Template C4

Kingston University London

Programme Specification

Title of Course: *BSc (Hons) Computer Science*

Date first produced	30/06/2017
Date last revised	19/09/2024
Date of implementation of current version	01/09/2024
Version number	9
Faculty	Faculty of Engineering, Computing and the Environment
School	School of Computer Science and Mathematics
Department	Department of Computer Science
Delivery Institution	Kingston University

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
Intermediate Awards(s) and Title(s): ***There are 4 Intermediate awards for each pathway***	Certificate of Higher Education Diploma of Higher Education Ordinary degree
Course Code ***For each pathway and mode of delivery***	
UCAS code ***For each pathway***	G400 (3 year full time)G401 (4 year sandwich)G403 (4 year with foundation)

RQF Level for the Final Award:	6
Awarding Institution:	Kingston University
Teaching Institution:	Kingston University
Location:	Penrhyn Road
Language of Delivery:	English
Modes of Delivery:	Part-time Full-time
Available as:	
Minimum period of registration:	Part-time - 6 Full-time - 3
Maximum period of registration:	Part-time - 12 Full-time - 6
Entry Requirements:	The minimum entry qualifications for the programme are: From A levels: 112 points, General Studies not accepted BTEC National: 112 points: Distinction, Merit, Merit Access Diploma: 60 credits overall 45 at level 3 the remainder from level 3 or level 2 Computing Foundation Year Plus: GCSE (A*–C): five subjects, including English Language and Mathematics 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. We will consider a range of alternative qualifications or experience that is equivalent to the typical offer.

	Applications from international students with equivalent qualifications are welcome. Disclosure and Barring Services (DBS) clearance is not required.
Programme Accredited by:	
QAA Subject Benchmark Statements:	Computing
Approved Variants:	Compensation of modules: Compensation is permitted in at most 30 credits across the programme, excluding the CI6600 Individual Project module. A module other that CI6600, with a grade of F5 (35-39) can be compensated for a PC grade by at least 90 credits passed at that level.
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:	n/a
End Point Assessment Organisation(s):	n/a

SECTION 2: THE COURSE

A. Aims of the Course

The over-arching aim of the Computer Science course is to produce highly trained graduates with specialist technical knowledge and scientific mind set, capable of solving real world problems, are driven by passion, sustainability and wider socio-technical implications are considered at all levels. Specifically the aims are to produce graduates who:

- have the required knowledge, skills and attitudes to practice as computing professionals in both industry and commerce
- are equipped to meet the academic, professional and practical requirements for membership of appropriate professional bodies such as the British Computer Society
- are aware of the actual and potential range of information and computer-based systems and of the ways in which these interact with their material, human, organizational and social environments
- possess the appropriate ability and inclination, and are equipped, to undertake advanced studies and/or research and development in the computing and information systems disciplines
- can apply their knowledge and skills in the various contexts in which information and computer-based systems are developed. In particular, can both initiate and sustain a planned and disciplined personal effort when working alone and can participate effectively as a member of a team
- have an inquisitive and reflective attitude when modelling systems and understands the functional and qualitative properties of systems.
- have the ability to evaluate and predict security, performance and efficiency associated system properties and their context dependencies.
- understand and can articulate the legal, ethical, social, cultural and public aspects of problems and solutions.
- have the capacity to acquire new knowledge and skills independently; reflect on trends in the computing domain and their actions are demonstrative of a creative contribution.

B. Intended Learning Outcomes

This 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 outcomes are referenced to the QAA subject benchmarks for Computing and the Framework for Higher Education Qualifications in England, Wales and Northern Ireland (2016), and relate to the typical student.

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
A5	identify the different project management approaches commonly used in the IT industry and select, modify or construct one for a given context	B5	use different programming approaches, patterns and/or paradigms, and justify the selection of one or more for a given context	C5	specify, design and prototype human/computer interfaces using HCI and UX theory and best practices
A4	explain the different ways in which data and information may be represented, stored and transmitted	B4	elicit, evaluate and model business, customer and user requirements, incorporating considerations such as sociological and commercial contexts, user experience, aesthetics and technical practicalities	C4	implement software solutions using a variety of programming languages, environments and platforms
A3	explain security issues and evaluate risk for the safe operation of computing and information systems	B1	analyse, abstract and decompose problems to design effective solutions	C3	collaborate and communicate effectively with other professionals/stakeholders to plan, design, manage, implement and deliver IT projects
A1	explain and apply essential concepts, theories, principles and practices of computer science	B2	synthesise information from disparate and potentially incomplete sources to model and build systems, documents and other related artefacts	C2	use (and, where appropriate, modify) established systems, software development methods, techniques and tools to model and build computer based solutions
A2	explain the social, ethical, legal, commercial and other human factors that affect the design, development, deployment of computer systems	B3	analyse and evaluate the extent to which a system meets the criteria for its current use and future development	C1	develop and critically evaluate specifications for specialist computer systems and communicate these specifications to other computing professionals

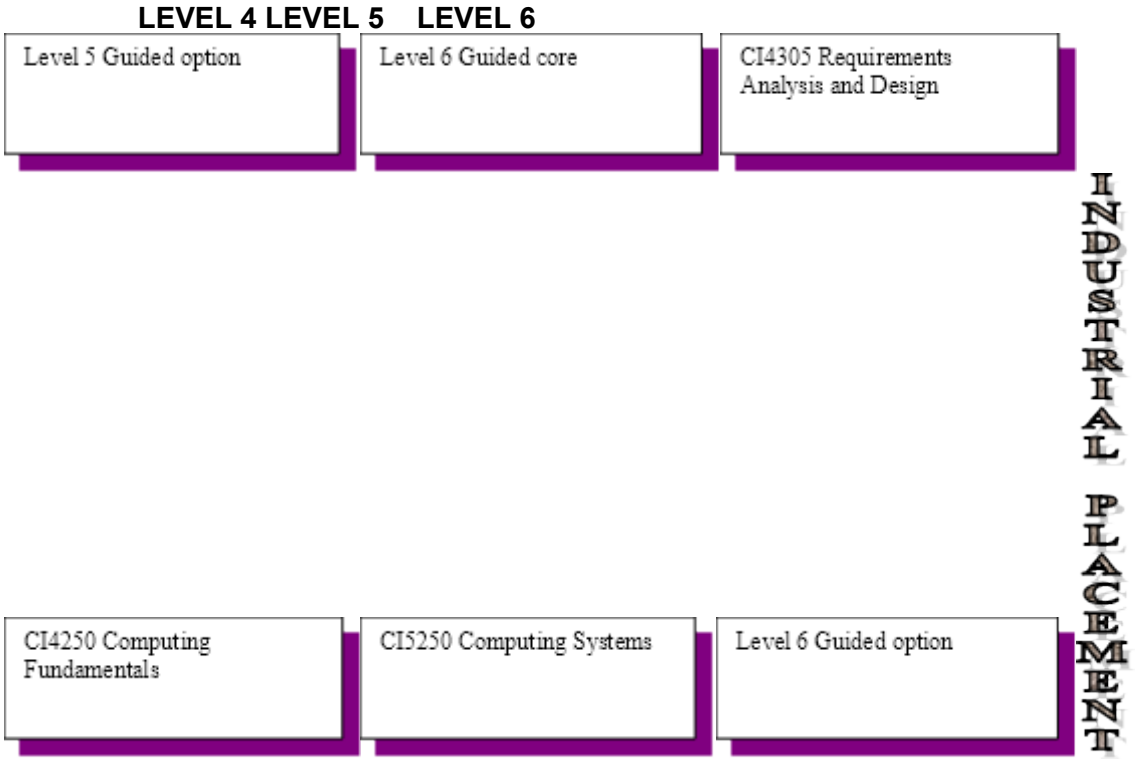
In addition to the programme learning outcomes, the programme of study defined in this programme specification will allow students to develop the following range of Graduate Attributes:

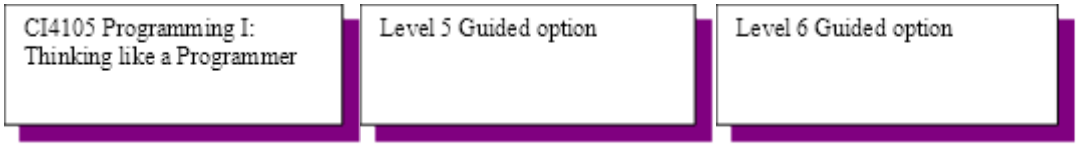
1. Creative Problem Solving
2. Digital Competency
3. Enterprise
4. Questioning Mindset
5. Adaptability
6. Empathy
7. Collaboration
8. Resilience
9. Self-Awareness

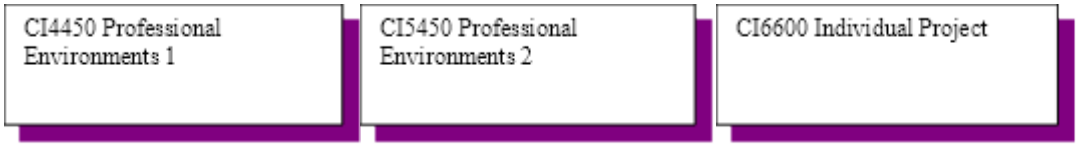
C. Outline Programme Structure

This programme is offered in full-time and part-time and it can also be taken in a sandwich mode, all leading to the award of a BSc (Hons) degree. Entry is normally at level 4 with A-level or equivalent qualifications (See section D). Transfer from a similar programme is possible at level 5 with passes in comparable level 4 modules – but is at the discretion of the admissions tutor. Intake is normally in September. Direct entry into level 6 is not permitted.

BSc (Hons) Computer Science







Guided option routes
The core modules are designed to cover the underlying principles for the subject discipline and the guided option routes then allow students to specialise according to their intended employment destinations. The current guided routes are:

- Software Engineering
- User Experience Design
- Web and Mobile App
- Networking and Network Security

Each level is made up of four modules each worth 30 credit points; a student must complete 120 credits at each level. All students will be provided with the University regulations and specific additions that are required for accreditation by any outside body i.e. a professional or statutory bodies that confers professional accreditation. Full details of each module will be provided in module descriptors and student module guides.

Part time students
Part time students should take core modules first, apart from the Individual Project, which is taken last.

BSc (Hons) Computer Science

Level 4							
BSc (Hons) Computer Science							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Computing Fundamentals	CI4250	30	4	1 and 2			

Professional Environments 1	CI4450	30	4	1 and 2			
Programming I – Thinking Like a Programmer	CI4105	30	4	1 and 2		0	0
Requirements Analysis and Design	CI4305	30	4	1 and 2			
Optional Modules							

Progression to Level 5

Progression to level 5 requires 120 credits including passes in the above 4 modules. Students exiting the programme at this point who have successfully completed 120 credits are eligible for the award of Certificate of Higher Education in Computer Science.

Level 5							
BSc (Hons) Computer Science							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Computing Systems	CI5250	30	5	1 and 2			
Professional Environments 2	CI5450	30	5	1 and 2			
Optional Modules							
Database-Driven Application Development	CI5320	30	5	1 and 2			
Industrial Placement	CI5999	60	5	1 and 2			
Networking Concepts	CI5210	30	5	1 and 2			
Programming II - Software Development	CI5105	30	5	1 and 2			
User Centered Design	CI5330	30	5	1 and 2			

Progression to Level 6

Progression to level 6 requires 120 credits at level 5. Students exiting the programme at this point who have successfully completed 240 credits are eligible for the award of Diploma of Higher Education in Computer Science.

Placement Module

Students on the sandwich route take the module CI5999 Industrial Placement.

Level 6
BSc (Hons) Computer Science

Core modules	Module code	Credit Value	Level	Teaching Block	Pre-requisites	Full Time	Part Time
Individual Project	CI6600	30	6	1 and 2			
Optional Modules							
Advanced Data Modelling	CI6320	30	6	TY13		3	4
Cyber Security	CI6245 E	30	6	TY13		4	3
Digital Entrepreneurship	CI6415 E	30	6	TY13		3	4
Internet Services and Protocols	CI6250	30	6	1 and 2	CI5210		
Mobile Application Development	CI6330	30	6	TY13		3	4
Programming III – Patterns and Algorithms	CI6115	30	6	1 and 2	CI5105		
Software Development Practice	CI6125	30	6	1 and 2	None		
User Experience Design Thinking	CI6315	30	6	1 and 2	CI5330		

Level 6 requires the completion of

Level 6 requires the completion of the compulsory module CI6600 Individual project and three option modules. The complete list of option modules available will be determined annually and subject to resourcing. Part time students take the CI6600 Individual Project last.

D. Principles of Teaching, Learning and Assessment

The learning and teaching strategies reflect the field aims and learning outcomes, student background, potential employer requirements and the need to develop a broad range of technical and professional skills, with the ability to apply them appropriately. The strategies ensure that students have a sound understanding of computing and have acquired the transferable skills expected of modern-day graduates.

The programme is designed according to the KU Curriculum Design Principles and it utilises a wide range of teaching and learning methods to enable all students to be actively engaged throughout the course. The learning, teaching and assessment strategies reflect the programme aims and learning outcomes, student background, potential employer requirements, and the need to develop a broad range of technical skills with the ability to apply them appropriately.

The academic year includes scheduled contact time for lectures, workshops, enhancement activities, and revision. The standard module provision includes laboratory sessions, seminars, group work – to underpin the principles taught in the lectures – but, also dedicated programming aid sessions for students needing further help.

In each year of the course students will develop systems, sometimes as members of a team and sometimes 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, and analytical skills. They also begin to deal with client requirements and case studies.

The capstone project is a mandatory part of the programme and is undertaken in the final year. 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. Students are provided with opportunities to engage with the project earlier on in their programme before the start of the project to ensure that they are adequately prepared to undertake this in their final year.

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. The ‘top down’ approach provides more motivation for students to engage with material/concepts and opportunities for relatable (concrete), inclusive example problems to be used. Students frequently work in groups to tackle these problems both in timetabled sessions and outside, thereby creating a learning community in which the students collaborate with each other and staff. As the students work together in groups, both formatively and summatively, this community supports them automatically allowing for different learning styles and varied backgrounds.

Teaching and learning sessions adopt a hybrid approach based on modern pedagogical principles, with use of appropriate TEL such as clickers. For any topics where a more formal didactic approach is deemed the most appropriate, the ‘lecture’ delivery will still involve active participation by students, for example, working through exercises and/or using classroom response systems throughout the session. 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.

Canvas, the university’s virtual learning environment, is used extensively 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. Canvas is also used to facilitate group work, both formatively and summatively. For example in the Professional Environment modules students are introduced to the group collaboration features of Canvas and are encouraged to use the Canvas app to mediate discussion and to collaborate on coursework “artefacts” which can be formatively assessed in the group workshops while the record of collaboration contributes, summatively, to the module’s assessment outcomes.

Study materials, including examples and exercises, are published on Canvas in advance of the time-tabled sessions, to allow students to prepare and fully benefit from classroom time – further many sessions adopt a flipped or partially flipped approach for which the pre-published materials are essential. The availability of this material assists students from various backgrounds to achieve a common level at the start of the session or to highlight any deficiencies which they can then address with the lecturer.

Students are encouraged to develop as independent learners as they progress through their degree course. This is supported explicitly through, for example, the strand of professional skills modules culminating in the individual project in the final year.

Assessment and Feedback

The assessment is regarded as 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 is 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 so as 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 which provides tangible evidence of their developing skills and knowledge thus enhancing their employment prospects.

Inclusive Teaching Practice

The teaching practice is guided by the HEA considerations for effective practice across subject areas together with Kingston University’s “Excellence in Inclusive Curriculum” initiative. In particular, a collaborative approach which creates a partnership between staff, students, employers and other stakeholders. Opportunities to insure that the curriculum is inclusive take place at such forums as the Staff Student Consultative Committees and Boards of Study together with discussions at module and course level. Meetings take place between subject teams to consider subject specific issues. The variety of teaching activities also takes account of the students’ different learning preferences and experiences and there is a careful balance of individual and group based activities.

Marking criteria are provided for all assessments as part of the assessment booklet 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. The case studies used are designed to be inclusive. Resources are provided on the KU EDI website.

Feedback, in a variety of formats provides students with guidance in 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 skills and typically provides an opportunity for practical application of their academic knowledge to the implementation 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 communicate clearly 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.

Students are expected to develop their skills, knowledge, confidence and understanding through independent and group learning, in the form of guided and self-directed study, and the exploration of the application of computing in the real world, throughout their course. For example basic team-working, investigative, researching and (informal) communication skills are introduced, developed and facilitated through the Professional Environment modules. Students are also introduced to the professional environment surrounding their area of study alongside considerations of ethical behaviour and responsibility. These themes are reinforced with professional development opportunities tailored for each programme level and delivered by colleagues from Student Achievement and KU Talent. Furthermore, all students explore group case studies in computing and information systems, requiring the collaborative investigation/solution of some real world problems as well as the production of written reports and oral or poster presentations. These foster the development of team-working, research and (formal) communication skills. In the final year all students will carry out research and development and present the background to and findings of their projects as indicated above. This will enhance their research and investigative skills to explore and master complex new ideas, learn and apply advanced techniques and further develop their independent working and communication skills.

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. 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.
- 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 Director 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 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
- A virtual learning environment (VLE) available on the university's intranet

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:

SEC Academic Success Centre

Drop-in Programming Sessions (Java Aid, C++ Aid)

Drop-in Maths Aid sessions

Academic Probation Programme, with Academic Success Workshops

SEC Academic Success Centre (SASC) 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 has an effect on 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 SEC 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).

Throughout the first teaching block, some academic sessions based around problem centred learning encourage the students to work together in their tutor groups in formative assessments to facilitate 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.

Student attendance is closely monitored from the first teaching week. 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 by their tutor 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 SASC 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 KU Talent, 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 review and development
- Periodic review undertaken at subject level
- Student evaluation
- Moderation policies

G. Employability and work-based learning

Computing qualifications are amongst the most versatile and enable graduates to find employment in a wide spectrum of careers ranging from systems and business analysts, and software engineers, through to programmers and network specialists in a wide range of public and private sector industries. Recent graduates found employment with large 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 a host of 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 with many case studies chosen for their topicality and relevance to industry such as information systems design, programming, networking, and implementation issues. Working on case studies designed to simulate the working environment, typically in teams, gives students experience of applying their computing, information systems and networking methods and key skills to open-ended problems with complex solutions, and presenting their findings, including any limitations, in a professional manner. This mirrors the experience of computing professionals working in commerce and industry. To further set the material in context as well as inspire our students, leading practitioners from industry, such as Google and IBM are invited to give guest lectures and workshops. Throughout the course students develop communication and interpersonal skills, learn time management and the value of prioritising and planning by involvement in the learning activities outlined in section F above.

In preparation for their future employment we make extensive use of industry standard software such as Oracle J Developer, Oracle SQL Developer, Opnet, Eclipse, Adobe, Autodesk, MS Visual Studio, Netbeans, Unity, throughout the course. The use of the guided option routes enable students to specialise in their chosen domains.

Personal Development Portfolio (PDP)
PDP is centred on student learning and development to encourage the student to become a more effective, independent and confident self-directed learner which appeals to employers. The student is responsible for engaging with the PDP process which is introduced in the core Professional Environments modules to support them and enable them to reflect upon their learning and achievements, formulate study action plans and to plan their career development needs. Students create a personal record of learning containing evidence of their qualities, key skills, achievements and products (artefacts of their learning and assessments) to support industrial placement applications and future job applications or applications for graduate studies. The development plans are reviewed regularly for feedback from their personal tutor.

Industrial Placement (IP) and its Importance to Student Employability

All of our students are encouraged to make use of the opportunity to enhance their learning and personal development by undertaking a Summer Internship between years of study and/or an industrial placement in the third year of their programme. 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 (Talent Preparation Officers) within the KU Talent team in securing a position and while in the workplace, although ultimately the responsibility for the placement remains with the student. 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. 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 KU Talent, 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 students study and work in a multidisciplinary environment, developing their ability to communicate with non-subject specialists. In this way students gain insight into the true nature of commercial teamwork, harnessing a range of different talents and skills to tackle complex problems, preparing them for the workplace. As they progress students enhance their planning, teamwork and communication skills, (in the professional environments modules and throughout the programme) and show evidence of these though oral and poster presentations and both individual and group written reports. Outputs from these (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. Furthermore, their personal development and 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 KU Talent team, the University's Careers Service.

This theme culminates in the Level 6 capstone project module, which draws together the academic strands of the course. It also enhances students' employability skills in different ways, giving them an insight into what professionals do in graduate careers. Typically, the project involves the creation of an artefact relevant to the course, often with some new element or feature. Undertaking this type of activity gives students a taste of independent research, albeit supported by the supervisor, as they familiarise themselves with the real world situation and the techniques required to investigate it. In the project, students are encouraged to develop their critical thinking, creative and analytical skills, and gain experience and proficiency in technical writing. 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.

The experiences gained during, and their reports and presentations on, students' projects can provide a valuable case study to be cited in job applications and, if shortlisted, a focus for discussion and demonstration of professional skills in interviews. This has proved to be vitally important for several recent graduates, for whom giving an account of their project and the skills developed therein was crucial in securing a position of graduate employment during their interviews.

The course is vocational and 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
Network support / Network Engineerexecutive	Analyst / Application Analyst / Business Analyst	Internet developer	Project manager
Web master	Analyst programmer	Web designer / Web Developer	Network analyst
Data Analyst / Information Analyst	Multimedia Programmer	UX Analyst	Communication Manager / Network Consultant

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

KU Talent; the University's career service, has a specific team for the faculty that helps source industrial placements. Placement specialists within the KU Talent team help students throughout the application process, with support interviews and throughout the transition to work, for example, with mock interview sessions, CV workshops, careers fairs and industry

speakers on employers' needs. The team monitors the student whilst in industry. Placement students are visited whilst in industry by a network of academics who act as individual placement tutors.

Work placements are actively encouraged as they expose students to a real working environment, which makes them more experienced and employable after their first degree. Work placements also enable employers to find employees for permanent positions. Note that ultimately it is the responsibility of individual students to source and secure work placements.

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

QAA Benchmark statement website: http://www.qaa.ac.uk/en/Publications/Documents/SBS-Computing-16.pdf
Professional or statutory body information: http://www.bcs.org/
Module guides
Student handbook
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								
		CI4305	CI4450	CI4105	CI4250	CI5210	CI5999	CI5330	CI5250	CI5450	CI5105	CI5320	CI6315	CI6250	CI6115	CI6125	CI6415E	CI6600	CI6245E	CI6330	CI6320
Knowledge & Understanding	A5	S	S		S			S		S	S		S		S			S			
	A4			S	S	S			S			S		S	S			S			
	A3		S			S			S	S	S	S		S		S		S			

	A1	S	S	S	S	S		S	S	S	S	S	S	S	S	S		S			
	A2	S	S					S		S	S		S		S	S		S			
Intellectual Skills	B5			S						S	S	S			S	S		S			
	B4	S	S					S	S	S	S	S	S		S	S		S			
	B1	S	S	S	S	S		S		S	S	S	S	S	S	S		S			
	B2	S	S	S		S		S	S	S	S	S	S	S	S	S		S			
	B3	S	S	S				S	S	S	S	S	S		S	S		S			
Practical Skills	C5	S			S			S		S			S		S			S			
	C4		S	S	S				S		S	S			S	S		S			
	C3	S		S				S		S	S	S	S		S	S		S			
	C2	S	S	S	S	S		S	S	S	S	S	S	S	S	S		S			
	C1	S	S		S	S		S	S			S	S	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.