspan="4"><table>
<tr><th>Mode</th><th>Length years</th><th>Start - month</th><th>Finish - month</th></tr>
<tr><td>Full time</td><td>3</td><td>September</td><td>July</td></tr>
<tr><td>Full time with placement/ sandwich year</td><td>4</td><td>September</td><td>July</td></tr>
<tr><td>Part time</td><td>4</td><td>September</td><td>July</td></tr>
<tr><td>Part time with Placement / sandwich year</td><td colspan="3">Sandwich year is not offered in part-time mode</td></tr>
</table></td></tr>
<tr><td>Is this course generally suitable for students on a Tier 4 visa?</td><td colspan="4">Please complete the International Office questionnaire
Yes
Students are advised that the structure/nature of the course is suitable for those on a Tier 4 visa but other factors will be taken into account before a CAS number is allocated.</td></tr>
<tr><td>Approval dates:</td><td colspan="2">Course(s) ~~validated~~/ Subject to validation</td><td colspan="2">December 2024</td></tr>
<tr><td></td><td colspan="2">Course specification last updated and signed off</td><td colspan="2">September 2022</td></tr>
</table>

Professional, Statutory & Regulatory Body accreditation	This course will go forward for Partial CEng/IEng accreditation by The Institution of Engineering and Technology (IET) in the academic year 2023/24. Formal accreditation can only be granted after an accreditation visit and approval from the IET's Academic Accreditation Committee.	
	The IET accreditation that will take place in the academic year 2023/24 will be backdated to the September 2020 intake.	
Reference points:	Internal	LSBU Group Corporate Strategy 2020-2025 https://connect.lsbu.ac.uk/Utilities/Uploads/Handler/Uploader.ashx?area=composer &filename=2025-group-strategy.pdf&fileguid=fab88482-e7d5-4d4c-8869- 20ece353e7df Academic Quality and Enhancement Website https://www.lsbu.ac.uk/about-us/professional-services/academic-quality- enhancement-office LSBU Academic Regulations https://www.lsbu.ac.uk/ data/assets/pdf_file/0017/351260/Academic-Regulations- 2022-23.pdf

	External	QAA Quality Code for Higher Education (2018, 2023) https://www.qaa.ac.uk/the-quality-code OfS Regulatory Framework for Higher Education (2022) https://www.officeforstudents.org.uk/publications/securing-student-success- regulatory-framework-for-higher-education-in-england/ OfS Conditions of Registration https://www.officeforstudents.org.uk/advice-and-guidance/regulation/registration- with-the-ofs-a-guide/conditions-of-registration/ Framework for Higher Education Qualifications (QAA) https://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf QAA Subject benchmark statement: Engineering (March 2023) https://www.qaa.ac.uk/the-quality-code/subject-benchmark-statements/subject- benchmark-statement-engineering QAA Subject benchmark statement: Computing (March 2023) https://www.qaa.ac.uk/the-quality-code/subject-benchmark-statements/computing FHEQ Outcome Classification Descriptions for Level 6 https://www.qaa.ac.uk/docs/qaa/quality-code/annex-d-outcome-classification-descriptions-for-fheq-level-6-and-fqheis-level-10-degrees.pdf?sfvrsn=824c981_10 PSRBs requirements https://www.hesa.ac.uk/collection/c12061/psrb_faq SEEC Credit Level Descriptors (May 2021) https://seec.org.uk/wp-content/uploads/2021/05/MDX_SEEC-Descriptors_Update- May-2021_Version-2_For-screen_AW13885.pdf Competitions and Markets Authority Guidance (March 2015) https://www.gov.uk/government/organisations/competition-and-markets-authority The Accreditation of Higher Education Programmes (AHEP), (Fourth Edition, August 2020) https://www.engc.org.uk/media/3464/ahep-fourth-edition.pdf The UK Standard for Professional Engineering Competence and Commitment (UK-SPEC), (Fourth Edition, August 2020) https://www.engc.org.uk/media/3417/uk-spec-fourth-edition.pdf ACM Computing Curricula 2020 (December 2020) http://www.acm.org/binaries/content/assets/education/curricula- recommendations/cc2020.pdf ACM IEEE Computer Society, Computer Engineering Curricula (December 2016)

		https://www.engc.org.uk/media/3417/uk-spec-fourth-edition.pdf
B. Course Aims and Features		
Distinctive features of course	The BEng (Hons) in Electronic and Computer Systems Engineering course combines the expertise of electrical and electronic engineering and computer science. It is distinctive in that it teaches the theory of electronics and computer engineering coupled with the required hardware and software tools and systems engineering approach to design, that enable graduates to tackle complex engineering projects that are commonplace in our society.	

	This course will set students on track to be one of those engineers. Students will explore a wide range of electronic and computer engineering applications and further to design and develop software, hardware and networking systems for a variety of fields in today's fast-changing marketplace. It is distinctive as it will equip students to exploit the expected exponential growth in highly connected devices and systems. The study develops analytical, computer and applied skills that enhances student's prospects of employment and consultancy in a wide range of industries, or of running their own business. Students desiring intensive study in electronics and computer engineering will find this course to be a challenging and rewarding experience. In the first year, the course introduces the science and engineering of computers, programming, electronics and digital systems with emphasis on theory, analysis and design. The second year focusses on core unit operations such as discrete mathematics, algorithms, computer architecture, electronics, networking and software design. After two-years study, the students can opt to having one year industrial placement. The sandwich option, is a significant and distinctive feature of the course, presents an opportunity to understand the way that the industry functions and to gain an appreciation of the priorities in the commercial environment. The final year includes the individual project, in addition to a wide range of taught modules that allow students to focus on some of the more advanced areas of computing such as embedded systems and The Internet of Things, cybersecurity, Artificial Intelligence, Software Engineering. The curriculum of this course will enable graduates to obtain the theoretical and practical knowledge to be involved in the design of electronic and computer-based systems to address highly specialized and specific application needs by enhancing their employment opportunities. The best aspect of this course is that its graduates are capable of taking technical responsibility for complex engineering systems and are well-prepared for lifelong learning that will empower them to surpass today's technology and effectively address the challenges of the future.

Course Aims	The programme shares with other BEng (Honours) engineering programmes in the division, the aim to produce engineering graduates who have demonstrated the following abilities: • Systematic understanding of key aspects of their field of study, including acquisition of coherent and detailed knowledge, at least some of which is at, or informed by, the forefront of defined aspects of a discipline. • Ability to deploy accurately established techniques of analysis and enquiry within a discipline. • Conceptual understanding that enables them: ▪ To devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of a discipline. ▪ To describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline. • Appreciation of the uncertainty, ambiguity and limits of knowledge. • 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).

	• Ability to apply the methods and techniques that they have learned to review, consolidate, extend and apply their knowledge and understanding, and to initiate and carry out projects. • Be able to critically evaluate arguments, assumptions, abstract concepts and data (that may be incomplete), to make judgments, and to frame appropriate questions to achieve a solution - or identify a range of solutions - to a problem. • Know how to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences. • Have the qualities and transferable skills necessary for employment requiring: ▪ The exercise of initiative and personal responsibility. ▪ Decision-making in complex and unpredictable contexts. ▪ The learning ability needed to undertake appropriate further training of a professional or equivalent nature. • Understand the role of, and have skills in, Engineering Applications, as defined by the Engineering Council and the IET, setting their educational experience in the context of work, the working of industry; the creation and lifecycle of products. • Appreciate the importance of developing their professional career (all students are encouraged to join the IET as student members, indeed the Division subsidises membership). • Be able to apply a professional engineering approach in their activities including innovation and enterprise. • Be able to apply a thorough understanding of relevant science and mathematics to the analysis and design of technical solutions to improve quality of life. **Specific to BEng (Hons) Electronic and Computer Systems Engineering** The Electronic and Computer Systems Engineering programme aims to produce graduates who have acquired and can use a broad base of active knowledge in the field of electronic and computer engineering and the skills necessary to update, extend and deepen it for career development or further study; this includes: • Appropriate grounding in underpinning high-level mathematical skills, science and circuits theory. • Digital, analogue and particularly hybrid electronic systems. • Present trends in computer hardware and software engineering. • The theory and applications of networking, computing algorithms, computer architectures and systems resource management.

	• The theory and applications of software design and computer programming, information security, signal processing, embedded systems and digital design. • The ability to design computers, electronic and computer-based systems, and networks that include both hardware and software as well as their integration to solve novel engineering problems, subject to trade-offs involving a set of competing goals and constraints. • The theoretical knowledge to solve problems in new technologies and develop new analytical techniques.

	• Successful application of the knowledge to deliver innovative products and services and/or take technical responsibility for complex engineering systems. • Acquisition and maintenance of a preparation for professional practice in engineering. • The rules and standards, which apply in electronic and computer systems services/products, for QA and the cost and legal implications of their designs. • Accountability for project, finance and personnel management and managing trade-offs between technical and socio-economic factors. • Effective interpersonal skills in communicating technical matters.

Course Learning Outcomes	**<u>Program Specific Learning Outcomes (UKSPEC)</u>** This course is designed to meet the learning outcomes specified by the UK Engineering Council in its requirements for Accreditation of Higher Education Programmes (AHEP4) that fully satisfy the educational requirements for Incorporated Engineer, IEng, status and partially satisfy the education requirements for Chartered Engineering, CEng, status. The course learning outcomes are based upon the five categories of learning outcomes identified by the UK Engineering Council. **1. Science and Mathematics** The study of engineering requires a substantial grounding in engineering principles, science and mathematics commensurate with the level of study. On successful completion of an approved or accredited programme, an individual will be able to: **C1 (Science, mathematics and engineering principles).** 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. **2. Engineering Analysis** Engineering analysis involves the application of engineering concepts and tools to analyse, model and solve problems. At higher levels of study engineers will work with information that may be uncertain or incomplete. On successful completion of an approved or accredited programme, an individual will be able to: **C2 (Problem Analysis)**. Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles. **C3 (Analytical tools and techniques)**. Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed. **C4 (Technical literature)**. Select and evaluate technical literature and other sources of information to address complex problems. **3. Design and Innovation** Design is the creation and development of an economically viable product, process or system to meet a defined need. It involves significant technical and intellectual challenges commensurate with the level of study. On successful

	completion of an approved or accredited programme, an individual will be able to: **C5 (Design).** 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 (Integrated/systems Approach).** Apply an integrated or systems approach to the solution of complex problems. **4. The Engineer and Society** Engineering activity can have a significant societal impact and engineers must operate in a responsible and ethical manner, recognise the importance of diversity, and help ensure that the benefits of innovation and progress are shared equitably and do not compromise the natural environment or deplete natural resources to the detriment of future generations. On successful completion of an approved or accredited programme, an individual will be able to: **C7 (Sustainability).** Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts. **C8 (Ethics).** Identify and analyse ethical concerns and make reasoned ethical choices informed by professional codes of conduct. **C9 (Risk).** Use a risk management process to identify, evaluate and mitigate risks (the effects of uncertainty) associated with a particular project or activity. **C10 (Security).** Adopt a holistic and proportionate approach to the mitigation of security risks. **C11 (Equality, diversity and inclusion).** Adopt an inclusive approach to engineering practice and recognise the responsibilities, benefits and importance of supporting equality, diversity and inclusion. **5. Engineering Practice** The practical application of engineering concepts and tools, engineering and project management, teamwork and communication skills. Engineers also require a sound grasp of the commercial context of their work, specifically the ways an organisation creates, delivers and captures value in economic, social, cultural or other contexts. On successful completion of an approved or accredited programme, an individual will be able to: **C12 (Practical and workshop skills).** Use practical laboratory and workshop skills to investigate complex problems. **C13 (Materials, equipment, technologies and processes).** Select and apply appropriate materials, equipment, engineering technologies and processes, recognising their limitations.

	C14 (Quality management). Discuss the role of quality management systems and continuous improvement in the context of complex problems. **C15 (Engineering and project management).** Apply knowledge of engineering management principles, commercial context, project and change management, and relevant legal matters including intellectual property rights.

	C16 (Teamwork). Function effectively as an individual, and as a member or leader of a team. **C17 (Communication).** Communicate effectively on complex engineering matters with technical and non-technical audiences. **C18 (Lifelong learning).** Plan and record self-learning and development as the foundation for lifelong learning/CPD.

C. Teaching and Learning Strategy

Our teaching and learning strategies consider the AHEP4 learning outcomes and the competences and commitments aligned with the chartered engineer standard.

A. Knowledge and understanding

Graduates must be able to use a combination of general and specialist engineering knowledge and understanding to optimise the application of advanced and complex systems. They must maintain and extend a sound theoretical approach to enable them to develop their particular role. They should be able to develop technological solutions to unusual or challenging problems, using their knowledge and understanding and/or dealing with complex technical issues or situations with significant levels of risk.

Teaching and learning strategies:

Acquisition of knowledge and understanding is in the main through lectures, the associated handouts and supporting material on the Virtual Learning Environment (VLE). Lectures, tutorials and laboratory practical include analysis and/or design methods for which problems will be set to enhance students learning supported by associated problem-solving sessions, which reinforce the lecture content. Tutorials, coursework and tests provide written or verbal feedback to enhance and develop students learning. There is a substantial amount of self-directed learning through individual and/or group project work.

The course is designed to provide a broad foundation in the science and engineering of computers, electronics and digital systems with emphasis on theory, analysis, and design. It aims to develop analytical, computer, and applied skills that will enable students to analyse, design and test digital and computer systems, architectures, networks, and processes. The curriculum is broad and covers a wide range of areas, including physical electronics and devices, circuits and systems, as well as conceptual aspects such as algorithms, signals, and information.

By employing effective teaching and learning strategies, the course equips graduates with strong knowledge and understanding in the field. Through theoretical foundations, practical experience, and specialised modules, students develop expertise to address complex technical challenges, integrate diverse technologies, and optimise the application of advanced systems. Emphasis is placed on research, continuous learning, and building a broad knowledge base to ensure graduates are well- prepared to tackle emerging technologies and excel in their future roles.

B. Design development and solving engineering problems

Graduates must be able to apply appropriate theoretical and practical methods to the analysis and solution of engineering problems. They must be able to take an active role in the identification and definition of project requirements, problems and opportunities. They should demonstrate proficiency in identifying the appropriate investigations and research needed to undertake the design, development and analysis required to complete an engineering task and conduct these activities effectively. They should possess the ability

to implement engineering tasks and evaluate the effectiveness of engineering solutions.

Teaching and learning strategies:

Teaching and learning strategies aim to develop graduates' analytical and problem-solving skills. The acquisition of intellectual skills is facilitated through various methods, including lectures, tutorials, individual and team problem-based work. Students are encouraged to engage in private study by

writing laboratory reports and solving problems provided by tutors or based on past examinations and projects.

Computer laboratory sessions are incorporated into modules and projects, where students learn how to effectively utilize engineering tools to solve problems. These tools encompass both hardware and software aspects and are fundamental to organizing information and managing design complexity. The program emphasizes the familiarity and proficiency with commonly used tools, as well as the ability to deploy them in relevant situations.

The second-year module titled "Professional Practice and Team Design Project" focuses on fostering innovation by exploring business ideas derived from innovative research and development activities. Furthermore, in the final year, students gain intellectual skills through specialized modules and individual projects. They are encouraged to attend seminars and events organized by the School of Engineering, featuring invited speakers who discuss electronic and computer engineering topics.

The teaching and learning strategies aim to enhance graduates' analytical and problem-solving abilities. Through project-based learning, research investigations, design and development tasks, and solution evaluation, students apply their knowledge to practical situations. This includes tasks such as specifying requirements, conducting risk analysis, exploring emerging technologies, and implementing design solutions while considering constraints and feedback.

Continuous improvement and the integration of lessons learned are emphasized throughout the course. By effectively applying engineering knowledge, identifying and researching problems, and developing and evaluating solutions, graduates are prepared for success in their field.

C. Responsibility, management and leadership

Graduates must be able to demonstrate technical and commercial leadership. They must possess the ability to plan the work and resources needed to enable effective implementation of a significant engineering task or project. They are expected to manage (organise, direct and control), programme or schedule, budget and resource elements of a significant engineering task or project. Furthermore, graduates should demonstrate proficiency in leading teams or technical specialisms and assist others to meet changing technical and managerial needs, while also bringing about continuous quality improvement and promote best practice.

Teaching and learning strategies:

Teaching and learning strategies in the Electronic and Computer Systems Engineering course focus on equipping students with the skills necessary for responsibility management and leadership in engineering tasks and projects. Project-based learning is a key approach, allowing students to develop effective planning and resource allocation abilities. Emphasis is placed on managing various project elements while considering quality, cost, and time.

Teamwork and collaboration are fostered to cultivate leadership skills and provide guidance and support to team members. Mentorship from experienced professionals further develops students' abilities to navigate complex working relationships and provide effective leadership within different organizational structures. Continuous quality improvement is emphasized, with students learning to identify areas for enhancement, conduct risk assessments, and propose recommendations based on lessons learned.

Effective communication and collaboration with stakeholders are encouraged,

helping students understand the importance of maintaining information flow and negotiating arrangements. The course aims to provide students with a comprehensive understanding of responsibility management and leadership, enabling graduates to plan their work, manage others, and provide effective leadership in technical or commercial contexts. They will be well-prepared for the challenges of complex engineering projects while driving continuous quality improvement and future success.

Teaching and learning strategies in the Electronic and Computer Systems Engineering course focus on developing graduates' abilities to plan, manage, and lead engineering tasks on given projects. Strategies include providing opportunities for students to engage in project planning, budgeting, risk assessment, and implementation plan development. The curriculum emphasizes the balance between quality, cost, and time, and encourages students to monitor progress, assess performance, and

provide feedback to teams and individuals. Leadership development is fostered through reinforcing professional standards, supporting team and individual development, and seeking input from specialists. Additionally, students are exposed to promoting quality standards, implementing lessons learned, and proposing improvements through project evaluation.

D. Communication and interpersonal skills

Graduates must be able to demonstrate effective communication and interpersonal skills, including the ability to communicate effectively with others, at all levels, in English. They should be capable of clearly presenting and discussing proposals, justifications and conclusions. Moreover, they are expected to exhibit personal and social skills and demonstrate awareness of diversity and inclusion issues, fostering an inclusive and respectful environment.

Teaching and learning strategies:

Effective communication and strong interpersonal skills are crucial for graduates in the field of Electronic and Computer Systems Engineering. To equip students with these essential competencies, the course incorporates various teaching and learning strategies that foster effective communication and interpersonal interactions. One approach is through lectures and tutorials that emphasize the importance of clear and concise communication in English. Students are provided with opportunities to practice articulating their ideas, engage in discussions, and receive feedback to enhance their verbal and written communication abilities. Another focus is on developing presentation skills. Workshops and training sessions are conducted to teach students techniques for delivering impactful presentations and public speaking. Through regular practice and constructive evaluations, students gain confidence in presenting technical and strategic information.

Projects and group assignments are integrated into the curriculum to promote teamwork and cooperation. By working in teams, students learn to communicate effectively, resolve conflicts, and foster productive working relationships. These experiences enhance their interpersonal skills and prepare them for real-world engineering environments. The course also emphasizes the importance of diversity and inclusion. Students engage in discussions and activities that raise awareness of diversity issues and foster an inclusive environment. They learn to appreciate different perspectives, respect individual differences, and support the needs and concerns of others. To develop strong written communication skills, students are assigned tasks that require them to prepare reports, specifications, and technical documentation. They receive guidance and feedback on their writing style, clarity, and organization.

Workshops and self-assessment exercises are conducted to help students develop self-awareness, manage their emotions, and understand their strengths and weaknesses. They gain confidence and flexibility in dealing with various interpersonal situations. Throughout the course, students have opportunities to engage with professionals in the field through guest lectures, industry events, and networking workshops. These experiences enable them to build professional connections, expand their networks, and learn from experts in the industry. By implementing these teaching and learning strategies, the course aims to equip graduates with strong communication and interpersonal skills. These skills enable them to effectively collaborate, articulate ideas, and create an inclusive work environment, ultimately preparing them for successful careers in the field.

E. Personal and professional commitment

Graduates must be able to demonstrate a personal commitment to professional

standards, recognising obligations to society, the profession and the environment. They should have a clear understanding of and comply with relevant codes of conduct. Furthermore, they are expected to understand the safety implications of their role and manage, apply and improve safe systems of work. In addition, graduates should grasp the principles of sustainable development and apply them in their work practices. Moreover, they are required to carry out and record the Continuing Professional Development (CPD) necessary to maintain and enhance competence in their own area of practice. Finally, they should possess an understanding of the ethical issues that may arise in their role and carry out their responsibilities in an ethical manner.

Teaching and learning strategies:

The Electronic and Computer Systems Engineering course incorporates various teaching and learning strategies to instill in graduates a strong sense of personal and professional commitment. These strategies are designed to ensure that students recognize their obligations to society, the profession, and the environment, and develop the necessary skills and knowledge to meet these responsibilities effectively. One of the key approaches is to familiarize students with relevant codes of conduct. Lectures and workshops provide a comprehensive understanding of professional standards and the importance of adhering to them. Through case studies and discussions, students analyse the practical implications of these codes and learn to apply them to real-world scenarios.

Safety is another critical aspect covered in the course. Lecturers, tutors and lab instructors emphasise the safety implications of students' roles and educate them on how to manage, apply, and improve safe systems of work. Practical exercises, simulations enable students to develop a keen awareness of safety protocols and regulations specific to the field. Sustainable development principles are integrated into the curriculum to highlight the significance of environmental responsibility. Lectures, projects, and assignments focus on understanding and applying these principles in engineering practices. Students learn to consider environmental, social, and economic factors simultaneously and strive for outcomes that align with sustainability goals. They are also guided on how to identify their own development needs and plan CPD activities accordingly.

Ethical awareness and ethical decision-making are emphasised throughout the course. Case studies and discussions allow students to explore ethical issues that may arise in their roles as engineers. They learn to apply ethical principles outlined in the Statement of Ethical Principles and those defined by their organizations or companies. This encourages graduates to uphold the highest ethical standards in their professional practice. By implementing these teaching and learning strategies, the course aims to nurture graduates who exemplify personal and professional commitment. Through comprehensive knowledge, practical experiences, and ethical awareness, graduates are prepared to act professionally, uphold industry standards, and contribute positively to society and the environment.

Teaching and Learning overview

The course is comprised of several modules (see section G below), and each module is delivered through a combination of lectures, tutorials, practical workshops, and computing workshops. This combination constitutes directed teaching or classroom contact. The number of hours dedicated to lectures, workshops, etc., may vary, but the total number of study hours for each module depends on its credit weighting. Typically, a 20-credit module attracts 200 hours of learning (1 credit is equal to 10 hours), which includes both directed learning and independent learning.

Furthermore, teaching and learning in this course ensure that graduates have the capacity to meet the needs of employers as agents of change. The program aims to produce graduates who are well-prepared to enter employment with skills and expectations that benefit their employers. Graduates must be able to keep up with changes, and this program equips students with the mechanisms to achieve this. Lifelong learning is emphasized, fostering attitudes through novel approaches to teaching and learning that continually question and challenge situations, as well as highlight opportunities for advancement. Final year modules, including the project, challenge students with exercises that explore new avenues.

Independent Learning

The number of hours of independent learning required is dependent on the nature of the module. Generally, the number of hours of independent learning required increases as you progress from your first year (L4) to final year (L6). Typically, in most taught modules, the directed teaching varies between a third (65 hours) to a quarter (52 to 65 hours). This may significantly vary in some areas such as mathematics or computer programming where more support is offered and Project modules where more individual involvement is expected. Additionally, long thin modules (modules running across two
semesters) generally require 65 hours of directed teaching.

Students on this course must dedicate themselves to independent learning, utilizing various resources and activities to build a strong knowledge base and succeed in the field. Independent learning time can be allocated to engaging in live recordings, accessing pre-recorded videos, participating in VLE quizzes, utilizing learning.com resources, exploring extracurricular activities, utilizing the vast range of library resources, including online books from reputable publishers, and even making use of inter-library loan services. These opportunities enhance students' understanding and mastery of the module, fostering a comprehensive and self-directed learning experience.

Subject-related and generic resources

These include the Library in the LSBU Hub building, the control and robotics laboratory, the telecommunications and networking laboratory, the analogue and digital electronics laboratory, the power electronics laboratory, the projects room, and computer labs.

The core and optional reading lists are supplied at the end of each module guide produced by the module leader. A copy of the module guide will be made available on the Virtual Learning Environment, VLE (Moodle) and the reading lists can also be accessed through LSBU Library website (https://library.lsbu.ac.uk/).

Learning Support

To support students in their learning journey, academic and support staff are available during the normal operating hours of the University via prior appointment. Academic staff also operate surgery sessions where prior appointments are not required. During term time, the university buildings and library are open 24 hours from Monday to Thursday, until midnight on Fridays, from 9 am to 9 pm on Saturdays, and open from 9 am on Sundays. During outside term time, the library is open from Monday to Friday, from 8 am until midnight, and on Saturdays and Sundays from 9 am to 9 pm. The university offers various support options, including online live chat, telephone support, self-service options, and one-to-one appointments. Some specialist workshops/computing spaces etc are not accessible outside the normal operating hours of 9am to 5pm, unless timetabled for use in a module. Teaching sessions for PT students may run until 9pm the latest and the relevant and required areas are open for access as timetabled.

All students are allocated to a Personal tutor when they begin their study at LSBU and the personal tutor is the one who students would typically see about any problems or issues they face, not just academic ones (most academic problems will probably be dealt with by module teachers or Course Directors). Students are advised to initiate contact with their personal tutor from the beginning of their studies, evidenced by keeping a record of at least two meetings per semester. Students are guided about the tutoring systems during the enrolment and orientation process and during the Design and Practice module.

The LSBU Skills for Learning Centre offers students a range of interactive workshops, one-to-one tutorials and drop-in sessions delivered by experienced learning developers. It also offers Language support for international students. In addition to that, all students who struggle to understand some of the basics, or feel they need additional support in understanding of fundamentals of mathematics and science, may join the Maths Academic Clinic (operated by the Library) where it provides comprehensive advice and guidance.

Teaching staff

Most modules are delivered by full-time academic staff from within the parent division where the course resides and often by staff from other areas within the School of Engineering or the University where expertise lies. The primary aim is for each module to be taught by a single member of staff, usually the module leader (support teaching may be needed depending on the nature/size of the module etc, subgrouped in multiple tutorials or laboratory sessions). Occasionally, PG students or part-time teaching or research staff may support certain sessions, and, in such cases, the relevant tutors are trained, and care is taken to ensure the quality of the provision.

VLE

Each course has a course site, where relevant information is posted by the respective course director. Each module on the course has a Module site and all relevant teaching and learning material such as module guides, lecture notes, teaching slides, tutorial and seminar sheets, workshop exercises, past exam papers, assignments, supplementary material etc are made available by the module leader. The virtual learning environment (Moodle) can be accessed using the Windows OS login credentials and can be accessed from any Internet connected PC inside or outside of the LSBU campus.

D. Assessment

University keeps an assessment and examinations procedure; a current version can be accessed at https://www.lsbu.ac.uk/__data/assets/pdf_file/0003/330384/Assessment_and_Examinations_Procedure_2022-23_.pdf Coursework in modules can be either formative or summative and these details are usually made available in the module guide and explained to students by the module leader at the beginning of the semester. The module guide will also provide details about the weightage of these assessment components and when the relevant brief will be made available, including submission instructions, and deadlines.

Each module has two main assessment *components*, usually the **Examination** and the **Coursework**. The deadlines for coursework are published at the beginning of the academic year. Each module may have several assessment *subcomponents*; these may consist of assignments, mini tests, quizzes, essays, laboratory reports, logbooks, and examinations of various kinds such as tests. The assessment components for each module are specifically defined and kept up-to-date in the current Module Guides. Note that a component may consist of multiple pieces of work - several pieces of coursework (often referred to as a portfolio) may constitute a single component of the module assessment. To pass a module, students must obtain an overall **module mark of no less than 40%** and a minimum **threshold** mark of **30% in each component.** The weighting of each component in calculating the overall module mark is given in the Module Guide, and the module leader will often cover the details of this at the beginning of the module.

Formative assessment typically provides students with feedback to enhance their learning and performance prior to completing a formally assessed piece of summative work. Hence, summative assessment normally describes any piece of work that contributes towards a module mark. Normally, as a summative assessment, an end-of-semester examination takes the form of a 2 or 3-hour unseen paper. Formative assessment typically includes discussions in the classroom, tutorials exercises, simulation exercises, workshop or computing exercises, question and answer sessions, peer discussions, observations, reflection on learning, presentation rehearsals.

Progression means advancing from one year to the next, during the studies. Students need to complete (pass) all modules taken/studied at that level by obtaining the minimum component marks and the minimum module marks. Occasionally, with the discretion of the exam board, students may be allowed to progress with an outstanding module(s) and the course director will explain them in detail about this. It is important that students understand how progression works and what the rules are. The rules about progression and what happens if they fail modules are carefully set out (along with all the other University rules) in the Student Handbook, a copy of which is handed to them during enrolment. The rules about referrals, repeats and extenuating circumstances are defined by the University's Academic Regulations for Taught Programmes and are described in the Student Handbook and included in the course guide.

Assessment overview:

Science and Mathematics: Assessment is through examinations and practical work and assignments using logbooks and formal reports. Unseen examination questions and coursework, which use knowledge and understanding of mathematics and sciences to undertake: analysis and modelling of science and/or engineering problems

relevant to Electronic and computer systems engineering course to achieve C1, as well as synthesis to offer solutions to engineering problems relevant to the course to achieve C1. Laboratory work to meet the requirements of the course, which involves: critical analysis of

how theoretical solutions are arrived at, proficient analysis and presentation of data using relevant methods and tools, to achieve C1.
A substantial individual project (40 credits - the equivalent to one-third of a study year) involves the student going through the process of applying and integrating their knowledge of a range of engineering disciplines i.e., the process of engineering problem analysis to synthesize a solution in order to demonstrate that students has met C1. The combination of these assessment methods provides a comprehensive evaluation of students' acquisition and application of Science and Mathematics throughout the course.

Engineering Analysis: Unseen examination questions and coursework, which allow students to demonstrate that they have met C2 and C3. Examinations typically assess students' ability to analyse complex problems, apply analytical techniques, and draw substantiated conclusions using first principles.
Laboratory work to meet the requirements of the Electronic and computer systems engineering course, which involve experiments and demonstrations of the relevant scientific principles (C2, C3). Coursework assessments may include practical assignments, mini projects, and reports that require students to apply engineering analysis techniques to real-world scenarios. These assessments evaluate students' ability to select and apply appropriate computational and analytical techniques, recognise the limitations of the employed methods, and effectively utilize technical literature and other sources of information (C4).
An individual project, which involves the student using engineering analysis, that would be assessed by a combination of a formal report and a presentation and would demonstrate completion of C2, C3 and C4. The combination of these assessment methods ensures a comprehensive evaluation of students' acquisition and application of Engineering Analysis in the course.

Design and Innovation: Both examinations and coursework components are utilized to evaluate students' understanding and application of Design and Innovation (C5 and C6). Examinations assess theoretical knowledge, principles, and standards related to design processes and considerations. Coursework assessments typically involve design projects, reports, and presentations. These assessments evaluate students' ability to design solutions for complex problems, considering a range of factors such as societal, user, business, and customer needs, as well as health and safety, diversity, inclusion, cultural, societal, environmental, and commercial considerations. A substantial individual project which involves the student going through the process of design and innovation choices demonstrating the context of C5 and C6. The assessment methods aim to assess students' ability to apply an integrated or systems approach in their designs, considering the broader implications and requirements. The assessments provide an opportunity for students to demonstrate their creativity, innovation, and problem-solving skills in the context of electronic and computer systems engineering.

The engineer and society: Both examinations and coursework components are used to evaluate students' understanding and application of the engineer and society in the course. Examinations assess theoretical knowledge, ethical reasoning, and understanding of relevant principles and concepts. Coursework assessments often involve project reports, case studies, reflective essays, and presentations. These assessments evaluate students' ability to evaluate environmental and societal impacts, analyse ethical concerns, and make reasoned ethical choices guided by professional

codes of conduct. Risk assessment exercises may be included to assess students' ability to identify and mitigate risks associated with engineering projects. Additionally, assessments may involve evaluating students' understanding of security measures and their ability to adopt an inclusive approach in engineering practice. A substantial individual project which involves the student going through the context of the engineer and society (C7, C8, C9, C10 and C11). The combination of examination and coursework assessments ensures a comprehensive evaluation of students' acquisition and application of the Engineer and society learning outcomes in the course.

Engineering Practice: Both examinations and coursework components are utilized to evaluate students' understanding and application of Engineering Practice in the course. Examinations may assess theoretical knowledge, principles of engineering and project management, and legal aspects relevant to the commercial context. Coursework assessments typically involve practical laboratory reports, project deliverables, presentations, and reflective essays. These assessments evaluate students' ability to apply practical skills, select appropriate materials and technologies, discuss quality management systems, demonstrate knowledge of engineering and project management principles, effectively function as team members or leaders, and communicate engineering concepts to technical and non-technical audiences. Laboratory work to meet the requirements of the Electronic and computer systems engineering course, which involve experiments and demonstrations of the relevant engineering practice. This is assessed by logbooks and coursework assignments. Students have an understanding of, and the ability to work in, different roles within an engineering team. An individual project that would be assessed by a combination of a formal report, a poster, a presentation and a demonstration of the final project outcomes. The practical skills demonstrate completion of C12, C13, C14, C15, C16, C17 and C18. The combination of examination and coursework assessments ensures a comprehensive evaluation of students' acquisition and application of Engineering Practice in the course.

E. Academic Regulations

The University's Academic Regulations apply to this course and can be accessed via the following link:

https://www.lsbu.ac.uk/___data/assets/pdf_file/0017/351260/Academic-Regulations-2022-23.pdf

Local protocols based on IET requirements will be applied for the accredited courses. These local protocols can be viewed via the following link:

https://drive.google.com/file/d/1f5AXAQ4yOvCbcd01PxZ3SUFX4FP05Rh2/view

F. Entry Requirements

Course Entry requirements for BEng (Hons) Electronic and Computer Systems Engineering

To be considered for entry to the first year of this course, applicants will be required to have the following qualifications:

Full-time/Part-time students

- A Level BBB including Mathematics and/or Physical Sciences (120 UCAS points) **or;**
- BTEC National Diploma DDM, including Level 3 Mathematics (128 UCAS points) **or;**
- EAL Technical Extended Diploma in Engineering Technologies, D, including Further Engineering Mathematics; Electronic and Computer Principles and other options relevant to Electronics and Computer Engineering **or;**
- Access to HE qualifications with 24 Distinctions and 21 Merits, with at least half the course in Mathematics and related subjects (122 UCAS points) **or;**
- Equivalent level 3 qualifications worth 120 UCAS points and including Mathematics
- Applicants must hold 5 GCSEs A-C including Maths and English or equivalent (reformed GCSEs grade 4 or above) **or;**
- We welcome qualifications from around the world. English language qualifications for international students: IELTS score of 6.0 or Cambridge Proficiency or Advanced Grade C, **and** a Mathematics qualification equivalent to reformed GCSE grade 4 or above, as assessed by UK NARIC

Accredited Prior Learning/Transfer Credit/Direct Entry

Applicants may be considered for entry to the second year of the course with the following qualifications

(applicants will normally be interviewed and may be required to sit a Mathematics test to ensure their preparedness for direct entry):

- BTEC Higher National Diploma in Electrical and Electronic Engineering or a closely related subject
  or;
- DipHE in a directly relevant subject **or;**
- Transfer of 120 Level 4 credits from a directly equivalent degree course and with the approval of the director of that course **or;**
- An overseas qualification assessed by UK NARIC as equivalent to at least BTEC HND in a closely related subject **and** an IELTS score of 6.5 or equivalent.

Applicants may be considered for entry to the third year of the part-time course with the following qualifications and will be interviewed to ensure their preparedness for direct entry.

Part-time students: Foundation Degree (FdEng) in a directly-related subject.

Applicants may be considered for entry to the final year of the full-time course only under the above entry requirements and will be interviewed to ensure their preparedness for direct entry.

Full-time students: Transfer from another IET-accredited course with the approval of the director of this course.

Direct entry to the final year of the part-time course is not possible.

Accredited Prior Experiential Learning
APEL may be taken into account in determining the entry requirements for candidates with relevant work experience but cannot replace the requirement for formal qualifications in Mathematics.

Application to the

course Full-time:

via UCAS
https://accounts.ucas.com/account/login?returnUrl=https%3A//www.ucas.com/dashboard
Part-time: direct to the university, via a dedicated webpage
https://apply-ukapplications.lsbu.ac.uk/signin?ReturnUrl=%2f

G. Course structure(s)

Course overview

- The academic year (up to 2022-23) was organised into two semesters, each requiring approximately 15 weeks, including 12 teaching weeks, 1 revision week, and 2 exam weeks, with student attendance. The academic year (starting from 2023-24) is organized into two semesters, each lasting approximately 13 weeks, including 11 teaching weeks, 1 revision week, and 1 exam week, with student attendance. There is a transition week in between the end of semester 1 and the start of semester 2.
- The BEng course consists of 360 credits, with most modules worth 20 credits, except for the BEng project module, which carries double weightage and is worth of 40 credits.
- The BEng scheme is offered as a full-time (3 year) program, with an option of sandwich industrial training (4 year). Full-time Students undertake 120 credits per year.
- The part-time BEng course is completed over 4 years (the sandwich option is not offered). The breakdown of credits is as follows: Year1-80 credits; Year2-100 credits, Year3-100 credits, Year4-80 credits. Part time students usually have a full day of teaching per week, requiring one-day attendance at the University.

- The three-year BEng program comprises sixteen 20-credit modules plus the BEng project (40 credits), totalling 360 credits and 3,600 hours of learning.
- Balance Between Coursework and Examination Assessment
  - Level 4 - coursework (67%) and written examination (33%)
  - Level 5 - coursework (63%) and written examination (37%)
  - Level 6 - coursework (43%) and written examination (58%) – excluding the final year project
  - BEng Course Overall - coursework (59%) and written examination (41%) – excluding the final year project.

  Thus, this BEng course includes an overall contribution of coursework to the overall degree classification of 59% excluding the final year project.
- Contact hours: a full-time student on average can expect to spend 1,200 hours a year learning which will typically be broken down as follows:
  - Level 4 - lectures/seminars/workshops (32%) and independent study (68%)
  - Level 5 - lectures/seminars/workshops (26%) and independent study (74%)
  - Level 6 - lectures/seminars/workshops (23%) and independent study (77%)

BEng (Hons) Electronic and Computer Systems Engineering – Full time

	Semester 1		Semester 2	
YEAR 1 Level 4	Engineering Mathematics and Modelling			20
	Design and Practice			20
	Object-Oriented Programming C++	20	Electrical Circuit Analysis	20
120 credits	Digital Logic Design	20	Electronic Principles	20
YEAR 2 Level	Discrete Mathematics, Data Structures and Algorithms			20
	Professional Practice and Team Design Project			20

5 **120 credits**				
	Computer Architecture and Operating Systems	20	Data Communications and Computer Networks	20
	Analogue Electronics	20	Embedded Software Design	20
Optional Sandwich Year for Full Time students				
YEAR 3 Level 6 **120 credits**	Computer Systems and Software Engineering	20	Artificial Intelligence and Signal Processing	20
	Cybersecurity and Cryptography	20	Embedded Systems and The Internet of Things	20
	BEng Project			40

Placements information

The sandwich year alternatives involve a one-year placement away from the School between the second and the third year of academic study and offered only on the FT program. During the placement year, students are enrolled on a 0-credit module. The placement year is officially monitored by a placement officer, which usually is a member of academic staff. Students who undertake a placement with a relevant company/industry are required to maintain a portfolio and an academic staff member of the division will ensure that a visit is taken place to the placement location during the duration of the placement. The student is expected to take the lead in finding the placement (short summer placement or year-long sandwich placement) and the University will provide all possible support but will not guarantee finding a placement.
It is sometimes possible to undertake a short placement during the summer break, in which case there is no need to inform the University, but it is recommended to inform your course director for future reference as it can be useful when seeking a reference from your course director at the end of your course while seeking employment or further study.

Procedure and Check for Suitability:
Requiring students to complete a 'placement confirmation form'.
Returning the form to the placements inbox: ss-placements@lsbu.ac.uk
The placement officer will contact the placement provider for confirmation and to carry out any due diligence / health and safety checks / check for suitability.
Students cannot begin the placement until they have received an approval email for the placement officer.

Support Mechanisms: Documentation and Placement Tutors Support documents are available from: https://our.lsbu.ac.uk/article/our-students/student-placements

Three documents are available, and will be supplied to:

- Students (placement handbook)
- Staff / placement tutors (placement organisers handbook)
- Placement providers (placement provider handbook)

BEng (Hons) Electronic and Computer Systems Engineering – Part time

	Semester 1		Semester 2	
Year 1	Engineering Mathematics and Modelling			20
	Design and Practice			20
80 credits	Object-Oriented Programming C++	20	Electrical Circuit Analysis	20
Year 2	Discrete Mathematics, Data Structures and Algorithms			20
	Digital Logic Design	20	Electronic Principles	20
100 credits	Computer Architecture and Operating Systems	20	Data Communications and Computer Networks	20
Sandwich Year is not offered in Part Time mode				
Year 3	Professional Practice and Team Design Project			20
	Analogue Electronics	20	Embedded Software Design	20
100 credits	Computer Systems and Software Engineering	20	Artificial Intelligence and Signal Processing	20
Year 4 80 credits	Cybersecurity and Cryptography	20	Embedded Systems and The Internet of Things	20
	BEng Project			40

H. Course Modules

Module Code	Module Title	Level	Sem	Credit value	Assessment	
					CW%	EX%
EEE_4_EMM	Engineering Mathematics and Modelling	4	1&2	20	50	50
EEE_4_ECA	Electrical Circuit Analysis	4	2	20	50	50
MED_4_DAP	Design and Practice	4	1&2	20	100	
EEE_4_DL	Digital Logic Design	4	1	20	50	50

D						
EEE_4_OOP	Object-Oriented Programming C++	4	1	20	100	
EEE_4_ELP	Electronic Principles	4	2	20	50	50
EEE_5_DDA	Discrete Mathematics, Data Structures and Algorithms	5	1&2	20	50	50
EEE_5_DCN	Data Communications and Computer Networks	5	2	20	40	60
EEE_5_ESD	Embedded Software Design	5	2	20	100	
EEE_5_PTP	Professional Practice and Team Design Project	5	1&2	20	100	
EEE_5_AEL	Analogue Electronics	5	1	20	50	50
EEE_5_CAO	Computer Architecture and Operating Systems	5	1	20	40	60
EEE_6_CSE	Computer Systems and Software Engineering	6	1	20	50	50
EEE_6_CSC	Cybersecurity and Cryptography	6	1	20	40	60
EEE_6_ASP	Artificial Intelligence and Signal Processing	6	2	20	40	60
EEE_6_ESI	Embedded Systems and The Internet of Things	6	2	20	40	60
EEE_6_PRO	BEng Project L6	6	1&2	40	100	

I. Timetable information

Full-time students are usually timetabled between 9am and 6pm and the teaching typically spans across 3 to 4 days in a week, with Wednesday afternoon, where possible, reserved for extracurricular activities, sporting or cultural activities.

Part-time students are usually timetabled for a day and the same evening of their attendance day (see section G for information on attendance days). The day usually lasts until 8pm or 9pm.
Part-time students: timetabled classes typically fall on the following days: Year 1 – Monday, Year 2 –
Tuesday, Year 3 – Thursday, Year 4 - Friday

The timetables are made available to students at least two weeks before the commencement of the semester. Students are however advised to check their timetables via MyLSBU (https://my.lsbu.ac.uk/) more frequently in the early weeks of the semester, as there might be some updated to rooms and/or re- arrangement of sessions.

Any changes to the timetable after the start of the term are also circulated by the respective module leaders and course directors.

J. Costs and financial support

Course related costs

- The course fee is the fee published by the University's fee office. Field trips and placement activities, where organised, may cost extra and are not compulsory to attend but students are advised to utilise the opportunities where possible.
- Cost of books and other learning materials is also not included in the course fee. Learning resources are usually made available through VLE (Moodle) and the library holds copies of books recommended as core reading.

The course can be found on the LSBU webpage by following the link below:
https://www.lsbu.ac.uk/study/course-finder/electronic-and-computer-systems-engineering

Tuition fees/financial support/accommodation and living costs

- Information on tuition fees/financial support can be found by clicking on the following links: https://www.lsbu.ac.uk/study/course-finder/electronic-and-computer-systems-engineering#fees https://www.lsbu.ac.uk/student-life/student-services/financial-advice
- Information on student life, services and accommodation can be found by clicking the following link: https://www.lsbu.ac.uk/student-life

List of Appendices

Appendix A: Curriculum Map
Appendix B: Educational Framework (undergraduate courses)
Appendix C: Personal Development Planning (postgraduate courses) Appendix D: Terminology

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, 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.

Modules			Course outcomes																	
Level	Title	Code	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18
4	Engineering Mathematics and Modelling	EEE_4_EMM	✓	✓	✓	✓	✓	✓												
4	Electronic Principles	EEE_4_ELP	✓	✓	✓		✓							✓	✓				✓	
4	Design and Practice	MED_4_DAP	✓	✓	✓		✓	✓		✓			✓					✓		✓
4	Electrical Circuit Analysis	EEE_4_ECA	✓	✓	✓		✓	✓						✓	✓					
4	Object-Oriented Programming C++	EEE_4_OOP	✓	✓	✓		✓	✓						✓	✓				✓	✓
4	Digital Logic Design	EEE_4_DLD	✓	✓	✓		✓							✓	✓					
5	Discrete Mathematics, Data Structures and Algorithms	EEE_5_DDA	✓	✓	✓	✓	✓	✓						✓				✓	✓	✓
5	Computer Architecture and Operating Systems	EEE_5_CAO	✓		✓	✓	✓	✓	✓	✓		✓		✓	✓	✓				✓
5	Analogue Electronics	EEE_5_AEL	✓	✓	✓	✓		✓						✓	✓				✓	
5	Data Communications and Computer Networks	EEE_5_DCN	✓	✓	✓	✓	✓	✓	✓			✓		✓	✓	✓		✓	✓	

5	Professional Practice and Team Design Project	EEE_5_PTP					✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	
5	Embedded Software Design	EEE_5_ESD	✓	✓	✓	✓	✓	✓		✓		✓		✓	✓			✓	✓	
6	Computer Systems and Software Engineering	EEE_6_CSE	✓	✓		✓	✓							✓			✓		✓	✓
6	Cybersecurity and Cryptography	EEE_6_CSC	✓	✓	✓	✓	✓			✓	✓	✓		✓	✓			✓		✓
6	Artificial Intelligence and Signal Processing	EEE_6_ASP	✓	✓	✓	✓	✓		✓	✓			✓		✓					
6	Embedded Systems and The Internet of Things	EEE_6_ESI	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓	✓			✓	✓	
6	BEng Project	EEE_6_PRO	✓	✓	✓	✓	✓	✓	✓	✓			✓		✓		✓	✓	✓	✓

Appendix B: Embedding the Educational Framework for Undergraduate Courses

The Educational Framework at London South Bank University is a set of principles for curriculum design and the wider student experience that articulate our commitment to the highest standards of academic knowledge and understanding applied to the challenges of the wider world.

The Educational Framework reflects our status as University and builds on our 131 year history as a civic university committed to fostering social mobility through employability and enterprise, enabling our students to translate academic achievement into career success.

There are four key characteristics of LSBU's distinctive approach to the undergraduate curriculum and student experience:

- Develop students' professional and vocational skills through application in industry-standard facilities
- Develop our students' graduate attributes, self-awareness and behaviours aligned to our EPIIC values (https://www.lsbu.ac.uk/about-us/mission-vision-values)
- Integrate opportunities for students to develop their confidence, skills and networks into the curriculum
- Foster close relationships with employers, industry, and Professional, Statutory and Regulatory Bodies that underpin our provision (including the opportunity for placements, internships and professional opportunities)

The dimensions of the Educational Framework for curriculum design are:

- **informed by employer and industry** needs as well as professional, statutory and regulatory body requirements
- **embedded learning development** for all students to scaffold their learning through the curriculum taking into account the specific writing and thinking requirements of the discipline/profession
- **high impact pedagogies** that enable the development of student professional and vocational learning through application in industry-standard or authentic workplace contexts
- **inclusive teaching, learning and assessment** that enables all students to access and engage the course
- **assessment *for* learning** that provides timely and formative feedback

All courses should be designed to support these five dimensions of the Educational Framework. Successful embedding of the Educational Framework requires a systematic approach to course design and delivery that conceptualises the student experience of the curriculum as a whole rather than at modular level and promotes the progressive development of understanding over the entire course. It also builds on a well-established evidence base across the sector for the pedagogic and assessment experiences that contribute to high quality learning.

This appendix to the course specification document enables course teams to evidence how their courses meet minimum expectations, at what level where appropriate, as the basis for embedding the Educational Framework in all undergraduate provision at LSBU.

Dimension of the Educational Framework	Minimum expectations and rationale	How this is achieved in the course

Curricula informed by employer and industry need	Outcomes focus and professional/employer links All LSBU courses will evidence the involvement of external stakeholders in the curriculum design process as well as plan for the participation of employers and/or alumni through guest lectures or Q&A sessions, employer panels, employer- generated case studies or other input of expertise into the delivery of the course provide students with access to current workplace examples and role models. Students should have access to employers and/or alumni in at least one module at level 4.	At Level 4, students gain an introduction to the engineering profession and professional bodies, directly delivered by the IET staff, through the Design and Practice module. This establishes their understanding of the industry landscape. Moving to Level 5, students attend presentations on industrial placements and receive support to prepare their CVs for potential opportunities. Additional sessions and support services, such as interview training, are provided through the Job Shop and Career Gym. To enhance industry engagement, representatives from professional bodies conduct seminars within the Design and Practice module, highlighting the benefits of networking and engaging with these organizations. Students are encouraged to become student members of the professional body (e.g., IET), with membership fees covered by the division. Guest speakers, including alumni and employers, contribute valuable insights during the module, fostering real-world connections. Such interactions prove beneficial when students compete in national challenges like the London Mayoral Challenge and Engineers without Borders. Furthermore, industrial advisory boards at school and division levels actively contribute to curriculum design, ensuring alignment with employer and industry needs. These boards convene twice annually to provide their expertise. By incorporating these initiatives, our course develops students' professional skills, aligns with our EPIIC values, integrates confidence-building opportunities, and fosters relationships with employers, industry professionals, and relevant bodies. This approach enables us to meet the requirements of being informed by employer and industry needs.

Embedded learning development	Support for transition and academic preparedness At least two modules at level 4 should include embedded learning development in the curriculum to support student understanding of, and familiarity with, disciplinary ways of thinking and practising (e.g. analytical thinking, academic writing, critical reading, reflection). Where possible, learning development will be normally integrated into content modules rather than as standalone modules. Other level 4 modules should reference and reinforce the learning development to aid in the transfer of learning.	At level 4, modules in the Electronic and Computer Systems Engineering course provide a foundation for academic preparedness and smooth transition to advanced years. Mathematics module fosters analytical thinking, which is further reinforced by analysing and simulating mathematical concepts using MATLAB Simulink models. Digital Logic Design extends algebra knowledge to Boolean Algebra, enabling students to deepen their understanding within analytical models' boundaries and constraints. Academic writing skills are introduced and enhanced through various reports produced in different level 4 modules. For instance, Design and Practice module involves individual and team reports, engagement with personal tutors, and the creation of portfolios. The Object-Oriented Programming C++ module requires comprehensive logbooks and case studies to demonstrate proficiency in development environments. The Electrical Circuit Analysis module provides a workplace scenario, emphasizing basic health and safety measures delivered by professional technical staff. This is compulsory for students before they use equipment in laboratories. Students maintain Logbook records while progressing through timed exercises, practicing learning in an organized manner and capturing data for future reference. Additionally, personal tutoring is embedded within the Design and Practice module at level 4. Students engage with personal tutors and attend part time open surgeries. The course induction includes meetings with personal tutors, guidance on library and IT resources, study skills, and access to university support facilities. The Skills for Learning team conducts embedded sessions in Design and Practice, teaching analytical thinking, academic writing, critical reading, and reflection skills relevant to all modules. These resources can be accessed anytime offline via VLE.

		Personal tutoring continues at level 5 for all students progressed to year 2. At level 5, direct entry students receive an induction where the Course Director takes on the role of personal tutor to guide and support their transition into the program. This induction builds upon the personal tutoring structure established at level 4. Additionally, at level 6, the Course Director and Project Supervisor collaborate to provide further support within the personal tutoring system, ensuring students receive valuable guidance throughout their academic journey.

		This comprehensive approach ensures that students scaffold their learning, develop disciplinary thinking and writing abilities, and receive support throughout the curriculum, fostering their transition and academic preparedness.
High impact pedagogies	<u>Group-based learning experiences</u> The capacity to work effectively in teams enhances learning through working with peers and develops student outcomes, including communication, networking and respect for diversity of perspectives relevant to **professionalism** and **inclusivity**. At least one module at level 4 should include an opportunity for group working. Group-based learning can also be linked to assessment at level 4 if appropriate. Consideration should be given to how students are allocated to groups to foster experience of diverse perspectives and values.	The following modules, encourage and allow students to work in small groups of 2 to 4 in various settings, and experiencing various learning techniques be it peer learning, or communication and networking with their buddies and respect their diversity and individual perspectives: • Design and Practice, • Object-Oriented Programming C++ • Electronic Principles • Digital Logic Design • Electrical Circuit Analysis Some module leaders, form groups where students are forced to work with random classmates in certain assignments and they are given a free choice to form groups for certain tasks. Note that the group experience in Design and Practice is interdisciplinary with groups formed with students from electrical, mechanical and chemical disciplines.

Inclusive teaching, learning and assessment	<u>Accessible materials, resources and activities</u> All course materials and resources, including course guides, PowerPoint presentations, handouts and material available from VLE (Moodle) should be provided in an accessible format. For example, font type and size, layout and colour as well as captioning or transcripts for audio-visual materials. Consideration should also be given to accessibility and the availability of alternative formats for reading lists.	All teaching and learning materials are available on the VLE in an appropriate accessible format. VLE versions are updated at least yearly for the best student experience. Module leaders also encourage students to approach them should they need the material in a different format. An example is notes with larger fonts for partially visually impaired students and printed material provided to DDS students. Each module in VLE has a direct link to the reading list with most items directly available online as online books and resources. The VLE has an icon next to each document that reflects the accessibility score of readiness (Green/Amber/Red). This promotes module leaders to always keep readable and accessible documents. The division offers printing facilities in the main building and in most labs. In most labs we offer speakers and sound system to be used if necessary. In large lecture rooms/lecture theatres there are at least three screen available for students to properly read the

		content. Recordings are also available and accessible via VLE Module sites (e.g. Panopto, PowerPoint, MS Teams)
Assessment *for* learning	Assessment is recognised as a critical point for at risk students as well as integral to the learning of all students. Formative feedback is essential during transition into university. All first semester modules at level 4 should include a formative or low-stakes summative assessment (e.g. low weighted in final outcome for the module) to provide an early opportunity for students to check progress and receive prompt and useable feedback that can feed- forward into future learning and assessment. Assessment and feedback communicate high expectations and develops a commitment to **excellence**.	The L4 modules utilize a range of coursework assessments, categorized as formative or summative, essential for all students' learning and progress. Formative assessments are crucial early in a student's course journey, allowing prompt action on feedback to address weaknesses and progressively improve marks in later assessments. Due to subject complexity, summative assessments may be more suitable, allowing time for students to grasp intricate concepts before practical application in class or workplace scenarios. Formative feedback is part of scheduled meetings between students and academic staff during summative assessments. Summative assessment feedback follows recommended timelines, usually two weeks after submission. Summative assessments contribute less to the final module mark. Formative assessment, a cornerstone in early learning, is effectively delivered through quizzes via the VLE or questionnaires, reinforcing lecture content. Implemented across a minimum of three semester 1 modules, students benefit from instant feedback, fostering improvement. This inclusive approach extends to summative assessments, thoughtfully deconstructed into low-stakes components across two modules. This strategic breakdown familiarizes students with end-of-module examinations, fortified by prompt feedback within 15 working days post-submission.

High impact pedagogies	<u>Research and enquiry experiences</u> Opportunities for students to undertake small-scale independent enquiry enable students to understand how knowledge is generated and tested in the discipline as well as prepare them to engage in enquiry as a highly sought after outcome of university study. In preparation for an undergraduate dissertation at level 6, courses should provide opportunities for students to develop research skills at level 4 and 5 and should engage with open-ended problems with	Students on this course are required to undertake small-scale independent enquiry- based study and contribute to either their individual projects/task or to a group/team project that they are part of. The module Design and Practice at L4, facilitates such aspects for students to experience as part of their individual and team tasks and also as part of the major design challenge that all students on the module undertake. The design challenge is more of a cross disciplinary nature and required groups to be constituted with students from different courses which allows then to work as an interdisciplinary team and enjoy the diversity of the team and raise to the challenging academic aptitude required. The Professional Practice and Team Design Project module at L5 builds on the students experiences and competencies gained in their L4 study and facilitates the teams to

	appropriate support. Research opportunities should build student autonomy and are likely to encourage **creativity** and problem-solving. Dissemination of student research outcomes, for example via posters, presentations and reports with peer review, should also be considered.	work on an open-ended, academically challenging aspect within the students own discipline where they are required to work as a team to undertake research (both individually and as a team) and explore creative and innovative solutions. They are also then required to present their working formally to their peers and lecturers. They also experience writing of reflective reports and undertake peer review/assessments which are moderated by the group project supervisors and the academic in charge of the module. Students on this module also experience the use of disseminating their work and ideas, using a range of techniques like posters, presentations, sketches etc. The above aspects feed into and further challenge the students when they undertake their individual project at L6. Enriching the educational journey, research opportunities within the program foster student autonomy, nurturing creativity and honing problem-solving skills. By engaging in independent and collaborative projects across modules like Design and Practice, Professional Practice and Team Design Project, and other level 5 modules, students gain practical experience and a profound understanding of interdisciplinary teamwork, while refining presentation and dissemination techniques. These activities, aligned with the course's ethos, culminate in elevated proficiency for their L6 individual projects.

Curricula informed by employer and industry need / Assessment *for* learning	Authentic learning and assessment tasks Live briefs, projects or equivalent authentic workplace learning experiences and/or assessments enable students, for example, to engage with external clients, develop their understanding through situated and experiential learning in real or simulated workplace contexts and deliver outputs to an agreed specification and deadline. Engagement with live briefs creates the opportunity for the development of student outcomes including **excellence**, **professionalism**, **integrity** and **creativity**. A live brief is likely to develop research and enquiry skills and can be linked to assessment if appropriate.	Students are invited to talks by alumni and the industrial advisory panel members, who often share their experiences and current issues in the industry, through case studies or presentations, relevant to the courses and this will help develop the understanding of students where they are able to see how their classroom knowledge can be transformed to provide solutions to problems in workplace. Moreover, the learning experience is enriched through various avenues that bridge academia and industry. Students embark on technical visits, immersing themselves in environments like the Atomic Weapons Agency, gaining firsthand insights into real- world applications. Projects, often sponsored by esteemed industrial partners like the Metropolitan Police, blend theoretical foundations with practical problem-solving. Additionally, engaging with extracurricular activities, such as collaborations with Formula One teams and Aim93, exposes students to cutting-edge challenges. Notably, certain projects emerge from identified corporate issues, allowing part-time students to contribute solutions to pertinent industry problems. This dynamic interaction

		empowers students to seamlessly translate classroom knowledge into impactful contributions within their respective fields.
Inclusive teaching, learning and assessment	Course content and teaching methods acknowledge the diversity of the student cohort An inclusive curriculum incorporates images, examples, case studies and other resources from a broad range of cultural and social views reflecting diversity of the student cohort in terms of, for example, gender, ethnicity, sexuality, religious belief, socio-economic background etc. This commitment to **inclusivity** enables students to recognise themselves and their experiences in the curriculum as well as foster understanding of other viewpoints and identities.	Due to the nature of the subject material, there will be little contribution based on cultural or social diversity among the students of the cohort. However, industry practices vary from country to country and since our student body is diverse and arrive from different countries, this then becomes contextual in their learning, for instance, an illustrative distinction arises in the field of signal processing methodologies. These variances are not only influenced by international nuances but also dictated by the specific demands of various industries. Consequently, techniques suitable for terrestrial systems may substantially differ from those apt for aerospace applications. This disparity underscores the imperative for a comprehensive curriculum tailored to address the diverse intricacies encountered within these engineering disciplines. While the subject material in engineering programs may not inherently yield extensive cultural or social diversity contributions among students, we actively cultivate an inclusive and accommodating educational environment. Acknowledging the importance of equal opportunities for female students in engineering, we uphold this commitment by ensuring gender parity in project assignments. Our diverse student body, encompassing various backgrounds and religious beliefs, further enriches the learning experience. Notably, we have

		successfully tailored problems to align with different religious perspectives, fostering an equitable learning journey for all. Recognizing the unique needs of our students, we adapt projects to cater to both full- time and part-time (working) students, ensuring flexibility in their engagement. Our unwavering commitment to fairness is manifested in a comprehensive policy that assigns projects without bias, encompassing factors such as gender, ethnicity, sexuality, religious belief, and socio-economic background. Upholding the highest standards of academic integrity, our blind marking policy is systematically implemented during the Level 6 final year project. This practice ensures impartial evaluation and underscores our dedication to providing an inclusive and equitable learning experience for all students, regardless of their diverse backgrounds.

Curricula informed by employer and industry need	Work-based learning Opportunities for learning that is relevant to future employment or undertaken in a workplace setting are fundamental to developing student applied knowledge as well as developing work-relevant student outcomes such as networking, **professionalism** and **integrity**. Work-based learning can take the form of work experience, internships or placements as well as, for example, case studies, simulations and role-play in industry-standards settings as relevant to the course. Work-based learning can be linked to assessment if appropriate.	Part-time students who work in related technical roles immediately apply their knowledge in practice, providing a work-based learning experience. The mixed environment of full-time and part-time students allows contextual sharing of work aspects, enhancing the classroom learning. Assignments are designed based on case studies, closely resembling real-world scenarios. The course director raises awareness of potential sandwich placements at level 4, and Design and Practice incorporates a Personal Development Plan. LSBU's Job Shop and Career Gym assist students in obtaining sandwich and summer work placements. Students are visited during their placements, maintaining a daily log and submitting a reflective and evaluative final report. They also provide feedback to the following year's students during the placement meeting. The curriculum emphasizes professionalism and integrity, encompassing a code of conduct, meticulous programming documentation, adherence to software engineering processes, and active involvement in open-source projects.

Embedded learning development	Writing in the disciplines: Alternative formats The development of student awareness, understanding and mastery of the specific thinking and communication practices in the discipline is fundamental to applied subject knowledge. This involves explicitly defining the features of disciplinary thinking and practices, finding opportunities to scaffold student attempts to adopt these ways of thinking and practising and providing opportunities to receive formative feedback on this. A writing in the disciplines approach recognises that writing is not a discrete representation of knowledge but integral to the process of knowing and understanding in the discipline. It is expected that assessment utilises formats that are recognisable and applicable to those working in the	The course incorporates a range of assessment aspects to support students' adoption of disciplinary thinking and practices. At Level 4, students maintain personal technical logbooks for modules with laboratory or computer workshop components, forming the basis of coursework assessment. In Level 5, logbooks continue to play a role alongside formal reports, mini-projects, and dissertations in most technical modules. At Level 6, project students meet supervisors regularly to monitor progress and discuss objectives, utilizing logbooks for skills development. Additionally, students are engaged in varied presentation techniques, assimilating information during tasks and discussions and documenting it in logbooks. They retrieve data from these records, identifying strengths and weaknesses in their information recording style. In Level 6 modules, students make sound judgments based on assimilated information and disseminate it through various formats like posters, presentations, and formal reports to different target audiences. This comprehensive approach aligns with the specific writing and thinking requirements of the discipline and ensures students' progressive development of understanding throughout the curriculum.

	profession. For example, project report, presentation, poster, lab or field report, journal or professional article, position paper, case report, handbook, exhibition guide.	The final year project entails students producing comprehensive progression reports, individual posters, videos, and presentations, while their logbooks document their journey and working prototypes demonstrate their skills. Students are adeptly trained to independently create visual reports from data, enhancing their communication competence. Furthermore, they actively engage in disseminating their work across social networks and contribute to the scientific community, exemplified by platforms like GitHub. This multifaceted approach not only nurtures their disciplinary thinking and practices but also prepares them to share their accomplishments effectively in diverse contexts.
High impact pedagogies	Multidisciplinary, interdisciplinary or interprofessional group-based learning experiences Building on experience of group working at level 4, at level 5 students should be provided with the opportunity to work and manage more complex tasks in groups that work across traditional disciplinary and professional boundaries and reflecting interprofessional work-place settings. Learning in multi- or interdisciplinary groups creates the opportunity for the development of student outcomes including **inclusivity**, communication and networking.	Most of our student cohorts are very diverse and have varying entry qualifications and work in different sectors and are often working despite studying full-time. This already brings in a rich and diverse perspective to the teams who work either on lab-based exercises, which are usual from L4 to L6, or on specific group tasks as part of the modules that contribute to the development of soft skills at L4/L5. This is further strengthened when they undertake an interdisciplinary Professional Practice and Team Design Project at L5 where the culmination of all the knowledge, skills, experiences, is expected to shape the outputs, which requires strong inclusivity, communication and networking skills, to bring out the potential of each team member to the maximum benefit of the team.

Assessment *for* learning	<u>Variation of assessment</u> An inclusive approach to curriculum recognises diversity and seeks to create a learning environment that enables equal opportunities for learning for all students and does not give those with a particular prior qualification (e.g. A-level or BTEC) an advantage or disadvantage. A holistic assessment strategy should provide opportunities for all students to be able to demonstrate achievement of learning outcomes in different ways	The diversity and entry qualifications of the cohorts are considered when setting assessment, which are approved by external examiners and are overseen by academic quality review processes, both through LSBU's internal reviews as well as period review at times of accreditation by the professional body. Variation to standard agreed assessments are possible but should be approved by the relevant external examiner and relevant professional body accrediting the course, the IET in this case.

	throughout the course. This may be by offering alternate assessment tasks at the same assessment point, for example either a written or oral assessment, or by offering a range of different assessment tasks across the curriculum.	Any changes to assessment are internally discussed in open division meetings and changes are submitted to AQE and approved by the SASC, following yearly updated academic regulations.
Curricula informed by employer and industry need	<u>Career management skills</u> Courses should provide support for the development of career management skills that enable student to be familiar with and understand relevant industries or professions, be able to build on work-related learning opportunities, understand the role of self-appraisal and planning for lifelong learning in career development, develop resilience and manage the career building process. This should be designed to inform the development of **excellence** and **professionalism**.	This course provides opportunities and support to enable students to gain general employability skills, complemented by assistance from the University's employability office. Students also develop specific employability skills directly relevant to the industry. For instance, in some level 4 modules, they acquire proficiency in using CAD packages, Matlab, Multisim, C++ and IDE widely used in the industry, enhancing their CV. At level 4, students are encouraged to join the relevant professional body, the IET. LSBU's Outreach initiative promotes involvement in the University Student Ambassadors and Mentoring schemes. Throughout the course, students have access to a course VLE site with information about professional bodies. They are also encouraged to start Student Union Societies or clubs. Language study options prepare students for exchange courses with overseas links. Finally, in the level 5 and 6 module Professional Practice and Team Design Project, as well as on final year project module, students are informed about the importance of continuing professional development (CPD).
Curricula informed by employer and industry need / Assessment	<u>Capstone project/dissertation</u> The level 6 project or dissertation is a critical point for the integration and synthesis of knowledge and skills from across the course. It also provides an important transition into employment if the assessment is authentic, industry-facing or	The individual BEng project undertaken at level 6, weighted at 40 credits, provides students with an opportunity to integrate and synthesize the knowledge and skills acquired throughout the course. This project allows them to apply their expertise to real-world scenarios, including research or industry-linked projects. By engaging in this experience, students develop professionalism, integrity, and creativity, preparing them to face challenges in the professional world upon employment.

for learning / High impact pedagogies	client-driven. It is recommended that this is a capstone experience, bringing together all learning across the course and creates the opportunity for the development of student outcomes including **professionalism**, **integrity** and **creativity**.	

Appendix C: Personal Development Planning

Personal Development Planning (PDP) is a structured process by which an individual reflects upon their own learning, performance and/or achievement and identifies ways in which they might improve themselves academically and more broadly. Course teams are asked to indicate where/how in the course/across the modules this process is supported.

Approach to PDP	LEVEL 4	LEVEL 5	LEVEL 6
1 Supporting the development and recognition of skills through the personal tutor system.	All students are allocated a personal tutor, coordinated by the Senior Personal Tutor. Personal Tutoring (PT) is integrated into the level 4 module, Design and Practice, offering students the opportunity to learn about the aspects of PT on their courses. PT open surgeries can be booked on demand. The induction course includes the following: 1. Meeting with personal tutor 2. Use of library and learning resources (LIS) 3. Use of University IT facilities including VLE and AppsAnywhere 4. MyLSBU web site and Study skills resources. 5. Access to University support facilities. 6. Induction to 'Don't Panic' – PDP for L4.	Induction for direct entry students (See Level 4). Continuing the PT system at level 5.	At Level 6 CD and Project Supervisor support the PT system.

2 Supporting the development and recognition of skills in academic modules.	Most modules include practical elements, requiring the maintenance of a laboratory logbook for each module. This practice spans all levels of the course, with particular emphasis on L4, as logbooks provide a platform for further skills development such as report writing, dissertations and project management occurring at Levels 5 and 6. The following L4 modules have generic skills components, including keeping a laboratory logbook, team-working, planning and managing study: Mathematics, Electronic principles, Electrical Circuit Analysis.	Following on from L4 students continue the practice of keeping logbooks but this is now complemented in technical modules at L5 by writing formal laboratory reports which requires other skills such as information retrieval and IT. This aspect is featured in the following modules: Computer Architecture and Operating Systems L5, and Data Communications and Computer Networks L5.	At L6 students keep logbooks but additional transferable skills are developed by setting longer assignments, dissertations and mini projects involving information selection, retrieval and evaluation, for example: Computer Systems and Software Engineering, Artificial Intelligence and Signal Processing, Cybersecurity and Cryptography, Embedded Systems and The Internet of Things.
	In the core Mathematics module practice is encouraged by continuous assessment and feedback (weekly) of tutorial exercises. Enhanced Maths tutorials – additional support is provided for mathematics to improve basic skills for those students with diverse entry qualifications.		

3 Supporting the development and recognition of skills through purpose-designed modules.	Design and Practice plus Professional Practice and Team Design Project – these modules aim to introduce and develop the skills needed by professional engineers to enable them to make use of their technical knowledge, in particular: • Develop students' technical communications, basic report writing and team-working skills • Develop students' skills in project planning and management • Develop students' confidence in undertaking self-managed practical projects. • CV writing, evaluation and interview techniques	Professional Practice and Team Design Project L5 prepares students for their role as professional engineers in a number of ways, including: • Detailed study of project planning and networking techniques • Planning and preparation for the major project at L6 • Introduction to systems thinking • Recognition of the importance of sustainability, ethics, integrity, security and equality in modules such as Data Communications and Computer Networks, Embedded Software Design, Computer Architecture and Operating Systems.	BEng Project – this module develops skills required to manage the process of gathering, analysing, criticizing and disseminating information which students will use in their engineering career. A series of weekly lectures in semester 1 provides students with guidance and practical advice to further develop specific skills such as information searches, referencing, software documentation, data presentation, and practical design, prototyping and testing. This module also reinforces project management skills of students. Recognition of the importance of sustainability, ethics, security, equality, diversity and inclusion in modules such as Cybersecurity and Cryptography, Embedded Systems and The Internet of Things, Artificial Intelligence and Signal Processing.

4 Supporting the development and recognition of skills through research projects and dissertation work.	A team project in Design and Practice concentrates on the processes necessary to produce and market an engineering product.	Mini-projects, assignments and dissertations are featured in modules at L5, including: Embedded Software Design L5, Analogue Electronics L5, Discrete Mathematics, Data Structures and Algorithms L5. Professional Practice and Team Design Project module specifically tasks a team of students to take a project from requirements through to design solution within their selected degree discipline.	The main individual BEng Project will require the student to develop and demonstrate skills including: • Project planning and time management • Keeping a detailed project logbook • Technical report writing and presentation • Preparation of material, including a poster, and participation in an oral technical presentation session with other students and staff • Preparation for an individual oral examination (demonstration). All of these components form part of the project assessment in addition to the technical aspects.

5 Supporting the development and recognition of career management skills.	Students have an introduction to the engineering profession and professional bodies in Design and Practice.	Students attend a presentation about industrial placements and are given additional support to prepare their CV for potential placements. Additional preparation sessions are provided and students use the Careers office support services for interview training etc.	The IET representative gives a lecture on the graduate advantage to final year BEng students. Additionally, the school of engineering offers CV clinics, mock interview sessions, seminars and Q&A with engineers from industries. LSBU has developed a course available in the IET website on Management for engineers (usually paid, but available for free for LSBU students).
6 Supporting the development and recognition of career management skills through work placements or work experience.	CDs make students aware of potential sandwich placements. Careers centre has dedicated teams about placements and they visit L4 students to make them aware of this process.	The Industrial Officer assists students to obtain sandwich and summer work placements. The Industrial Officer visits students during their placement and they must maintain a daily log and compile a reflective and evaluative final report. They attend the placement meeting (see 5 above) to feedback to the following year's students.	

7 Supporting the development of skills by recognising that they can be developed through extracurricular activities.	The Skills for Learning Centre gives talks to student cohorts to encourage individuals to join the University Student Ambassadors scheme and the Mentoring scheme in local schools. The university maintains a VLE module site Skills for Learning Online including information about professional bodies and this is open to all students throughout their course. Students are encouraged to start their own 'clubs' and laboratory facilities and specific notice-boards are made available for this. Locally the school maintains extracurricular activities, all level 4 students are encouraged to join this scheme.	Mostly all extracurricular activities specifically targets level 5 students where in some cases they propose their own topics. Typical examples are the Formula one team and the Aim93 and MicroPython for Robots.	Some students continue contributing to extracurricular activities. Several students work towards certifications, e.g. Cisco, Linux, Matlab. All students have access to all courses available on learning.com
8 Supporting the development of the skills and attitudes as a basis for continuing professional development.	Students are encouraged to join the relevant professional body for the course. We run sessions where IET visits and gives talks to students about the impact for their careers of joining professional bodies. The division pays the IET membership for 5 years to all enrolled students.	See L4 LSBU Library Digital resources Course: Skills for Learning Online (lsbu.ac.uk)	Students are aware of the need for CPD in the level 6 module BEng project.
9 Other approaches to personal development	Learning.com	Linux Certifications	Throughout the course, students use the Linked Learning platform as a valuable resource for their CPD as part of their independent learning.

planning.			Cisco, Matlab Certifications
10 The means by which self- reflection, evaluation and planned development is supported e.g. electronic or paper-based learning log or diary.	Students must keep a personal technical logbook for each module with a laboratory or computer workshop component. This is marked within 15 working days of each submission and returned with comments and advice. At L4 these forms are included in the majority of the coursework mark in technical modules. Regarding the format of the logbook, we are flexible for students to either maintain an electronic logbook (preferable) or a paper- based logbook. The logbook is submitted electronically on VLE.	See L4. The logbook may form part of the coursework in some modules, but this is supplemented by formal reports, mini-projects, and dissertations in most technical modules.	Project students must meet their supervisors at least eight times throughout the year, this is electronically recorded where progress is monitored, and objectives are discussed. In the individual Project module, students must submit a logbook, which provides a platform for skills development.

Appendix D: Terminology

Within this document, the following terms are used with the meanings stated:

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

formative assessment	a type of assessment designed to help students learn more effectively, to progress in their studies and to prepare for summative assessment; formative assessment does not contribute to the final mark, grade or class of degree awarded to students
higher education provider	organisations that deliver higher education
independent learning	learning that occurs outside the classroom that might include preparation for scheduled sessions, follow-up work, wider reading or practice, completion of assessment tasks, or revision
intensity of study	the time taken to complete a part-time course compared to the equivalent full-time version: for example, half-time study would equate to 0.5 intensity of study
lecture	a presentation or talk on a particular topic; in general lectures involve larger groups of students than seminars and tutorials
learning zone	a flexible student space that supports independent and social earning (HUB)
knowledge	is information that can be recalled
know-how	is the ability to apply learned knowledge and skills to perform operations intuitively, efficiently and correctly
material information	information students need to make an informed decision, such as about what and where to study
mode of study	different ways of studying, such as full-time, part-time, e-learning or work-based learning
modular course	a course delivered using modules
module	a self-contained, formally structured unit of study, with a coherent and explicit set of learning outcomes and assessment criteria; some providers use the word 'course' or 'course unit' to refer to individual modules

national teaching fellowship	a national award for individuals who have made an outstanding impact on student learning and the teaching profession
navigability (of websites)	the ease with which users can obtain the information they require from a website
optional module	a module or course unit that students choose to take
professional body	an organisation that oversees the activities of a particular profession and represents the interests of its members
regulated course	a course that is regulated by a regulatory body
regulatory body	an organisation recognised by government as being responsible for the regulation or approval of a particular range of issues and activities
scholarship	a type of bursary that recognises academic achievement and potential, and which is sometimes used interchangeably with 'bursary'
semester	either of the parts of an academic year that is divided into two for purposes of teaching and assessment (in contrast to division into terms)
seminar	seminars generally involve smaller numbers than lectures and enable students to engage in discussion of a particular topic and/or to explore it in more detail than might be covered in a lecture
summative assessment	formal assessment of students' work, contributing to the final result
term	any of the parts of an academic year that is divided into three or more for purposes of teaching and assessment (in contrast to division into semesters)
total study time	the total time required to study a module, unit or course, including all class contact, independent learning, revision and assessment
tutorial	one-to-one or small group supervision, feedback or detailed discussion on a particular topic or project

Understanding	is the capacity to use concepts creatively, for example, in problem solving, design, explanations and diagnosis
work/study placement	a planned period of experience outside the institution (for example, in a workplace or at another higher education institution) to help students develop particular skills, knowledge or understanding as part of their course
workload	see 'total study time'
written examination	a question or set of questions relating to a particular area of study to which candidates write answers usually (but not always) under timed conditions
prospective student	those applying or considering applying for any programme, at any level and employing any mode of study, with a higher education provider