Course Specification

A. Course Information			
Final award title(s)	MSc Electrical and Electronic Engineering		
Intermediate exit award title(s)	PgDip Electrical and Electronic Engineering PgCert Electrical and Electronic Engineering		
UCAS Code	-	**Course Code(s)**	4321 FT 4322 PT
	London South Bank University		
School	☐ ASC ☐ ACI ☐ BEA ☐ BUS ■ ENG ☐ HSC ☐ LSS		
Division	Electrical & Electronic Engineering		
Course Director	Dr Antonio Vilches		
Delivery site(s) for course(s)	■ Southwark ☐ Havering ☐ Other: please specify		
Mode(s) of delivery	■ Full time ■ Part time ☐ other please specify		

Length of course/start and finish dates

Mode	Length years	Start - month	Finish - month
Full time	1	September	August
Part time	2	September	August

Is this course generally suitable for students on a Tier 4 visa?	Please complete the International Office questionnaire **Yes** ~~No~~ 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 Review date	December 2024
	Course specification last updated and signed off	Aug 2022
Professional, Statutory & Regulatory Body accreditation	Institution of Engineering and Technology (PB approval will be sought after the University event)	
Reference points:	Internal	Corporate Strategy 2015-2020 Academic Quality and Enhancement Manual School Strategy LSBU Academic Regulations
	External	QAA Quality Code for Higher Education 2013 Framework for Higher Education Qualifications Subject Benchmark Statements (QAA) PSRB Competitions and Markets Authority SEEC Level Descriptors 2016 UK Standard for Professional Engineering

		Competence (UK-SPEC)
B. Course Aims and Features		
Distinctive features of course	This MSc in Electrical and Electronic Engineering is an advanced course designed for engineering graduates to enhance their skills in this ever changing area driven by rapid advances in technology. The ever-increasing pace of developments in all areas of electrical and electronic engineering. Industry requires people with a thorough understanding of operating principles and design methods for various modern electrical and electronic systems. Our aim is to produce graduates who will be able to not only respond to the latest changes and advances in technology but also to look ahead and help in shaping future developments. The distinctive features of this course are that the traditional electrical and electronic engineering subjects are supported by advanced timely subjects such as optical and microwave communications, robotics, industry standard graphics interface control (LabVIEW) and embedded software system design. And these are in great demand in industry today.	
Course Aims	This MSc in Electrical and Electronic Engineering course is aimed at graduates in the science and engineering fields who have prior experience of various technical backgrounds; i.e. electronics/electrical, telecommunication, computing, telemetric, networking,, design; who wish to obtain further study and training in Electrical and Electronic Engineering. This course combines the disciplines of electrical, electronic and systems engineering together with robotic systems and other advanced techniques incorporating modules in advanced power electronics and renewable energy systems, advanced instrumentation and design with digital signal processing, robotics and Real-Time systems. The primary aims of the course are: 1. To produce postgraduates who are intellectually independent, critical and creative, who will continue to further their own knowledge and skills after graduation. So to produce postgraduates who are well motivated, and who will be able to develop and enjoy a professional engineering career in the 21st century. 2. To produce engineers for industry, commerce and public service who will be able to apply engineering knowledge, with a deep understanding of engineering principles and skills, and with a commitment to quality and standards to the practice of electrical and electronic engineering. 3. To produce postgraduates who will be able to organise, manage technologically advanced development and production, and interact effectively in a global market. 4. To produce postgraduates with the intellectual and practical capacity to have a beneficial impact upon their profession, whether in the industrial or service sectors generally or in the specific engineering discipline in particular. More specifically, the MSc in Electrical and Electronic Engineering aims to produce postgraduates who have acquired and can use a broad base of active knowledge in electrical and electronic systems pertaining to these systems as well as the techniques used in engineering design of modern energy systems that focus energy conservation and sustainability. Moreover, the skills necessary to update, extend and deepen it for career development or further study. This includes: • To provide a broad understanding of the theory and application of power electronic circuits in the areas of power conversion, power	

	conditioners and electrical machine drives. • To develop knowledge, and the ability to analyse and understand the operation of renewable energy systems and to be able to incorporate sustainability into power networks design and operation. • To understand the need for and learn to design modern microcontroller based embedded software systems and interface these using the plethora of current industry standard bus protocols. • To learn how to design and implement modern photonic and microwave based communications platforms using industry standard software and to gain experience analysing and testing these. • To learn how to design and implement complex robotic systems using modern digital control techniques and industry standard tools. • To enable students to gain a fundamental understanding of DSP algorithms and how to implement them in hardware for real-time applications. • To further enhance skills in their ability to carry out research and project work in a professional way and to communicate their technical proposals effectively. Additionally, to develop skills to manage complex technical projects in a professional manner. • To develop the ability to evaluate the business opportunity that can be created from a technology's unique advantages.

Course Learning Outcomes	**Relating to knowledge and understanding:** **A1**: A comprehensive understanding of the relevant scientific principles of the specialisation **A2**: A critical awareness of current problems and/or new insights most of which is at, or informed by, the forefront of the specialisation **A3**: Understanding of concepts relevant to the discipline, some from outside engineering, and the ability to evaluate them critically and to apply them effectively, including in engineering projects. *Teaching and learning strategies:* Acquisition of knowledge and understanding is through the following modules: Advanced Power Electronics and Renewable Energy, Advanced Instrumentation and Design, DSP and Real-Time Systems, Optical and Microwave Communications and Robotics. All of these modules teach and develop knowledge and understanding within a multidisciplinary engineering context. *Assessment* Assessment is by examinations and also practical work and assignments using logbooks and formal reports. **Relating to intellectual skills:** **B1**: Ability both to apply appropriate engineering analysis methods for solving complex problems in engineering and to assess their limitations **B2**: Ability to use fundamental knowledge to investigate new and emerging technologies **B3**: Ability to collect and analyse research data and to use appropriate engineering analysis tools in tackling unfamiliar problems, such as those with uncertain or incomplete data or specifications, by the appropriate innovation, use or adaptation of engineering analytical methods. *Teaching and learning strategies:* Acquisition of IA is gained through the MSc project as well as the module on technical, research and professional skills. *Assessment* Assessment of is through presentations and also formal reports at various stages of project work including a feasibility study. Innovation and design skills are assessed by group work as well as a formal report. **Relating to practical skills:** **C1**: Advanced level knowledge and understanding of a wide range of engineering materials and components **C2**: A thorough understanding of current practice and its limitations, and some appreciation of likely new developments **C3**: Ability to apply engineering techniques, taking account of a range of commercial and industrial constraints **C4**: Understanding of different roles within an engineering team and the ability to exercise initiative and personal responsibility, which may be as a team member or leader.

Relating to transferrable skills:

D1: Knowledge, understanding and skills to work with information that may be incomplete or uncertain, quantify the effect of this on the design and, where appropriate, use theory or experimental research to mitigate deficiencies
D2: Knowledge and comprehensive understanding of design processes and methodologies and the ability to apply and adapt them in unfamiliar situations
D3: Ability to generate an innovative design for products, systems, components or processes to fulfil new needs.
D4: Knowledge and understanding of management and business practices, their limitations, and how these may be applied in the context of the specialisation and awareness that engineers need to take account of the commercial and social contexts in which they operate.
D5: Awareness of relevant economic, legal, social, ethical and environmental context

This course is also accredited for fulfilment of CEng by Engineering Council through the IET.

C. Teaching and Learning Strategy

- Teaching and learning activities include scheduled lectures and practical workshops in most of the modules.
- Subject-related and generic resources such as library facilities and electronic resources are disseminated through the VLE resources to each module. Other subject specific facilities such as dedicated laboratories are introduced within the modules.
- Normally classes will be arranged between 9:00 am and 5:00 pm. However, in some cases, and especially for part-time students evening classes may be arranged up to 9:00 pm. This is usually avoided where possible.
- All teaching is provided by academic staff in most cases. Occasionally some of the teaching and or practical sessions may be allocated to postgraduate students/staff or Graduate Teaching Assistants with relevant expertise in the subject area. Theses student/staff members would be required to undertake appropriate training prior to this type of activity.
- Dedicated virtual learning environment sites are associated with each module and provide blended learning, supporting lectures and practical components of the modules.
- Acquisition of PS is acquired during the practical laboratory sessions which constitute a part of most modules for this course.
- These include Advanced Instrumentation & Design laboratory sessions as well as DSP and Real-Time Systems labs
- Further development of these skills is acquired in the MSc project.

D. Assessment

- Most of the modules include continually assessed components assessed through submitted logbooks, formal and assignment reports. Some modules include written examinations. The composition of coursework and examination varies between the modules and are outlined in

the associated module guides.

- Formative assessments are provided in most of the modules, and there would normally be some summative assessment components in the form of logbook, assignments and formal reports. Percentage and frequency for the components are different for each module and are provided in associated module guides. Most modules include written examination a well as coursework component(s). In some modules written examination is not appropriate, e.g. the Project module, where submission of a final report is required. All modules must be passed in order to graduate with an MSc qualification. If there are failures, referral/deferral(s) would need to be successfully completed by set deadlines. Intermediate qualifications such as PgDip Electrical and Electronic Engineering or PgCert Electrical and Electronic Engineering may be awarded if certain level of achievement(s) can be awarded in accordance with the university regulations and protocols.

E. Academic Regulations

The University's Academic Regulations and Postgraduate examination protocols apply to this course:
https://www.lsbu.ac.uk/__data/assets/pdf_file/0008/84347/Academic_Regulations_2021-2022.pdf
https://www.lsbu.ac.uk/__data/assets/pdf_file/0010/84349/assessment-and-examination-procedure.pdf

F. Entry Requirements

In order to be considered for entry to the course applicants will be required to have the following qualifications:

- A degree equivalent to UK Honours degree (minimum 2nd class) in Electrical, Electronics, Communications or Computer Engineering; or
- Professional qualifications (e.g. CEng) along with several years of relevant industrial experience (should include analytical work). The relevant industrial experience is to be assessed by the Course Director.

Overseas applicants are required to have a minimum English language IELTS score of 6.5 with no less than 5.5 in any of the components of the IELTS test.

G. Course structure(s)

Course overview

The course is based on two semesters per academic year with three modules being delivered and assessed in each semester on the full-time mode. The part-time curriculum consists of the same modules, set out over two years.

MSc Electrical and Electronic Engineering – **Full time**

	Semester 1		Semester 2	
Level 7	Robotics	20	Optical and Microwave Communications	20
	Technical, Research and Professional Skills	20	Advanced Power Electronics and Renewable Energy Systems	20
	Advanced Instrumentation and Design	20	DSP and Real-Time Systems	20
			MSc Project	60

MSc Electrical and Electronic Engineering – **Part time**

	Semester 1		Semester 2		
Level 7					
Year 1	Robotics	20	Optical and Microwave Communications	20	
	Advanced Instrumentation and Design	20	Advanced Power Electronics and Renewable Energy Systems	20	
Year 2	Technical, Research and Professional Skills	20	DSP and Real-Time Systems	20	
	MSc Project		MSc Project	60	

Placements information

There are no placements on this course.

H. Course Modules

There are currently no optional modules on this course.

Module Code	Module Title	Level	Semester	Credit value	Assessment
EEE_7_TRP	Technical, Research and Professional Skills	7	1	20	100% Coursework (70/30 split)
EEE_7_ROB	Robotics	7	1	20	60% Examination and 40% Coursework
EEE_7_AID	Advanced Instrumentation and Design	7	1	20	100% Coursework (50/50 split)
EEE_7_OMC	Optical and Microwave Comms	7	2	20	60% Examination and 40% Coursework
EEE_7_APE	Advanced Power Electronics and Renewable Energy Systems	7	2	20	50% Written Examination and 50% Coursework
EEE_7_DSP	DSP and Real-Time Systems	7	2	20	50% Written Examination and 50% Coursework
EEE_7_PRO	Project	7	2	60	100% Coursework (90/10 split)

I. Timetable information

- The University operates a semester-based academic calendar. Each year consists of two semesters containing the taught course material and the assessments/examinations. Semesters are 15 weeks long (not including holidays) and teaching is normally carried out during the first 12 weeks, with week 13 reserved for revision. Most examinations will be timetabled in weeks 14/15 of each semester.
- Timetables changes from time to time, especially at the start of a semester, so always keep a check on the latest version – on the VLE
- The University is sometimes short of exam rooms (through refurbishment processes for example), so there can be quite late changes to the venues. Students are warned to be early for exams, and get into the habit of checking the Exam Timetable early on the day of the exam, in case of any changes. Also, to enter an examination, students need a valid

student ID card as proof of enrolment. ID numbers have to be written on answer scripts, students need to make sure they have their card at all times to know their ID number (keep a second copy somewhere).
- Students receive a confirmed timetable for study commitments at the beginning of the semester.

J. Costs and financial support

Course related costs

- In most cases, some lecture materials, such as lecture notes lab manuals will be provided on the dedicated VLE (Moodle) sites for each module. Other than that, course-related materials, e.g. such additional expenses as cost of books or other learning materials and any specialist equipment are not included in tuition fees.

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

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QAA subject benchmark statements can be found on the QAA website:
http://www.qaa.ac.uk/AssuringStandardsAndQuality/subjectguidance/Pages/Subject-benchmark-statements.aspx

Subject benchmark statement: Engineering (Master's), 2015
http://www.qaa.ac.uk/docs/qaa/subject-benchmark-statements/sbs-engineering-15-masters.pdf?sfvrsn=fb91f681_16

Appendix A: Curriculum Map

This map provides a design aid to help course teams identify where course outcomes are being developed (**D**), taught (**T**) and assessed (**A**) 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														
Title	**Code**	**A1**	**A2**	**A3**	**B1**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**	**D5**
Technical, Research and Professional Skills	EEE_7_TRP	TA	D	TA	TA	TA	TA	TA	D	TA	TA	TA	TA	D	D	TA
Robotics	EEE_7_ROB	TA	TA	D	TA	TA	DA	D	TA	TA	TA	D	D	TA		
Optical and Microwave Comms	EEE_7_OMC	TA	TA	D	TA	TA	DA	D	DA	D	D	DA	TA	TA	TA	
Advanced Instrumentation and Design	EEE_7_AID	TA	TA	D	DA	TA	D	TA	TA	TA	D	DA	TA	D	DA	
DSP and Real-Time Systems	EEE_7_DSP	TA	TA	D	D	D	TA	TA	TA	D	D	D	D	D		
Advanced Power Electronics and Renewable Energy Systems	EEE_7_APE	TA	D	TA	D	TA	D	D	TA	TA	D	D	DA	TA	D	DA
Project	EEE_7_PRO	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	D	DA	D

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 7
1 Supporting the development and recognition of skills through the personal tutor system.	Personal Tutor open surgeries – 2 hours/week on demand – all members of staff allocate 2 hours/week for bookable PT sessions. This is administered by the Senior Personal Tutor. Induction programme, including: Meeting with personal tutor Use of library and learning resources (LIS) Use of University IT facilities/Blackboard VLE Study skills Access to University support facilities
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 as logbooks provide a platform for further skills development. Additional transferable skills are developed by workshops, assignments and mini-projects involving information selection, retrieval and evaluation, IT skills, team working, planning and managing study. For example: • Literature research assignment in Technical, Research and Professional Skills. Formal laboratory reports in Advanced Instrumentation and Design and other modules.
3 Supporting the development and recognition of skills through purpose designed modules/modules.	The Technical, Research and Professional Skills aims 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.
4 Supporting the development and recognition of skills through research projects and dissertations work.	The main MSc Project enhances the student's ability: • to apply knowledge gained during the course to new problems • to innovate and solve problems of above average difficult • to utilize time and effort effectively for purposeful and sustained independent work • prepare technical reports • plan and manage project and time effectively The project also imparts to students the supervisor's experience of effective project management and research methods. The module on Technical, Research and Professional Skills is a precursor to the MSc project in developing these skills.
5 Supporting the development and recognition of career management skills.	Students have an introduction to the engineering profession and professional bodies in the Technical, Research and Professional Skills module. Students also attend the annual IET students meeting.
6 Supporting the development and recognition of career management skills through work placements or work experience.	Students are encouraged to take industry-based MSc projects, where they can learn more career management skills. Students are also introduced to the IET and encouraged to join the IET as student members.
7 Supporting the development of skills by recognising that they can be developed through extra curricula activities.	The department maintains a VLE site devoted to information about the IET and this is open to all students throughout their course. Students are encouraged to start their own 'clubs'. Laboratory facilities and specific notice boards are made available for this.

8 Supporting the development of the skills and attitudes as a basis for continuing professional development.	The department has an active IET Student Counsellor and students are encouraged to join the IET. An annual introductory meeting is held in November each year (graduate advantage presentation and also a membership presentation). These include membership and careers presentation from the Institution. A dedicated VLE site is maintained to support IET activities and disseminate resources.
9 Other approaches to personal development planning.	The department maintains active industry links through our industrial panel. With regular meetings this panel ensures that industry requirements and needs are fed back into the teaching on our courses and the preparation of our graduates for the workplace. This also improves personal development planning.
10 The means by which self-reflection, evaluation and planned development is supported e.g. electronic or paper-based learning log or diary.	The department has a long established practice where students must keep a personal technical logbook for each module with a laboratory or computer workshop component. The logbook sometimes forms part of the coursework assessment with other assessment methods used such as assignments, design reports, mini-projects providing a platform for skills development. Project students meet their supervisors at least once/fortnight where progress is monitored and objectives are discussed. The student's project logbook, which is an informal record of work, is signed off during these sessions. The project logbook is marked and forms part of the project assessment.

Appendix D: Terminology

awarding body	a UK higher education provider (typically a university) with the power to award higher education qualifications such as degrees
bursary	a financial award made to students to support their studies; sometimes used interchangeably with 'scholarship'
collaborative provision	a formal arrangement between a degree-awarding body and a partner organisation, allowing for the latter to provide higher education on behalf of the former
compulsory module	a module that students are required to take
contact hours	the time allocated to direct contact between a student and a member of staff through, for example, timetabled lectures, seminars and tutorials
coursework	student work that contributes towards the final result but is not assessed by written examination
current students	students enrolled on a course who have not yet completed their studies or been awarded their qualification
delivery organisation	an organisation that delivers learning opportunities on behalf of a degree-awarding body
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
material information	information students need to make an informed decision, such as what and where to study
mode of study	different ways of studying, such as full-time, part-time, e-learning or work-based learning
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
prospective student	those applying or considering applying for any programme, at any level and employing any mode of study, with a higher education provider

regulated course	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 of students than in 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
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