

Template C4



Programme Specification

Title of Course: *MSc Data Science*

Date first produced	24/07/2023
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Version number	3
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): <i>Up to 10 pathways</i>	MSc Data Science
Intermediate Awards(s) and Title(s): <i>There are 4 Intermediate awards for each pathway</i>	
Course Code <i>For each pathway and mode of delivery</i>	PFDSC1DSC20 PFDSC1DSC20
UCAS code <i>For each pathway</i>	

RQF Level for the Final Award:	
Awarding Institution:	Kingston University
Teaching Institution:	
Location:	Partner Institution
Language of Delivery:	English
Modes of Delivery:	Part-time Full-time
Available as:	Full field
Minimum period of registration:	Part-time - Full-time -
Maximum period of registration:	Part-time - Full-time -
Entry Requirements:	The minimum entry qualifications for the programme are: A good honours degree in a subject with significant computing science or mathematics/statistics content. Typical appropriate first-degree subjects would include: computer science (including software engineering or cyber security), mathematics, statistics, and engineering. Exceptionally applicants with qualifications that do not meet the requirements, but with considerable relevant professional experience will 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. Kingston University also approved the following mapping as equivalent alternatives to IELTS requirements for entry into franchised programmes to be delivered at ESOF in Sri Lanka; I. Local GCE O Level English language: Credit, Distinction or Very good pass II. ESOF English for Academic Purposes modules in reading, writing, listening and speaking: results which equate to our normal entry conditions in the following ways (*NB: The overall grade to be an average of the four skills module results.) IELTS ESOF 6.5 58+ 6.0 50-57 5.5 42-49
Programme Accredited by:	Non-accredited programme
QAA Subject Benchmark Statements:	The QAA subject benchmarks for Computing and Mathematics at Master's level
Approved Variants:	Compensation is not permitted in modules at Level 7. All Level 7 modules must be passed with a mark of at least 50%.
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 overarching aim of the MSc Data Science programme is to provide practically based education and training for students seeking employment in the position of Data Scientist, Data Analyst, Data Engineer and similar roles. The course offers postgraduate students with some background in computing, mathematics, or data-based investigation the opportunity to develop their skills in a way which will prepare them for careers in this fast-growing and exciting area which spans virtually all areas of commerce and industry as well as scientific research, and involves working with individuals and organisations to extract value from the ever-increasing volume of data that is available.

The principal aims of the MSc Data Science are:

- to equip students with the required knowledge, skills and attitudes to practice as professional data scientists now and in the future;
- prepare students for employment, research, further study and lifelong learning by developing their intellectual, problem-solving, practical and key (transferable) skills;
- to equip students with the knowledge and skills to critically evaluate, select and employ the most appropriate techniques for the analysis of data and presentation of information to assist in decision-making;
- to develop within students an appreciation of the legal, ethical, social, cultural and public implications associated with the management, analysis and presentation of data;
- to produce graduates who are able to conceptualise, critically evaluate and communicate information effectively and persuasively in oral, visual and written forms for a variety of 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 computational, mathematical and statistical techniques, and methods to interpret and represent data. With a balance of theory and practical application, this course builds on knowledge in relevant areas of statistics, data analysis, and programming.

B. Intended Learning Outcomes

The programme outcomes are referenced to the QAA subject benchmarks for computing and mathematics and the Framework 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		Intellectual Skills		Subject Practical Skills
	On completion of the course students will be able to:		On completion of the course students will be able to		On completion of the course students will be able to
A1	Specify and evaluate appropriate computational and statistical techniques applied to data science problems.	B1	Conceptualise, analyse, abstract and decompose problems to design and subsequently test and maintain effective models and solutions in data science.	C1	Use appropriate software to perform large-scale data analysis, visualisation, interpretation and prediction.
A2	Evaluate key ethical, legal, social and professional issues in applied data science.	B2	Synthesise information from disparate and potentially incomplete sources to create models, documents and other related artefacts for a professional audience.	C2	Collaborate and communicate effectively with other professionals/stakeholders to design, manage and deliver data science projects.
A3	Demonstrate a critical awareness of current developments and future trends in data science.	B3	Critically evaluate appropriate statistical methods and relevant computer applications, to assist in the solution of problems.	C3	Implement data science solutions using a variety of contemporary software environments.
A4	Analyse and critically evaluate different approaches to data and information representation, storage, transmission and presentation	B4	Build upon the practical application of skills to make a significant contribution as a data professional within an organisation.	C4	Keep up-to-date in the data science profession through relevant literature, research and using professional networks.
A5	Demonstrate an understanding of underpinning theory appropriate to the work of a data scientist.	B5	Deal confidently with complexity, lacunae and contradictions in a complex knowledge base using appropriate methods.	C5	Relate academic theory to practice, develop and practise key personal and employability skills and show examples of the application of these skills.
A6	Apply knowledge in a professional context, including understanding of their professional development and the structure of the placement	B6	Reflect critically on their experience during the professional placement, including research and information literacy, numeracy, management		

	organisation (With Professional Placement Only).		and leadership skills. (with Professional Placement Only).		
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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 operates within the framework of the University's Postgraduate Regulations. Courses in this framework 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 level 7 credits, for a Postgraduate Diploma 120 level 7 credits and a Master's Degree 180 level 7 credits.

The awards available are detailed in section A and the Technical Annex, below. All students will be provided with the postgraduate regulations in the student handbook on Canvas (the University's Virtual Learning Environment).

The course is offered as 1 year full-time, and normally 2 years part-time.

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-year period and complete their project within the same period.

Ethical, legal and professional issues relevant to Data Science are addressed within the context of the research methods part of the induction programme, the Individual Project and throughout the course. For example, ethics in the appropriate presentation of data and interpretation of statistics are discussed in the *Data Analytics and Visualisation* module, and legislation, security and related practices are part of *Databases and Data Management*.

Full details of each module will be provided in module descriptors and student module guides.

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.

The programme is made up of four taught modules each worth 30 credit points plus an individual project worth 60 credits. All students will be provided with the University Postgraduate Regulations. Full details of each module is provided in module descriptors and via the VLE.

MSc Data Science

Progression to Level 5

N/A

Progression to Level 6

N/A

Level 6 requires the completion of

N/A

Level 7							
MSc Data Science							
Core modules	Module code	Credit Value	Level	Teaching Block	Pre-requisites	Full Time	Part Time
Applied Data Programming	CI7340	30	7	1		1	1
Data Analytics and Visualisation	CI7330	30	7	1		1	1
Databases and Data Management	CI7320	30	7	2		1	1
Engineering Individual Project	CI7000	60	7	1 and 2		1	1
Machine Learning and Deep Learning	CI7521	30	7	2		1	1
Optional Modules							

Level 7 information

There are two entry points to the programme: September and January. The standard academic year starts from September, with TB1, followed by TB2 starting from January. January intake students will have the standard academic year's TB2 as their first teaching block, and the TB1 of the following academic year will be their second teaching block.

Taught module lectures and tutorials will be held from September to May each academic year. Students will work on their dissertation throughout the year.

Part-time students will normally complete their taught modules over the course one year and complete their dissertation between May and September of their second year.

Students exiting the programme with 60 credits are eligible for the award of PgCert in Data Science.

Students exiting the programme with 120 credits are eligible for the award of PgDip in Data Science.

D. Principles of Teaching, Learning and Assessment

The School's broad strategy of aiming for problem-centred teaching and accessible, relevant (authentic) artefact-based assessment (assessment of learning by doing/creating) was created in recognition of this. The course adopts the University's Inclusive Curriculum Design Principles to cater for this diversity and define the approaches to learning, teaching and assessment (LTA), pastoral care and employability with the following broad principles:

1. An inclusive curriculum with the student at the heart of the learning process encouraging choice in their focussed topics for investigation within the prescribed module assignment formats (where practical) and sharing experiences and perspectives within the course through discussion and presentation of results.
 - Module descriptors adopt problem-centred approaches which in turn facilitate an inclusive learning environment.
 - Curricula and approaches to LTA allow for expression of cohorts' experiences and perspectives, ultimately for sharing and shaping understanding together. Modules and the dissertation challenge students' epistemological and ontological approaches to the study of Data Science, including software and its legal, social and ethical aspects, data presentation and the impact on society and the interpretation of statistics, to develop approaches to critical evaluation of current and future knowledge.
 - Teaching sessions are problem-centred, predominantly workshop-based, and necessarily interactive to make best use of the intensive weeks of study interspersed with directed study. Workshops and the use of the VLE (or other cohort-inspired networking tools) allow students to investigate and share their understanding of new concepts, techniques and technologies. This approach is also designed to enhance their practical competency and confidence when dealing with a range of "users" (recognising the diversity of Data Science teams and roles).
 - The delivery is research informed, taking advantage of CSM's diverse research portfolio, dynamically updated in accordance with advances in the field.
 - Modules incorporate opportunities to explore current developments in the field, in practice and applied settings incorporating student perspectives, real world situations, problem solving and task-based learning. Content includes the opportunity for students to personalise the topics being explored and allow them to adapt summative assessments towards their personal interests and motivations, where practical, such as through the use of Data Science scenarios or appropriately-licensed datasets of personal interest in module assignments as well as the dissertation.

- Teaching teams draw on the academic strengths and research interests of staff and use invited speakers and experts from research and industry to bolster the curriculum. This offers students up-to-date learning experiences from experts in these areas.
 - Students complete their MSc by conducting an individualised capstone research project, designed in collaboration with the Data Science team.
2. Assessment *for* learning (rather than solely *of* learning) enabling an inclusive student perspective in their design and application, permitting a degree of individual choice and direction for assessed tasks work.
- All assessments have been designed at level 7, as appropriate for the Data Science MSc, to be inclusive, accessible, artefact-based and authentic to the field.
 - Students' induction at the start of the course includes an introduction to the language of UK HEI assessment and the tools used to measure the quality of their academic performance.
 - The assessment strategy aims to incorporate an element of choice within a carefully designed framework of assessments that align with the diversity of a Data Scientist's needs, and thus encourages students to be personally involved in their assessments. For example, students will have opportunities to choose to work with datasets reflecting their specialism or areas of interest in coursework assignments, provided the data is publicly available and appropriately licensed.
 - Students have formative tasks and feedback available within the workshops preceding all assessments. Teaching sessions adopt a range of activities (including practical tasks, case studies, group discussion, role play) to enrich the learning experience in a problem-centred, predominantly workshop-based setting, which directly supports the formulation of summative assessments.
 - Feedback on both formative tasks and summative work enables students to learn from assessment experiences, reflect alongside directed study and feed-forward that learning to future assessments, most critically to the final dissertation project.
3. An approach to the personal tutor system appropriate to the Data Science MSc, which provides opportunities for students to personalise their experience and track their academic and personal skills development.
- The Course Leader is the nexus of the postgraduate personal tutor system and normally acts as the formal Personal Tutor, supported day-to-day during intensive week-block teaching by the course's module leaders.
 - The Course Leader and/or Personal Tutor will meet with Data Science students regularly to provide guidance on assessment and personal development choices, discuss progress on the course, career plans, goals, development and recognition of personal and graduate attributes.

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 if required

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.
- An induction week at the beginning of each new academic session
- Student Voice Committee
- Canvas – a versatile on-line interactive learning management system available on the university's intranet

Support for Academic 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 Canvas and how to use it as a learning environment.

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 Student Voice 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 teaching block, specifically at:

- The start of the teaching block 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 teaching block – 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

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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
- Student Voice Committees (SVCs)
- School Education Committee
- Annual Monitoring and Enhancement
- Internal Subject Review undertaken at subject level
- Student evaluation including MEQs
- Moderation policies
- Feedback from employers

G. Employability and work-based learning

Data Science spans computing and mathematics subject areas. Qualifications in these disciplines are amongst the most versatile and enable graduates to find employment in a wide spectrum of careers ranging from systems and business analysts, through to programmers and network specialists in a wide range of public and private sector industries, as well as within specific Data Science and closely related roles. During the course, students will have gained proficiency and knowledge in applied programming,

statistics and visualisation and common industrial software environments that will enhance employment and lifelong learning opportunities in this area.

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

Employability is signposted in the curriculum where the emphasis is on applying knowledge, developing practical skills and applying them in mini projects representing typical workplace issues. During induction week students are encouraged to reflect on and identify what they have previously learned, whether academically or in terms of transferable skills, and how these may be relevant to their choice of subject discipline and employment opportunities. They are also encouraged to explore the job market and possible career paths at an early stage of the course, and to consider attributes that employers look for in graduates above and beyond essential academic skills. The students are then encouraged to continue to build on the key skill attributes learnt from their previous education and experiences, and focus on the importance of the following KU graduate attributes that are particularly relevant to Data Science: Creative and original thinking, being inventive and experimental, finding original solutions to problems, influencing change, being more resilient and self-aware and able to consider their actions in the context of the wider community. As the course progresses, students are further encouraged to develop clearer ideas about career options and are offered assistance and guidance in the preparation of a CV and for job applications and interviews. For students already in employment the course offers an opportunity to enhance their knowledge and to develop their practical, intellectual and key skills to assist them in their career development, obtaining recognition for current and acquired skills.

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

The Institute for Apprenticeships and Technical Education Data Scientist (Integrated Degree) Level 6 specification
<https://www.instituteforapprenticeships.org/apprenticeship-standards/data-scientist-integrated-degree/>

QAA Subject Benchmark Statement <https://www.qaa.ac.uk/quality-code/subject-benchmark-statements> for Computing and Mathematics at master's level (Data Science is akin to other joint courses combining aspects of computing, mathematics and statistics).

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				
		C17320	C17330	C17000	C17340	C17521
Knowledge & Understanding	A1					
	A2					
	A3					
	A4					
	A5					
	A6					
Intellectual Skills	B1					
	B2					
	B3					
	B4					
	B5					
	B6					
Practical Skills	C1					
	C2					
	C3					
	C4					
	C5					

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