EST 1892 LSBU

Course Specification

<table>
<tr><th colspan="4">A. Course Information</th></tr>
<tr><td>Final award title(s)</td><td colspan="3">MSc Applied Artificial Intelligence</td></tr>
<tr><td>Intermediate exit award title(s)</td><td colspan="3">Pg Dip Applied AI
Pg Cert Applied AI</td></tr>
<tr><td>UCAS Code</td><td></td><td>Course Code(s)</td><td>FT – 5794
FT Jan – 5795
PT – 5796</td></tr>
<tr><td>Awarding Institution</td><td colspan="3">London South Bank University</td></tr>
<tr><td>School</td><td colspan="3">☐ ASC ☐ ACI ☐ BEA ☐ BUS ☒ ENG ☐ HSC ☐ LSS</td></tr>
<tr><td>Division</td><td colspan="3">Computer Science and Informatics</td></tr>
<tr><td>Course Director</td><td colspan="3">Enrico Grisan</td></tr>
<tr><td>Delivery site(s) for course(s)</td><td colspan="3">☒ Southwark ☐ Havering ☐ Croydon
☐ Other: (please specify)</td></tr>
<tr><td>Mode(s) of delivery</td><td colspan="3">☒Full time ☒Part time ☐Other (please specify)</td></tr>
<tr><td>Length of course/start and finish dates</td><td colspan="3"><table><tr><th>Mode</th><th>Length years</th><th>Start - month</th><th>Finish - month</th></tr><tr><td>Full time</td><td>1</td><td>September</td><td>August</td></tr><tr><td>Full time</td><td>1.5</td><td>January</td><td>June</td></tr><tr><td>Part time (2 year)</td><td>2</td><td>September</td><td>August</td></tr></table></td></tr>
<tr><td>Is this course suitable for a Visa Sponsored Student?</td><td colspan="3">☒ Yes ☐ No</td></tr>
<tr><td rowspan="3">Approval dates:</td><td colspan="2">Course validation date</td><td>November 2021</td></tr>
<tr><td colspan="2">Course Review date</td><td>November 2026</td></tr>
<tr><td colspan="2">Course specification last updated and signed off</td><td>September 2022</td></tr>
<tr><td>Professional, Statutory & Regulatory Body accreditation</td><td colspan="3">BCS accreditation: Initial Partial CITP accreditation (July 2022)

The course aims to map onto the “Guidelines on course accreditation, Information for universities and colleges BCS, January 2020”: Section 2.4 and Appendix III (available at https://www.bcs.org/media/1209/accreditation-guidelines.pdf) and on the “Machine learning MSc conversion programmes” by BCS, October 2019 sec. 5 (available at https://www.officeforstudents.org.uk/media/05d13d4f-3267-4c94-8c57-6e033f281a18/machine-learning-msc-conversion-programmes-bcs.pdf)

Direct mapping of BCS requirements and expected outcomes are located in the course aims and learning outcomes</td></tr>
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	The curriculum map for the MSc (conversion) Applied AI, mapping each module to the BCS requirements is reported in the appendix A	
Link to Institute of Apprenticeship (IoA) Standard and Assessment Plan (Apprenticeship only)	N/A	
Reference points:	Internal	Corporate Strategy 2020-2025 Academic Quality and Enhancement Website School Strategy LSBU Academic Regulations
	External	QAA The UK Quality Code for Higher Education 2018 Framework for Higher Education Qualifications FHEQ Outcome Classification Descriptions for Level 6 Subject Benchmark Statements (Dated) OfS Guidance PSRBs SEEC Level Descriptors 2021 Competitions and Markets Authority Institute for Apprenticeships and Technical Education EQA Framework (Apprenticeships only) BCS Guidelines for Accreditation [2020] IET Guidance for meeting AHEP learning outcomes [2015]

B. Course Aims and Features

Distinctive features of course	• Uniquely designed for students without prior higher education in STEM disciplines, wishing to re-skill or up-skill in pursuing of a career in the artificial intelligence fields. • Develops theoretical background and practical hands-on experience in artificial intelligence and machine learning using industry standard tools. Addresses the latest research and AI applications, including natural language processing, industry 4.0, computer vision, data quality management, and data mining.
Course Aims	The MSc in Applied AI aims to: 1. Provide you with a comprehensive understanding of the theory and methods of statistical and mathematical modelling needed to shape an artificial intelligence solution to help decision making or support an organisation's business (BCS ML conversion 5a-5d, *BCS requirements: 2.4.2 and 2.4.3*) 2. Provide you with the awareness that data can be biased and with the skills and modelling techniques that help minimise misunderstanding or misuse of data. (BCS ML conversion 5b, 5e, 5h, *BCS requirements: 2.4.2 and 2.4.3*) 3. Provide you with employer focussed skills required in an artificial intelligence role to identify organisational requirements, checking understanding and testing models and solutions as they are being developed, and to to contribute as part of a team to use state of the art Machine Learning and Artificial intelligence solutions to understand and enhance a business

	and its operation (BCS ML conversion 5f-5j, and *BCS requirements: 2.4.1 and 2.4.3*) 4. Provide you with the technical knowledge and understanding to carry out a critically evaluative review of current artificial intelligence literature/software/process developments, and research, to select and specify tools/techniques for a particular purpose, referring also to supporting disciplines *(covers BCS requirements: 2.4.1 and 2.4.2)* *5.* Develop your ability to recognise and be able to respond in an appropriate way to opportunities for innovation in Artificial Intelligence, as well as participating effectively in technology review and peer review processes. *(covers BCS requirements: 2.4.1 and 2.4.2)* *6.* Work as a member of a development team recognising the different roles within a team and different ways of organising teams while applying the principles of appropriate supporting disciplines for: investigating and defining a problem, identifying constraints, understanding customer/user needs, identifying and managing cost drivers, ensuring fitness for purpose and managing the design process, finally critically evaluating outcomes. *(covers BCS requirements: 2.4.1)*
Course Learning Outcomes	**a) Students will have knowledge and understanding of:** **A1** Demonstrating a systematic understanding of the domain of Artificial Intelligence, including issues at the forefront of professional practice in the discipline; it also includes a critical/evaluative understanding of the role of these areas/issues in developing bespoke AI solutions. *(covers* BCS ML conversion 5a-5d *, BCS requirements: 2.4.2: 2.4.3)* **A2** Importance of methodologies (both current and emerging) for Artificial Intelligence, and analytic processes, a through and critical understanding of the subject literature/research, driving innovation and contributing to the knowledge in the domain. *(covers BCS requirements: 2.4.2, 2.4.3)* **A3** Consistently produce work which applies and is informed by research at the forefront of the developments in the domain of Artificial Intelligence, demonstrating a critical evaluation of aspects of the domain *(covers BCS requirements: 2.4.2, 2.4.3)* **A4** The study, development and management of Artificial Intelligence projects including: timescales, risk identification/management, cost and quality constraints, as well as ethics, data security, working within professional frameworks and social/legal constraints. The project solution will demonstrate *an in-depth investigation of the context and literature,* originality in the application of knowledge, a sound justification for the approach adopted as well as a *critical appraisal of the project, indicating the rationale for any design/implementation decisions and the lessons learnt*. The project will also demonstrate the ability of the student to act autonomously in planning and implementing tasks at a professional or equivalent *(covers BCS requirements: 2.4.3, 2.5)* Teaching and learning strategy: Achievement of the learning outcomes is normally through exposition, demonstration, and practical work, the latter being divided between tutorials and assignments. Module co-ordinators provide material via the VLE and are encouraged to explore the use of innovative on-line technologies that provide enhanced e-learning and assessment

environments. Lectures will be used to introduce and provide new information and update existing knowledge while seminars and tutorials allow smaller group exercises, discussion of ideas amongst students and researchers, developing a research informed culture.

Assessment:
Assessment methods are specified in each module guide and cover the module and course learning outcomes. Content, knowledge and understanding is assessed through unseen written examinations, presentations and coursework. The course lays a strong emphasis on the synthesis of practical expression & theoretical technical knowledge. For this reason, the dominant form of assessment used is coursework rather than examination.

b) Students will develop their intellectual skills such that they are able to:

B1 Conduct a critically evaluative analysis of a case-based domain using appropriate analytic and quantitative methods *(covers BCS requirements: 2.4.2, 2.4.3)*

B2 Develop the in-depth knowledge necessary to apply the principles and practices of the discipline in tackling a significant technical problem;. *(covers BCS requirements: 2.4.2, 2.4.3)*

B3 act autonomously in planning and implementing tasks at a professional or equivalent, and in conducting effective independent research *(covers BCS requirements: 2.4.2, 2.4.3, 2.4.5)*

Teaching and learning strategy:
Acquisition of the course intellectual outcomes is normally through a range of tutorial and seminar work and assignments, including use of literature searches and comparisons, case studies, and projects. Students can expect, as part of the teaching and learning strategy, to be pro-active participants in the development of intellectual skills through discussion and peer presentation, and subject reporting

Assessment:
Intellectual skills are typically assessed through coursework/ examinations and the final masters project

c) Students will acquire and develop practical skills such that they are able to:

C1 Be able to make concise, engaging and well-structured oral presentations, arguments and explanations *(covers BCS requirements: 2.4.2, 2.4.3)*

C2 Develop the knowledge necessary to identify Artificial Intelligence project domains and apply suitable techniques in order to synthesize advanced (theory/practical) concepts to design, develop, deploy, and maintain bespoke/innovative AI solutions. *(covers BCS requirements: 2.4.2, 2.4.3)*

C3 Communication /Presentation of advanced Artificial Intelligence projects and concepts to a wide range of audiences. *(covers BCS requirements: 2.4.2, 2.4.3, 2.5)*

C4 Be able to construct and manage a project applying appropriate technology, techniques, life-cycle/methodology *(covers BCS requirements: 2.4.2, 2.4.3, 2.5)*

Teaching and learning strategy:

	Practical skills are normally developed through practical coursework, frequently in groups, skill- based sessions, case studies and problem-solving approaches. Assessment: Typically assessed via a variety of coursework types (although examination may be used where appropriate). The typical coursework types include: reports, software engineering tasks, in-class tests, blogs and presentations. The exact allocation of assessment types and weightings depending on the subject content and the learning outcomes. **d) Students will acquire and develop transferrable skills such that they are able to:** **D1** Be creative/innovative, self-motivated and self-aware with the ability to review the literature, current developments/software/processes reflecting critically on successes and failures *(covers BCS requirements: 2.4.1)* **D2** Recognise and be able to respond in an appropriate way to opportunities for innovation, as well as participating effectively in technology review and peer review processes *(covers BCS requirements: 2.4.1)* **D3** Specify, design, deploy, verify and maintain Artificial Intelligence solutions, including working with technical uncertainty, undertaking risk management associated with a range of activities. *(covers BCS requirements: 2.4.1)* **D4** Recognise the different roles within an Artificial Intelligence team and different ways of organising teams while applying the principles of appropriate supporting disciplines for: investigating and defining a problem, identifying constraints, understanding customer/user needs, identifying and managing cost drivers, ensuring fitness for purpose and managing the design process, finally critically evaluating outcomes. *(covers BCS requirements: 2.4.1)* Teaching and learning strategy: Acquisition of transferrable skills is encouraged throughout the course, via, seminar and tutorials, formative assessments, e-learning, group projects, open discussions and personal tutoring. Assessment: a) Assessment is usually through coursework/exams and through the master's project.

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/research based applications and utilising real-world examples will be used wherever possible.

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

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 7, there are 52 direct contact hours and 148 independent study hours
- Project module has 10 direct contact hours and 590 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, Microsoft Imagine, etc. 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 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

Majority of academics have standing with a professional body (e.g. BCS, IEEE), 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

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).

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.

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 50% 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.

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

Intermediate exit awards

Students who successfully complete a single semester will be offered a PG Cert. in Applied AI

Students who successfully complete two semesters but do not submit and defend their dissertation will be offered a PG Dip. in Applied AI

E. Academic Regulations

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

F. Entry Requirements

- 2:2 UK honours first degree or international equivalent in any subject, a GCSE Grade 4 in Mathematics or equivalent, a GCSE Grade 4 in English or equivalent
- We recognise that many people have a wealth of valuable skills and knowledge they've developed at work or through training. If candidates have the potential to succeed in postgraduate or post-experience studies we'll consider their application on its individual merit. Applications may be considered where candidates demonstrate a combination of educational qualifications and work experience.
- We welcome qualifications from around the world. English language qualifications for international students: IELTS score of 6.5.
- After admission, perspective students can apply for the accreditation of prior experiential learning (APEL), following the approved School of Engineering procedure.

G. Course Structure(s)

Course overview

All full time and part time courses are organized into two semesters, each lasting 15 weeks.
Semester one starts in September, Semester 2 in January and Semester 3 in June.
The standard 'building block' of all course delivery are modules All module size across the course is 20 credits; with the exception of the Dissertation project, which is a triple module worth 60 credits, and two module that zero credits (non-credit-bearing) *Research Methods* and *Ethics in AI and Seminars*
The content delivery of the modules running in the first semester will be carefully coordinated, so that the students will be exposed to the necessary prerequisites from "*Foundations of calculus, statistics and optimization*" and "*Python for AI and Visualization*" when they will be needed in "*Machine learning*" and "*Deep learning*". Additionally, the module timetables will be arranged so to provide a bulk teaching load of "*Foundations of calculus, statistics and optimization*" and "*Python for AI and Visualization*" in the initial weeks of the semester.

In order to accommodate both September and January starters, the modules "*Foundations of calculus, statistics and optimization*" and "*Python for AI and Visualization*" will be taught bot in the first and second semester.

(Applied Artificial Intelligence) – **Full time**

MSc Applied AI (FT) Level 7 **September starters**	**Semester 1 and Semester 2**	**Semester 1 (Autumn)**	**Semester 2 (Spring)**	
	Ethics in AI and seminars	Foundations of calculus, statistics and optimization	Elective module 1	
		Python for AI and Visualization	Elective module 2	
		Machine Learning	Research methods	
		Deep Learning	Dissertation	
			Elective Modules	
			Data Mining and Analysis	
			Natural Language Processin	
			Industrial Cyber-Physical Sy	
			Computer vision	

MSc Applied AI (FT) Level 7 **January starters**	**Semester 1 and Semester 2**	**Semester 1 (Spring)**	**Semester 2 (Autumn)**	**Semester 3 (Spring)**	
	Ethics in AI and seminars	Foundations of calculus, statistics and optimization	Machine Learning	Dissertation	
		Python for AI and Visualization	Deep Learning		
		Research methods	Elective module 2		
		Elective module 1			
		Elective Modules	**Elective Modules**		
		Computer vision	Natural Language Processing		
		Natural Language Processing	Future Internet Technologies		
		Industrial Cyber-Physical Systems	Robotics		

(Applied Artificial Intelligence) – **Part time**

MSc Applied AI (PT) Level 7 **September starters**	**Semester 1 and Semester 2**	**Semester 1 (Autumn)**	**Semester 2 (Spring)**	**Semester 1 (Autumn)**	**Semester 2 (Spring)**
	Ethics in AI and seminars	Foundations of calculus, statistics and optimization	Python for AI and Visualization	Deep Learning	Research methods
		Machine Learning	Elective module 1	Elective module 2	Dissertation
			Elective Modules	**Elective Modules**	
			Natural Language Processing	Data Mining and Analysis	
			Future Internet Technologies	Future Internet Technologies	
			Robotics	Industrial Cyber-Physical Systems	
				Computer vision	

H. Course Modules

Reference Code	Modules	Semester	Compulsory/Elective	Level	Credit Value	Assessment
CSI_7_FCS	Foundations of calculus, statistics and optimization	1 and 2	C	7	20	Homework+ Examination
CSI_7_PPA	Python Programming for AI and Visualization	1 and 2	C	7	20	Coursework
CSI_7_DEL	Deep Learning	1	C	7	20	Coursework

CSI_7_MAL	**Machine Learning**	**1**	**C**	**7**	**20**	**Coursework**
CSI_7_DAT	**Data Management**	**1**	**E**	**7**	**20**	**Coursework**
CSI_7_DMA	**Data Mining and Analysis**	**2**	**E**	**7**	**20**	**Coursework+ Examination**
CSI_7_NLP	**Natural Language Processing**	**2**	**E**	**7**	**20**	**Coursework**
CSI_7_ICS	**Industrial Cyber-Physical Systems**	**2**	**E**	**7**	**20**	**Coursework**
CSI_7_CVP	**Computer Vision and Pattern Recognition**	**2**	**E**	**7**	**20**	**Coursework**
CSI_7_FIT	**Future Internet Technologies**	**1**	**E**	**7**	**20**	**Coursework**
EEE_7_ROB	**Robotics**	**1**	**E**	**7**	**20**	**Coursework+ Examination**
CSI_7_EAI	**Ethics in AI and Seminars**	**1 - 2**	**C**	**7**	**0**	**Coursework (pass/fail)**
CSI_7_RME	**Research Methods**	**2**	**C**	**7**	**0**	**Coursework (pass/fail)**
CSI_7_PRO	**Dissertation**	**2**	**C**	**7**	**60**	**Report+ Viva**

I. Timetable Information

- Timetables will be made available via the university VLE.
  Full Time students will usually be expected to be timetabled for 2-3 days per week
  Part-Time students will usually be expected to be timetabled for 1-2 days per week

J. Costs and Financial Support

Course related costs

The course fee does not include the cost of text books or personal devices (student laptops). These items are not required for study as alternatives exist: All text books 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

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.

As the course has received in July 2022 initial partial Chartered IT Professional (CITP) accreditation by the British Computer Society, the Chartered Institute for Information Technology, we have created curriculum maps using:
"BCS Guidelines on course accreditation, Information for universities and colleges, January 2020" , available at: https://www.bcs.org/media/1209/accreditation-guidelines.pdf

In addition to the curriculum map for the MSc Applied AI, mapping each module to the course outcome, a curriculum map for each module to the BCS is provided, with the key legenda in the following text box.

KEY to tabulated values:	T=Taught	D=Developed	A=Assessed
	TS = Transferrable skills CA = Cognitive Abilities PA = Practical Abilities PR = Project Requirements		

Modules																	
Level	**Title**	**Code**	**A1**	**A2**	**A3**	**A4**	**B1**	**B2**	**B3**	**C1**	**C2**	**C3**	**C4**	**D1**	**D2**	**D3**	**D4**
7	Foundations of calculus, statistics and optimization	CSI_7_FCS		TDA			TDA	TDA	DA	DA			DA	DA	D		TDA
7	Python Programming for AI and Visualization	CSI_7_PPA		TDA			TDA	TDA	DA	DA			DA	DA	D		TDA
7	Deep Learning	CSI_7_DEL	TDA	TDA	DA	D	TDA	TDA	DA	DA	TDA	D	DA	TDA	DA	TDA	TDA
7	Machine Learning	CSI_7_MAL	TDA	TDA	DA	D	TDA	TDA	DA	DA	TDA	D	DA	TDA	DA	TDA	TDA
7	Data Management	CSI_7_DAT	TDA	TDA	D	D	TDA	TDA	DA	DA	D	D	DA	TDA	DA		TDA
7	Data Mining and Analysis	CSI_7_DMA	TDA	TDA	D	D	TDA	TDA	DA	DA	D	D	DA	TDA	DA		TDA
7	Natural Language Processing	CSI_7_NLP	TDA	TDA	TDA	TDA	TDA	TDA	DA	DA	TDA	D	DA	TDA	DA	TDA	TDA
7	Industrial Cyber-Physical Systems	CSI_7_ICS	TDA	TDA	TDA	TDA	TDA	TDA	DA	DA	TDA	D	DA	TDA	DA	TDA	TDA
7	Future Internet Technologies	CSI_7_FIT		TDA	D	D	TDA	TDA	DA	DA	D	D	DA	TDA	DA	TDA	TDA
7	Computer Vision and Pattern Recognition	CSI_7_CVP	TDA	TDA	TDA	TDA	TDA	TDA	DA	DA	TDA	D	DA	TDA	DA	TDA	TDA
7	Robotics	EEE_7_ROB	TDA	TDA	D	D	TDA	TDA	DA	DA	D	D	DA	TDA	DA	TDA	TDA
7	Ethics in AI and Seminars	CSI_7_EAI	TDA	TDA	TDA	TDA				DA	DA			TDA	TDA	TDA	TDA
7	Research Methods	CSI_7_RME	TDA	TDA	TDA	TDA		DA	DA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA
7	Dissertation	CSI_7_PRO	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA

			Level 7 modules	Foundations of calculus, statistics and optimization	Python for AI and Visualization	Deep Learning	Machine Learning	Data Management	Data Mining and Analysis	Natural Language Processing	Industrial Cyber-Physical Systems	Computer Vision and Pattern Recognition	Future Internet Technologies	Robotics	Ethics in AI and Seminars	Research Methods	Dissertation				
2.4.1 Core requirements for accreditation of specialist masters programmes																					
a	Carry out a critical review of the literature, current developments and available software as well as the associated software processes	TS	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
b	Support the development of the self-directed learner who can set goals and select appropriate knowledge, skills, etc. as well as supporting tools for a particular purpose	TS	DA	DA	DA	DA	DA	DA	DA	DA	DA	DA		DA	DA	DA					
c	Recognise and be able to respond in an appropriate way to opportunities for innovation	TS	DA	DA	TDA	TDA	DA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
d	Participate effectively in the peer review process	TS	DA	DA	TDA	DA	DA	DA	TDA	TDA	TDA	TDA		DA	TDA	DA					
e	Undertake risk management associated with a range of activities	TS	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
f	Use appropriate processes to specify, design, deploy, verify and maintain computer-based systems, including working with technical uncertainty	TS	DA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
g	Investigate and define a problem, identify constraints, understand customer and user needs, identify and manage cost drivers, ensure fitness for purpose and manage the design process and evaluate outcomes	TS	TDA	TDA	TDA	TD	TD	TD	TDA	TDA	TDA	TDA		TD	TDA	DA					
h	Apply the principles of appropriate supporting disciplines	TS	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
i	An ability to work as a member of a development team recognising the different roles within a team and different ways of organising teams	TS	TDA	TDA	TDA	TD	TD	TD	TDA	TDA	TDA	TDA		TD	TDA	DA					
2.4.2 Specialist masters additional requirements for CITP																					
a	demonstrate a systematic understanding of the knowledge of the domain of their programme of study, with depth being achieved in particular areas. This should include the foundations of the discipline and/or issues at the forefront of professional practice in the discipline; it should also include an understanding of the role of these in contributing to the effective design, implementation	CA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
b	demonstrate a comprehensive understanding of the essential principles and practices of the domain of the programme of study including current standards, processes, principles of quality and the most appropriate software support; the reasons for their relevance to the discipline and/or professional practice in the discipline; and an ability to apply these	CA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
d	understand and be able to participate within the legal, social, ethical and professional framework within which they would have to operate as professionals in their area of study	CA	TD	TD	TD	TD	TD	TD	TD	TDA	TD	TDA		TDA	TDA	DA					
c	consistently produce work which applies and is informed by research at the forefront of the developments in the domain of the programme of study; this should demonstrate critical evaluation of aspects of the domain	PA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
e	demonstrate the ability to apply the principles and practices of the discipline in tackling a significant technical problem; the solution should demonstrate a sound justification for the approach adopted as well as a self-critical evaluation of effectiveness but also a sense of vision about the direction of developments in aspects of the discipline	PA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
2.4.3 Specialist masters additional requirements for CEng																					
a	a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights in the development and implementation of systems, much of which is at, or informed by, the forefront of their field of study	CA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
b	a comprehensive understanding of the state-of-the-art techniques and methodologies for developing systems	CA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
c	understand and be able to participate within the legal, social, ethical and professional framework as professionals in systems, software or information engineering	CA	TD	TD	TD	TD	TD	TD	TD	TDA	TD	TDA		TDA	TDA	DA					
d	develop and apply new technologies	PA	D	D	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	DA	DA					
e	show originality and innovation in the application of knowledge and techniques for developing systems	PA	DA	DA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	DA	DA					
f	make general evaluations of commercial risk through some understanding of the basis of such risks	PA	D	D	TD	TD	TD	TDA	TDA	TD	TD	TDA		TD	TDA	DA					
2.5 Projects																					
a	Students must be provided with written guidance on all aspects of the project, including selection, conduct, supervision, milestones, format of the report and the criteria for assessment.	PR	D	D	D	D	D	D	D	D	D	D		D	TDA	TDA					
b	projects should reflect the aims and learning outcomes which characterise the programme to which they contribute as set out in the programme specification	PR	D	D	D	D	D	D	D	D	D	D		D	TDA	TDA					
Project reports																					
c	elucidation of the problem and the objectives of the project	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
d	an in-depth investigation of the context and literature, and where appropriate, other similar products (this section is likely to be emphasised less for an IEng project)	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
e	where appropriate, a clear description of the stages of the life cycle undertaken	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
f	where appropriate, a description of how verification and validation were applied at these stages	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
g	where appropriate, a description of the use of tools to support the development process	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
h	a critical appraisal of the project, indicating the rationale for any design/implementation decisions, lessons learnt during the course of the project, and evaluation (with hindsight) of the project outcome and the process of its production (including a review of the plan and any deviations from it)	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
i	a description of any research hypothesis	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
j	in the event that the individual work is part of a group enterprise, a clear indication of the part played by the author in achieving the goals of the project and its effectiveness	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
k	references	PR	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
Postgraduate project requirements																					
l	a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of the specialist academic discipline	PR	DA	DA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
m	a comprehensive understanding of techniques applicable to their own research or advanced scholarship	PR	DA	DA	DA	DA	DA	DA	TDA	DA	DA	TDA		DA	TDA	DA					
n	originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline	PR	DA	DA	DA	DA	DA	DA	TDA	DA	DA	TDA		DA	TDA	DA					
o	deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences	PR	DA	DA	TDA	TDA	TDA	TDA	TDA	TDA	TDA	TDA		TDA	TDA	DA					
p	demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level	PR	DA	DA	DA	DA	DA	DA	TDA	DA	DA	TDA		DA	TDA	DA					
q	critical self-evaluation of the process	PR	DA	DA	DA	DA	DA	DA	TDA	DA	DA	TDA		DA	TDA	DA					

Appendix B: Personal Development Planning (<u>For Postgraduate Courses Only</u>)

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.	The course director as the student's Personal Tutor meets the student in the first few weeks of the course to identify the skill set needed for development and provide guidance throughout the course of studies.
2 Supporting the development and recognition of skills in academic modules/units.	All modules support the development and recognition of skills, in particular transferrable skills, through seminar/tutorials and assessments.
3 Supporting the development and recognition of skills through purpose designed modules/units.	All modules are designed to support the development and recognition of both practical and transferrable skills and address employability. These are stated in the individual module descriptors/guides.
4 Supporting the development and recognition of skills through research projects and dissertations work.	The Research Methods module will equip students with research methods and skills to undertake the L7 project. Having progressed to the dissertation, students will be supported and guided by their project supervisor in developing and recognising the skill sets in the areas of their projects and future career development.
5 Supporting the development and recognition of career management skills.	The Career Management Talks each semester provide students with information of the Informatics labour market and systematic support on skill development such as CV writing skills and job interviews.
6 Supporting the development and recognition of career management skills through work placements or work experience.	The Programme has dedicated Moodle site where job and placement opportunities will be posted. Further, staff at the Employability and Skills office located within the Student Centre offer information, advice and guidance on job search and career management skills. Students are encouraged to use various employability facilities such as the Job Shop and Career Gym to look for job opportunities and to enhance their employability skills.
7 Supporting the development of skills by recognising that they can be developed through extra curricula activities.	Students are encouraged to attend seminar and workshops provided by the Employability Services. Various events have recently been provided such as Career Capital Clubs, Mock Interview week and Volunteering drop-in session. Students are also encouraged to join the British Computer Society to keep abreast of current development and practices.
8 Supporting the development of the skills and attitudes as a basis for continuing professional development.	This will be covered in the Research Methods module. Support will also be given by the course director and the project supervisor. The Division also provide a series of master's classes as part of students' professional development.
9 Other approaches to personal development planning.	The Orientation Programme normally includes a session on employability and learning resources offered by the Learning Resources Centre (LRC). An integrative assignment may be designed to address teamwork, project and other skills through a case study that reflects current practices.
10 The means by which self-reflection, evaluation and planned development is supported e.g. electronic or paper-based learning log or diary.	Students are also encouraged to keep a learning journal, both on paper and electronically, to reflect on their learning experience. In many modules this forms part of the assessment regime.

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 C: Terminology

Some examples are listed below:

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
elective module	a module that students can choose to take
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
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
lecture	a presentation or talk on a particular topic; in general lectures involve larger groups of students than seminars and tutorials
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
performance (examinations)	a type of examination used in performance- based subjects such as drama and music
pre-registration (HSC only)	a pre-registration course is designed for students who are not already registered with an independent regulator such as the Nursing and Midwifery Council (NMC)
professional body	an organisation that oversees the activities of a particular profession and represents the interests of its members
prospective student	those applying or considering applying for any programme, at any level and employing any mode of study, with a higher education provider

regulated course	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
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