Template C4

Kingston University London

Programme Specification

Title of Course: *BSc (Hons) Computer Science and Artificial Intelligence*

Date first produced	24/01/2023
Date last revised	19/09/2024
Date of implementation of current version	01/09/2024
Version number	8
Faculty	Faculty of Engineering, Computing and the Environment
School	School of Computer Science and Mathematics
Department	Department of Computer Science
Delivery Institution	

This Programme Specification is designed for prospective students, current students, academic staff and employers. It provides a concise summary of the main features of the programme and the intended learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if they take full advantage of the learning opportunities that are provided. More detailed information on the learning outcomes and content of each modules can be found in the course VLE site and in individual Module Descriptors.

SECTION 1: GENERAL INFORMATION

Award(s) and Title(s): ***Up to 10 pathways***	BSc (Hons) Computer Science and Artificial Intelligence
Intermediate Awards(s) and Title(s): ***There are 4 Intermediate awards for each pathway***	Cert HE Computer Science and Artificial Intelligence Dip HE Computer Science and Artificial Intelligence
Course Code ***For each pathway and mode of delivery***	UPCSA1CSA20 UFCSA1CSA20
UCAS code ***For each pathway***	

RQF Level for the Final Award:	
Awarding Institution:	Kingston University
Teaching Institution:	
Location:	Penrhyn Road
Language of Delivery:	English
Modes of Delivery:	Full-time Part-time With Professional Placement
Available as:	Full field
Minimum period of registration:	Full-time - 3 Part-time - 6 With Professional Placement - 4
Maximum period of registration:	Full-time - 6 Part-time - 12 With Professional Placement - 8
Entry Requirements:	The minimum entry qualifications for the programme are: From A levels: 112 points (“BBC”) excluding General Studies BTEC National: 112 points (DMM) Access Diploma: 60 credits overall, at least 45 at level 3 Plus: GCSE Mathematics grade 6 GCSE En
Programme Accredited by:	N/A
QAA Subject Benchmark Statements:	The programme outcomes are referenced to the QAA subject benchmarks for Computing (2022) and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2019),
Approved Variants:	CI6600 cannot be compensated (IET/BCS). Compensation of at most 30 credits only (IET/BCS)

Is this Higher or Degree Apprenticeship course?	

For Higher or Degree Apprenticeship proposals only	
Higher or Degree Apprenticeship standard:	N/A
Recruitment, Selection and Admission process:	Entry Requirements: The minimum entry qualifications for the programme are: From A levels: 112 points (“BBC”) excluding General Studies BTEC National: 112 points (DMM) Access Diploma: 60 credits overall, at least 45 at level 3 Plus: GCSE Mathematics grade 6 GCSE English grade 4 A minimum overall IELTS score of 6.0 with a minimum of 5.5 each element, iBT TOEFL 80 with R at 20, L at 19, S at 21 and W at 20, or equivalent is required for those for whom English is not their first language. Entry is normally at Level 4 with A-level or equivalent qualifications (See section D). Transfer from a similar course is possible at Level 5 with passes in comparable Level 4 modules – but is at the discretion of the course team. Intake is normally in September. The Admissions Tutor and Course Leader will consider a range of alternative qualifications or experience that is equivalent to the typical offer.
End Point Assessment Organisation(s):	N/A

SECTION 2: THE COURSE

A. Aims of the Course

The over-arching aim of the Computer Science and Artificial Intelligence (AI) course is to produce highly trained graduates with specialist technical knowledge in the mathematical and computational science aspects of applied AI, capable of solving real world problems with understanding of the wider socio-technical implications. Specifically, the aims are to produce graduates who:

- are equipped to meet the academic, professional, and practical requirements for membership of appropriate professional bodies such as the British Computer Society
- possess the appropriate ability and inclination, and are equipped, to undertake advanced studies and/or research and development in the computing, applied AI, and information systems disciplines
- can apply their knowledge and skills in the commercial, economic, and other contexts in which information and computer-based systems are developed with aspects of AI
- have an inquisitive and reflective attitude when modelling systems or data and understands the functional, information security and qualitative properties of systems and AI models
- understand and can articulate the legal, social, ethical, professional, cultural, and public aspects of problems and solutions in computing and AI
- have the capacity to acquire new knowledge and skills independently and to reflect on trends in the broad domain of computing and AI
- can seek, use, and communicate relevant information effectively in oral, visual and written forms
- are able to work in groups and individually, and to work for and with non-specialists, interpreting model and statistical outcomes for different audiences

The course is ideal for students who are interested in developing and applying problem-solving skills to real world problems, would like to develop their understanding of computing, mathematics and statistical techniques through the practical lens of AI, and seek to expand their knowledge of the ethical dimensions inherent in these expanding and influential areas of computer science. With a balance of solid theory and practical application, this course builds on knowledge in relevant areas of statistics, data analysis, probability and programming.

The course is designed to not require a mathematics or statistics A-level or equivalent and does not assume significant prior knowledge of programming. However, an interest and enthusiasm for both data analysis and computing is an essential pre-requisite.

B. Intended Learning Outcomes

The course outcomes are referenced to the relevant QAA subject benchmarks indicated and the Frameworks for Higher Education Qualifications of UK Degree-Awarding Bodies (2014) and relate to the typical student. The course provides opportunities for students to develop and demonstrate knowledge and understanding specific to the subject, key skills, and graduate attributes in the following areas:

The programme learning outcomes are the high-level learning outcomes that will have been achieved by all students receiving this award. They must align to the levels set out in the 'Sector Recognised Standards in England' (OFS 2022).

Programme Learning Outcomes					
	Knowledge and Understanding On completion of the course students will be able to:		**Intellectual Skills** On completion of the course students will be able to		**Subject Practical Skills** On completion of the course students will be able to
A1	explain and apply essential concepts, theories, principles and practices of computer science and mathematics underpinning applications of AI	B1	analyse, abstract and decompose problems to design effective solutions or models	C1	develop and critically evaluate specifications for specialist computer systems involving AI and communicate these specifications to other computing professionals
A2	explain the social, ethical, legal, commercial and other human factors that affect the design, development, deployment of computer systems involving aspects of AI	B2	synthesise information from disparate and potentially incomplete sources	C2	se (and, where appropriate, modify) established systems, AI models, techniques and tools to model and build computer-based solutions
A3	explain security issues and evaluate risk in the context of computing and AI	B3	analyse and evaluate the extent to which a system or AI model meets the criteria for its current use and future development	C3	collaborate and communicate effectively with other professionals/stakeholders to plan, design, implement, evaluate and deliver projects
A4	explain the different ways in which data and information may be represented, stored and transmitted digitally	B4	elicit, evaluate and model business, customer and user requirements, incorporating considerations such as sociological and commercial contexts	C4	implement software solutions involving AI using a variety of programming languages, environments and platforms
A5	select and apply knowledge appropriate to specific situations, particularly unfamiliar situations	B5	use different programming environments and justify the selection of one or more for a given context		
		B6	identify appropriate mathematical methods and any relevant computer applications, to assist in the solution of problems		

In addition to the programme learning outcomes, the programme of study defined in this programme specification will allow students to develop the following range of Graduate Attributes:

1. Creative Problem Solving
2. Digital Competency
3. Enterprise
4. Questioning Mindset
5. Adaptability
6. Empathy
7. Collaboration
8. Resilience
9. Self-Awareness

C. Outline Programme Structure

Full details of each module will be provided in module descriptors and the course page on the University Learning Management System, Canvas.

In addition to the development of the above "key skills" inherently as part of the course *via* its modules, the development of the core skills related to the subject Computer Science and AI occurs particularly in core modules as follows:

- programming (from CI4105 and developed & applied in MA5700 and MA6700)
- mathematics and statistics (through MA4700, MA5710 and MA6700)
- data management (introduced in CI5325 and further developed in CI6320)
- professional, legal and ethical considerations (developed and enhanced through CI4450, CI5450, MA5700 and MA6700)

as well as *via* option modules which enable the course to be tailored to individual aspirations for personal development and career paths, and culminating in their expression as part of the "capstone" CI6600 individual project.

Note: As per GR5 within the general regulations, the University aims to ensure that all option modules listed below are delivered. However, for various reasons, such as demand, the availability of option modules may vary from year to year or between teaching blocks. The University will notify students by email as soon as these circumstances arise.

Option modules are selected in the spring term, guided by course leader and personal tutors. They are designed to allow students to specialise or tailor their learning journeys to meet their individual career goals towards roles in broad "data science" e.g. by including user experience modules, or more specialist towards the computer science area by taking option modules in programming or software development.

BSc (Hons) Computer Science and Artificial Intelligence

Level 4							
BSc (Hons) Computer Science and Artificial Intelligence							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**

Computing Fundamentals	CI4250	30	4	1 AND 2		1	1
Mathematics for AI	MA4700	30	4	1 and 2		1	1
Professional Environments 1	CI4450	30	4	1 AND 2		1	1
Programming I – Thinking Like a Programmer	CI4105	30	4	1 AND 2		1	1
Optional Modules							

Progression to Level 5

This course permits progression from level 4 to level 5 with 90 credits at level 4 or above. Progression to level 5 requires passes in MA4700, CI4105. The outstanding 30 credits from level 4 can be trailed into level 5 and must be passed before progression to level 6.
Students exiting the course at this point who have successfully completed 120 credits at level 4 or above are eligible for the award of Certificate of Higher Education in *Computer Science with Artificial Intelligence*.

Level 5							
BSc (Hons) Computer Science and Artificial Intelligence							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Data Modelling	CI5325	15	5	1		1	1
Introduction to Artificial Intelligence	MA5700	30	5	1 AND 2	MA4700 CI4105	1	1
Principles of Data Analytics for AI	MA5710	15	5	2		1	1
Professional Environments 2	CI5450	30	5	1 and 2		1	1
Optional Modules							
Computing Systems	CI5250	30	5	1 and 2		1	1
Programming II - Software Development	CI5105	30	5	1 and 2	CI4105	1	1

Progression to Level 6

This course permits progression from level 5 to level 6 with 90 credits at level 5 or above. Progression to level 6 requires passes in MA5700, MA5710 and CI5325. The outstanding 30 credits from level 5 can be trailed into level 6 and must be passed before consideration for an award.
Students exiting the programme at this point who have successfully completed 120 credits at level 5 or above are eligible for the award of Diploma of Higher Education in *Computer Science and Artificial Intelligence.*

Level 6							
BSc (Hons) Computer Science and Artificial Intelligence							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Applied AI and Machine Learning	MA6700	30	6	1 and 2	MA5700 MA5710	1	1
Individual Project	CI6600	30	6	1 AND 2		1	1
Mobile Application Development	CI6330	30	6	TY12		3	3
Optional Modules							
Advanced Data Modelling	CI6320	30	6	TY13	CI5320	3	4
Bayesian Estimation and Risk Modelling	MA6720	15	6	1		1	1
Data Analytics for AI	MA6710	15	6	2		1	1
Programming III – Patterns and Algorithms	CI6115	30	6	1 AND 2	CI5105	1	1
Programming III – Patterns and Algorithms	CI6115	30	6	TB2	CI5105	3	3
Software Development Practice	CI6125	30	6	1 and 2		1	1
User Experience Design Thinking	CI6315	30	6	1 AND 2		1	1

Level 6 requires the completion of

Level 6 requires the completion of the compulsory modules and 30 credits from optional modules.

Level 7 information

n/a

D. Principles of Teaching, Learning and Assessment

The learning and teaching strategies reflect the programme aims and learning outcomes, student background, potential employer requirements and the need to develop and apply a range of technical and professional skills addressing capability, competency and performance. The strategies ensure that a sound understanding of computing is acquired along with the transferable skills expected of modern-day graduates.

These strategies include:

- A blended learning approach to provision
- Problem-based Learning
- The development of an Inclusive Curriculum
- Embedding Employability and an appreciation of the Workplace into the Curriculum
- Personal Development

- Working in Teams

Teaching and learning sessions adopt a hybrid blended approach based on modern pedagogical principles, with use of appropriate technology enhanced learning (TEL). Subject material and corresponding techniques are typically introduced via problem-centred learning often with a tutorial/seminar flipped or 'partially flipped' classroom approach to replace traditional lectures. The ubiquity of synchronous remote learning tools enables a "hybrid" approach in some sessions, whereby when it is appropriate the session might be timetabled as an online session but where possible computing space on campus will also be timetabled to accommodate students who may not be able to take full advantage of an online session off campus. The "hybrid" approach also includes, for example, opportunities for project supervision and personal tutor meetings to be a mix of on-campus and online, which experience has shown can help to meet the scheduling needs and increase engagement of contemporary students. There are also dedicated programming and maths aid sessions for students needing further help, augmented by the involvement of Mentors from the University peer mentor programme, which are typically level 6 students supporting level 5 modules, and level 5 students supporting level 4, giving the less experienced students the opportunity to benefit from the direct experience of their peers, as well as providing opportunities for skills-development for the Mentors themselves.

Learning computer science is often most readily undertaken in the context of the search for solutions to real-life problems. This is reflected in the approach adopted throughout this programme which is problem-centred wherever appropriate. The strategy is to start with a relevant problem then to move forward from there to explore the theory and techniques necessary to investigate that problem. Students frequently work in groups to tackle these problems, thereby creating a learning community in which the students collaborate with each other and staff. As the students work together, formatively and summatively, this community supports both different learning styles and varied backgrounds. Classes take advantage of this using discussion to bring the cohort's experience into the classroom. Ultimately the course flexibility to address broad data science outcomes is achieved through the final dissertation project where students will typically propose a topic that builds on their experience and aligns with their career aspirations.

Canvas, the university's virtual learning environment, is used in all modules as a communication tool and means of dissemination of learning and reference materials, formative worksheets, assignments, links, videos and lecturer-annotated slides. In this way it acts as a dynamic study guide in each module and going further it provides a structured learning space to support students for independent study, facilitate discussion, and in addition in some modules, for formative and summative tests and surveys. The availability of this material assists students from various backgrounds to achieve a common level before the start of sessions or allow them to highlight any deficiencies which they can then address with the lecturer. Canvas is also used to facilitate group work, both formatively and summatively.

An inclusive approach is taken to curriculum development and teaching practice that also seeks to decolonise. The context of artificial intelligence gives ample opportunities for modules to include case studies and reference contemporary research highlighting pitfalls in the use of AI that can disproportionately affect specific groups of end-users in a non-inclusive way, and illustrating how an ethical, inclusive and end-user-centric approach to the design, development, testing and implementation of AI technologies is something that all data scientists need to be aware of. This is modelled through the use of case studies in teaching, drawn from contemporary topics outside the University as well as from research and practice from the School, typically evolving year-on-year to reflect developments in the field and the School's research.

A collaborative approach is taken in exploring assessment practice and the delivery of learning through communication between staff, students, student helpers and student representatives , formally through existing committees and meetings, course development and feedback structures, alongside informal approaches. This includes, for example, the development of assessment criteria and discussion about the development of module content.

The embedding of employability focusses on developing graduate attributes. These are: being professional, proactive, thoughtful, creative, resilient, and globally aware. The major. vehicle for their development is in the Professional Environments and Project Modules. Parts of the Professional Environments modules are co-delivered and assessed in partnership with the Careers and Employability Team.

In terms of personal development in each year of the course students develop systems, as members of a team and as an individual. For example, in their first-year students are aided in developing their programming, research, (in terms of reading and research methods such as interviewing, distinguishing between strong and weak evidence and argument), writing, decision-making, team/groupwork, project management and analytical skills. They also begin to deal with case studies. The support and development towards a capstone project continues in year two with the introduction of project and software management and the creation of artefacts developed in teams. This underpins the capstone project which is a mandatory part of the programme and is undertaken in the final year. This is an individual piece of work undertaken independently but supervised. It offers students the opportunity to integrate their cumulative academic studies and practical skills with a single project, which may be for a real client. Again, a main vehicle for personal development are the Professional Environment modules. There is an evolving strategy called ‘Navigate’ being run by the Access Participation and Inclusion and the Careers and Employability Services. The aim is to synchronise and complement the delivery of Navigate across these modules and is part of a wider University strategy to embed employability, global awareness and sustainability into curricula.

Peer Support

Undergraduate students are recruited each year from Levels 5 and 6 to act as mentors or helpers for the levels below them. This has a great benefit for both the mentors/helpers and the students they are working with, in terms of academic support for the students and further skills development for the mentors/helpers. The mentors are supported and trained by the University’s Student Achievement Team and supervised by staff in workshops.

Assessment and Feedback

Assessment is an integral part of our learning and teaching strategy, and incorporates both assessments of and for learning. Ample opportunities are given to students for formative assessment with rapid feedback. A wide range of assessment mechanisms are used to ensure that students with diverse backgrounds and different strengths and abilities are not disadvantaged and to ensure that our students are capable of tackling many different types of problems. The methods of assessment have been selected to be most appropriate for the nature of the subject material, teaching style and learning outcomes in each module and the balance between the various assessment methods for each module reflects the specified learning outcomes. Emphasis is given to authentic assessments based on real-world problems. This allows the students to produce “artefacts” as outcomes of the assessment process, forming a portfolio of their work across the programme which provides tangible evidence of their developing skills and knowledge thus enhancing their employment prospects. Students also learn to evidence this for employers through the Professional Environment modules.

Marking criteria are provided for all assessments at the beginning of the year for each module and care is taken to ensure that the language used in the assessment is jargon free, which is checked by the moderator and made available for comment by the External Examiner. Case studies used are designed to be inclusive and contemporary, providing opportunity for ethical debate as suits the module topics and circumstances.

Feedback is provided in a variety of formats, predominantly *via* the Canvas VLE, and gives students guidance on developing skills which are both beneficial for future assessments and highly valued by employers. Feedback in the Professional Environment modules involves the Personal Tutors as a conduit through which feedback is given.

In the final year every student undertakes a 30-credit capstone Individual Project, which draws on and enhances the skills and knowledge developed throughout the programme. This consolidates independent learning and typically provides an opportunity for practical application of their academic knowledge to the implementation and critical evaluation of a solution or construction of a suitable artefact.

In the programme as a whole, the following components are used in the assessment of the various modules:

- Practical exercises: to assess students' understanding and technical competence
- Individual and group-based case studies: to assess ability to understand requirements, to provide solutions to realistic problems and to interact and work effectively with others as a contributing member of a team. The outcomes can be:
  - Written report, where the ability to communicate the relevant concepts, methods, results, and conclusions effectively will be assessed.
  - Oral presentation, where the ability to summarise accurately and clearly communicate the key points from the work in a brief presentation will be assessed.
  - Poster presentation where information and results must be succinct and eye-catching.
  - Video, which may replicate features of oral presentations but allows advance preparation away from the audience (which may suit some students better).
  - Article emphasising the ability to communicate with different audiences.
  - Interview emphasising the ability to answer questions appropriately and relevantly.
  - Simulated client interactions: letters, quotations, etc.

- Multiple choice or short answer questions: to assess competence in basic techniques and understanding of concepts.
- Long answer structured questions in coursework assignments: to assess ability to apply learned techniques to solve simple to medium problems and which may include a limited investigative component
- Long answer structured questions in end-of-module examinations: to assess overall breadth of knowledge and technical competence to provide concise and accurate solutions within restricted time
- Project: The individual project module represents an opportunity for students to draw together different aspects of their learning on the course and to apply the techniques learned in an extended study. As such the assessment here will place a greater emphasis on ability to plan work, manage time effectively, and research background information, culminating in a written report and interview.

At the beginning of each academic year there is a joint department-wide meeting at which the delivery of material and assessments is planned with a full calendar being constructed. This ensures:

- that care is taken to avoid summative assessment bunching and thus student workloads are managed;

- synchronized and coherent delivery of material across the programme in a way that is visible both to staff and students, thus enabling assessments to draw on skills and knowledge from an appropriate variety of modules.

The expectations of self-directed study are outlined in each module in Canvas, to ensure that this is clear to students.

Research Informed Teaching

The course team is research active within the Digital Information Research Centre (DIRC), which is dedicated to the advancement of the theory and applicability of computer science to enable internationally leading work in the field of informatics, addressing the needs of society in the thematic areas of health, communications, security and data. The centre provides an inclusive and outward looking environment for research development, fostering interdisciplinary and multidisciplinary research to achieve maximum impact in real-world applications.

The following areas within the centre are incorporated into the course design:

- NoobLab is an online programming environment that has emerged as an artefact from research by the Technology Enhanced Learning Group. Targeted at those students who are new to programming, it provides an immersive learning experience in which practical exercises can be delivered in a stimulating, engaging fashion, with real-time feedback provided to the student as they work and progress at their own pace. The School has internationally recognised research groups that feed into and support student learning through its teaching programme.

- The computer vision activity within the centre has internationally recognised expertise in visual surveillance, medical imaging and intelligent environments. Recently, the centre coordinated a special session of the Computer Vision and Pattern Recognition conference on “Computer Vision for Computer Games”. The Human Body Motion Group within DIRC works on the extraction, analysis and synthesis of human motion using video footage and motion capture data for graphics and games applications. Thus there is good linkage between research and teaching and the teaching team for computer science draws from DIRC members.

- The Wireless Multimedia and Networking Research Group carries out fundamental and applied research on wireless communications and networking, media streaming and closely related fields. It investigates adaptive delivery of media information with an adequate quality of service. Research activity relies on the different fields of information theory, signal processing and applied mathematics, communication theory, wireless networking and security.

Thus, there is good linkage between research and teaching and the teaching team for computer science draws from DIRC members.
Students are also able to develop their research skills which form a fundamental part of Levels 4 to 6’s curriculum. These skills enable students to distinguish and present appropriate evidentiary information in an argument. These skills are greatly valued by employers.
Staff members also engage with research into teaching and learning in Higher Education which feeds through to support learning in lectures and other forms of student engagement during contact time.

E. Support for Students and their Learning

Students are supported by a highly qualified team of academic staff that includes individuals in the following roles:

- A Course Leader to help students understand the programme structure
- A Module Leader for each module
- A Personal Tutor to provide academic and personal support

Additional support is provided by the following specialist staff:

- A Placement Tutor & Faculty Placement Team to give general advice on placements
- Technical Support to advise students on IT and the use of software
- A designated Programme Administrator
- English language support for international students

Matters outside the academic arena are supported by:

- Student support facilities that provide advice on issues such as finance, regulations, legal matters, accommodation, international student support etc.
- Disability and dyslexia student support
- A substantial Study Skills Centre that provides academic skills support
- Careers and Employability Service
- The Students' Union
- An induction week at the beginning of each new academic session
- Staff Student Consultative Committee

The students are introduced to all these mechanisms during induction sessions at the beginning of each new academic year. It is here that the level 4 students first encounter the university's computer network, which includes their personal access to the VLE and how to use it as a learning environment. They are also encouraged to make use of the substantial Study Skills Centre, an important resource that provides additional help across a range of academic skills.

Students are expected to be involved in the development of their programme. On an individual level through meetings with their personal tutors at which they can discuss their academic progress, personal development and can seek advice on course and module choices in the light of their career aspirations. As a cohort, students can contribute to many aspects of programme evolution for example by student representation on committees including Staff Student Consultative Committees as well as by their formal and informal feedback such as end-of-module reviews.

Support for Academic Skills

There is a range of support available within the School, which includes but is not limited to:

- Faculty Academic Success Centre
- Drop-in Programming Sessions (Java Aid, C++ Aid)
- Drop-in Maths Aid sessions
- Academic Probation Programme, with Academic Success Workshops

Faculty Academic Success Centre is a one-to-one drop-in Study Skills session for students every weekday. Help is available on a range of academic skills from writing reports, note-taking, to exam revision, referencing, and mathematical skills.

The Academic Probation Programme highlights students at risk of losing their university place. It supports first year students who have failed the year by requiring them to perform a range of academic activities designed to reach the required academic level. This is closely monitored by their personal tutor to whom they report.

There is a Student Support Team to help students with any problem that is affecting their studies. This can range from illness, problems writing an assignment, questions about academic regulations to serious confidential issues.

The Personal Tutoring Scheme (PTS)

There exists a faculty-wide student support system. It includes, for example, a faculty wide drop-in centre where students could seek advice without an appointment; also, they can email, or phone a designated number to get instant help. Students are assigned a member of the computing academic staff as their Personal Tutor (PT) which they retain for the full three or four-year duration of their time at university. The first contact between student and PT is during Induction Week for an introductory meeting and thereafter the following procedure is followed:

Level 4 [settling in and building confidence]

In the first year (Level 4) PTs follow-up the Induction Week contact with a 1-to-1 meeting between weeks 1 and 3 in order to discuss any academic or pastoral issues that might have arisen during this important settling-in period. Employability topics such as the value of industrial placements and internships are introduced; they are encouraged to think about compiling a CV in preparation for their future applications (this is followed up in the professional environments module).

In years 1 and 2, some academic sessions based upon Professional Environment Modules are offered by Personal Tutors in addition to the workshops provided. Here, they gain further feedback on work submitted. These meetings can lead to the bonding of these individuals into self-supporting study teams which are intended to endure. In addition, selected second year students are recruited as mentors in the Level 4 programme to encourage the community spirit of their course and foster engagement. The same is done for final year students to support second years.

Student attendance is monitored from the first teaching week. For example, in the Professional Environment module this includes monitoring attendance and participation in group (team-based) workshops where students are developing their group working skills. Those absent from classes are contacted to determine whether they need additional support. This is to address the danger of poor attendance at the beginning of the course which can be associated with poor academic outcomes.

Subsequent PT meetings are motivated by continued monitoring of formative assessment in core modules and helping students to begin preparing for summative assessments by providing support and signposting appropriate sessions in study skills centres. Where problems exist, both PTs and the module team(s) will direct students to Programming Aid/MathsAid and/or Faculty Academic Success Centre as appropriate.

Level 5 ['stepping it up' and broadening horizons]

In the second year the focus of the PT system is to encourage students to begin looking forwards, toward some form of academically relevant placement activity, perhaps as a full-scale Industrial Placement in year 3, or as some form of identifiable engagement with industry, such as a relevant short-term placement, summer work or a subject-relevant internship. All students receive information from the KU Talent team on the process and opportunities before the winter vacation.

The PT highlights the importance of students engaging with this in their "welcome back" induction meeting in week 1, together with an explanation of how Level 5 modules contribute to degree classification and any other differences in course structure and assessment procedures between Level 4 and Level 5.

Level 6 [maximising success and moving on]

In the final year the focus shifts to graduation and employability and the PT scheme uses the capstone project module to promote PT-style discussions alongside regular project meetings

In the first weeks of term the PT's role is to welcome students back, encourage them to reflect on their progress and module feedback, and plan to make the most of their final year, exemplified by early deliverables in the project module. Throughout Level 6, the KU Talent team provides activities which the PT signposts for students, some of which are delivered within and linked explicitly to sessions and assignments in core modules.

After the winter vacation the PT meets with their tutees to discuss the opportunities for graduate study and employment and provide contact details for employers' reference

requests. The final project is a key employability “artefact”. Students can seek advice from their personal tutor or project supervisor who may be a different academic.
Both the Project Supervisor and Personal Tutor are able, in collaboration with Employability and Careers, to encourage students how best to present their project on their *cv* and at interview

F. Ensuring and Enhancing the Quality of the Course

The University has several methods for evaluating and improving the quality and standards of its provision. These include:

- External examiners
- Boards of study with student representation
- Annual Monitoring and Enhancement
- Continuous Monitoring of courses through the Kingston Course Enhancement Programme (KCEP+)
- Student evaluation including Module Evaluation Questionnaires (MEQs), level surveys and the National Student Survey (NSS)
- Moderation policies
- Feedback from employers
- The British Computer Society who accredits many of the School’s courses

G. Employability and work-based learning

Computing qualifications are versatile and enable graduates to find employment in careers ranging from systems and business analysts, and software engineers, through to programmers and network specialists in public and private sector industries. Recent graduates found employment with organisations such as IBM, Hewlett Packard, Capgemini, JDA Software, Thomson Reuters, GlaxoSmithKline, Axa, BAA, British Telecom, Ernst & Young, Marks & Spencer, Waitrose, Virgin Media, NHS Institute for Innovation and Improvement as well as smaller companies. Graduates also pursue careers in academia joining universities such as Kingston University’s PhD programmes in digital imaging, computer forensics, and user experience.
Our curriculum is largely applied in nature working on case studies designed to simulate the working environment, typically in teams, giving students experience of applying their subject and key skills to open-ended problems and presenting complex solutions This is supported by the use of project management and software development industrial practices facilitating the creation of appropriate artefacts. Leading practitioners from industry, such as Google and IBM are invited to give guest lectures and workshops. In preparation for their future employment, we make extensive use of industry standard software throughout the course. The use of the guided option routes enables students to specialise in their chosen domains.

Industrial Placement (IP)

Industrial placements are actively encouraged in the third year of study – although it is the responsibility of individual students to source and secure such placements. All placements are vetted to ensure that they provide a relevant experience in which students can apply their learning in a practical situation. All placement students on the course receive comprehensive support from the placement specialists (Careers and Employability Advisors) within the Careers and Employability Team in securing a position and while in the workplace, although ultimately the responsibility for the placement remains with the student. Undertaking the placement after Level 5 enables the taking of a sandwich degree programme.

Employability

All our students are encouraged to make use of the opportunity to enhance their learning and personal development by undertaking a Summer Internship.

Students also gain employability and transferrable skills through participation in the School's annual monitoring process (*e.g.* as student representatives on the Staff Student Consultative Committee, Faculty Forum, Board of Study and Faculty Board), through volunteering, which the University and Union of Kingston Students facilitates, as Student Ambassadors, where computer science students have been excellent ambassadors for our courses at Open Days, Enrolment and Induction events and through the University's Talent Academy programme which offers a range of different on-campus employment opportunities to students. Large numbers of suitable employers and alumni come to the University to take part in Careers Fairs, deliver talks and to recruit students for specific opportunities.

Our programme is designed to embed employability skills within the curriculum at all levels and develop students' ability to recognise their personal and academic achievements and career aspiration. This is fostered through the strand of professional environments modules built into the programme from the start. During these, students experience a transition from guided towards independent learning and career planning and development, through a series of sessions, offered under the auspices of Employability and Careers, including Professional Communication, Time and Self-Management and Identifying and Articulating Skills. There are also opportunities to perfect skills required to gain employment such as CV writing, Psychometric Test and Using LinkedIn. These modules are shared with other courses in the school and our students study and work in a multidisciplinary environment, developing their ability to communicate with non-subject specialists. Outputs from these modules (written reports, posters, and records, e.g., as videos and/or slideshows), plus products such as computer programs or results from modelling exercises on real-world problems, can be collated into a portfolio which may be presented to potential employers. Career options and plans are discussed with their personal tutors at regular intervals throughout their studies, and guidance given as appropriate. This is in liaison with the Employability and Careers Service.

This theme culminates in the Level 6 capstone project module, which also enhances students' employability skills in different ways. Typically, the project involves the creation of an artefact relevant to the course. This activity gives students a taste of independent research, supported by the supervisor, as they familiarise themselves with the real-world situation and the techniques required to investigate it. The experiences on projects provide valuable cases to be cited in job applications.

When choosing their Level 6 option choices and project topic, students are guided by their Personal Tutor regarding what possible choices best suit their career aspirations.

In addition to this the Employability and Careers service are piloting a scheme called Navigate, which broadly mirrors the embedded approach we have had to these skills to date.

Curriculum developments are discussed by the School's Industrial Advisory Panel. The School has strong links with both industry and the professional body, the BCS the Chartered Institute for IT. It hosts a local BCS chapter and several members of the School are involved with the Institute at corporate level. The Destinations and Leavers survey indicates that graduates from this programme go onto the following careers:

Technical Analyst	Technical manager / Information Systems Manager	System support manager / Information Manager	Software developer / Software Engineer

Software administrator	IT Consultant / Systems Architect	IT developer	Database administrator / IT systems administrator
Web designer / Web Developer	Analyst / Application Analyst / Business Analyst	Internet developer	Project manager
Data Analyst / Information Analyst	Analyst programmer	UX Analyst	Network analyst

Educational Exchange Visits

A small number of students take advantage of the opportunity for an overseas educational exchange visit, in which part of the course is studied at a university in another country, typically the USA or in Europe. This broadens their cultural experience and enhances their personal development in ways that are particularly valuable in today's multinational employment market

Work-based learning, including sandwich courses and higher or degree apprenticeships

N/A

H. Other sources of information that you may wish to consult

Professional or statutory body information: http://www.bcs.org/ and BCS Accreditation Guidance https://www.bcs.org/deliver-and-teach-qualifications/university-accreditation/

QAA Benchmark statement website: https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

Guidance on Enterprise and Entrepreneurship (Draft)
http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/EE_Draft_Guidance.pdf
Shadbolt review
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/518575/ind-16-5-shadbolt-review-computer-science-graduate-employability.pdf

Hinchliffe, G. & Jolly A. (2009), "Employer Concepts of Graduate Employability", The Higher Education Academy, Subject Centre for Education (ESCalate), York

I. Development of Course Learning Outcomes in Modules

This table maps where course learning outcomes are **summatively** assessed across the modules for this course. It provides an aid to academic staff in understanding how individual modules contribute to the course aims, a means to help students monitor their own learning, personal and professional development as the course progresses and a checklist for quality assurance purposes.

Module Code		Level 4				Level 5						Level 6								
		MA4700	CI4105	CI4450	CI4250	MA5700	CI5325	MA5710	CI5250	CI5450	CI5105	CI6330	MA6710	MA6720	CI6115	CI6320	CI6125	MA6700	CI6600	CI6315
Knowledge & Understanding	A1	S	S	S		S	S	S		S	S				S		S		S	S
	A2							S		S					S				S	
	A3						S			S	S						S		S	
	A4		S		S										S				S	
	A5			S		S	S	S	S	S	S						S		S	
Intellectual Skills	B1		S	S	S	S	S		S	S	S				S		S		S	
	B2					S	S	S	S	S	S								S	
	B3						S	S		S	S				S				S	
	B4							S		S	S						S		S	
	B5		S					S			S				S		S		S	
	B6			S		S	S	S		S					S				S	
Practical Skills	C1						S	S	S	S							S		S	
	C2			S		S	S	S			S						S		S	
	C3						S	S	S	S							S		S	
	C4									S	S								S	

Students will be provided with formative assessment opportunities throughout the course to practise and develop their proficiency in the range of assessment methods utilised.