LEEDS BECKETT UNIVERSITY

Course Specification

MSc Data Science

2018-19 (MDATS)

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Record of Enhancement

No.	Detail of modification	Date Effective
1	Validation of MSc Data Science 19-Oct-2017	Level 7: September 2018

Version Control

Version Control	
Version number and date effective	
For completion by Quality Assurance Services only:	
Next Re-validation date	

Target award, course title and programme code:
MSc Data Science (MDATS)

Level of qualification: Level 7
Interim awards available

Award	Title	Level
PG Dip	Data Science	7
PG Cert	Data Science	7

The award of a _distinction_ may be made to those students who have demonstrated excellent performance against the attainment of an average of 70% or more in assessments contributing to the final award.

The award of _merit_ may be made to those students who have demonstrated excellent performance against the attainment of an average of 60% or more in assessments contributing to the final award.

Course Rationale and Philosophy

The Digital Knowledge Economy is regarded as "fundamental to the UK's future prosperity" and there is an aim to be a global centre for the creative industries. "The strength of Digital Britain is in its strong network of universities, business and people and that this strength is multiplied when the country works together. The Government therefore encourages all sectors of the Digital Community to get involved in cross promoting the UK through the strategy to grow and enhance our digital proposition to the world." (Digital Britain 2015)

Data and information is recognised as a central in the economic, business and cultural life of our society today. At the heart of this is the recognition that data will continue to transform the modern world. A need for graduates within the information and data science area has been recognised by the government hence the recent STEM initiative which is designed to promote appropriate provision for areas of significant importance to the country's workforce requirements.

The strong industry requirement for advanced information and analytic skills, alongside research and data strategists within the local area is highlighted by the Northern Digital Jobs Strategy (see: https://technorthhq.com/events/digital-jobs-action-summit/) which aims to position Leeds as the digital powerhouse of the North. The continuing need for technology related positions has been highlighted by BCS.

Data and information are recognised as a key asset of a business. This course develops a comprehensive understanding of the role of data within a business, covering:
1. Data governance - how data can be sourced, consolidated and stored securely, responsibly and efficiently. The ethical considerations of data including algorithms, biases and quality, how this is documented and controlled.
2. Techniques to analyse data depending on the requirements and to present the information visually to ensure effective communication.
3. An understanding of how the data can contribute and influence a company's business and data strategy.
4. A focus on the application of data science in a specific field such as health, education, fraud or business.

The course is aimed at students already in work looking to enhance their understanding of the Data Science area or students with a general interest looking to learn more and perhaps move into roles more specifically aligned with Data Science and analytics.

The course has a strong theme of understanding, designing and critically evaluating the data in terms of security, ethics, data governance and

sustainability (linked with performance and reusability), this is of particular relevance in light of the EU's General Data Protection Regulation (GDPR) to be implemented from 25 May 2018. The GDPR applies to companies under two broad definitions: 'controllers' of data and/or 'processors' of data. The definitions are similar to those defined in the Data Protection Act 1998 (DPA). Controllers say how and why personal data is processed, and processors act on the controller's behalf. As a processor, the GDPR requires specific legal obligations and liabilities; for example, to maintain records of personal data and processing activities. A controller must ensure contracts with processors comply with the GDPR.

It has been designed alongside the University Education Strategy, ensuring that academically the students are supported on their learning pathway, this happens by way of learning activities aimed to develop critical thinking and an ability to apply the concepts to different contexts. The modules 'dovetail' designed to provide different views of the subject area alongside techniques and digital tools to assist with the process and presentation. All the tutors have research profiles in the area, ensuring that the students are not only exposed to new research, but appreciate the philosophy of research in academia and industry via the expertise of the staff.

We are aware of the importance of peers and community to support students on their educational journey, the students on the course are taught in small groups and encouraged to contribute in class and discuss their own research, experiences and thinking. There is a postgraduate room dedicated to the postgraduate students, we find that the students use this well to work and meet with each other.

The University Education Strategy (2016-21) is available from: http://www.leedsbeckett.ac.uk/staffsite/services/quality-assurance-services/supporting-information/the-education-strategy/

Overview and Aims:

Context of development

Data Science has a long history within our University having evolved from our areas of information management, knowledge transfer and systems development. In practical terms, data science is conducted by data managers who are part business-minded, part manager, part technologist and part data scientist. The role of these managers therefore falls into the following respective domains:

- As business-people, data managers are articulate, good communicators, presentable and have contact with the day-to-day business managers and their customers. They are primarily concerned with the information needed for activities such as strategic planning, production planning, market research, financial planning, product knowledge, legislation, archiving, competitive analysis

etc. They understand the potential, the tools and techniques to analyse the data and how best to present the information.

- As managers, they run businesses within businesses and are concerned with people, budgets and projects. They therefore need to deal with financial planning, human resource management, project management, technology planning, communications, decision analysis and control systems.

- As technologists, data managers are skilled in managing information technology and understanding big data. They need to know about technology, systems and how they work, what the latest trends are and the impact of it on the working environment. They also bridge the gap between "real technologists" and end users.

- As data scientists, data managers are able to think critically about the data, are skilled in activities such as information collection, analysis and presentation alongside the legal, ethical and data governance issues.

Our students may be working in one of these roles and looking to gain a wider appreciation, perhaps as part of their career strategy. The course outcomes develop all of these roles, the core modules provide a generic overview in information, data management and systems with option modules allowing the student to find a route that suits their own skills, aspirations and interest area. The dissertation/project allows for a specific area to be investigated deeply. The Project Management module ensures that all students graduate with skills enabling them to manage people and projects as would be expected from this MSc. Recent students have secured roles at NHS Digital Data centre, at Kirklees Council in data management and business intelligence, another set up her own data services consultancy business and another has gone on to study for a PhD in the area.

For each module students will normally receive a weekly lecture followed by a tutorial or practical lab based session(s). These are supplemented with a programme of guest speakers and industry led seminars. In addition all staff provide weekly drop in slots for students who need personalised learning support.

The module materials and support provided will encourage deep learning. Deep learning on master's level includes thinking critically, using literature effectively and developing distinct thoughts (see Post Graduate Course Development Principles). There are opportunities for considering research papers, articulating and critiquing different philosophies and reflecting across the learning experience and modules – this is available through core and elective modules. Challenging and industry related tasks will stretch students' capabilities and actively engage them in applying skills and knowledge for their future employment.

The course level assessment strategy will ensure support for the assessment of the course learning outcomes and provide a balance of assessment methods enabling students to progressively develop knowledge and expertise.

Course Learning Outcomes

1	At the end of this course, you will be able to demonstrate a systematic understanding of knowledge, and a critical awareness of current ethical, data governance and security problems and/or new insights, associated with the exploitation of information services and resources in organisations and to support collection, sorting and ordering of data, big data and information in an organisation;
2	At the end of this course, you will be able to critically evaluate and demonstrate originality and current research in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge about data and data management and management of computer systems which capture, process and transmit data;
3	At the end of this course, you will be able to deal with complex business issues both systematically and creatively, make informed professional judgements in the absence of complete data and information, implement and communicate their conclusions clearly to specialist and non-specialist audiences;
4	At the end of this course, you will be able to take responsibility for continuing to advance their knowledge and understanding, and to develop new skills to a high level – both generally (as appropriate to the holder of a masters level award) and specifically as related to the field of data science.

Course Structure

MSc Data Science Level 7	Core(Y)	CLO1	CLO 2	CLO 3	CLO 4
Database Systems	Y	√	√	√	
Critical Perspectives on Information	Y	√	√	√	√

Research Practice	Y			√	√
Dissertation /Masters Project	Y	√	√	√	√
Project Management	Y	√	√		√
Data Analytics and Visualisation	Y	√	√	√	√
Managing Information in the Digital and Global Environment;	N	√	√	√	√
Digital Security	N	√	√		√
Green Computing Strategies	N	√	√		√
Business Intelligence	N	√	√	√	√
Data Warehouse Models and Approaches	N	√	√	√	√
Cloud Computing	N	√	√	√	
Negotiated Skills Development	N		√		√

40	**Course Structure**
	Level 7
	In September, students will study modules delivered in Semester 1 structure, as shown below. Once both semesters' module deliveries are completed, the students will embark on their Dissertation and work towards their submission deadline in March/April. Students who begin their studies in January will start with Semester 2 modules. During the summer break students will be encouraged to work on research leading to their dissertation/project. Students will be encouraged to choose a project fitting their communities or organisations they have worked for or select one from a list of projects from academic provision which usually tend to be industrial-based. They are expected to select appropriate methodologies and technologies with respect to the project and client, whilst applying appropriate project management skills. All students are expected to present their outputs during the Dissertation conference.

Semester 1	Core	Semester 2	Core

Data Analytics and Visualisation (DAV) *This module introduces data analytics within the context of bid data using appropriate software. Concepts of big data, statistics and visualisation to present the data are covered.*	Y	Database Systems (DS) *This module introduces big data storage solutions, data integration, sourcing, documentation and quality considerations.*	Y
Project Management	Y	Critical Perspectives on Information *This module covers data control, data governance and ethical concerns.*	Y
The three core modules combine to form a strong 'data' theme and understanding together they inform and influence and information strategy. *The options allow students to develop their own skills towards:* *Big Data Strategy (suggestions: MIDGE, GCS or DWMA)* *Big Data Architectures (suggestions: Cloud Computing, DWMA, Digital Security)* *Big Data Analytics (suggestions: BI, Digital Security, DWMA)*			
Elective	*N*	*Elective*	*N*
*Research Practice(delivered in sem 1&2)*Y			Y
Elective Options (MIDGE) Managing Information in the Digital and Global Environment; Business Intelligence (BI)* Cloud Computing		Elective Options: Green Computing Strategies (GCS) Digital Security* Data Warehouse Models and Approaches (DWMA) Negotiated Skills Development (NSD)	
Semester 3			
Dissertation	Y		
NSD – allows students to identify an area relevant to themselves to study which has relevance to the course. *Only one of these may be selected for the course, as they are final year undergraduate modules.*			

NB - All option modules are indicative.

Contained awards available:

Contained Awards	Award	Title	Level
	PG Dip	Data Science	7
	PG Cert	Data Science	7

Length of programme, FT/PT and mode of study:

Programme	Length (years)	FT/PT (please specify)	Mode (campus based/DL or other)
MSc Data Science	Sept – 12 months Jan – 15 months	FT	Full-time
MSc Data Science	24 months	PT	Part-time

Learning and Teaching

The MSc Data Science course has been developed using the University Education strategy. (The full document is available from:
http://www.leedsbeckett.ac.uk/staffsite/services/quality-assurance-services/supporting-information/the-education-strategy/) and stipulates that "Leeds Beckett aims to be an excellent, accessible, globally engaged university contributing positively to a thriving Northern economy. Our Mission is to ensure we use our knowledge and resources to make a positive and decisive difference to people, communities and organisations." Our objective is to provide an **Excellent Education and Experience** to all our students. This is achieved on the MSc Data Science by:

- Ensuring the curriculum is relevant – we include Guest Lectures from local Companies in the area. Recently NHS Digital gave a talk on their Data Warehouse and Price Waterhouse gave a Guest Lecture on a project they are doing for the University around student attrition. Globally active research staff ensure new applications and innovations are represented.
- Ensuring the students are supported – the post graduate courses have a small number of students on them and a core staff team. We aim to create a strong course identity via a shared understanding of the course aims, outcomes and expectations. Students are made aware of how to contact us, via drop in sessions, email and assessment feedback opportunities. The postgraduate lab is available solely for them to ensure they have space to meet with each other. It is well used. We arrange social events and encourage social networking.
- Ensuring the teaching methods are appropriate. Leeds Beckett has been awarded "silver" status in the National Teaching Excellence Framework (TEF) (http://www.leedsbeckett.ac.uk/tef/) results, for the last three years running. The University is active in its research into Education and shares and supports staff in the design and delivery of modules. The postgraduate progression, engagement and feedback rates for this course are excellent.

The Course employs a wide range of learning opportunities and teaching methods, informed by curriculum review, research-based pedagogical approaches and continuous staff development. Innovative approaches to teaching, learning and assessment include the use of simulations, case studies, projects, practical work, work-based learning, formative face-to-face and online collaborative discussion,

collaborative and applied learning, projects, and practitioner informed teaching and student-led learning. Regular team meetings ensure that tutors are able to share and develop their understanding of the parts of the course in which they are not directly involved and understand the students profile better.

Scheduled sessions include the use of lectures, seminars, tutorials and practical laboratory sessions. Advantage is taken of both technology and supportive activities to ensure that effective learning takes place.

Students, on and off-campus are able to engage with the course director and module leaders through the pre-assigned availability times and social activities organised twice a year. A Facebook group and discussion boards within modules will allow them to develop supportive networks with other peers. As does the designated Postgraduate lab. Opportunities to celebrate the postgraduate students' achievements include the Postgraduate Showcase of project work and the Postgraduate Research Conference.

The University Postgraduate course development principles have been considered in the development of teaching and learning activities, approaches and assessment.
(see: https://teachlearn.leedsbeckett.ac.uk/teaching-and-learning-activities/course-design/design-a-new-course/course-development-principles/)

Learning and Teaching Approaches
In the ever changing technological world, the skills required to successfully manage and share an organisations' data, require employees that have good understanding of data issues, technology, people and business. All of these skills are addressed by modules on this course, placing our graduates at the forefront of the emerging digital economy and graduates can look forward to a wide range of career opportunities in the field of data science, data control, information management, knowledge management, business analytics, data analytics, databases, Knowledge Transfer Partnerships (KTP).

On completion of this course students may also proceed to PhD study.

In addition, students are also encouraged to undertake projects or volunteering opportunities with outside organisations. Students are also encouraged to undertake projects for external clients, where possible.

What is true of the UK is also true of other nations: indeed the Digital Britain report, Was in part a recognition that the UK needs to adopt the same priorities and initiatives as other parts of the world. Our masters provision is gradually seeing more home students enrol and we are actively developing strategy to encourage this.
(Digital Britain, 2009 available from:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/228844/7650.pdf)

The Shadbolt report which outlines recommendations for the upskilling the nation in computer science recommends post graduate study as a pipeline towards supporting further research.
(Shadbolt report, 2016 available from:
https://cphc.ac.uk/2016/05/16/shadbolt-review-published/)

Use of the Virtual Learning Environment
The University's Virtual Learning Environment (University VLE) is at the heart of all modules. The school has moved beyond the use of the VLE as a repository and now the breadth of University VLE's provision is used in collaborative work, 24/7 access, innovative learning and assessment activities. All modules make use of the university VLE, with most making extensive use by including a range of learning, teaching and assessment resources including module and assessment guides and workbooks. All modules are repurposed to include extensive materials (online journals, lecture notes and videos) which provide the opportunity for students to work at their own pace without the need for extensive lecturer contact.

Assessments are uploaded to the VLE for marking and feedback. Turnitin is used to detect possible plagiarism. Students receive their module marks via the VLE, as well as specific assessment feedback both formatively and summatively.

Specific examples of online learning include the use of e-portfolios for literature reviews and tracking prototype development, blogs, discussion boards to discuss deepen understanding of concepts and web conferencing for project meetings.

Graduate attributes (UG only)
N/A

Student Support Network

If you have a question or a problem relating to your course, your Course Administrator is there to help you. Course Administrators works closely with academic staff and can make referrals to teaching staff or to specialist professional services as appropriate. They can give you a confirmation of attendance letter, and a transcript. You may also like to contact your Course Rep or the Students' Union Advice team for additional support with course-related questions.

If you have any questions about life at our University in general, call into or contact the Student Hub on either campus to speak to our Student Experience Team. This team, consisting of recent graduates and permanent staff, are available to support you throughout your time here. They will make sure you have access to and are aware of the support, specialist services, and opportunities our University provides.

There is a Student Hub on the ground floor of the Rose Bowl at City Campus and one in Campus Central at Headingley. You can also find the team in the Gateway in the Leslie Silver Building at City Campus. The telephone number is 0113 812 3000, and the e-mail address is StudentHub@leedsbeckett.ac.uk.

Within MyBeckett you will see two tabs (Support and Opportunities) where you can find online information and resources for yourselves. The **Support** tab gives you access to details of services available to give you academic and personal support. These include Library Services, the Students' Union, Money advice, Disability advice and support, Wellbeing, International Student Services and Accommodation. There is also an A-Z of Support Services, and access to online appointments/registration.

The **Opportunities** tab is the place to explore the options you have for jobs, work placements, volunteering, and a wide range of other opportunities. For example, you can find out here how to get help with your CV, prepare for an interview, get a part-time job or voluntary role, take part in an international project, or join societies closer to home.

Academic Librarian Support

You can use 'my Hub' https://myhub.leedsbeckett.ac.uk/students/login which is an online resource available 24/7 where you can access information and guidance about a range of services, register and make appointments with Services, register for workshops and employability tutorials, search for job vacancies and use a range of careers resources.

Academic Librarians provide tailored information and literature searching sessions to students as part of their courses and also offer one-to-one appointments and drop in sessions for students. All new students are offered an induction session and follow up information skills teaching complemented by online guides, web pages and online tutorials to inform students of relevant resources and activities to support their programme of study.

Skills for Learning provides online resources, services and publications to enable students to develop their academic skills. The Skills for Learning website offers a wide range of generic learning and teaching resources on topics which include: academic writing, group skills, research, maths, critical awareness and reflective skills. Skills for Learning also provides drop-in workshops, customised classes, and group and one-to-one tutorial support in academic communication, maths and IT. http://skillsforlearning.leedsbeckett.ac.uk/

The Library purchases a range of quality electronic and print resources to support the curriculum, numbering over almost 500,000 items for 2015-16. Academic Librarians are responsible for the identification and selection of materials to support courses and research in their subject area. Many information and learning resources are acquired in electronic format where available, enabling simultaneous multi-user access 24/7 from both on and off campus. The Library has access to many bibliographic and full

text databases. The Resource Discovery Tool, "Discover" supplied by EBSCO, provides single search access for users to the whole range of information resources available through the University Library services. Other Information databases in this subject area are Sage, JStor, Zetoc, ProQuest Technology, Web of Knowledge etc..

The Library also works with other libraries to enable access for Leeds Beckett students and staff. For example, SCONUL Access provides access to resources in over 140 institutions across the country. An Interlibrary Loan service is available to staff, research students, taught masters students and undergraduates working on dissertations to facilitate access to information resources not held by The Library.

The Library opens 24/7 every day of the year providing over 2100 study places of which approximately 800 offer access to computing or multi-media facilities. Wireless networking is also available throughout The Library and wireless enabled laptops are available for loan. The i-print system offers multi-functional devices for printing, photocopying and scan to email, as well as the option to send to print from home computers or personal laptops.

The Library website, Library Online, provides access to information and resources available through The Library, including the support For Your Subject pages, information about library services, and a range of written and online Guides and Tutorials for further help and support.

Library Online http://libraryonline.leedsbeckett.ac.uk/pages/home

Discover http://libraryonline.leedbeckett.ac.uk/pages/resources/

For Your Subject guides:

http://libraryonline.leedsbeckett.ac.uk/pages/resources/for_your_subject

Library Guides and Tutorials:

http://libraryonline.leedsbeckett.ac.uk/pages/help/guides_and_tutorials

Assessment Strategy

In keeping with the Leeds Beckett Education Strategy and the Postgraduate course development principles which state that students should be offered opportunities via learning to: think critically, use literature effectively and develop their distinct thought through writing as well as to listen, reflect on, understand, synthesise and engage with alternative views (Casey et al, 2011 – see link below). A variety of assessment methods alongside the teaching and learning methods are used to ensure students meet the course and module learning outcomes. These include development of a product (web/mobile prototype/application), written assignments, VLE-based tests, Vivas, presentations, poster presentations and product demonstrations. This ensures there is a balance between assessment-types enabling students to develop expertise.

The assessment method is normally explained to student by their module tutor and the students is encouraged to investigate more about it. All students are strongly encouraged to use skills for learning website to learn more about dissertation writing, reflective reports, presentations etc. When appropriate, sample work is given or brought to the class for students' to examine.

Formative and Summative assessments are planned on an annual basis on to mitigate against bunching. This is carefully planned, so students do not have more than two assessments in the same week.

The course is designed with strong career themes that run through the modules. The assessment on modules builds on and reinforces these themes. A case study approach is often used to enable students to work with real-world scenarios. Each module provides individual assessment support via drop in sessions or planned formative feedback in class. Supervisors are assigned for the Dissertation supervision matching the supervisor expertise with the student's area of research.

The need for students to develop skills for employment such as formal report writing and presentations is recognised as part of the assessment strategy. For example the Project Management module will support students in developing skills such as leadership and project planning.

(see: https://teachlearn.leedsbeckett.ac.uk/teaching-and-learning-activities/course-design/design-a-new-course/course-development-principles/)

Feedback on Assessed Coursework

Formative feedback is scheduled on all modules, and strongly recommended to all students especially when there is only one assessment in the module.

Written feedback is given using clear assessment criteria and in many cases this is provided via the VLE. Interim summative assessment is used within individual modules to encourage engagement and build student confidence.

Module Assessment Methods

Module Titles	Core (Y)	Oral /Practical exam	Coursework	Report and reflective log	Interim report	report	Research log	Exam	Dissertation
Database Systems & Approaches	Y		X						
Data Analytics and Visualisation	Y		X			X			

Critical Perspectives on Information	Y			X	X				
Research Practice	Y	X	X						
Dissertation /Masters Project	Y	X							X
Project Management	Y					X		X	
Digital Security	N					X		X	
Business Intelligence	N	X				X			
Data Warehouse Models and Approaches	N		X						
Managing inform-ation in the Digital and Global Environment	N				X	X		X	
Green Computing Strategies	N			X				X	
Cloud Computing	N		X						
Negotiated Skills Development	N	X		X					

Employability and Professional Context

The course seeks to be accredited by the British Computer Society (BCS) –The Chartered Institute of IT. http://www.bcs.org/. It is due to be reaccredited by the BCS in 2018.

Input from Employers from relevant sectors is sought a number of times during the year to input into, advise upon and influence new provision; reflect on and update current provision and input into staff development and research.

Employers work directly with students through guest lectures the provision of professional development workshops, collaborative projects, showcasing events, and research events.

The Services for Students team provides a range of resources to support student employability. These can be found principally through:

The Leeds Beckett website which can be accessed via the Student Hub pages on www.leedsbeckett.ac.uk via the A-Z a range of topics are covered such as Career Planning, CVs and Applications, Interviews and Assessment Centres, Graduate Employment and Volunteering Opportunities, there is also a University based Job Shop. Additionally an overview of jobs overseas, visa requirements and vacancies are provided.

This team of experts can help students to make well-informed decisions about student and graduate employment or postgraduate study. Through their vacancy database, regular careers & jobs fairs and their employer links, students will be supported in accessing employment and further appropriate study opportunities. Practical help and resources are also available to assist in exploring and researching careers, job hunting and professional presentation in CVs, applications and interviews in an increasingly competitive market.

Work Related Activities

There are no explicit work related activities.
In keeping with the nature of a Masters students are able to undertake assignment directly related to their work or projects put forward by external clients.

Reference Points used in course design and delivery

All our courses leading to Leeds Beckett University awards have been designed and approved in accordance with UK and European quality standards. Our courses utilise the Frameworks for Higher Education Qualifications (FHEQ) and where relevant subject benchmarks (where these are available) and professional, statutory and regulatory body requirements (for professionally accredited courses).

We review our courses annually and periodically, responding to student feedback and a range of information to enhance our courses. Our University is also subject to external review by the Quality Assurance Agency. Our latest report can be found on the QAA web site at http://www.qaa.ac.uk/reviews-and-reports

We appoint External Examiners to verify that our University sets and maintains standards for awards which adhere to relevant national subject benchmark statements and the Framework for Higher Education Qualifications (UK), ensure standards and student achievements are comparable with other Higher Education Institutions in the UK, with which they are familiar, and ensure that assessments measure achievement of course and module learning outcomes and reach the required standard. External Examiners may also provide feedback on areas of good practice or potential enhancement.

Professional Bodies
Subject Benchmark(s) Statements
http://www.qaa.ac.uk/assuring-standards-and-quality/the-quality-code/subject-
   benchmark-statements

This award has been developed in the accordance to the QAA's Subject Benchmark statement for PG Computing benchmark. These have influenced the course learning outcomes, course design principles and teaching learning and assessment strategies.

The discipline of computing/IT includes study of the nature of computation, effective ways to exploit computation, and the practical limitations of computation in application terms. There is a rich set of aspects associated with the computing/IT discipline.

The course will offer fundamental concepts covering its use of
   1. ideas of abstraction and design, applied in the context of the domain knowledge
   2. life cycle and process concepts
   3. professional, legal, social, cultural and ethical concerns
   4. techniques associated with software construction and development, including the development of socio-technical systems
   5. exploring usability of computing systems, including multi-core processors and their exploitation; distributed systems, cloud computing
   6. methods and techniques for Data Science, based around sound principles for updating and maintaining information
   7. information systems, defined as 'what emerges from the usage and adaptation of the IT and the formal and informal processes by all of its users'
   8. systems concerns, as a disciplined recognition of the need to take an holistic perspective in the development of computing systems.

A mapping of the CLO's to the QAA benchmarks

1	At the end of this course, you will be able to demonstrate a systematic understanding of knowledge, and a critical awareness of current ethical, data governance and security problems and/or new insights, associated with the exploitation of information services and resources in organisations and to support collection, sorting and ordering of data, big data and information in an organisation ;QAA: 5.2
2	At the end of this course, you will be able to critically evaluate and demonstrate originality and current research in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge about Data Science and management of computer systems which capture, process and transmit data;

	QAA: 5.1
3	At the end of this course, you will be able to deal with complex business issues both systematically and creatively, make informed professional judgements in the absence of complete data and information, implement and communicate their conclusions clearly to specialist and non-specialist audiences;

QAA: 5.2, 5.3 |
| 4 | At the end of this course, you will be able to take responsibility for continuing to advance their knowledge and understanding, and to develop new skills to a high level – both generally (as appropriate to the holder of a masters level award) and specifically as related to the field of data science.
QAA:6 |

This master's award supports QAA's Subject Benchmark statements were a Computing/IT award is designed to cover a particular specialism or sub-discipline within computing in greater detail. The Data Science award includes the following:

- Emphasis on current professional practice
- Use of modern tools in new applications looking at visualisation and data representation
- The award is supporting students in gaining a subject specific knowledge, understanding and skills, which are transferable.

The Learning Outcomes for this program are designed to show a clear relationship to the subject of Computing/IT. This program accommodates students to enter with typically an honours degree or equivalent. The curriculum demonstrates integration between theory and practice of Data Science that address the needs of employers.

The Graduates from this level, award, are typically expected to be able to conduct a critical review of current literature and evaluate the technical, societal and management dimensions of databases, data analysis, gain a good knowledge and understanding of advanced aspects of Data Science and it's practice, based on current theory and practice, underpinning theoretical considerations with a strong emphasis on the underlying discipline of databases and their quality for principles of storing, processing and communication of information is considering appropriate Methods and Methodologies. A Student at this level is expected to have the ability to assess a system and have a good understanding of professional, legal, social, cultural and ethical issues related to the data privacy and an awareness of their societal and environmental impact.
(See: http://www.qaa.ac.uk/en/Publications/Documents/SBS-Masters-degree-computing.pdf)

The Framework for Higher Education Qualifications

The learning outcomes of the course map directly to the qualifications descriptor for higher education qualifications at level 7: Master's degree defined in QAA Framework for Higher Education.

Upon completion students will be able to demonstrate the following:

- a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study or area of professional practice. These are achievable through the Managing Information in the Digital and Global Environment, Database Systems, Critical Perspectives on Information, Systems, Designs and Innovation; and Dissertation modules.

- a comprehensive understanding of techniques applicable to their own research or advanced scholarship. These are achievable through all core and electives Green Computing Strategies and Green Computing Technologies modules.

- originality in the application of knowledge, together with a practical understanding of how established techniques of research and enquiry are used to create and interpret knowledge in the discipline. These are achievable through all core and electives Green Computing Strategies and Green Computing Technologies modules.

- conceptual understanding that enables the student:
  - to evaluate critically current research and advanced scholarship in the discipline
  - to evaluate methodologies and develop critiques of them and, where appropriate, to propose new hypotheses. These outcomes are collectively incorporated into the Managing Information in the Digital and Global Environment, Systems, Designs and Innovation, Critical Perspectives on Information, Mobile Application Development, Project Management, Research Practice and Dissertation modules.

- deal with complex issues both systematically and creatively, make sound judgements in the absence of complete data, and communicate their conclusions clearly to specialist and non-specialist audiences. These outcomes are collectively incorporated into the Managing Information in the Digital and Global Environment, Database Systems, Systems, Designs and Innovation, Critical Perspectives on Information, Data Warehouse Models and Approaches (SAS), Project Management, Research Practice and Dissertation modules.

- demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks at a professional or equivalent level. These outcomes are collectively incorporated into the Database Systems, Critical Perspectives on Information, Data Warehouse Models and Approaches (SAS) modules.

- continue to advance their knowledge and understanding, and to develop new skills to a high level. These are achievable through the Managing Information in the Digital and Global Environment, Database Systems,

Systems, Designs and Innovation, Critical Perspectives on Information and Dissertation modules.

- the qualities and transferable skills necessary for employment requiring:
  - o the exercise of initiative and personal the exercise of initiative and personal responsibility
  - o decision-making in complex and unpredictable situations
  - o the independent learning ability required for continuing professional development. These outcomes are collectively embedded into all the award's modules.

http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/FHEQ08.pdf

QAA Quality Code
The University's Academic Principles & Regulations and internal quality assurance infrastructure are fully informed by the expectations and requirements of the QAA Quality Code. Benchmarking of regulatory process against the expectations and requirements of the code is undertaken as appropriate to ensure that threshold standards are maintained and academic quality is enhanced.

Quality Assurance Agency (QAA) produced UK Quality Code for Higher Education sets a shared starting point for setting, describing and assuring the academic standards of higher education awards and the quality of the learning opportunities they provide. In particular this course the course meets Chapter A1 and A2 fully meeting the Level 7 descriptors for level 7 and meeting the Computing subject benchmark statements. The assessments are robust, valid and reliable and are based on the achievement of the intended learning outcomes, with thorough moderation processes ensuring student performance is properly judged, fulfilling A6 and B6. The teaching strives to be inspirational, working in partnership with students and promoting creative and transformational learning, satisfying B3. The course aims to motivate students to fully engage in learning, including independently and students are encouraged to participate in quality enhancement and quality assurance of the course, B5. The supportive environment and excellent learning resources fulfil B4.

Staff Teaching on the Course
You can find details of our highly qualified permanent teaching staff on our website, who are involved in teaching, research and administration associated with the course.

Regulatory Exemption details:
A condition to the BCS accreditation is that the students require some programming knowledge prior to the award.

Scheduled Non-Modular Contact Hours