Programme Specification (PG)

Awarding body / institution:	Queen Mary University of London
Teaching institution:	Queen Mary University of London
Name of final award and programme title:	MSc Data Analytics (PT)
Name of interim award(s):	PG Cert in Mathematics and PG Dip in Mathematics
Duration of study / period of registration:	2 years [part-time]
Queen Mary programme code(s):	PMSP-QMMATH1_PSDAN_G31B
QAA Benchmark Group:	7
FHEQ Level of Award:	Level 7
Programme accredited by:	
Date Programme Specification approved:	
Responsible School / Institute:	School of Mathematical Sciences

Schools / Institutes which will also be involved in teaching part of the programme:
N/A

Collaborative institution(s) / organisation(s) involved in delivering the programme:
N/A

Programme outline

This Data Analytics MSc will teach you the core mathematical principles of data analysis and how to apply these to real world scenarios. Building on the statistical foundations of machine learning you'll then choose from module options which explore the financial, business and scientific applications; such as in trading and risk systems, optimisation of business processes, and relationships across complex systems.

Data science is the driving force behind today's most successful businesses. In our data-driven economy, companies are seeking highly numerate data experts who can use statistical techniques and the latest technologies to extract clear insights to inform every aspect of their strategy and operations. From financial corporations, to AI start-ups, and across the technology, retail and healthcare industries, highly sought-after Data Scientists can earn over £56k per year on average (according to Indeed.co.uk, UK figures).

The programme is run by the School of Mathematical Sciences and is offered full time (one year) and part-time (two years). Full time students will take four modules per semester, followed by a dissertation.

Programme Title: MSc Data Analytics (PT)

Aims of the programme

The programme will provide students with:
- an understanding of the major theories, principles and concepts of data analytics
- a familiarity with some of the routine materials, techniques and practices of current data analytics as practiced in industry and research
- with the required skills for the gathering, basic analysis, and presentation of analysis of data, ideas, concepts and conclusions. Including the use of standard tools in data analytics.
- the ability to apply their skills in a number of different contexts

What will you be expected to achieve?

The outcomes are in line with the QAA Benchmark Standards for Mathematics, Statistics, and Operational Research (Masters'). Broadly, this includes:
- a good understanding of the mathematical foundations of Data Analytics as well as some state-of-the-art advanced techniques
- how to apply this understanding and techniques to compute with and analyze data
- able to choose appropriate techniques for different contexts
- able to communicate results and conclusions effectively
- be proficient in using standard software packages

This will include both theoretical underpinnings as well as practical experience.

The specific outcomes are listed below:;

Academic Content:	
A 1	Knowledge of the mathematical foundations of data analytics
A 2	Knowledge of the interpretation of results based on a mathematically rigorous methodology
A 3	Knowledge of methodologies for designing and carrying out experiments with data
A 4	Understanding statistical methodologies and their application
A 5	Understanding a project pipeline, including inception, planning, execution, and presentation of results
A 6	Knowledge of and specialisation in some applications of data analytics
A 7	Knowledge of current state of the art techniques and accepted best practices

Disciplinary Skills - able to:	
B 1	Achieve an understanding of mathematical and computational techniques for data analytics

B 2	Assess and interpret results of statistical analyses
B 3	Use core knowledge to investigate and learn new and emerging techniques in data analytics
B 4	Investigate data associated to an unfamiliar problem, and perform meaningful analysis of it
B 5	Using core principles to be able to able to work with different data modalities
B 6	Work effectively with computational and analytic tools

Attributes:	
C 1	Work effectively with computational and analytic tools
C 2	Ability to follow the literature and keep up with new developments
C 3	Ability to structure and produce high quality written material (develop transferable skills required to be effective in
C 4	Inform decision making using performed analyses
C 5	Investigate quantitative data confidently and competently
C 6	Be able to identify pertinent facts and trends from complex, often contradictory information
C 7	Integrate knowledge from many different fields

How will you learn?

The taught programme is designed to provide the students with the understanding and grounding needed to progress successfully through the MSc through to the dissertation. Lectures that provide the theoretical background will be balanced by coursework and a project that give the students the practical skills needed to undertake research projects. Following the courses will also prepare students to read, understand and evaluate current scientific literature, and prepare them for analysing data. The final dissertation project will teach students to manage their own study, perform research and produce scientific output at Masters level.

Throughout the whole academic year students are encouraged to undertake independent reading both to supplement and consolidate what is being taught and learnt and to broaden their individual knowledge and understanding of the subject.

Practical and computational skills are developed through coursework, the project work and through interaction with the other research students and the project supervisor.

Technical reports and presentations are taught and developed through workshops and feedback on written coursework, progress reports of the project and presentations. Use of the scientific literature is introduced by the Library during the induction week and then developed by academic staff through lectures on Research Methods, coursework, and reports and presentation of the individual supervised special project.

Transferable skills are built up through the teaching and learning programme outlined above. Effective communication is taught and assessed through workshops and feedback on the project reports and oral presentations. It is assessed through coursework, written examinations and project work.

Usage of information and communications technology is developed through workshops, computer based exercises, coursework activities, the project and other and individual learning.

Management of resources and time is developed throughout the course within a framework of coursework deadlines and the examination system. Moreover, the programme is structured and delivered in such a way as to promote independent learning with open mindedness and critical inquiry.

Throughout the project what is being taught and simultaneously assessed is management skills, the integration and evaluation of information from a variety of sources, and the transfer of knowledge techniques and solutions from one discipline to another.

How will you be assessed?

The assessment is by written examination and a written dissertation, in line with the regulations for projects/dissertations at Masters level. Where computational and programming skills are delivered, modules will have in-term assessed project work and coursework.

The project - a dissertation that counts for 60 credits written during the summer - starts early in January. It is assessed, on the basis of the individual literature review, main report and presentation, initially by the supervisor and second examiner, and then by the External Examiner and the full Examination Board.

How is the programme structured?

Please specify the structure of the programme diets for all variants of the programme (e.g. full-time, part-time - if applicable). The description should be sufficiently detailed to fully define the structure of the diet.

The programme consists of three compulsory taught modules and five elective modules, with an even split between semesters, as well as a summer dissertation project.

The compulsory mathematics modules will cover the most important core aspects of data analytics while the elective modules allow the student to tailor their learning experience according to their interests. Several of the modules are exclusive to this programme.

The programme will seek to give students a solid understanding of the mathematical underpinnings of the core techniques in data analytics while allowing them to gain breadth by choosing modules from statistical foundations, financial applications, and scientific applications of data analytics (taking modules from at least two of these areas) and gain depth in their dissertation. This includes a two module, year-long cycle of Machine Learning with Python and Advanced Machine Learning, which form the cornerstone of modern data analytics.

Semester A - Year 1
Two compulsory modules
MTH765P [7] Storing Manipulating and Visualising Data
MTH794P [7] Probability and Statistics for Data Analysis

Semester B - Year 1

Choose two from
MTH741P [7] Digital and Real Asset Analytics;
MTH750P [7] Graphs and Networks
MTH776P [7] Bayesian Statistics
MTH791P [7] Computational Statistics with R
MTH792P [7] Financial Data Analytics
MTH782P [7] SAS for Business Intelligence
MTH783P [7] Time Series Analysis for Business

MTH784P [7] Optimisation for Business Processes
MTH6139P [6] Time Series

The selection may include at most two of MTH782P, MTH783P and MTH784P. The selection may not include both of MTH6139P and MTH783P.

Semester C - Year 1

MTHM038 [7] Dissertation

Semester A - Year 2
One compulsory module
MTH786P [7] Machine Learning with Python

Choose one from
MTH739P [7] Topics in Scientific Computing
MTH766P [7] Programming in Python

Semester B - Year 2

Choose two from
MTH741P [7] Digital and Real Asset Analytics;
MTH793P [7] Advanced Machine Learning
MTH750P [7] Graphs and Networks
MTH776P [7] Bayesian Statistics
MTH791P [7] Computational Statistics with R
MTH792P [7] Financial Data Analytics
MTH782P [7] SAS for Business Intelligence
MTH783P [7] Time Series Analysis for Business
MTH784P [7] Optimisation for Business Processes
MTH6139P [6] Time Series
MTH767P [7] Neural Networks and Deep Learning

The selection may include at most two of MTH782P, MTH783P and MTH784P. The selection may not include both of MTH6139P and MTH783P.

Semester C - Year 2

MTHM038 [7] Dissertation

Academic Year of Study PT - Year 1

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Storing Manipulating and Visualising Data	MTH765P	15	7	Compulsory	1	Semester 1

Programme Title: MSc Data Analytics (PT)

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Probability and Statistics for Data Analysis	MTH794P	15	7	Compulsory	1	Semester 1
Digital and Real Asset Analytics	MTH741P	15	7	Elective	1	Semester 2
Graphs and Networks	MTH750P	15	7	Elective	1	Semester 2
Bayesian Statistics	MTH776P	15	7	Elective	1	Semester 2
Computational Statistics with R	MTH791P	15	7	Elective	1	Semester 2
Financial Data Analytics	MTH792P	15	7	Elective	1	Semester 2
SAS for Business Intelligence	MTH782P	15	7	Elective	1	Semester 2
Time Series Analysis for Business	MTH783P	15	7	Elective	1	Semester 2
Optimisation for Business Processes	MTH784P	15	7	Elective	1	Semester 2
Time Series	MTH6139P	15	6	Elective	1	Semester 2
Dissertation	MTHM038	60	7	Compulsory	1	Semester 3

Academic Year of Study PT - Year 2

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Mazchine Learning with Python	MTH786P	15	7	Compulsory	2	Semester 1
Topics in Scientific Computing	MTH739P	15	7	Elective	2	Semester 1
Programming in Python	MTH766P	15	7	Elective	2	Semester 1
Digital and Real Asset Analytics	MTH741P	15	7	Elective	2	Semester 2

Programme Title: MSc Data Analytics (PT)

Module Title	Module Code	Credits	Level	Module Selection Status	Academic Year of Study	Semester
Advanced Machine Learing	MTH793P	15	7	Elective	2	Semester 2
Graphs and Networks	MTH750P	15	7	Elective	2	Semester 2
Bayesian Statistics	MTH766P	15	7	Elective	2	Semester 2
Computational Statistics with R	MTH791P	15	7	Elective	2	Semester 2
Financial Data Analytics	MTH792P	15	7	Elective	2	Semester 2
SAS for Business Intelligence	MTH782P	15	7	Elective	2	Semester 2
Time Series Analysis for Business	MTH783P	15	7	Elective	2	Semester 2
Optimisation for Business Processes	MTH784P	15	7	Elective	2	Semester 2
Time Series	MTH6139P	15	6	Elective	2	Semester 2
Neural Networks and Deep Learning	MTH767P	15	7	Elective	2	Semester 2
Dissertation	MTHM038	60	7	Compulsory	2	Semester 3

What are the entry requirements?

An upper second class degree is normally required, usually in a STEM related subject (electronic engineering, computer science, mathematics, physics or a related discipline). Students with a good lower second class degree may be considered on an individual basis. Applicants with unrelated degrees will be considered if there is evidence of equivalent content in their academic or professional background. For international students we require English language qualifications IELTS 6.5.

How will the quality of the programme be managed and enhanced? How do we listen to and act on your feedback?

The Staff-Student Liaison Committee provides a formal means of communication and discussion between schools/institutes and its students. The committee consists of student representatives from each year in the school/institute together with appropriate representation from staff within the school/institute. It is designed to respond to the needs of students, as well as act as a forum for discussing programme and module developments. Staff-Student Liaison Committees meet regularly throughout the year.

Each school/institute operates a Learning and Teaching Committee, or equivalent, which advises the School/Institute Director of Taught Programmes on all matters relating to the delivery of taught programmes at school level including monitoring the application of relevant QM policies and reviewing all proposals for module and programme approval and amendment before submission to Taught Programmes Board. Student views are incorporated in the committee's work in a number of ways, such as

through student membership, or consideration of student surveys.

All schools/institutes operate an Annual Programme Review of their taught undergraduate and postgraduate provision. APR is a continuous process of reflection and action planning which is owned by those responsible for programme delivery; the main document of reference for this process is the Taught Programmes Action Plan (TPAP) which is the summary of the school/institute's work throughout the year to monitor academic standards and to improve the student experience. Students' views are considered in this process through analysis of the NSS and module evaluations.

What academic support is available?

The Postgraduate Taught Programmes Officer and Student Support Officer in SMS will run the induction programme. The Senior Tutor in SMS will assign an adviser to each student on the programme - initially this will be the Programme Director but as numbers increase, we expect other staff will also advise students on the programme. The Student Support teams in SMS will ensure that students feel able to consult staff to resolve any difficulties as they arise.

Course representatives from the new programme will attend the Postgraduate Student-Staff Liaison Committee in SMS. The programme review will be overseen by the Director of Taught Programmes in SMS and the SMS Education Committee.

Programme-specific rules and facts

N/A

How inclusive is the programme for all students, including those with disabilities?

Queen Mary has a central Disability and Dyslexia Service (DDS) that offers support for all students with disabilities, specific learning difficulties and mental health issues. The DDS supports all Queen Mary students: full-time, part-time, undergraduate, postgraduate, UK and international at all campuses and all sites.
Students can access advice, guidance and support in the following areas:
• Finding out if you have a specific learning difficulty like dyslexia
• Applying for funding through the Disabled Students' Allowance (DSA)
• Arranging DSA assessments of need
• Special arrangements in examinations
• Accessing loaned equipment (e.g. digital recorders)
• Specialist one-to-one "study skills" tuition
• Ensuring access to course materials in alternative formats (e.g. Braille) • Providing educational support workers (e.g. note-takers, readers, library assistants)
• Mentoring support for students with mental health issues and conditions on the autistic spectrum.

Links with employers, placement opportunities and transferable skills

The Data Analytics MSc programme will prepare students for a range of careers dealing with data, especially in the information technology sector, as well as public health, finance, public services, marketing, consultancy and commerce. The analytic and computing skillsacquired through the programme are much valued in the financial sector and a number of recent graduates from the School of Mathematical Sciences have gone on to work for companies such as the Royal Bank of Scotland, HSBC, Procter and Gamble, Barclays Capital, JP MorganChase and EDF Energy. During the project phase of the MSc, the students will have the opportunity to define their project in collaboration with our external collaborators.

Programme Specification Approval

Person completing Programme Specification:	Simon Rawstron (ESM-Education Services Manager), Shabn
Person responsible for management of programme:	Shabnam Beheshti, DoE
Date Programme Specification produced / amended by School / Institute Learning and Teaching Committee:	16 Feb 2023
Date Programme Specification approved by Taught Programmes Board:	