MSc Data Science

Programme Specification

1.	**Programme title**	MSc Data Science MSc Data Science with Integrated Placement (15 months) (Hendon only) MSc Data Science with Integrated Placement (24 months) (Hendon only)
2.	**Awarding institution**	Middlesex University
3a **3b**	**Teaching institution** **Language of study**	Middlesex University: Hendon; Dubai; Mauritius English
4a **4b** **4c**	**Valid intake dates** **Mode of study** **Delivery method**	September (all campuses) January (Hendon & Dubai only) February (Mauritius campus only) Full-time or Part-time ☒ On-campus/Blended ☐ Distance Education
5.	**Professional/Statutory/Regulatory body**	N/A
6.	**Apprenticeship Standard**	N/A
7.	**Final qualification(s) available**	MSc Data Science MSc Data Science with Integrated Placement (15 months) MSc Data Science with Integrated Placement (24 months) PGDip Data Science PGCert Data Science
8.	**Academic year effective from**	**2024/25**

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 with a minimum score of 6.0 in each band.

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. 4. Appraise the professional, legal and ethical framework within which a data science professional must operate	**Teaching/learning methods** Students gain knowledge and understanding through a combination of blended* 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. * The delivery mode will be blended, most sessions will be held on campus enhanced by a few online activities. **Assessment methods** Students' computing-related cognitive abilities (A1 through A4) are assessed by a combination of coursework, multiple choice questions and an individual dissertation. Coursework may comprise group and individual assignments, presentations and viva-voce examination.
B. Cognitive Skills On completion of this programme the successful student will be able to: 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	**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. The delivery mode will be blended, most sessions will be held on campus enhanced by a few online activities. **Assessment methods** Students' cognitive skills (B1 through B4) are assessed by coursework and an individual dissertation. Coursework may comprise

application of appropriate research methods	group and individual assignments, tests, presentations and viva-voce examination.
C. Practical Skills On completion of this programme the successful student will be able to: 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 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	**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. **Assessment methods** 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.

12. Programme structure (levels, modules, credits and progression requirements)

12.1 Structure of the programme

The programme is structured to accommodate both full-time study, which may include an industrial placement for 3 months and 12 months for students studying at the Hendon campus, and part-time enrolment. The standard University academic year consists of 24 weeks, divided into two semesters of approximately 12 weeks each. Students have the flexibility to commence the programme either in the Autumn semester (September) or the Winter semester (January).

The programme comprises 120 credits of compulsory taught modules and a 60-credit postgraduate project module. For an MSc award a total of 180 credits must be attained. For a PGDip (exit) award, 120 credits must be attained, i.e., all taught modules. For a PGCert (exit) award, a minimum of 60 credits must be attained and there is no restriction on which taught modules must be completed to make up those 60 credits. All taught modules are compulsory. Full-time students study the taught modules over a period of 24 weeks. Following

the completion of the taught modules, students undertake the project module (60 credits) over the next term to complete the programme in approximately one calendar year. The programme structure is illustrated below.

Programme structure (Full time)

Level 7 Semesters 1 & 2	CST4050 Modelling, Regression and Machine Learning (30 credits)	CST4060 Visual Data Analysis (30 credits)	CST4070 Applied Data Analytics – Tools, Practical Big Data Handling, Cloud Distribution (30 credits)	CST4080 Legal, Ethical & Security Aspects of Data Science (30 credits)
Level 7 Semester 3	CST4090 Individual Data Science Project (60 credits)			

Programme structure (Full time) (with Integrated Placement – Hendon campus only)

Year 1 Level 7 Semesters 1 & 2	CST4050 Modelling, Regression and Machine Learning (30 credits)	CST4060 Visual Data Analysis (30 credits)	CST4070 Applied Data Analytics – Tools, Practical Big Data Handling, Cloud Distribution (30 credits)	CST4080 Legal, Ethical & Security Aspects of Data Science (30 credits)
Year 1 Level 7 Semester 3	CST4090 Individual Data Science Project (60 credits)			
Year 2 Semester 1 (3 months) or All Year (12 months)	CST4840 PG Work Placement (3 months) (0 credits)		CST4850 PG Work Placement (12 months) (0 credits)	

Part-time students typically study 60 credits of taught modules in their first academic year of study followed by a further 60 credits of taught modules in the following academic year. It is acceptable within the regulations of the learning framework for part-time students to study 30 credits in a given academic year provided the overall programme is completed within the specified timescale for part-time registration. This will require a module registration schedule to be designed with, and approved by, the programme leader.

Students may advance to the project stage with a 30-credit deficit but must successfully complete all taught modules before registering for the placement. The duration of the postgraduate project is one semester for full-time and two semesters for part-time students.

12.2 Levels and modules		
Level 7		
Compulsory	**Optional**	**Progression requirements**
Students must take all of the following: **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 **CST4090** Individual Data Science Project **All modules are FHEQ Level 7** Full-time students registered on the placement programmes (Hendon campus only) must additionally take the relevant placement module as follows:	There are no optional modules on this programme	Students may advance to the project stage with a maximum of a 30-credit deficit. Before progressing to the placement module, students are required to successfully pass all taught modules.

Either CST4840 – Postgraduate Work Placement (3 months) Or CST4850 – Postgraduate Work Placement (12 months)		

12.3 Non-compensatable modules	
Module level	**Module code**
7	CST4090

13. Information about assessment regulations

This programme will run in line with general University 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

https://www.mdx.ac.uk/about-us/policies/university-regulations

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.

14. Placement opportunities, requirements and support (if applicable)

Industrial placement is offered as an optional opportunity for full-time students in the UK. Students can choose either a 3-month or 12-month placement duration.

Students are responsible for securing their placement through independent applications, with support available from our employability service, MDXWorks. If a suitable placement opportunity has not been identified before the start of the placement module due to unsuccessful applications or unsuitability, students will be transferred to the non-placement programme title upon successful completion of the project module.

15. Future careers / progression

Successful students will be well placed for a range of roles in the professional computing sector, and the strong research underpinning of the programme provides a platform for further research activity.

16. Particular support for learning

For more information please check this link:

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

The Department of Computer Science 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 Learning Enhancement Team (LET) 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 provided with electronic module handbooks for each module they study 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.
- Feedback is given on completion of all formative assessments.
- Where applicable, 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 Computer Science 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).

17. HECos code(s)	100 I100, I460 and I210

18. Relevant QAA subject benchmark(s)	Computing

19. Reference points

The following reference points were used in designing the programme:

- QAA computing subject benchmark statement (master's degrees in computing 2011)
- 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
- University equality and diversity policy document

20. 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.

21. 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	Programme Outcomes													
		A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	C5	C6
Modelling, Regression and Machine Learning	CST450	√	√	√		√	√	√				√	√	√	√
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	√	√	√	√	√	√	√	√	√	√	√	√	√	