Template C4

Kingston University London

Programme Specification

Title of Course: *MSc Network and Information Security*

Date first produced	30/09/2012
Date last revised	30/09/2019
Date of implementation of current version	
Version number	5
Faculty	Faculty of Engineering, Computing and the Environment
School	School of Computer Science and Mathematics
Department	Department of Networks and Digital Media
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***	MSc Network and Information Security
Intermediate Awards(s) and Title(s): ***There are 4 Intermediate awards for each pathway***	PG Diploma PG Certificate
Course Code ***For each pathway and mode of delivery***	G400
UCAS code ***For each pathway***	

Award(s) and Title(s): ***Up to 10 pathways***	MSc Network and Information Security with Management Studies
Intermediate Awards(s) and Title(s): ***There are 4 Intermediate awards for each pathway***	PG Diploma PG Certificate
Course Code ***For each pathway and mode of delivery***	
UCAS code ***For each pathway***	

RQF Level for the Final Award:	7
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 - 2 Full-time - 1
Maximum period of registration:	Part-time - 4 Full-time - 2
Entry Requirements:	Applicants for the MSc & Postgraduate Diploma are normally required to have a good honours degree in a relevant area or academic equivalent such as Computer Science/Information Technology.

	Exceptionally applicants who have substantial working experience in security or either the computing or data communications arena but no first degree may be considered if they can satisfy the Admissions Tutor of their motivation, evidence of their ability to work at this level and they are numerate. Overseas students are required to satisfy the Admissions Officer that they have reached an equivalent academic standard as those required for home students. Language Requirements IELTS – minimum 6.5 overall, including a minimum of 6.0 in writing, and a minimum of 5.5 in reading, listening and speaking TOEFL IBT – overall score of 88, inc min score of 20/30 Writing, 20/30 Reading, 17/30 Listening and 20/30 Speaking
Programme Accredited by:	BCS The Chartered Institute for IT
QAA Subject Benchmark Statements:	Computing
Approved Variants:	None
Is this Higher or Degree Apprenticeship course?	

For Higher or Degree Apprenticeship proposals only	
Higher or Degree Apprenticeship standard:	
Recruitment, Selection and Admission process:	
End Point Assessment Organisation(s):	

SECTION 2: THE COURSE

A. Aims of the Course

The Aims of the Course are to:

- provide students with knowledge, skills and a critical appreciation of technical, professional, legal and ethical aspects of Network and Information Security;
- enable students to analyse a system and design an appropriate, custom solution;
- develop subject related practical skills;
- provide students with the opportunities to develop their written and oral communication skills;
- prepare students for employment, research, further study and lifelong learning by developing their intellectual, problem-solving, practical and key (transferable) skills.

In addition the PG Diploma will enable the students to:

- provide students with an in-depth knowledge and understanding of the core elements of Network Security, Cryptography and Network Technologies for both secure and dependable computing;
- enable students to critically analyse a scenario, evaluate a range of solutions, and adapt and exploit a variety of strategies to ensure optimum system performance;

In addition the MSc will enable the students to:

- enable students to identify, locate and critically appraise secondary and primary sources as a basis for independent study, technical papers and a major research project.

B. Intended Learning Outcomes

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	Demonstrate a critical awareness of the current developments and future trends in cryptography and network security	B1	Depth of knowledge in the complex and specialised areas of Network Security and Cryptography and considerable breadth of knowledge across networking and secure & dependable computing	C1	Carry out subject related practical tasks
A2	Design and deploy a secure and dependable network infrastructure showing a detailed understanding of the underlying principles and practical techniques	B2	An ability to deal with complexity, lacunae and contradictions in a complex knowledge base using appropriate methods	C2	Encode/decode data with a variety of algorithms appropriate for different situations
A3	Analyse and specify security requirements, including: security polices and countermeasures for network services	B3	Independent evaluation of alternative approaches (including their own) together with the ability to accurately report this	C3	Use vulnerability assessment and auditing tools
A4	Demonstrate knowledge and understanding of relevant data communications standards	B4	A confident response to problems by autonomously synthesising information and ideas to provide appropriate solutions	C4	Configure a firewall and other network security mechanisms
A5	Awareness of the ethical, legal and professional issues in the deployment of security countermeasures and assessment tools			C5	Configure network properties for different types of network nodes
				C6	With Management Studies only: Plan and control the development of a business with an awareness of security

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 course is part of the University's Postgraduate Regulations (PR). Courses in the PR are made up of modules that are designated at level 7. Single taught modules in the courses are valued at 30 credits and the course contains a project that has 60 credits. The minimum requirement for a Postgraduate Certificate is 60 credits, for a Postgraduate Diploma 120 credits and a Masters Degree 180 credits.

The course offers the PG Certificate as an exit award only and is based on the student passing any coherent subset of the taught modules. The awards available are detailed in Section A and the requirements are outlined below. All students will be provided with the PR regulations in the student handbook.

The Courses are offered as 1 year full-time, and normally 2-3 years part-time. The modules are offered as two 1-week blocks several weeks apart. The full MSc course consists of an induction programme, 4 modules, and the project. Full-time students will complete the programme of study and assessment in 52 weeks.

The normal study pattern for part-time students is that they should complete 4 modules over a two to three year period and complete their project within the same period. Because of the structure of the course, part-time students may be able to commence the course at different times during the academic year after discussion with the Course Director of relevant issues, including the need for specific preparatory study.

Normally, each module will include approximately 60 hours contact time, followed by directed learning resulting in a total of 300 hours of student effort. The project is the equivalent of two modules and requires 600 hours of student effort.

Planning meetings will take place at the beginning of each teaching block to ensure there is no assessment overloading or bunching.

The course design fully considers all student groups. Delivery in 1-week blocks separated by several weeks enables part-time students to study whilst also meeting

their other commitments. Overseas students are also able to complete their degree within visa limitations.

A January intake is accommodated by ensuring that two, technical core modules are delivered in Teaching Block 2, and that option modules and the Business in Practice module is delivered in Teaching Block 1. This ensures that all students, including January starters taking 'with Business' pathways, can complete the individual project in the summer without disadvantage. Core modules have no pre-requisites and hence the different orders in which September and January intake will progress through the course does not pose a problem. However, for some critical material (for example, fundamental concepts in TCP/IP) we have additional teaching session scheduled. During Induction week in the semester preceding when the Data Communications module runs, a one day 'Introduction to Data Communications' session will be held. This will allow students to acquire a grounding of the principles of Data Communications that could be useful for other modules in their first semester studies.

To address advanced ethics and professional issues, these issues are addressed within the context of technical core modules taken before the project is conducted, specifically, within Network and Information Security, and the Individual Project.

E1. Professional and Statutory Regulatory Bodies

BCS, the Chartered Institute for IT

E2. Work-based learning

The industrial placements team, aided by the Employability Co-ordinator, helps to prepare the students for interview and work, for example, with mock interview sessions, CV workshops, and industry speakers on employers needs. Industry-hosted project dissertations are actively encouraged. It is the responsibility of individual students to source and secure such arrangements giving them more experience and employability skills after their MSc degree. In some of the modules, guest presentations by industrial speakers take place (subject to availability), including the opportunity to network and to make contact with potential future employers in the area of network security.

E3. Outline Programme Structure

The programme is made up of four modules each worth 30 credit points plus a capstone project worth 60 credits. All students will be provided with the University regulations and specific additions that are sometimes required for accreditation by outside bodies (e.g. professional or statutory bodies that confer professional accreditation). Full details of each module will be provided in module descriptors and student module guides.

Level 7 requires the completion of the three compulsory modules and one option modules. The complete list of option modules available will be determined annually and is subject to resourcing.

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MSc Network and Information Security

Level 7							
MSc Network and Information Security							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Cryptography and Applications	CI7100	30	7	1			
Data Communications	CI7110	30	7	2			
Network and Information Security	CI7130	30	7	2			
Project Dissertation	CI7000	60	7	1 and 2			
Optional Modules							
Mobile Security	CI7160	30	7	1			
Multimedia Communications	CI7120	30	7	1			
Wireless Communications and Networks	CI7150	30	7	1			

MSc Network and Information Security with Management Studies

Level 7							
MSc Network and Information Security with Management Studies							
Core modules	**Module code**	**Credit Value**	**Level**	**Teaching Block**	**Pre-requisites**	**Full Time**	**Part Time**
Business in Practice	CI7600	30	7	1		0	0
Cryptography and Applications	CI7100	30	7	1		0	0
Data Communications	CI7110	30	7	2		0	0
Network and Information Security	CI7130	30	7	2		0	0
Project Dissertation	CI7000	60	7	1 and 2		0	0
Optional Modules							
Mobile Security	CI7160	30	7	1		0	0
Multimedia Communications	CI7120	30	7	1		0	0
Wireless Communications and Networks	CI7150	30	7	1		0	0

D. Principles of Teaching, Learning and Assessment

The Course is designed to give students a balance of theoretical and practical experience.

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.

Formal lectures are used in order to give the students a good background understanding in the area and to develop the theoretical aspects. These are then often reinforced by practical sessions and/or industry specialists who contribute throughout the course in order to give informative insight into industry developments.

The practical workshops, open forums, newswires (e.g. CBDiForum, earthweb, ebiz) and group presentations are introduced into the modules to provide students with a detailed understanding of the approaches taken in industry. The students are often given an opportunity to work with a client organisation on their coursework thus enabling them to experience a real-life work environment and enhancing their employability.

The course ensures that the students are exposed to team working through group presentations, joint report writing, joint research and lab work. The students develop presentation and communication skills through these activities as well as practise analytical thinking, focused literature reviewing and academic essay writing, as part of their coursework portfolio. In this way, they also improve their research and evaluation skills.

The student is required to further explore and exploit the information given in the modules through guided self study.

Students will be given close guidance to select a project that is relevant to their background and specialisation. During the project, the student will be expected to apply the knowledge acquired during the course. Key skills in communication, presentation, literature search, problem analysis, project planning, report writing and solution justification are all part of the learning outcomes defined in this course.

Contact Time

The programme consists of modules in which the learning outcomes are achieved through a combination of scheduled tutor lead activities and practice. Scheduled contact time with students given within each module guide consists of lectures, tutorials, and practical sessions. Contact with staff often takes place in the context of giving feedback on assessed work but will not necessarily be scheduled. In addition to these there are daily drop-in sessions at the School's Academic Skills Centre where support is provided on a one-to-one basis.

StudySpace

StudySpace, the university's learning management system, is used extensively in all modules as a means of dissemination of lecture notes, worksheets, assignments, reference materials, links, videos and lecturer annotated slides. In this way it acts as a repository for learning materials to be used by the students for independent study and in addition in some modules, for formative and summative tests and surveys.

Assessment and Feedback

The use of a variety of assessment methods is adopted as an appropriate assessment strategy to ensure all aspects of learning outcomes are covered and achieved. In particular:

- A **portfolio of coursework assignments** is designed to develop analytical and practical skills in a student, while an
- An **unseen exam** is designed to develop skills required in problem solving situations, commonly found in practice.

The **formative assessment** is used to help students answer particular components of the assessment by giving them timely feedback on exercises specially designed to simulate the exam questions or elements of the coursework assignments. The **feedback** is provided in:

- A **written form** thus presenting an additional learning resource helping the student build the knowledge throughout the learning process and prepare for the summative assessment.
- The **exercises** may take various forms including:
    - small building projects,
    - essay writing or
    - analysing past exam questions

At the end of the course every student undertakes a **project dissertation** which is a significant activity that draws on and enhances the skills and knowledge developed throughout the programme. As such, the assessment places greater emphasis on ability to plan work, manage time effectively, and research background information, culminating in portfolio of written reports and an interview.

In the programme as a whole, the assessment components as outlined in the **Section C**, under the **Teaching/Learning and Assessment Strategies** heading are used in all of the modules.

Research Informed Teaching

The **Wireless Multimedia and Networking Research Group** carries out fundamental and applied research on wireless communications and networking, media streaming and closely related courses. 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. This expertise feeds directly into the content of the course maintaining its **state of the art currency**.

To further set the material in context and inspire our students, leading practitioners from industry are invited to give guest lectures and workshops.

Students are able to develop their research skills through an opportunity to **engage directly** in current research projects, in addition to the mandatory part of the curriculum that covers research methodology. They are also invited to actively participate **in research seminars** and presentations. These skills enable students to distinguish and present appropriate evidentiary information in an argument, which are greatly valued by employers.

Staff 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 Personal tutor to help and guide the student throughout the course
- A Module Leader for each module

Additional support is provided by the following specialist staff:

- 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
- StudySpace – a versatile on-line interactive learning management system available on the university's intranet

Support for Academic Skills

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

- Faculty-wide Student Support team
- SEC Study Skills (**S**^{3})
- Drop-in Programming Sessions (Java Aid, C++ Aid)
- Drop-in Maths Aid sessions

SEC Study Skills (**S**^{3}) 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 Student Support Team help students with any problem which has an effect on their studies. This can range from illness, problems writing an assignment, questions about academic regulations to serious confidential issues.

The students are introduced to all these mechanisms during induction sessions at the beginning of each new academic year. It is here that the students first encounter the university's computer network, which includes their personal access to StudySpace 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 course director/personal tutor 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 the mid-module and end-of-module reviews.

The Personal Tutoring Scheme

A **Personal Tutor** is allocated to each MSc student. Personal Tutors are recruited from the Course team – to ensure the students have the opportunity to benefit from various aspects of the profession that each individual academic brings. The personal tutors will meet with their students sufficiently frequently to maintain close communication and manage to provide information/advise on the matters relevant at the start of the course, address the progression and advise on the personal development leading to relevant career choices. Typically, there will be **at least 2 individual meetings per semester**, specifically at:

- The start of the semester/course to discuss the work patterns on the course and/or the choice of electives
- At the end of the teaching block to review the progress of individual students

There are also planned **group meetings** – one per semester – to discuss issues of common interest. At each of these meetings the students are encouraged to raise issues of their concern so that they can be resolved effectively and timely in due course.

Level 7: Getting the most out of the Masters

- To help students to make the transition to Masters level study and understand how to use feedback on the postgraduate course
- To encourage students to be proactive in making links between their course and their professional and/or academic aspirations
- To explore students' research aspirations

- To help students gain confidence in contributing to, and learning from, constructive peer review
- To encourage students to become part of a wider disciplinary and/or professional community
- To help students to prepare for the dynamics of supervision

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:

- Periodic review undertaken at the subject level
- Periodic review for professional accreditation by the BCS: The Chartered Institute for IT
- Boards of study with student representation
- Annual review and development
- 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, network security, and user experience.

Working on case studies designed to simulate the working environment, typically in teams, gives students experience of applying the theoretical concepts to practice in a professional manner. Furthermore, they have the opportunity to **work with client organisations** on real-life problems as part of their coursework assignments in modules, such as CI7130 Network and Information Security and/or their project dissertation. There is therefore an opportunity for a student to develop communication and interpersonal skills throughout the course. They learn about time management and the value of prioritising and planning by involvement in such projects and in the learning activities outlined in Section F above.

BCS – the Professional Chartered Institute for IT
As an accredited BCS degree course students are eligible to join as student members thereby providing them with another route in which to monitor current industry standards and needs. They are eligible for full membership on the successful completion of their degree and they can continue within the BCS to Chartered Information Technology Professional (CITP) status, providing proof of

experience in a competitive job market. It partially meets the accreditation requirements for CEng.

Curriculum, Employability and Practical Skills

Employability is signposted in the curriculum where the emphasis is on applying knowledge, developing practical skills and applying them in case studies as part of their coursework reports.

If students are already in employment, they are actively encouraged to share typical workplace issues during discussions in the class, and to use past or present scenarios from work for their projects.

The project dissertation enabling the student to showcase their ability to manage and develop their work. The course has several modules to choose from for the option module to cater to a broad range of careers ranging from system, network and security administration to security consultant. Students are recommended to discuss their choice with their course director with a view to employability and career pathway. (not management studies)

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:

Software Engineer	System Administrator	Business Analyst	Ph.D. Student
Software Manager	IT Administrator	Project Manager	Postdoctoral Student
Technical Manager	Network Administrator	Teaching Professional	Lecturer
Security Consultant	Security Administrator	Computer Security Professional	Researcher

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

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

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 7							
		CI7100	CI7110	CI7160	CI7130	CI7120	CI7000	CI7600	CI7150
Knowledge & Understanding	A1								
	A2								
	A3								
	A4								
	A5								
Intellectual Skills	B1								
	B2								
	B3								
	B4								
Practical Skills	C1								
	C2								
	C3								
	C4								
	C5								
	C6								

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