

## Programme Specification



<b>1. Programme title</b>	MSc Data Science
<b>2. Awarding institution</b>	Middlesex University
<b>3. Teaching institution</b>	Middlesex University Hendon, Malta, Dubai campuses
<b>4. Details of accreditation by professional/statutory/regulatory body</b>	
<b>5. Final qualification</b>	MSc Data Science
<b>6. Year of validation</b>	2018
<b>Year of amendment</b>	2019/20
<b>7. Language of study</b>	English
<b>8. Mode of study</b>	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
2. Apply appropriate data science techniques to a given problem
3. Analyse, reason about and implement complex data science systems.

### 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 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.

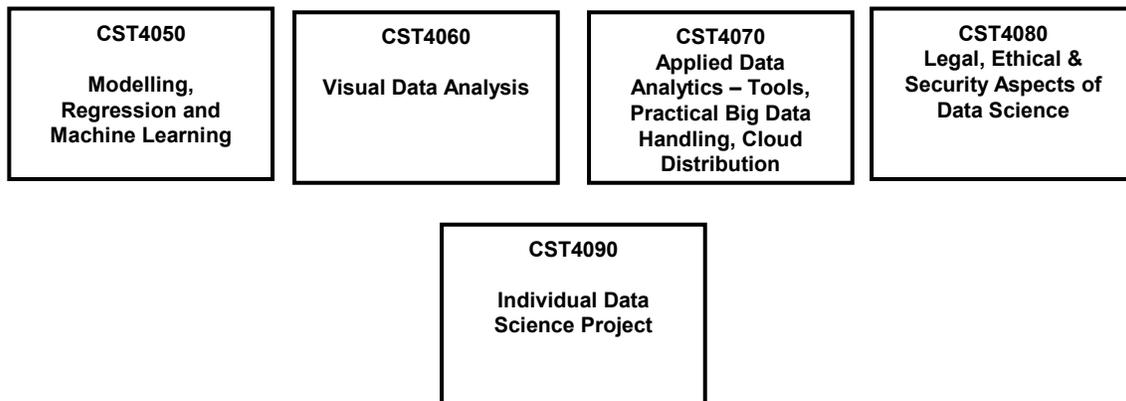
\*Online only while Covid restrictions apply.

<p>4. Appraise the professional, legal and ethical framework within which a data science professional must operate</p>	<p><b>Assessment methods</b>  Students' computing-related cognitive abilities (A1 through A4) are assessed by a combination of coursework, in-class (Due to COVID-19, these will be remote online tests) tests and an individual dissertation. Coursework may comprise group and individual assignments, presentations and viva-voce examination.</p> <p>Due to COVID-19 face to face sessions are going to be conducted online during the 2020/21 academic year.</p> <p>All sessions will be delivered online and recorded. The recorded sessions will be available for students who are unable to attend.</p>
<p><b>B. Cognitive Skills</b>  On completion of this programme the successful student will be able to:</p> <ol style="list-style-type: none"> <li>1. Plan and apply appropriate techniques for the solution of problems in data science</li> <li>2. Utilise a range of modelling and abstraction techniques for the specification and design of data science systems</li> <li>3. Critically evaluate a range of data science methodologies</li> <li>4. Plan and execute a challenging and substantial data science project by application of appropriate research methods</li> </ol>	<p><b>Teaching/learning methods</b>  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 (when COVID-19 restrictions apply, these will be remote and online) and the group project. Seminar sessions provide an opportunity to address questions, queries and problems.</p> <p><b>Assessment methods</b>  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>Due to COVID-19 face to face sessions are going to be conducted online during the 2020/21 academic year.</p> <p>All sessions will be delivered online and recorded. The recorded sessions will be available for students who are unable to attend.</p>
<p><b>B. Practical skills</b></p> <ol style="list-style-type: none"> <li>1. Learn effectively and independently to acquire new knowledge and skills for</li> </ol>	<p><b>Teaching/learning methods</b>  Students learn practical skills through the teaching and learning strategy outlined above. Although not all the skills are explicitly taught,</p>

<p>the purpose of continuing professional development</p> <ol style="list-style-type: none"> <li>2. Analyse complex problems systematically and implement effective solutions</li> <li>3. Communicate effectively in writing, verbally and by presentation</li> <li>4. Effectively manage time and other resources</li> <li>5. Reflect critically on her, or his, own work and that of colleagues</li> <li>6. Display effective team working skills to make a positive contribution, as a member or leader, to the work of a group</li> </ol>	<p>they are nurtured and developed throughout the programme, which is structured and delivered in such a way as to promote this process.</p> <p><b>Assessment methods</b></p> <p>Students' practical skills (C1 through C6) are assessed by coursework and an individual dissertation. Coursework may comprise group and individual assignments, tests, presentations and viva-voce examination.</p> <p>Due to COVID-19 face to face sessions are going to be conducted online during the 2020/21 academic year.</p> <p>All sessions will be delivered online and recorded. The recorded sessions will be available for students who are unable to attend.</p>
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## 12. Programme structure (levels, modules, credits and progression requirements)

### 12. 1 Overall structure of the programme



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. 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. Students 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.

12.2 Levels and modules		
Level 7		
COMPULSORY	OPTIONAL	PROGRESSION REQUIREMENTS
<p>Students must take all of the following:</p> <p><b>CST4050</b> Modelling, Regression and Machine Learning</p> <p><b>CST4060</b> Visual Data Analysis</p> <p><b>CST4070</b> Applied Data Analytics - Tools, Practical Big Data Handling, Cloud Distribution</p> <p><b>CST4080</b> Legal, Ethical &amp; Security aspects of Data Science</p> <p><b>CST4090</b> Individual Data Science Project</p> <p><b>All modules are FHEQ Level 7</b></p>	<p>There are no optional modules on this programme</p>	<p>Students must successfully complete 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

**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 (if applicable)**

Not applicable

**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. (Access to campus-based facilities will depend on Covid-19 related restrictions in place at the time, and in some instances online facilities may be used instead).
- 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. (Access to campus-based facilities will depend on Covid-19 related restrictions in place at the time, and so online facilities may be used instead).
- 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](mailto:disability@mdx.ac.uk)) or contact Sobia Hussain on 020 8411 4945.

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

<b>20. Reference points</b>
The following reference points were used in designing the programme:

- 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

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

