# Course Specification

| A. Course Information | | | |
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| **Final award title(s)** | BEng (Hons) Electronic and Computer Systems Engineering | | |
| **Intermediate exit award title(s)** | DipHE in Electronic and Computer Systems Engineering<br>CertHE in Engineering | | |
| **UCAS Code (BEng)** | TBA | **Course Code(s)** | Full time: 5604<br>Part time: 5605 |
| | London South Bank University | | |
| **School** | ☐ ASC ☐ ACI ☐ BEA ☐ BUS ☒ ENG ☐ HSC ☐ LSS | | |
| **Division** | Electrical and Electronic Engineering | | |
| **Course Director** | Stavros Dimitriou | | |
| **Delivery site(s) for course(s)** | ☒ Southwark ☐ Havering<br>☐ Other: please specify | | |
| **Mode(s) of delivery** | ☒Full time ☒Part time ☒other please specify-SANDWICH | | |

**Length of course/start and finish dates**

| Mode | Length years | Start - month | Finish - month |
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| Full time | 3 | September | June |
| Full time with placement/ sandwich year | 4 | September | June |
| Part time | 4 | September | June |
| Part time with Placement/ sandwich year | Not Offered in part-time modality | | |

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| **Is this course generally suitable for students on a Tier 4 visa?** | Please complete the International Office questionnaire<br>Yes<br>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. | |
| **Approval dates:** | Course(s) ~~validated~~/ Subject to validation | December 2019 |
| | Course specification last updated and signed off | |
| **Professional, Statutory & Regulatory Body accreditation** | This is a new course that merges two former BEng (Hons) courses which are accredited by the **Institution of Engineering and Technology** on behalf of the Engineering Council. This new course aims to **fully meet** the academic requirements for registration as an **Incorporated Engineer** and **partially** meet the academic requirements for registration as a **Chartered Engineer.** | |

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| | Previous accreditation visit took place in November 2017 and the course, BEng (Hons) Computer Systems and Networks Engineering, was accredited for a full 5-year period, until 2022 intake) | |
| **Reference points:** | Internal | Corporate Strategy 2015-2020<br>Academic Quality and Enhancement Manual<br>School Strategy<br>LSBU Academic Regulations |
| | External | Competitions and Markets Authority Guidance<br>SEEC Level Descriptors 2016<br>QAA -Subject benchmark statement Engineering, 2015<br>Framework for Higher Education Qualifications (QAA, 2015)<br>THE ACCREDITATION OF HIGHER EDUCATION PROGRAMMES - UK Standard for Professional Engineering Competence (AHEP3 2014) |
| **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.<br>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 about this course is that its graduates are capable to take technical responsibility for complex engineering systems and are well-prepared for lifelong learning that will enable them to move beyond today's technology to meet the challenges of the future. | |

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| **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:<br>• 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.<br>• Ability to deploy accurately established techniques of analysis and enquiry within a discipline.<br>• Conceptual understanding that enables them:<br>▪ To devise and sustain arguments, and/or to solve problems, using ideas and techniques, some of which are at the forefront of a discipline.<br>▪ To describe and comment upon particular aspects of current research, or equivalent advanced scholarship, in the discipline.<br>• Appreciation of the uncertainty, ambiguity and limits of knowledge.<br>• 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).<br>• 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.<br>• 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.<br>• Know how to communicate information, ideas, problems and solutions to both specialist and non-specialist audiences.<br>• Have the qualities and transferable skills necessary for employment requiring:<br>▪ The exercise of initiative and personal responsibility.<br>▪ Decision-making in complex and unpredictable contexts.<br>▪ The learning ability needed to undertake appropriate further training of a professional or equivalent nature.<br>• 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.<br>• Appreciate the importance of developing their professional career (all students are encouraged to join the IET as student members, indeed the Division subsidises membership).<br>• Be able to apply a professional engineering approach in their activities including innovation and enterprise.<br>• 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.<br><br>**<u>Specific to BEng (Hons) Electronic and Computer Systems Engineering (ECE)</u>**<br>The BEng (Hons) 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 |

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| | skills necessary to update, extend and deepen it for career development or further study; this includes:<br>• Appropriate grounding in underpinning high-level mathematical skills, science and circuits theory.<br>• Digital, analogue and particularly hybrid electronic systems.<br>• Present trends in computer hardware and software engineering.<br>• The theory and applications of networking, computing algorithms, computer architectures and systems resource management.<br>• The theory and applications of software design and computer programming, information security, signal processing, embedded systems and digital design.<br>• 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.<br>• The theoretical knowledge to solve problems in new technologies and develop new analytical techniques.<br>• Successful application of the knowledge to deliver innovative products and services and/or take technical responsibility for complex engineering systems.<br>• Acquisition and maintenance of a preparation for professional practice in engineering.<br>• The rules and standards, which apply in electronic and computer systems services/products, for QA and the cost and legal implications of their designs.<br>• Accountability for project, finance and personnel management and managing trade-offs between technical and socio-economic factors.<br>• Effective interpersonal skills in communicating technical matters. |
| **Course Learning Outcomes** | **<u>Program Specific Learning Outcomes (UKSPEC)</u>**<br>This course is designed to meet the learning outcomes specified by the UK Engineering Council in its requirements for Accreditation of Higher Education Programmes (AHEP3) 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 six categories of learning outcomes identified by the UK Engineering Council.<br>**1. Knowledge and Understanding**<br>Engineering is underpinned by science and mathematics and other associated disciplines as defined by the relevant professional engineering institutions. Students will need the following knowledge understanding and abilities:<br>**A1**: Knowledge and understanding of scientific principles and methodology necessary to underpin their education in their engineering discipline, to enable appreciation of its scientific and engineering context, and to support their understanding of relevant historical, current, and future developments and technologies.<br>**A2**: Knowledge and understanding of mathematical and statistical methods necessary to underpin their education in their engineering discipline and to enable them to apply mathematical and statistical methods, tools and notations proficiently in the analysis and solution of engineering problems |

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| | **A3**: Ability to apply and integrate knowledge and understanding of other engineering disciplines to support study of their own engineering discipline.<br><br>**2. Intellectual Skills**<br>Engineering analysis involve the application of engineering concepts and tools to the solution of engineering problems. Students must be able to demonstrate:<br>**B1**: Understanding of engineering principles and the ability to apply them to analyse key engineering processes.<br>**B2**: Ability to identify, classify and describe the performance of systems and components through the use of analytical methods and modelling techniques.<br>**B3**: Ability to apply quantitative and computational methods in order to solve engineering problems and to implement appropriate action<br>**B4**: Understanding of, and ability to apply, an integrated or systems approach to solving engineering problems.<br><br>**3. Practical Skills**<br>This involves the practical application of engineering skills, combining theory and experience, and the use of other relevant knowledge and skills. Students must be able to demonstrate:<br>**C1**: Understanding of contexts in which engineering knowledge can be applied (e.g. operations and management, application and development of technology, etc).<br>**C2**: Extensive knowledge of characteristics of particular materials, equipment, processes, or products.<br>**C3**: Ability to apply relevant practical and laboratory skills including ability to communicate their work to technical and non-technical audiences.<br>**C4**: Understanding of the use of technical literature and other information sources.<br>**C5**: Awareness of nature of intellectual property and knowledge of relevant legal and contractual issues.<br>**C6**: Understanding of appropriate codes of practice and industry standards.<br>**C7**: Awareness of quality issues and their application to continuous improvement.<br>**C8**: Ability to work with technical uncertainty.<br><br>**4. Transferable Skills**<br>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 and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems and complex problems. Further to this, students need the skills to manage their activities and to be aware of the various legal and ethical constraints under which they are expected to operate. Students will need the knowledge, understanding and skills to:<br>**D1:** Understand and evaluate business customer and user needs, including considerations such as the wider engineering context public perception and aesthetics.<br>**D2:** Investigate and define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues, intellectual property; code of practice and standards. |

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| | **D3:** Apply advanced problem-solving skills, technical knowledge and understanding, to establish rigorous and creative solutions that are fit for purpose for all aspects of the problem including production, operation, maintenance and disposal<br>**D4:** Plan and manage the design process, including cost drivers, and evaluate outcomes. Work individually and as part of a team and show understanding of, and the ability to work in, different roles within an engineering team.<br>**D5:** Know and understand management techniques that may be used to achieve engineering objectives along with the commercial, economic and social context of engineering processes<br>**D6:** Be aware of relevant economic, legal, social, ethical and environmental context for engineering activities. |

## C. Teaching and Learning Strategy

**General Learning Outcomes** (UK-SPEC)

**Knowledge and Understanding:**

Graduates must be able to use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology. They must maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology. They should be able to engage in the creative and innovative development of engineering technology and continuous improvement systems.

**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 programme 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. The programme also develops analytical, computer, and applied skills that will enable students to analyse, design and test digital and computer systems, architectures, networks, and processes. It is broad and covers areas from physical electronics and devices, circuits and systems to conceptual issues of algorithms, signals and information.

**Assessment**

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 A1 and A2,
- synthesis to offer solutions to engineering problems relevant to Electronic and computer systems engineering to achieve A3.

Laboratory work to meet the requirements of the course, which involves:

- critical analysis of how theoretical solutions are arrived at, to achieve A1,
- proficient analysis and presentation of data using relevant methods and tools, to achieve A2.

A substantial individual project (40 credits - the equivalent to one-third of a study year) which 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 student has met A1, A2 and A3.

**Intellectual Skills:**

Graduates must be able to apply appropriate theoretical and practical methods and tools to the analysis and solution of electronic and computer engineering problems. They must be able to identify potential projects and opportunities, to conduct appropriate research, and undertake design and development of engineering solutions and further to manage implementation of design solutions and evaluate their effectiveness. They must be able to demonstrate cognitive skills such as conceptualisation and critical thinking, problem solving, research and enquiry, synthesis and creativity, analysis and evaluation.

**Teaching and learning strategies:**

Acquisition of Intellectual Skills is developed through lectures, tutorial, individual and team problem-based work. In private study, students will develop skills by writing laboratory reports, and tackling problems set by the tutor/laboratory instructor or in past examinations and projects. Computer laboratory sessions are embedded in modules and projects, where students are taught the appropriate tools to solve engineering problems. The programme teaches tools, which span the hardware and software spectrum, and are fundamental to engineering to effectively organize information and manage design complexity. Familiarity with commonly used tools, the ability to deploy them in appropriate situations, and the ability to use them effectively are important Intellectual skills. Innovation is covered in the second-year module entitled Professional Practice and Team Design Project, which develops business ideas from innovative research and development activities. Acquisition of Intellectual Skills is also gained through the specialist final year modules as well as the final year individual project. Students are encouraged to attend the seminars/events such as those organised by the School of Engineering and to attend presentations from invited speakers on relevant to electronic and computer engineering topics.

**Assessment**

Unseen examination questions and coursework, which allow students to demonstrate that they have met B1 and B2. Laboratory work to meet the requirements of the Electronic and computer systems engineering course, which involve experiments and demonstrations of the relevant scientific principles (B1, B2). 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 B1, B2, B3 and B4.

**Practical skills:**

Graduates must possess practical engineering skills and must be able to provide technical and commercial leadership. They must be able to plan for effective project implementation and further plan, budget, organise, direct and control tasks, people and resources. They must be able to lead teams and develop staff to meet changing technical and managerial needs, to bring about continuous improvement through quality management.

**Teaching and learning strategies:**

Acquisition of practical skills is acquired during the practical laboratory sessions. Students should learn to record laboratory activity to document and keep track of all design activities, conducted experiments, and measured/observed results. The laboratory experience, in most of the modules, should also assist students in learning practical issues such as: proper use of computers and test equipment, building electrical and electronic circuits and systems, building and testing software, understanding processes and issues associated with product development. Laboratory experiences capitalise on this interest to provide a foundation for other important elements of practical activity. The programme offers carefully planned practical assignments in a laboratory setting which help students develop confidence in their technical ability. Laboratory experiences should help students develop the expertise needed to build new products. Computing laboratory exercises allow students

to develop skills in programme design, coding and testing. Further development of these skills is acquired in the final year individual project.

**Assessment**

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 (C1, C2, C3, C4 and C8). An individual project that would be assessed by a combination of a formal report, a presentation, a viva voce examination and would demonstrate completion of C1, C4, C5, C6, C7 and C8.

**General Transferable Skills:**

Graduates must be able to demonstrate effective interpersonal skills and further to demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment. Electronic and computer systems engineering graduates must have developed transferable skills, additional to those set out in the other learning outcomes, that will be of value in a wide range of situations, including the ability to:

- Apply their skills in problem solving, communication, working with others, information retrieval and the effective use of general IT facilities.
- Plan self-learning and improve performance, as the foundation for lifelong learning/CPD.
- Monitor and adjust a personal programme of work on an on-going basis.
- Exercise initiative and personal responsibility, which may be as a team member or leader.

Those additional general skills are applied and described in individual modules and can be seen on module descriptors where they are applicable.

**Teaching and learning strategies:**

Acquisition of general transferable skills is achieved through communication of knowledge in formal reports. These constitute a part of the assessment for most modules on the course. One aspect of this is ensuring that students possess a set of transferable skills such as communication, teamwork, and presentation skills. Students can use these skills in any occupation and can convey from one type of work to another without retraining. Additionally, students acquire library and research skills as well as professional skills such as time management, project management, information literacy, information management, career development, self-awareness, and keeping up-to-date with innovations in the field. From a motivational perspective, students receive formative feedback on these skills in the context of electronic and computer systems engineering and in a way that highlights their relevance and importance to the discipline.

**Assessment**

A substantial individual project which involves the student going through the process of making design choices made in the context of D1 and D2 and further considering his/her work in the context of Economic, Legal, Social, Ethical and Environmental concerns (D5 and D6). Normally the project would be assessed by a combination of a formal report and a presentation/viva voce examination and would demonstrate completion of D3 and D4. Laboratory work which involves some choices in how solutions are arrived at (D3). Open-ended examination questions (D2). Coursework which allow students to demonstrate that they have met D2 and D3. Coursework which requires the student to consider the context of Economic, Legal, Social, Ethical and Environmental concerns as part of a problem relevant to the electronic and computer systems engineering course (D5 and D6).

**Teaching and Learning overview**

The course is made up of several modules (see section G below) and each module is delivered through a combination of lectures, tutorials, practical workshops, computing workshops etc all of which amounts to directed teaching (classroom contact). There is a variance in the makeup of the number of hours dedicated to lectures, workshops etc but the total number of study hours attracted by each

module is dependent on the module weighting in credits. Typically, a 20-credit module, attracts 200 hours (1 credit is equal to 10 hours) of learning which constitutes both directed learning and independent learning.

Further, teaching and learning in this programme ensures that graduates have the capacity to meet the needs of employers behaving as an agent of change, producing graduates who are prepared to move into employment with skills and expectations that benefit their employers. Graduates must be able to keep abreast with changes, and a key requirement of this programme is equipping students with the mechanisms for achieving this. Lifelong learning is considered in this programme, which can foster such attitudes with novel approaches to teaching and learning that continually question and challenge situations and by highlighting opportunities for advances. Final year modules, including the project, can challenge students by exercises that seek to 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 at L4) to a quarter (52 to 65 hours at L5 and L6). This may significantly vary in some modules such as Mathematics or Computer Programming where more support is offered and Project modules where more individual involvement is expected.

**Subject-related and generic resources**

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 (http://www1.lsbu.ac.uk/library/).

**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 no prior appointments are needed. The University buildings and library are open from 8am to 9pm during term time, while the library operates for an extended period during examinations. 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 establish 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 briefed 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, first year students who struggle to understand some of the basics, or feel they need additional support in understanding of fundamentals of mathematics and science, may come along to the Maths Academic Clinic where they can provide comprehensive advice and guidance. The clinic may be offered on a weekly basis or individually by lecturers or personal tutors if necessary.

**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 University where expertise lies. The primary aim is that each module is taught by a single member of staff, which most likely is the module leader (support teaching may be needed depending on the nature/size of the module etc, sub grouped 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, supplement 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 http://www.lsbu.ac.uk/__data/assets/pdf_file/0010/84349/assessment-and-examination-procedure.pdf
Coursework in modules can be either formative or summative and the 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**. 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 Phase tests. The assessment components for each module are specifically defined and kept up to date in the current Module Guides. Note that a component is not necessarily a single piece 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 normally provides students with feedback to enable them to improve 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 take the form of a 2 or 3-hour unseen paper. Formative assessment typically includes discussions in classroom, tutorials exercises, simulation exercises, workshop or computing exercises, questions and answer sessions, peer discussions, observations, reflection on learning, presentation rehearsals.

Progression means moving on 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.

## E. Academic Regulations

The University's Academic Regulations apply for this course. And can be accessed via the following link:

https://www.lsbu.ac.uk/__data/assets/pdf_file/0008/84347/academic-regulations.pdf

Local protocols based on IET requirements will be applied for the accredited courses.

## 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**

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.

**Full-time/Part-time students**

- 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, **or;**
- Exceptional performance on the part-time HND in Electrical and Electronic Engineering at London South Bank University with the recommendation of its course director

Applicants may be considered for entry to the final year of the full-time course only under the above circumstances 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 that 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**
**Part-time: direct to the university, via a dedicated webpage**

## G. Course structure(s)

**Course overview**

- The academic year is organised into two semesters, each requiring roughly 15 weeks (12 teaching weeks, 1 revision week and 2 exam weeks) of attendance by students.
- The BEng course is made up of 360 credits. The course is made up of several modules, most modules are worth of 20 credits except for the BEng project module which is weighted double and worth of 40 credits.
- The BEng scheme is offered in full-time (3 year) mode, with further options of sandwich industrial training (4 year), or year in Europe (e.g. Switzerland). Students undertake study of 120 credits per year.
- The part-time BEng course is delivered across 4 years (Sandwich option not offered). The breakdown of credits are Year1-80 credits; Year2-100 credits, Year3-100 credits, Year4-80 credits. The part time course usually involves a full day of teaching per week, requiring attendance at the University on one day per week.
- The three-year BEng program contains 16 of 20-credit modules plus the BEng project (40 credits - equivalent to one-third of a study year), equals 360 credit hours of study and a total of 3,600 hours of learning.
- Balance Between Coursework and Examination Assessment
  - Year 1 - coursework (67%) and written examination (33%)
  - Year 2 - coursework (63%) and written examination (37%)
  - Year 3 - coursework (43%) and written examination (38%) – 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:
  - Year 1 - lectures/seminars/workshops (32%) and independent study (68%)
  - Year 2 - lectures/seminars/workshops (26%) and independent study (74%)
  - Year 3 - lectures/seminars/workshops (23%) and independent study (77%)

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

| | Semester 1 | | Semester 2 | |
|---|---|---|---|---|
| **Level 4** | Engineering Mathematics and Modelling | | | 20 |
| | Design and Practice | | | 20 |
| **120 credits** | Object-Oriented Programming C++ | 20 | Electrical Circuit Analysis | 20 |
| | Digital Logic Design | 20 | Electronic Principles | 20 |
| | | | | |
| **Level 5** | Discrete Mathematics, Data Structures and Algorithms | | | 20 |
| | Professional Practice and Team Design Project | | | 20 |
| **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** | | | |
| **Level 6** | Computer Systems and Software Engineering | 20 | Artificial Intelligence and Signal Processing | 20 |
| **120 credits** | 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. The placement year is not compulsory and is not assessed. However, 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 a visit is taken place to the placement location during the duration of the placement. The student is expected to lead on 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 in the end of your course while seeking employment or further study.

## 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 modality** | | | | |
| **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** | Cybersecurity and Cryptography | 20 | Embedded Systems and The Internet of Things | 20 |
| **80 credits** | BEng Project | | | 40 |

## H. Course Modules

| Module Code | Module Title | Level | Sem | Credit value | Assessment | |
|---|---|---|---|---|---|---|
| | | | | | CW% | EX% |
| ENG_4_401 | Engineering Mathematics and Modelling | 4 | 1&2 | 20 | 50 | 50 |
| TBC | Electrical Circuit Analysis | 4 | 2 | 20 | 50 | 50 |
| ENG_4_403 | Design and Practice | 4 | 1&2 | 20 | 100 | |
| TBC | Digital Logic Design | 4 | 1 | 20 | 50 | 50 |
| TBC | Object-Oriented Programming C++ | 4 | 1 | 20 | 100 | |
| TBC | Electronic Principles | 4 | 2 | 20 | 50 | 50 |
| TBC | Discrete Mathematics, Data Structures and Algorithms | 5 | 1&2 | 20 | 50 | 50 |
| TBC | Data Communications and Computer Networks | 5 | 2 | 20 | 40 | 60 |
| TBC | Embedded Software Design | 5 | 2 | 20 | 100 | |
| TBC | Professional Practice and Team Design Project | 5 | 1&2 | 20 | 100 | |
| TBC | Analogue Electronics | 5 | 1 | 20 | 50 | 50 |
| ENG_5_CAO | Computer Architecture and Operating Systems | 5 | 1 | 20 | 40 | 60 |
| TBC | Computer Systems and Software Engineering | 6 | 1 | 20 | 50 | 50 |
| ENG_6_CCR | Cybersecurity and Cryptography | 6 | 1 | 20 | 40 | 60 |
| TBC | Artificial Intelligence and Signal Processing | 6 | 2 | 20 | 40 | 60 |
| ENG_6_ESI | Embedded Systems and The Internet of Things | 6 | 2 | 20 | 40 | 60 |
| ENG_6_424 | Individual Project L6 | 6 | 1&2 | 40 | 100 | |

## I. Timetable information

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

The timetables are made available to students at least 2 weeks before commencement of the semester. Students are however advised to check their timetables via MyLSBU, more frequently, in the early weeks of the semester, where there are usually some changes 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/courses/course-finder/computer-engineering-beng-hons

**Tuition fees/financial support/accommodation and living costs**

- Information on tuition fees/financial support can be found by clicking on the following link - http://www.lsbu.ac.uk/courses/undergraduate/fees-and-funding or
- http://www.lsbu.ac.uk/courses/postgraduate/fees-and-funding
- Information on living costs and accommodation can be found by clicking the following link- https://my.lsbu.ac.uk/my/portal/Student-Life-Centre/International-Students/Starting-at-LSBU/#expenses

## List of Appendices

**Appendix A: Curriculum Map**

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** | A1 | A2 | A3 | B1 | B2 | B3 | B4 | C1 | C2 | C3 | C4 | C5 | C6 | C7 | C8 | D1 | D2 | D3 | D4 | D5 | D6 |
| 4 | Engineering Mathematics and Modelling | TBA | | TA | | | TA | TA | | | | | | | | | | | | | | | |
| 4 | Electronic Principles | TBA | TA | TA | TA | | | | | TA | | | TA | | | TA | TA | | | TA | TA | | TA |
| 4 | Design and Practice | TBA | | TA | | TA | TA | TA | TD | TA | TA | TA | TA | TD | TA | TA | TA | TA | TA | | | TA | |
| 4 | Electrical Circuit Analysis | TBA | TA | TA | TA | TD | TA | TA | | TD | | TA | TD | | | | | | TA | TD | | | TA |
| 4 | Object-Oriented Programming C++ | TBA | TA | TA | | TD | TD | | | TA | TA | | | | | | | TD | TD | TA | DA | | DA |
| 4 | Digital Logic Design | TBA | TA | TA | TA | TA | TD | TA | TD | | TA | TA | | | | TA | | | | | | | |
| 5 | Discrete Mathematics, Data Structures and Algorithms | TBA | TA | TA | TA | TA | TA | TA | | TA | TA | TA | TA | | | | TA | | TA | | TA | | TA |
| 5 | Computer Architecture and Operating Systems | TBA | TA | TA | TA | TA | TA | TA | | TA | TA | TA | TA | | TA | | TA | | TA | TA | TA | TA | TD |
| 5 | Analogue Electronics | TBA | TA | TA | | TD | TA | DA | TA | TD | TD | | TD | | | TD | TD | | | TD | TD | TD | TD |
| 5 | Data Communications and Computer Networks | TBA | TA | TA | | TD | TA | TA | | | | TA | TD | TD | TD | | | | TA | | TA | TA | |
| 5 | Professional Practice and Team Design Project | TBA | TA | A | TA | TD | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA |
| 5 | Embedded Software Design | TBA | TA | TA | TD | TA | TA | AD | | TD | TD | TA | | | | | | TD | TA | | TA | TA | |
| 6 | Computer Systems and Software Engineering | TBA | TA | | TA | TA | TA | TA | | TD | TD | TD | | | | | | TA | TA | TA | TA | | TD |
| 6 | Cybersecurity and Cryptography | TBA | TA | TA | TA | TA | TD | TA | TD | | TA | TA | TD | | TA | | | | TA | TA | TA | | TD |
| 6 | Artificial Intelligence and Signal Processing | TBA | TA | TA | TA | TA | TA | TA | TD | TA | TD | TA | TA | | | TD | | | TA | TA | TA | | |
| 6 | Embedded Systems and The Internet of Things | TBA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | | TA | TA | |
| 6 | Individual Project | TBA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | TA | | | TA | TA | TA | TA | TA | TA |

## 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 of the Year for Graduate Employment awarded by *The Times and The Sunday Times Good University Guide 2018* and builds on our 125 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
- 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 | <u>Outcomes focus and professional/employer links</u><br>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. | Industrial Advisory boards, both at school level and division level, feeds into the curriculum design through its twice annually convened meeting.<br><br>Representatives from professional bodies, are invited to a short seminar session as part of the module Design and Practice where students are informed about how they can engage with professional bodies and build relation with the local networking bodies to secure learning of state-of-the-art aspects of their discipline of engineering in the work arena and also to have access to facilities and professional networks operating in the local area. Students are encouraged to become student members of the professional body (IET) and the division pays for the membership to provide a sound start to their professional engagement.<br>Alumni and employers are invited as guest speakers on the above module whose valuable inputs contribute to the student's ideas and activity which they later put use when competing on a national level in challenges such as the London Mayoral Challenge, Engineers without Borders etc. |
| Embedded learning development | <u>Support for transition and academic preparedness</u><br>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 at L4 prepare form the basis for academic preparedness and help them with transition to later years in their course. For e.g.,<br><br>The mathematics module provides the underpinning knowledge to enable them to think analytically. This is then reinforced in this module where mathematical modules taught in the Mathematics module are now analysed and simulated using MATLAB Simulink models. Digital Logic Design module also extended elementary algebra knowledge to Boolean Algebra. This allows students to dissect the model deeper and |

| | | |
|---|---|---|
| | modules. Other level 4 modules should reference and reinforce the learning development to aid in the transfer of learning. | gain a better understanding in terms of boundary conditions and constraints within which these analytical models can be validated.<br><br>Academic writing, in its various forms is introduced and strengthened when they produce a variety of reports for the various modules they study at L4:<br>• As part of Design and Practice module, they produce individual and team reports, engage with a personal tutor, maintain record of their meetings, produce a portfolio etc.<br>• As part of the Object-Oriented Programming C++ module, they produce evidence of working on development environments (IDE) through a comprehensive logbook and case study.<br>• As part of the Digital Logic Design, they produce a digital logbook as an ePortfolio and experience the process of submission of their records digitally through VLE and receive individual feedback via the VLE.<br>• As part of the Electrical Circuit Analysis module, students experience the workplace scenario where they are required to follow basic health and safety aspects related to working in places where death by electrocution is a hazard. They also maintain a hand-written record of their experience in the workshop while they progress through a set of time scheduled exercises. This helps them to put learning into practice in a timely and organised way whilst also recording data in a meaningful way and they are encouraged to pay attention to handle data for later retrieval. |
| High impact pedagogies | <u>Group-based learning experiences</u><br>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 | The following modules, encourage and allow students to work in small groups of 2 to 3 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:<br>• Design and Practice,<br>• Object-Oriented Programming C++<br>• Electronic Principles<br>• Digital Logic Design |

| | | |
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| | 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. | • Electrical Circuit Analysis<br><br>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. |
| Inclusive teaching, learning and assessment | <u>Accessible materials, resources and activities</u><br>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 as soft copies on the VLE in an appropriate accessible format. 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. |
| Assessment *for* learning | <u>Assessment and feedback to support attainment, progression and retention</u><br>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 modules at L4 employ a range of course work assessments, categorised into formative or summative assessments that are integral to the learning and progression of all students.<br>Formative assessments are important in the early years of a student's journey on the course as this will provide an opportunity to quickly act on the formative feedback obtained and work to address weaknesses which then helps them to progressively gain better marks in the later part of that assessment and other assessments.<br>Also, due to the nature of the subjects studied, sometimes summative assessment are more suitable as it takes time for students to develop their understanding of complex concepts and then fully put them into practice or use, in either a classroom exercise or a work-place related case study. In situations where summative assessments are undertaken, formative feedback forms part of the scheduled contact time/meetings between the students and member of academic staff. Feedback for summative assessments is generally provided to students within the recommended timeframe as per the school/university regulations, which is currently two weeks after submission. |

| | | |
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| | | Summative assessments contribute with a lower weighting, to the final module mark. The weightings can range from 5 to 50% depending on the number and type of assessment components that form part of the course work for that specific module. |
| High impact pedagogies | <u>Research and enquiry experiences</u><br>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 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. | 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.<br><br>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.<br><br>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 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 academic in charge of the session/project/task/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.<br><br>The above aspects feed into and further challenge the students when they undertake their individual project at L6. |
| Curricula informed by employer and industry need | <u>Authentic learning and assessment tasks</u><br>Live briefs, projects or equivalent authentic workplace learning experiences and/or assessments enable students, for example, to engage with | 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 |

| | | |
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| / Assessment *for* learning | 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.<br>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 where they are able to see how their classroom knowledge can be transformed to provide solutions to problems in workplace. |
| Inclusive teaching, learning and assessment | <u>Course content and teaching methods acknowledge the diversity of the student cohort</u><br>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 e.g. electrical earthing and bonding techniques/arrangements are traditionally different in different countries and are also industry specific, so what is applicable to land-based equipment is not relevant to off-shore equipment etc. |
| Curricula informed by employer and industry need | <u>Work-based learning</u><br>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, | Direct work-based learning is not part of this course, however part-time students who currently work in related technical capacity will have the benefit of immediately putting their knowledge into practice.<br><br>Full-time and part-time students are often mixed in lectures and often contextually part-time students share their work aspects and how they relate to the classroom learning, which is an important experience to full-time students. |

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| | simulations and role-play in industry-standards settings as relevant to the course. Work-based learning can be linked to assessment if appropriate. | Assignments where possible are designed to be based on case studies, which are close to real world scenarios and guest talks often feed into these. |
| Embedded learning development | <u>Writing in the disciplines: Alternative formats</u><br>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 profession. For example, project report, presentation, poster, lab or field report, journal or professional article, position paper, case report, handbook, exhibition guide. | The course offers varying assessment aspects which supports students attempts to adopt ways of thinking and practising, which is underpinned by knowledge and skills gained, the formative feedback provided and the opportunities to put them into practice.<br><br>Students also undertake a variety of presentation techniques; they are generally required to assimilate information while performing a task in the laboratory or during a group discussion and quickly note it down as a running commentary in a logbook for formal presentation. Further, in their study, they are required to retrieve data from the information recorded which enables them to experience their own strengths and weaknesses associated with their personal style of recording information.<br><br>In L6 modules, they are also required to make sound judgements based on assimilated information and obtained data to then disseminate the information to a specific target audience in a specified style such as a poster, presentation, formal report etc. to either a layman audience, a competent co-worker, a consultant, reviewer, or a professional body etc. |
| High impact pedagogies | <u>Multi-disciplinary, interdisciplinary or interprofessional group-based learning experiences</u><br>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 | 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 |

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| | 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. | 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><br>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 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. | 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.<br><br>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. |
| Curricula informed by employer and industry need | <u>Career management skills</u><br>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 that are complemented with the help from University's employability office (such as career planning, Career fairs etc.).<br><br>Specific employability skills (few listed here) that are directly relevant to the industry are also developed as part of the course:<br>• In Design and Practice, students are taught and trained to use CAD packages which are widely used in the industry and is an important competency to add to their CV. Students in this course are trained in working with PCB designs of electronic circuits as part of Design and Practice. |

| | | |
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| Curricula informed by employer and industry need / Assessment *for* learning / High impact pedagogies | <u>Capstone project/dissertation</u><br>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 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**. | The individual BEng project undertaken at L6 will provide an opportunity for students to integrate and synthesise the knowledge and skills gained throughout their course, which they are able to apply to real-world scenarios, be it research, or industry linked. This experience develops the student's professionalism, integrity and creativity and prepares them to challenges in the real world when they undertake employment. |

**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 allocated a personal tutor– coordinated by the Senior Personal Tutor. Personal tutoring is embedded in the level 4 module, Design and Practice where students are given the opportunity to learn about the aspects of PT on their courses. PT open surgeries are bookable on demand. Induction course, including: 1. Meeting with personal tutor 2. Use of library and learning resources (LIS) 3. Use of University IT facilities/Blackboard VLE 4. Study skills. 5. Access to University support facilities. 6. Induction to 'Don't Panic' – PDP for L4. | Induction for direct entry students. See Level 4 | At Level 6 CD and Project Supervisor support the PT system. |
| 2 Supporting the development and recognition of skills in academic modules/modules. | Most modules have practical elements and this requires keeping a laboratory logbook for each module. This occurs across all levels of the course but particular emphasis is placed on this aspect at 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, Design and Practice, Electronic principles, Electrical Circuit Analysis. In the core Mathematics module practice is | 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, Professional Practice and Team Design Project 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, BEng Project. |

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|---|---|---|---|
| | encouraged by continuous assessment and feedback (weekly) of tutorial logbooks.<br>Enhanced Maths tutorials – additional support is provided for mathematics to improve basic skills for those students with diverse entry qualifications. | | |

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| 3 Supporting the development and recognition of skills through purpose-designed modules/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:<br>• Develop students' technical communications, basic report writing and team-working skills<br>• Develop students' skills in project planning and management<br>• Develop students' confidence in undertaking self-managed practical projects.<br>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:<br>• Detailed study of project planning and networking techniques<br>• Planning and preparation for the major project at L6<br>• Introduction to systems thinking | 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. |

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| 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 electronic product. | Mini-projects, assignments and dissertations are featured in modules at L5, including:<br>Embedded Software Design L5,<br>Analogue Electronics L5,<br>Discrete Mathematics, Data Structures and Algorithms L5.<br>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:<br>• Project planning and time management<br>• Keeping a detailed project log book<br>• Technical report writing and presentation<br>• Preparation of material and participation in an oral technical presentation session with other students and staff<br>• Preparation for an individual oral examination (viva).<br>All of these components form part of the project assessment in addition to the technical aspects. |

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| 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 |
| 6 Supporting the development and recognition of career management skills through work placements or work experience. | CDs make students aware of potential sandwich placements. | The Industrial Training Officer (ITO) assists students to obtain sandwich and summer work placements. The ITO 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.<br>BEng students can spend their placement year in Switzerland through the programme called 'A Year in Europe'. | |

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| 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.<br>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.<br>Students are encouraged to start their own 'clubs' and laboratory facilities and specific notice-boards are made available for this. | Students can study a language to prepare for exchange courses with overseas links. See https://my.lsbu.ac.uk/my/portal/Study-Support/Skills-for-Learning/ | |
| 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 | Students are aware of the need for CPD in the level 6 module BEng project. |
| 9 Other approaches to personal development planning. | | | Throughout the course students use the Linked Learning platform that helps in their CPD as part of independent learning. |

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| 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 two weeks of each submission and returned with comments and advice. At L4 this forms the basis of the majority of the coursework mark in technical modules. | 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 meet their supervisors at least once a week or in a fortnight where progress is monitored, and objectives are discussed.In the individual Project students must keep a logbook, which provides a platform for skills development. |

## Appendix D: Terminology

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

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| **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 |

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| **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 |
| **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 |
| **performance (examinations)** | a type of examination used in performance-based subjects such as drama and music |
| **professional body** | an organisation that oversees the activities of a particular profession and represents the interests of its members |

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| **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 |