Course Specification

A. Course Information			
Final award title(s)	BSc (Hons) Computer Science BSc (Hons) Computer Science (Sandwich) BSc (Hons) Computer Science Top-Up		
Intermediate exit award title(s)	CertHE Computer Science DipHE Computer Science		
UCAS Code		**Course Code(s)**	FT 4637 PT4 year 4638 PT6 year 4937 Top Up (FT) 5455
	London South Bank University		
School	☐ ASC ☐ ACI ☐ BEA ☐ BUS ☒ ENG ☐ HSC ☐ LSS		
Division	Computer Science and Informatics		
Course Director	Mike Child		
Delivery site(s) for course(s)	☒ Southwark ☐ Havering ☐ Other: please specify		
Mode(s) of delivery	☒Full time ☒Part time (4 years) ☒Part Time (6 years) ☒ Top-up ☒ Full-time sandwich		

Length of course/start and finish dates

Mode	Length years	Start - month	Finish - month
Full time	3	September	August
Full time with placement/ sandwich year	4	September	August
Part time (4 year)	4	September	August
Part time (6 year)	6	September	August
Top-up	1	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	May 2018
	Course Review date	May 2023
	Course specification last updated and signed off	Sep 2022
Professional, Statutory & Regulatory Body	**BCS accreditations** **Full CITP** - Accredited by BCS, The Chartered Institute for IT for the	

accreditation	purposes of fully meeting the academic requirement for registration as a Chartered IT Professional. **Partial CEng** - Accredited by BCS, The Chartered Institute for IT on behalf of the Engineering Council for the purposes of fully meeting the academic requirement for Incorporated Engineer and partially meeting the academic requirement for a Chartered Engineer.	
Reference points:	Internal	Corporate Strategy 2020-2025 Academic Quality and Enhancement Manual LSBU Academic Regulations
	External	QAA Quality Code for Higher Education [2018] Framework for Higher Education Qualifications [2014] Subject Benchmark Statements [2019] Competitions and Markets Authority [2015] SEEC Level Descriptors [2016] BCS Guidelines for Accreditation [2020] ACM curricula for Computer Science [2013] IET Guidance for meeting AHEP learning outcomes [2015]

B. Course Aims and Features

Distinctive features of course	The BSc (Hons) Computer Science degree offers the opportunity to study both the theory of computation and practical approaches to the design and implementation of systems. This course explores a wide range of computer science topics from the algorithmic essentials and hardware foundations to advanced software systems, networks, virtual machines and emerging technologies. The emphasis is on developing a comprehensive understanding of sophisticated high-level computer systems and technology directly in terms of the fundamental principles of computer science. This is intended to provide a more complete understanding than could be achieved by studying the end-products alone. It will provide graduates with the ability to see all computing systems as complex expressions of fundamental principles and thereby comprehend their likely potentials and limitations. The course offers a balanced programme including the theory of computation, machine architecture, machine language, algorithms, data structures, programming and software development, software engineering, operating systems, databases, user-centred design and security. It also offers various speciality areas such as artificial intelligence, mobile and cloud computing.
Course Aims	The BSc (Hons) Computer Science degree aims to: 1. produce graduates who are equipped with the knowledge and skills to design, develop, use and manage computer systems of diverse kinds 2. provide a comprehensive understanding of the analysis, design, implementation and evaluation of computer systems 3. provide a combination of theory, practical skills and knowledge suitable for a range of professional roles in the computing industry 4. produce graduates with the professional and ethical standards required for employment in the industry
Course Learning Outcomes	**A. Students will acquire knowledge and understanding of:** 1. the foundations and contemporary development of theoretical

	computer science, computer hardware, computer networks, operating systems and application software 2. requirements analysis and the formal specification of computer systems 3. software development using a variety of software engineering techniques, design notations, development environments and programming languages, data encoding, storage, management and analysis 4. the fundamental issues related to robustness and security in systems, software and networks including consideration of social, ethical and legal issues which affect the development and use of information systems **B. Students will develop their intellectual skills such that they are able to:** 1. locate, analyse, evaluate and make effective use of reference material including literature from academic, technical and professional sources to comprehend and critically evaluate theoretical arguments in computer science 2. analyse and predict future developments in computing based upon fundamental principles and evolving trends 3. evaluate, modify and synthesise approaches to software development and systems design 4. collaborate effectively and professionally with technical and non-technical colleagues working to analyse practical problems and propose appropriate and feasible technical solutions **C. Students will acquire and develop practical skills such that they are able to:** 1. design, develop, test and document software representative of contemporary programming practices and using professional development tools and techniques 2. analyse and specify requirements for the implementation of a range of computing and information systems including effectively use formal notations and graphical and numerical representations for data, processes and other relevant concepts 3. analyse systems for potential security weaknesses and propose mitigating measures that could be taken 4. comprehend the fundamental principles underpinning computer systems allowing you to estimate limitations and potential future advancements, and facilitating the acquisition of further technical competencies and skills by means of applying these principles to new technologies **D. Students will acquire and develop transferable skills such that they are able to:** 1. communicate effectively verbally and in writing

	2. work effectively in teams 3. manage time and personal resources effectively 4. sustain self-directed learning to maintain continuing professional development

C. Teaching and Learning Strategy

Overview of teaching and learning activities

There will be a combination of lectures, tutorials and computer laboratory activities to inform, contextualise, discuss, analyse, explore and critically evaluate the material in order to enable students to assimilate the material and develop students' intellectual abilities around it.

The delivery will aim to ensure a balance of cognitive tasks involving the demonstration and application of factual knowledge, problem-solving, analysis and critique with practical exercises in computer laboratories to reinforce learning through direct experience. Practical applications and utilising real-world examples will be used wherever possible.

At level 4 independent (non-contact) study hours will be predominantly concerned with assimilation, at level 5 knowledge acquisition will take place as part of analytical study and at level 6 students will be engaging in independent research and critical evaluation. At level 6 students will undertake an independently managed project which will involve making use of practical (and other) skills acquired during the course. Students taking the sandwich course will acquire practical skills and experience in their internship.

Modules exist to support the development of study and communication skills, to develop self-management skills and develop effective team-working (in certain modules cross discipline). In addition, classroom activities in many other modules will be used to foster these abilities.

Importance of independent learning

Students are required to undertake directed self-study and prepare solutions/discussions to questions relative to various topic areas. Students will be encouraged to identify for themselves particular problems of difficulty and to use seminar discussions, where appropriate, for the resolution of these. Students must regularly access the Moodle site for this module. They should download the class/lecture material from the Moodle site, and do the recommended reading, before each lecture/class. Where appropriate, students are also expected to download the relevant seminar questions and study them in advance of each seminar, in order to derive maximum benefit from seminar time. The programme of teaching, learning and assessment gives guidance on the textbook reading required for each week, the purpose of which is to encourage further reading both on and around the topic.

Each 20-credit module has a total of 200 study hours, out of which:

- at level 4, 5 and 6 there are 52 direct contact hours and 148 independent study hours
- Project module has 40 direct contact hours and 360 independent study hours

Subject-related and generic resources available

Students will have access to approximately 200 PCs and 15 Macs in 10 teaching computer labs, which typically have the following ICT software facilities: Microsoft SQL Server, NetBeans with JDK, Oracle, Python, SAS, Visual Paradigm, etc. Students all have remote access to most software via AppsAnywhere. We also have a cyber security lab, which is used for specialised modules and several printers, including large format printers.

Generic resources include:

- Perry library - provides access to traditional books, journal sources, PCs to use and laptops to borrow. The Perry Library is open throughout the week, and during the term are staffed from 09:00 until 19:00 from Monday – Friday, and 10:00 to 16:30 at

weekends. There is seating capacity for 600 students in the library and the book-stock is in excess of 600,000 volumes. The building provides wireless access.

- The Students' Support Centre - provides a first stop service for students on academic, personal and financial matters. It is aimed at improving student experience and offers LSBU's best employability, development and student services. The centre also offers home to our Students' Union.
- Fitness - there is also a sports hall, fitness suite and gymnasium
- Catering - there is a large refectory, with a selection of smaller cafes and eating outlets on campus.

Learning support

We support students throughout their course in many different ways, such as:

- personal tutoring
- support sessions on core maths & programming skills taking place weekly
- peer student led support sessions
- practical skills workshops
- labs equipped with the latest hardware and software
- lectures, seminars, personal tuition
- online learning materials
- varied assessment methods
- advice on work experience and career options
- opportunities for work placements and projects with employers
- tailored field trips
- training in research methods and assistance with independent research projects.

Teaching staff

The majority of academics have standing with a professional body (e.g. BCS, IEEE, HEA), and either a research background or an industry experience in their teaching area. Some modules may be supported with postgraduate students, who will either support tutorials at a lower level or provide support on modules related to their research area. Module leader with the division management will establish the suitability of the teaching team and support and training will be provided where necessary to ensure quality of teaching is delivered.

Virtual Learning for students

There is a strong emphasis on virtual learning embedded in the course. MS Teams is extensively used to provide video conferencing and real time communication for teaching events and other meetings. Other platforms such as Poll Everywhere are also used where appropriate. Lectures are recorded with the specialised Panopto software and published online for student access. Online interactive quizzes such as Kahoot are actively employed in many teaching sessions.

Moodle, the university's Virtual Learning Environment (VLE) provides online resources and support for all students. It enables students with access to resources and tools to support their teaching and learning, ensuring that any student will have access to the same electronic curriculum resources irrespective of their location (on or off-campus).

The VLE also provides facilities such as on-line timetables, assessment submissions, lecture and tutorial resources, assessment results, as on-line timetables, lecture resources, course information, examination results, module selection and submission systems, revision tools, video, podcasts, module feedback, forums and other systems for both students and staff to support their courses.

The VLE is also used in collaboration with LinkedIn Learning, through which students have free access to a wide range of training materials supporting their course. Typically, the content from LinkedIn Learning is used via embedded links in the VLE to prescribe playlist sequences of

audio/video and various media content in support of students learning.

D. Assessment

Formative assessment

Formative assessment is essential as it is effective in promoting student learning and it helps seek to determine how students are progressing through a certain learning goal. Wherever possible formative assessment will be used to allow students to gauge their own progress and address weak areas. Formative assessment will also provide assessors with the opportunity to learn about the extent to which students have developed expertise and can tailor their teaching accordingly.
Formative assessment will take different forms depending on the module level and type, but in general a selection and combination of the following will be used:

- interactive revision quizzes
- think-pair-share concept and class discussions
- verbal feedback on tutorial activities
- observation and questioning to provide instant feedback as the student takes part in learning activities
- self and peer assessment

Summative assessment

For all modules summative assessment consists of either 100% coursework or a combination of coursework and two-hour typically closed-book examination. All modules have a 40% pass mark which has to be achieved for each component individually (exam and coursework).

Students' acquisition of knowledge and understanding will be assessed by coursework tasks requiring the demonstration of such, including assessed practical tasks, report writing, in-class tests and presentations, individual and team-projects, etc. There is typically one coursework per module, which may consist of two or more components.

Examinations will be closed-book and will require students to demonstrate that knowledge and understanding have been achieved.

Progression and Award

Progression means a student can move to a higher stage of study. If you have passed all the modules in one stage of study you can progress to the next stage. If you have failed any modules within the stage of study you can progress to the next stage if your failure has been compensated or condoned.

You may be awarded a pass by compensation if you have not met all the requirements to pass a module but your overall performance, and your performance in the failed module, meets criteria previously approved by the Quality and Standards Committee. If we award a compensated pass, the module mark is recorded as a pass mark on your transcript.

We may condone a pass if you can prove that your work was affected by circumstances outside your control. If we condone a failed module, the mark will stay the same, but you will be credited with a pass on your transcript.

You can progress to the next stage while still needing to complete one 20-credit module from the first semester and one 20-credit module from the second semester or the equivalent for part-time study. You must have passed all relevant modules (or had any failures condoned or

compensated) before you can receive an award.

E. Academic Regulations

The University's Academic Regulations apply for this course. For course specific protocols please refer to the Divisional protocol document.

F. Entry Requirements

Degree Course

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

- A Level BBB or;
- BTEC National Diploma DDM or;
- Access to HE qualifications with 24 Distinctions 21 Merits including 3 Merits in Maths and 12 Merits in ICT or;
- One of the following T-Levels with a pass of Merit:
    - Digital Production, Design and Development
    - Digital Business Services
    - Digital Support Services

  or;
- Equivalent level 3 qualifications worth 122 UCAS points
- Applicants must hold 5 GCSEs A-C including Maths and English or equivalent (reformed GCSEs grade 4 or above).

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.

Top-up Course

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

- Higher National Diploma with at least 60 credits at merit in second year modules, including a level 5 module in networks at merit, or
- other equivalent Higher Education qualification

All applicants must have broadly the equivalent subject knowledge and abilities as students that have completed the first two years of the full time Computer Science degree. Applicants **must** have demonstrated competence in networking by having passed a suitable level 5 module in the subject with a grade at merit level (60%) and are expected to possess reasonable software development ability.

We welcome qualifications from around the world. English language qualifications for international students: IELTS score of 6.0, Cambridge Proficiency or Advanced Grade C.

G. Course structure(s)

Course overview

All full time and part time courses are organized into two semesters, each lasting 15 weeks.
The Top-up course has a slightly different structure, as it consists of three semesters, the third one being a summer semester.
Semester one starts in September, Semester 2 in January and Semester 3 in June.

The standard 'building block' of all course delivery are modules – identified in size by CATS (Credit Accumulation and Transfer Scheme) credits. All module size across the course is 20 CATS credits;

with the exception of the Honours project, which is a double module worth 40 credits.

This course has a full-time, full-time with sandwich, part-time (4 year degree), part-time (6 year degree) and top-up award-bearing structure of modules, with defined learning outcomes and secure location within the Framework for Higher Education Qualifications. All of the above courses will lead to a single honours awards of the University.

Computer Science – Full time with sandwich

Year 1	Semester 1		Semester 2	
Level 4	Fundamentals of Computer Science, compulsory	20 credits	Professional Practice, compulsory	20 credits
	Discrete Mathematics, compulsory	20 credits	Requirements Analysis and UCD, compulsory	20 credits
	Fundamentals of Software Development, compulsory	20 credits	Data Structures and Algorithms, compulsory	20 credits
Year 2				
Level 5	Operating Systems, compulsory	20 credits	Big Data and Database Systems, compulsory	20 credits
	Principles of Data Networks, compulsory	20 credits	Software Engineering, compulsory	20 credits
	Object Oriented Programming, compulsory	20 credits	Advanced Programming, compulsory	20 credits
Sandwich year				
	Sandwich Placement in Computer Science and Informatics (0 credit)			
Year 3				
Level 6	Project, compulsory 40 credits			
	ICT Project Management in Practice, compulsory	20 credits	Systems and Cyber Security, compulsory	20 credits
	Data Mining and Big Data Analytics, optional	20 credits	Smart Internet Technologies, optional	20 credits
	Mobile Computing, optional	20 credits	AR/VR Technologies, optional	20 credits
			Artificial Intelligence, optional	20 credits

Computer Science – Part time (4 year course)

Year 1	Semester 1		Semester 2	
	Fundamentals of Computer Science, compulsory	20 credits	Professional Practice, compulsory	20 credits
	Fundamentals of Software Development, compulsory	20 credits	Data Structures and Algorithms, compulsory	20 credits
Year 2				
	Discrete Mathematics, compulsory	20 credits	Requirements Analysis and UCD, compulsory	20 credits
			Software Engineering, compulsory	20 credits
	Object Oriented Programming, compulsory	20 credits	Advanced Programming, compulsory	20 credits
Year 3				
	Operating Systems, compulsory	20 credits	Big Data and Database Systems, compulsory	20 credits
	Principles of Data Networks, compulsory	20 credits	Smart Internet Technologies, optional	20 credits
			AR/VR Technologies, optional	20 credits
			Artificial Intelligence, optional	20 credits
Year 4				
	Project, compulsory 40 credits			
	ICT Project Management in Practice, compulsory	20 credits	Systems and Cyber Security, compulsory	20 credits

	Data Mining and Big Data Analytics, optional	20 credits		
	Mobile Computing, optional	20 credits		

Computer Science – Part time (6 year course)

Year 1	Semester 1		Semester 2	
	Fundamentals of Computer Science, compulsory	20 credits	Professional Practice, compulsory	20 credits
	Discrete Mathematics, compulsory	20 credits		
Year 2				
			Requirements Analysis and UCD, compulsory	20 credits
	Fundamentals of Software Development, compulsory	20 credits	Data Structures and Algorithms, compulsory	20 credits
Year 3				
	Operating Systems, compulsory	20 credits	Big Data and Database Systems, compulsory	20 credits
	Principles of Data Networks, compulsory	20 credits		
Year 4				
			Software Engineering, compulsory	20 credits
	Object Oriented Programming, compulsory	20 credits	Advanced Programming, compulsory	20 credits
Year 5				
	ICT Project Management in Practice, compulsory	20 credits	Systems and Cyber Security, compulsory	20 credits
	Data Mining and Big Data Analytics, optional	20 credits		
	Mobile Computing, optional	20 credits		
Year 6				
	Project, compulsory 40 credits			
			Smart Internet Technologies, optional	20 credits
			AR/VR Technologies, optional	20 credits
			Artificial Intelligence, optional	20 credits

Computer Science – Top-up Full time (1 year)

Year 1	Semester 1		Semester 2	
	Object Oriented Programming, compulsory	20 credits	Big Data and Database Systems, compulsory	20 credits
	ICT Project Management in Practice, compulsory	20 credits	Systems and Cyber Security, compulsory	20 credits
	Data Mining and Big Data Analytics, optional	20 credits	Smart Internet Technologies, optional	20 credits
	Mobile Computing, optional	20 credits	AR/VR Technologies, optional	20 credits
			Artificial Intelligence, optional	20 credits
	Summer			
	Project, compulsory 40 credits			

Computer Science – Top-up Part time (2 years)

Year 1	Semester 1		Semester 2	
	Object Oriented Programming, compulsory	20 credits	Big Data and Database Systems, compulsory	20 credits
	Data Mining and Big Data Analytics, optional	20 credits	Smart Internet Technologies, optional	20 credits

	Mobile Computing, optional	20 credits	AR/VR Technologies, optional	20 credits
			Artificial Intelligence, optional	20 credits
Year 2				
	Project, compulsory 40 credits			
	ICT Project Management in Practice, compulsory	20 credits	Systems and Cyber Security, compulsory	20 credits

Placements information

A Sandwich course has a zero credit (pass/fail) placement module which is taken during the placement period, the assessment (presentation and report) submission is due on resuming studies.

H. Course Modules

All options are offer subject to a minimum threshold of students. If a first-choice option is not available, students will be offered a second or third module option. Students will be informed of their options prior to the end of the year.

Code	Module Title	Level	Sem	Credit	Assessment
CSI-4-PPR	Professional Practice	4	2	20	Coursework 100%
CSI-4-DSA	Data Structures and Algorithms	4	2	20	Coursework 100%
CSI-4-FCS	Fundamentals of Computer Science	4	1	20	Coursework 100%
CSI-4-FSD	Fundamentals of Software Development	4	1	20	Coursework 100%
CSI-4-MCS	Discrete Mathematics	4	1	20	Coursework 100%
CSI-4-RAU	Requirements Analysis and User-Centred Design	4	2	20	Coursework 100%
CSI-5-BDD	Big Data and Database Systems	5	2	20	Coursework 60% - Exam 40%
CSI-5-OOP	Object Oriented Programming	5	1	20	Coursework 100%
CSI-5-OSY	Operating Systems	5	1	20	Coursework 60% - Exam 40%
CSI-5-SFE	Software Engineering	5	2	20	Coursework 100%
CSI-5-ADP	Advanced Programming	5	2	20	Coursework 60% - Exam 40%
CSI-5-PDN	Principles of Data Networks	5	1	20	Coursework 60% - Exam 40%
CSI-5-PLA	Sandwich Placement in Computer Science and Informatics	5	1&2	0	End of placement report
CSI-6-ART	AR/VR Technologies	6	2	20	Coursework 60% - Exam 40%
CSI-6-ARI	Artificial Intelligence	6	2	20	Coursework 60% - Exam 40%
CSI-6-CSP	Computer Science Project	6	1&2	40	Coursework 100%
CSI-6-DMA	Data Mining and Big Data Analytics	6	1	20	Coursework 60% - Exam 40%
CSI-6-ICT	ICT Project Management in Practice	6	1	20	Coursework 100%
CSI-6-MOB	Mobile Computing	6	1	20	Coursework 60% - Exam 40%
CSI-6-SIT	Smart Internet Technologies	6	2	20	Coursework 60% - Exam 40%
CSI-6-SCS	Systems and Cyber-security	6	2	20	Coursework 60% - Exam 40%

I. Timetable information

Students can expect to receive a confirmed timetable for study commitments as soon as possible. Students are usually expected to have approximately 1.5 days per week teaching free.

J. Costs and financial support

Course related costs

The course fee does not include the cost of textbooks or personal devices (student laptops). These items are not required for study as alternatives exist (including laptop loan service): All textbooks that are mandatory for study are usually available via the library in a free form (for example as e-books) and the computer labs provide the essential equipment. The costs of field trips are not included, but where a field trip is required for the purpose of study costs will not exceed typical transport costs within the London area.

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

Appendix A: Curriculum Map

This map provides a design aid to help course teams identify where course outcomes are being developed, taught and assessed within the course. It also provides a checklist for quality assurance purposes and may be used in validation, accreditation and external examining processes. Making the learning outcomes explicit will also help students to monitor their own learning and development as the course progresses.

Modules			Course Outcomes															
Level		**cr**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**B4**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
L4	Fundamentals of Computer Science	20	ta	ta	ta	t	ta	t	t			t		ta				
L4	Discrete Mathematics	20	ta	t	ta		t		t	ta		tda		td				
L4	Professional Practice	20	t	t		t	ta	d		tda				d	ta	ta	tda	t
L4	Requirements Analysis and UCD	20	d	tda	td	tda	td	da	tda	tda	td	tda	d	td	da	tda	da	
L4	Fundamentals of Software Development	20	d	ta	tda		ta	d	tda	td	tda	tda		tda	da		da	da
L4	Data Structures and Algorithms	20	d	ta	tda		ta	d	tda	td	tda	tda	t	tda	da		da	da
L5	Operating Systems	20	tda	t	tda	td	d	td	tda			tda	td	tda			ta	
L5	Software Engineering	20	d	tda	td	tda	tda	d	tda	tda	tda	tda	d	tda	tda	tda	d	td
L5	Big Data and Database Systems	20	td	tda	tda	td	tda	d	tda	tda	td	tda	td	td	da	da	d	
L5	Principles of Data Networks	20	ta		ta	t	d	d	tda	d		ta	ta	tda				
L5	Object-Oriented Programming	20	d	tda	tda	td	tda	td	tda	tda	tda	tda		tda	da		da	da
L5	Advanced Programming	20	td	tda	tda	td	tda	td	tda	tda	tda	tda		tda	da		da	da
L6	Computer Science Project	40	da	da	da	tda	tda	tda	da	da	da	tda	d	tda	tda		tda	tda
L6	ICT Project Management in Practice	20	da	da	da	tda	tda	tda	tda	tda	da	da	d	d	tda	tda	tda	tda
L6	Systems and Cyber Security	20	tda	d	d	tda	tda	tda	tda	td	d	tda	tda	tda	da		d	td
L6	Smart Internet Technologies	20	td	d	d	d	td	tda	tda	tda	tda	tda	d	tda	da	da	d	td
L6	AR/VR Technologies	20	td	d	d	d	td	tda	tda	tda	tda	tda	tda	tda	da		d	td
L6	Data Mining and Big Data	20	td	tda	tda	td	tda	tda	tda	tda	tda	tda	tda	tda	da		d	td
L6	Mobile Computing	20	td	tda	tda	td	tda	tda	tda	tda	tda	tda	tda	tda	da		d	td
L6	Artificial Intelligence	20	td	td	tda	d	td	tda	tda	tda	tda	tda	d	tda	da	da	d	td

Numbered columns correspond to numbered learning outcomes under each heading as given in specification document t = taught, d = developed, a = assessed

A. Students will acquire knowledge and understanding of:

1. the foundations and contemporary development of theoretical computer science, computer hardware, computer networks, operating systems and application software
2. requirements analysis and the formal specification of computer systems
3. software development using a variety of software engineering techniques, design notations, development environments and programming languages, data encoding, storage, management and analysis
4. the fundamental issues related to robustness and security in systems, software and networks including consideration of social, ethical and legal issues which affect the development and use of information systems

B. Students will develop their intellectual skills such that they are able to:

1. locate, analyse, evaluate and make effective use of reference material including literature from academic, technical and professional sources to comprehend and critically evaluate theoretical arguments in computer science
2. analyse and predict future developments in computing based upon fundamental principles and evolving trends
3. evaluate, modify and synthesise approaches to software development and systems design
4. collaborate effectively and professionally with technical and non-technical colleagues working to analyse practical problems and propose appropriate and feasible technical solutions

C. Students will acquire and develop practical skills such that they are able to:

1.design, develop, test and document software representative of contemporary programming practices and using professional development tools and techniques
2. analyse and specify requirements for the implementation of a range of computing and information systems including effectively use formal notations and graphical and numerical representations for data, processes and other relevant concepts
3.analyse systems for potential security weaknesses and propose mitigating measures that could be taken
4.comprehend the fundamental principles underpinning computer systems allowing you to estimate limitations and potential future advancements, and facilitating the acquisition of further technical competencies and skills by means of applying these principles to new technologies

D. Students will acquire and develop transferable skills such that they are able to:

1. communicate effectively verbally and in writing
2. work effectively in teams
3. manage time and personal resources effectively
4. sustain self-directed learning to maintain continuing professional development

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	Outcomes focus and professional/employer links All LSBU courses will evidence the involvement of external stakeholders in the curriculum design process as well as plan for the participation of employers and/or alumni through guest lectures or Q&A sessions, employer panels, employer-generated case studies or other input of expertise into the delivery of the course provide students with access to current workplace examples and role models. Students should have access to employers and/or alumni in at least one module at level 4.	The course design has been informed by discussion with industry representatives. It is intended that all final year taught modules should include at least one external speakers. The level 6 module ICT Project Management in Practice has been designed around a consultancy exercise based on a real case study presented by external professionals. The level 4 module Professional Practice has been designed to provide experience and knowledge of all professional issues and will incorporate presentations by external professionals and LSBU alumni.
Embedded learning development	Support for transition and academic preparedness At least two modules at level 4 should include embedded learning development in the curriculum to support student understanding of, and familiarity with, disciplinary ways of thinking and practising (e.g. analytical thinking, academic writing, critical reading, reflection). Where possible, learning development will be normally integrated into content modules rather than as standalone modules. Other level 4 modules should reference and reinforce the learning development to aid in the transfer of learning.	The level 4 module Professional Practice is the key provider of learning development and disciplinary thinking in conjunction with the level 4 module Requirements Analysis and UCD.

High impact pedagogies	<u>Group-based learning experiences</u> The capacity to work effectively in teams enhances learning through working with peers and develops student outcomes, including communication, networking and respect for diversity of perspectives relevant to **professionalism** and **inclusivity**. At least one module at level 4 should include an opportunity for group working. Group-based learning can also be linked to assessment at level 4 if appropriate. Consideration should be given to how students are allocated to groups to foster experience of diverse perspectives and values.	The level 4 module Professional Practice incorporates team and group working exercises, with outputs of these activities included in the assessment. At level 5 the module Software Engineering involves team work as an integral part of its teaching and assessment. The level 6 module ICT Project Management in Practice revolves around a more sophisticated and in-depth team-working exercise.
Inclusive teaching, learning and assessment	<u>Accessible materials, resources and activities</u> All course materials and resources, including course guides, PowerPoint presentations, handouts and 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 course materials and resources will be provided in suitable accessible formats.
Assessment *for* learning	<u>Assessment and feedback to support attainment, progression and retention</u> 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 communicates high expectations and develops a commitment to **excellence**.	All taught modules have formative assessment strategies explicitly described in their descriptors.

High impact pedagogies	<u>Research and enquiry experiences</u> Opportunities for students to undertake small-scale independent enquiry enable students to understand how knowledge is generated and tested in the discipline as well as prepare them to engage in enquiry as a highly sought after outcome of university study. In preparation for an undergraduate dissertation at level 6, courses should provide opportunities for students to develop research skills at level 4 and 5 and should engage with open-ended problems with 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.	At level 4 Professional Practice includes the development of research skills and students create a personal online portfolio of material in the course of the module. At level 5 the module Software Engineering provides students with opportunities for collaborative research activities.
Curricula informed by employer and industry need / Assessment *for* learning	<u>Authentic learning and assessment tasks</u> Live briefs, projects or equivalent authentic workplace learning experiences and/or assessments enable students, for example, to engage with external clients, develop their understanding through situated and experiential learning in real or simulated workplace contexts and deliver outputs to an agreed specification and deadline. Engagement with live briefs creates the opportunity for the development of student outcomes including **excellence**, **professionalism**, **integrity** and **creativity**. A live brief is likely to develop research and enquiry skills and can be linked to assessment if appropriate.	The level 6 module ICT Project Management in Practice explicitly addresses the use of authentic workplace learning experiences, while other modules (particularly at level 6, but to a lesser extent in level 4 and 5) are intended to make use of case studies and examples derived from current events, industry and ongoing developments in the relevant fields.

Inclusive teaching, learning and assessment	<u>Course content and teaching methods acknowledge the diversity of the student cohort</u> 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.	The course team will be encouraged to explore a wide variety of teaching approaches to offer all students as exciting a learning experience as possible and hopefully to allow all to find aspects of the course that allow them to make use of their individual strengths and characters. Non-technical content such as examples and case studies shall be drawn from a global context.
Curricula informed by employer and industry need	<u>Work-based learning</u> Opportunities for learning that is relevant to future employment or undertaken in a workplace setting are fundamental to developing student applied knowledge as well as developing work-relevant student outcomes such as networking, **professionalism** and **integrity**. Work-based learning can take the form of work experience, internships or placements as well as, for example, case studies, simulations and role-play in industry-standards settings as relevant to the course. Work-based learning can be linked to assessment if appropriate.	There is an opportunity for all students to apply for short term internships, which are advertised by the VLE.

Embedded learning development	<u>Writing in the disciplines: Alternative formats</u> 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.	Discipline specific writing techniques are explicitly taught at level 4 in Professional Practice, developed through coursework assignments in modules such as Software Engineering at level 5, and brought to a professional standard in the level 6 project dissertation.
High impact pedagogies	<u>Multi-disciplinary, interdisciplinary or interprofessional group-based learning experiences</u> Building on experience of group working at level 4, at level 5 students should be provided with the opportunity to work and manage more complex tasks in groups that work across traditional disciplinary and professional boundaries and reflecting interprofessional work-place settings. Learning in multi- or interdisciplinary groups creates the opportunity for the development of student outcomes including **inclusivity**, communication and networking.	The level 6 taught module ICT Project Management in Practice has been designed in collaboration with the Division of Law and involves the active participation of academics and cooperation with students from a separate discipline.

Assessment *for* learning	<u>Variation of assessment</u> An inclusive approach to curriculum recognises diversity and seeks to create a learning environment that enables equal opportunities for learning for all students and does not give those with a particular prior qualification (e.g. A-level or BTEC) an advantage or disadvantage. An 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.	A wide range of diverse assessment types is used throughout the course to offer students opportunities to effectively apply their individual talents.
Curricula informed by employer and industry need	<u>Career management skills</u> Courses should provide support for the development of career management skills that enable student to be familiar with and understand relevant industries or professions, be able to build on work-related learning opportunities, understand the role of self-appraisal and planning for lifelong learning in career development, develop resilience and manage the career building process. This should be designed to inform the development of **excellence** and **professionalism**.	The level 6 module ICT Project Management in Practice provides a forum for career related discussion. Reflection is an assessed component of many modules throughout the course and is an integral component of the final year dissertation.
Curricula informed by employer and industry need / Assessment *for* learning / High impact pedagogies	<u>Capstone project/dissertation</u> The level 6 project or dissertation is a critical point for the integration and synthesis of knowledge and skills from across the course. It also provides an important transition into employment if the assessment is authentic, industry-facing or 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 final year project has been designed as a capstone module that allows students to synthesise and apply all they have learnt in the module. The project has been designed with the recognition of the British Computer Society explicitly in mind and thus represents an undertaking relevant to future employment prospects (for example as something students can describe to potential employers in depth to illustrate their expertise).

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.	A personal tutor will be assigned to each student from among the academic staff teaching on the level 4 modules.	The personal tutor assigned at level 4 will continue to support students in their personal development.	Project supervisor take over personal tutoring role.
2 Supporting the development and recognition of skills in academic modules/modules.	All modules	All modules	
3 Supporting the development and recognition of skills through purpose designed modules/modules.	Professional Practice		ICT Project Management in Practice
4 Supporting the development and recognition of skills through research projects and dissertations work.			Project
5 Supporting the development and recognition of career management skills.	Professional Practice		ICT Project Management in Practice
6 Supporting the development and recognition of career management skills through work placements or work experience.		BSc Sandwich Placement; various shorter placements and internships	
7 Supporting the development of skills by recognising that they can be developed through extra curricula activities.	Extra-curricula and capstone events	Extra-curricula and capstone events	Extra-curricula and capstone events
8 Supporting the development of the skills and attitudes as a basis for continuing professional development.	Professional Practice		ICT Project Management in Practice
9 Other approaches to 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.	Electronic learning log in Business and Professional Issues		Project log book

Students will be allocated a personal tutor, usually from among the full time academic staff teaching on the level 4 modules. This arrangement allows tutors and tutees to establish a relationship through regular contact in addition to formal individual meetings. As far as is operationally practical, students will retain the same personal tutor through their level 5 studies. This provides a continuity that allows tutors to develop a better understanding of their tutees and students to recognise that they have a consistent level of support. While students may or may not have contact with their personal tutors in teaching activities a series of individual meetings will be employed to maintain the relationship. At level 6 the student will be studying a full-year project and is required to have frequent regular meetings with their assigned supervisor. As PDP is a significant component of the project module, it will be intrinsically involved in the development of their work and in the discussions they have with their supervisors. Thus it is most appropriate for the supervisor to fulfil the PDP functions of the personal tutor role at level 6.

The following table shows how PDP is being applied in the BSc (Hons) Computer Science Top-up degree course.

Approach to PDP	Level 5 and 6
1 Supporting the development and recognition of skills through the personal tutor system.	The course director provides the personal tutoring role.
2 Supporting the development and recognition of skills in academic modules/units.	
3 Supporting the development and recognition of skills through purpose designed modules/units.	ICT Project Management in Practice
4 Supporting the development and recognition of skills through research projects and dissertations work.	Computer Science Project
5 Supporting the development and recognition of career management skills.	ICT Project Management in Practice
6 Supporting the development and recognition of career management skills through work placements or work experience.	
7 Supporting the development of skills by recognising that they can be developed through extra curricula activities.	Extra-curricula and “capstone” events .
8 Supporting the development of the skills and attitudes as a basis for continuing professional development.	ICT Project Management in Practice
9 Other approaches to 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.	Computer Science Project log book

The course director will act as personal tutor to all students. In the full-time degree course, project supervisors provide this, but the top-up students carry out their projects over the summer so the same arrangement is not applicable here.

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 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
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 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
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