

Programme Specification



1. Programme title	MSc Data Science MSc Data Science with Integrated Placement (15 months full time; 3 months work placement) MSc Data Science with Integrated Placement (24 months full time; 12 months work placement)
2. Awarding institution	Middlesex University
3. Teaching institution	Middlesex University Hendon, Malta, Dubai campuses
4. Details of accreditation by professional/statutory/regulatory body	
5. Final qualification	MSc Data Science
6. Year of validation	2018
Year of amendment	2019/20
7. Language of study	English
8. Mode of study	Full-time or Part-time

9. Criteria for admission to the programme

Applicants should normally have one of the following:

- A second class or higher honours degree in a computing discipline awarded by a UK university or a qualification deemed by the University to be equivalent.
- A second class or higher honours degree in an appropriate discipline (e.g. engineering or mathematics) with relevant knowledge of computing and significant

industrial experience.

International students whose first language is not English or who have not been taught in the English medium throughout, and whose first degree is not from a British university, must achieve an IELTS score of 6.5 or TOEFL 575 (paper based) 233 (computer based).

University policies supporting students with disabilities apply, as described in the Guide and Regulations, 'Information for Students with Disabilities'.

10. Aims of the programme

Data-Science and Data-Analytics are increasingly identified as key industrial activities; this is reflected, in human resourcing terms, within recently-minted job specifications such as “Data Scientist”, “Big Data Analyst” etc. University postgraduate course offerings have begun to reflect this industrial demand with a sudden expansion (especially within the last year) in courses catering to the Data Scientist job specification.

The Data-Science/Data-Analytics distinction is deployed rather loosely in the corporate sector as a whole, but Data Science, where specified, tends to lean more on machine-learning, regression and pattern recognition than Data Analytics per se; big data (ie algorithmic scaling) and visualisation are also explicit foci of Data Science. Data Analytics tends to be more ungrounded, by contrast; there is more of an emphasis on exploratory statistics than on modelling – data inspection, cleaning and transformation are particularly emphasised. Both are equally concerned with data mining and supporting decision making. Middlesex’s MSc offering in Data Science therefore also covers Data Analytics.

The curriculum for the MSc in Data Science is designed to offer those postgraduates with a familiarity in maths, science or computing an opportunity to develop a key set of skills for future employment in a way that builds on their existing knowledge and skill base. We thus anticipate that, on completing the course, postgraduates will be in a position to fulfill the requirements of the position of *Data Scientist*, which is rapidly becoming a required post for any company in the corporate sector that wishes to take full advantage of the data that they collect. The Middlesex Data Science M.Sc. focuses on the intertwining areas of *machine learning*, *visual analytics* and *data governance*, with the aim being to strike a balance between theoretical underpinnings, practical hands-on experience, and acquisition of industrially-relevant languages and packages. Students will also be exposed to cutting-edge contemporary research activity within data science that will equip research-oriented students with the potential to pursue a research-based career, and, in particular, further PhD study.

11. Programme outcomes*

A. Knowledge and understanding

On completion of this programme the successful student will have knowledge and understanding of :

1. Appraise the ideas and concepts underlying a selected set of advanced topics in data science

Teaching/learning methods

Students gain knowledge and understanding through a combination of traditional lecture delivery, small group discussions, small group and individual exercises, lab sessions and the individual project. Throughout their studies students are encouraged to undertake independent study both to supplement and consolidate what is being learned, and to

<ol style="list-style-type: none"> 2. Apply appropriate data science techniques to a given problem 3. Analyse, reason about and implement complex data science systems. 4. Appraise the professional, legal and ethical framework within which a data science professional must operate 	<p>broaden their individual knowledge and understanding of the subject. Critical evaluation and selection of techniques and solutions engage the students in relating theory to practice.</p> <p>Assessment methods Students' computing-related cognitive abilities (A1 through A4) are assessed by a combination of coursework, in- class tests and an individual dissertation. Coursework may comprise group and individual assignments, presentations and viva-voce examination.</p>
<p>B. Cognitive Skills On completion of this programme the successful student will be able to:</p> <ol style="list-style-type: none"> 1. Plan and apply appropriate techniques for the solution of problems in data science 2. Utilise a range of modelling and abstraction techniques for the specification and design of data science systems 3. Critically evaluate a range of data science methodologies 4. Plan and execute a challenging and substantial data science project by application of appropriate research methods 	<p>Teaching/learning methods Students learn cognitive skills through the teaching and learning strategy indicated in Section A. These abilities are nurtured in particular by self-directed learning, small group teaching and discussions, small group and individual exercises, laboratory sessions and the group project. Seminar sessions provide an opportunity to address questions, queries and problems.</p> <p>Assessment methods Students' cognitive skills (B1 through B4) are assessed by coursework and an individual dissertation. Coursework may comprise group and individual assignments, tests, presentations and viva-voce examination.</p>
<p>B. Practical skills</p> <ol style="list-style-type: none"> 1. Learn effectively and independently to acquire new knowledge and skills for the purpose of continuing professional development 2. Analyse complex problems systematically and implement effective solutions 3. Communicate effectively in writing, verbally and by presentation 	<p>Teaching/learning methods Students learn practical skills through the teaching and learning strategy outlined above. Although not all the skills are explicitly taught, they are nurtured and developed throughout the programme, which is structured and delivered in such a way as to promote this process.</p> <p>Assessment methods Students' practical skills (C1 through C6) are assessed by coursework and an individual dissertation. Coursework may comprise group</p>

<ol style="list-style-type: none"> 4. Effectively manage time and other resources 5. Reflect critically on her, or his, own work and that of colleagues 6. Display effective team working skills to make a positive contribution, as a member or leader, to the work of a group 	<p>and individual assignments, tests, presentations and viva-voce examination.</p>
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12. Programme structure (levels, modules, credits and progression requirements)			
12. 1 Overall structure of the programme			
CST4050 Modelling, Regression and Machine Learning	CST4060 Visual Data Analysis	CST4070 Applied Data Analytics – Tools, Practical Big Data Handling, Cloud Distribution	CST4080 Legal, Ethical & Security Aspects of Data Science
CST4053 Preparing for the Integrated Placement (compulsory for those taking CST4013 / CST4052)	CST4013 / CST4052 Postgraduate Work Experience (Option)	CST4090 Individual Data Science Project	

The programme is available in full-time and part-time mode in the UK.

The programme comprises four 30 credit taught modules and a 60 credit postgraduate project module. All modules are compulsory. Students enrolled on the programme ‘with integrated placement’ full-time in the UK also take either a 3 months or 12 months non-credit rated placement module. In preparation for the placement module, students must successfully complete the non-credit rated module CST4053 Preparing for the Integrated Placement.

The programme commences in the autumn term (October). Full-time students study the four 30-credit modules in parallel over a period of 24 weeks. Those students studying the programme with integrated placement full-time in the UK who take either the 3 months or 12 months non-credit rated placement module are required to successfully complete the non-credit rated module CST4053 Preparing for the Integrated Placement before they can progress on to one of the placement modules. Students then have the option of taking either a 3 months or 12 months non-credit rated placement module followed by the project module (60 credits). This will extend the programme duration to

either 15 months or two calendar years. Students not taking the placement module undertake the project module (60 credits) over the spring and summer terms to complete the programme in approximately one calendar year. Part-time students typically study two 30-credit modules in their first academic year of study followed by two further 30-credit modules. It is acceptable within the regulations of the learning framework for part-time students to study 30 credits (i.e., one module) in a given academic year provided the overall programme is completed within the specified timescale for part-time registration.

Details of each module can be found in the Programme Handbook.

Students must successfully complete all the modules of the taught part of the programme before they can register for the Project Module. Full-time students taking the placement module undertake this following successful completion of the taught part of the programme and before the Project Module.

12.2 Levels and modules		
Level 7		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
<p>Students must take all of the following:</p> <p>CST4050 Modelling, Regression and Machine Learning</p> <p>CST4060 Visual Data Analysis</p> <p>CST4070 Applied Data Analytics - Tools, Practical Big Data Handling, Cloud Distribution</p> <p>CST4080 Legal, Ethical & Security aspects of Data Science</p> <p>CST4090 Individual Data Science Project</p> <p>All modules are FHEQ Level 7</p>	<p>Full-time students in the UK may additionally take one of the following optional modules:</p> <p>Either CST4013 – Postgraduate Work Experience (3 months)</p> <p>Or</p> <p>CST4052 – Postgraduate Work Experience (12 months)</p> <p>In preparation for the above, students must successfully complete module CST4053 Preparing for the Integrated Placement.</p>	<p>Students must successfully complete</p> <p>CST4050, CST4060, CST4070, CST4080 and CST4053 before progressing to one of the placement modules.</p> <p>CST4050, CST4060, CST4070 and CST4080 before progressing to the individual project (CST4090) module.</p>

12.3 Non-compensatable modules (note statement in 12.2 regarding FHEQ levels)

Module level	Module code
7	CST4090

13. Curriculum map

See Curriculum Map Below

14. Information about assessment regulations

- Information on how the University formal assessment regulations work, including details of how award classifications are determined, can be found in the University Regulations at

<http://www.mdx.ac.uk/aboutus/Strategy/regulations/index.aspx>

- Practical aspects of the programme that are assessed by coursework may be carried out using specialist software and may include lab tests.
- Theoretical material is assessed by coursework and examinations.
- Grades are awarded on the standard University scale of 1–20, with Grade 1 being the highest. To pass a module all components, both coursework and examination, must be passed individually with a minimum grade of 16. Failure in one of the components will result in the failure of the module.

For additional information on assessment and how learning outcomes are assessed please refer to the individual module narratives for this programme.

15. Placement opportunities, requirements and support

- Students in the UK enrolled on the masters 'with integrated placement' undertake an industrial placement module (either a 3 months or 12 months placement).
- In preparation for the placement, students must successfully complete module CST4053 Preparing for the Integrated Placement.
- The placement will be secured through the students' independent work applications and with the support of our employability centre. In the case where appropriate work-placement has not been identified prior to the start of the module associated with the placement due to unsuccessful student application and/or suitability, students will be required to progress directly to the Project module.

16. Future careers (if applicable)

Successful students will be equipped with the potential to pursue research-based careers in data science, including the possibility of progressing to PhD programmes such as that offered by Middlesex

The job specification "Data Scientist" is now in common currency and reflective of

industrial demand; the course is designed to cater to the Data Scientist job specification.

17. Particular support for learning (if applicable)

For more information please check this link:

<http://unihub.mdx.ac.uk/study>

The School's Teaching and Learning Strategy is compliant with those of the University, in seeking to develop learner autonomy and resource-based learning. In support of the students learning experience:

- All new students go through an induction programme and some have early diagnostic numeric and literacy testing before starting their programme. The Learner Development Unit (LDU) provides one-to-one tutorials and workshops for those students needing additional support in these areas.
- Students are allocated a personal email account, secure networked computer storage and dial-up facilities
- A programme handbook is made available to students at enrolment (electronic copies for all students are available via virtual learning environment).
- New and existing students are given module handbooks for each module they study. Soft copies of all module handbooks can be found on Unihub. Web-based learning materials are provided to further support learning.
- Extensive library facilities are available at the base campus.
- Students can access advice and support on a wide range of issues from the Student Services Counter and the Student Information Desk. Student Advisers aligned to subject areas offer confidential one to one advice and guidance on programme planning (if applicable) and regulations.
- High quality specialist laboratories equipped with industry standard software and hardware where appropriate, for formal teaching as well as self-study.
- Tutorial sessions for each module organised for groups of up to 20 students are provided for additional teaching support.
- Formative feedback is given on completion of student coursework
- Past exam papers for all modules (which are assessed by examination) are available for students via Unihub.
- Research activities of academic staff feed into the teaching programme, which can, on some occasions, provide an opportunity for students to work with academics on some aspect of research.

Middlesex University encourages and supports students with disabilities. Some practical aspects of School of Science & Technology programmes may present challenges to students with particular disabilities. You are encouraged to visit our campuses at any time to evaluate facilities and talk in confidence about your needs. If we know your individual needs we'll be able to provide for them more easily. For further information contact the Disability Support Service (email: disability@mdx.ac.uk) or contact Sobia

Hussain on 020 8411 4945.

18. JACS code (or other relevant coding system)	I100, I460 and I210
19. Relevant QAA subject benchmark group(s)	Computing

20. Reference points
The following reference points were used in designing the programme: <ul style="list-style-type: none">▪ QAA computing subject benchmark statement▪ QAA framework for higher education qualifications in England, Wales and Northern Ireland▪ QAA Quality code▪ CLTE Learning and Quality Enhancement Handbook▪ University's regulations for postgraduate taught programmes▪ British computer society (BCS) guidelines on course accreditation▪ University equality and diversity policy document

21. Other information

Please note programme specifications provide a concise summary of the main features of the programme and the learning outcomes that a typical student might reasonably be expected to achieve if s/he takes full advantage of the learning opportunities that are provided. More detailed information about the programme can be found in the rest of your programme handbook and the university regulations.

Curriculum map for *MSc Data Science*

This section shows the highest level at which programme outcomes are to be achieved by all graduates, and maps programme learning outcomes against the modules in which they are assessed.

Programme learning outcomes

Knowledge and understanding	
A1	Appraise the ideas and concepts underlying a selected set of advanced topics in data science
A2	Apply appropriate data science techniques to a given problem
A3	Analyse, reason about and implement complex data science systems.
A4	Appraise the professional, legal and ethical framework within which a data science professional must operate
Cognitive skills	
B1	Plan and apply appropriate techniques for the solution of problems in data science
B2	Utilise a range of modelling and abstraction techniques for the specification and design of data science systems
B3	Critically evaluate a range of data science methodologies
B4	Plan and execute a challenging and substantial data science project by application of appropriate research methods
Practical skills	
C1	Learn effectively and independently to acquire new knowledge and skills for the purpose of continuing professional development
C2	Analyse complex problems systematically and implement effective solutions
C3	Communicate effectively in writing, verbally and by presentation
C4	Effectively manage time and other resources
C5	Reflect critically on her, or his, own work and that of colleagues
C6	Display effective team working skills to make a positive contribution, as a member or leader, to the work of a group

Programme outcomes													
A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6
Highest level achieved by all graduates													
7	7	7	7	7	7	7	7	7	7	7	7	7	7

Module Title	Module Code by Level	Programme outcomes													
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6
Modelling, Regression and Machine Learning	CST4050	☐	☐	☐		☐	☐	☐				☐	☐	☐	☐
Visual Data Analysis	CST4060	☐	☐	☐		☐	☐	☐				☐	☐	☐	☐
Applied Data Analytics - Tools, Practical Big Data Handling, Cloud Distribution	CST4070		☐	☐	☐	☐	☐	☐			☐	☐	☐	☐	☐
Legal, Ethical & Security aspects of Data Science	CST4080				☐	☐		☐		☐		☐	☐	☐	☐
Individual Data Science Project	CST4090	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐