LIVERPOOL JOHN MOORES UNIVERSITY

Programme Specification Document

Approved, 2022.02

Overview

Programme Code	35895
Programme Title	Data Science
Awarding Institution	Liverpool John Moores University
Programme Type	Masters
Programme Leader	Ivan Baldry
Link Tutor(s)	

Awards

Award Type	Award Description	Award Learning Outcomes
Alternative Exit	Postgraduate Certificate - PC	Engage with advanced levels of theoretical and practical aspects in a range of topics in Data Science Explore and evaluate appropriate research methodologies. Demonstrate appropriate levels of critical analysis, reflection and contextual awareness in selected areas.
Target Award	Master of Science - MS	See Learning Outcomes Below
Recruitable Target	Master of Science - MS240	See Learning Outcomes Below
Alternative Exit	Postgraduate Diploma - PD	Engage with advanced levels of theoretical and practical aspects in a wide range of topics in Data Science Devise and synthesise appropriate research methodologies. Plan a relevant research and/or development project. Demonstrate creativity in critical analysis, reflection and contextual awareness in a wide range of topics including working in unfamiliar problem domains.

Alternate Award Names	

External Benchmarks

Subject Benchmark Statement	

Programme Offering(s)

Mode of Study, Mode of Delivery	Intake Month	Teaching Institution	Programme Length
Full-Time, Face to Face	September	LJMU Taught	1 Years

Aims and Outcomes

Educational Aims of the Programme

Data science is an emerging discipline that extends the field of statistics to incorporate advances in computing, especially with large quantities of data. It is a growing area of demand at both undergraduate and postgraduate level, with a predicted scarcity of expertise forecast over the next decade. There is a need for a level 7 programme to serve as a specialisation and conversion course aimed at numerate graduates aiming for industrial and academic positions in the Data Science marketplace. To satisfy this need, the programme needs to combine data analytics with big data computing. These areas of expertise are covered by the Astrophysics Research Institute and the School of Computer Science and Mathematics. The MSc is therefore founded on a strong foundation at LJMU of research activity in data analysis and big data computation.

The aim of the programme is therefore to provide training in the skills and techniques of modern data science and give the student the ability to apply those skills and techniques to create solutions to research and business problems. The students will gain an understanding not just of how to apply the techniques and skills, but also their limitations and how to synthesise their combination to gain greater insights.

Learning Outcomes

Code	Description
PLO1	Demonstrate a thorough knowledge of the statistical techniques used in data science.
PLO2	Critically review research literature and communicate with peers.
PLO3	Collate, analyse and interpret large data sets.
PLO4	Be able to adapt knowledge and skills to unfamiliar problem domains.
PLO5	Break down complex problems into a logically structured set of achievable tasks, for work alone or as part of a team.
PLO6	Communicate effectively, both written and verbally, to expert and diverse audiences.
PLO7	Demonstrate a clear understanding of the legal, ethical and data protection issues in data science.
PLO8	Demonstrate practical experience of the solution of problems in data science using modern computational languages and techniques.

Code	Description
PLO9	Show originality in the application of knowledge, together with a practical understanding of the critical evaluation of research, scholarship and methodologies within data science.
PLO10	Demonstrate the application of statistical, machine learning and data visualisation techniques to familiar and unfamiliar problems in data science.
PLO11	Demonstrate the application of big data computing technologies and techniques.
PLO12	Critically evaluate information from a variety of sources, and draw and defend conclusions
PLO13	Apply planning, research methodology and analytical skills to an in-depth study of a chosen research area
PLO14	Analyse and solve set problems, choosing the appropriate techniques and technologies.

Programme Structure

Programme Structure Description

To obtain a Master of Science degree in Data Science, the students must acquire 180 credits at level 7 (six 20-credit modules and the independent research project 7030DATSCI). Intermediate awards are the Postgraduate Certificate in Data Science (60 credits at level 7 from three 20-credit modules) and the Postgraduate Diploma in Data Science (120 credits at level 7 from any modules apart from 7030DATSCI). Students that wish to undertake an additional 60 credits, to form part of a 240-credit MSc, can study the additional module 7031DATSCI (this can be included towards a Diploma if the MSc is not obtained).

Programme Structure - 180 credit points	
Level 7 - 180 credit points	
Level 7 Core - 180 credit points	CORE
[MODULE] 7010DATSCI Introduction to Data Analytics Approved 2022.02 - 20 credit points	
[MODULE] 7011DATSCI Statistical Methods in R Approved 2022.01 - 20 credit points	
[MODULE] 7012DATSCI Big Data Computing Approved 2022.01 - 20 credit points	
[MODULE] 7020DATSCI Research Methods in Data Science Approved 2022.02 - 20 credit points	
[MODULE] 7021DATSCI Machine Learning and Data Mining Approved 2022.01 - 20 credit points	
[MODULE] 7022DATSCI Efficient algorithms for complex data sets Approved 2022.01 - 20 credit points	
[MODULE] 7030DATSCI Data Science Project Approved 2022.03 - 60 credit points	
Level 7 Optional - No credit points	OPTIONAL

Module specifications may be accessed at https://proformas.ljmu.ac.uk/Default.aspx

Teaching, Learning and Assessment

Acquisition of knowledge through lectures, seminars, practicals, directed reading, focused literature review exercises, coursework assignments, student discussion groups and tutorials.

Testing of the knowledge base is through a combination of continuous assessment methods, short and extended computer based assignments, formal written examinations, project report or dissertation, and oral presentations.

Analytic, mathematical and problem solving skills are developed through self-learning assessments, focussed literature review exercises, written assignments and tutorials.

The Research Project will involve both experimental and literature research, further developing skills of research methodology, critical analysis and discussion.

Analysis and problem solving skills are assessed through computer based assignments and written examinations. Experimental and analysis research skills are assessed in the presentation of the Project together with an oral defence.

Practical experimental skills, preparing a high-level technical report and giving a technical presentation are developed through the Research Project and Research Methods modules.

Computational and programming skills are embedded in every module and will be developed throughout the programme.

Project proposal and report, computer based coursework assignments and examinations, oral presentation.

Transferable skills are embedded on the programme. Skills are learned through completion of written assignments, participating in tutorials and collecting and transferring data via computer networks and from on-line databases, and through the Data Science Project.

As part of the research methods and project modules, the students will be encouraged and assisted to develop a professional on-line presence.

Skills are developed through self-assessment exercises, coursework and the oral and written "pitches" of research proposals and projection management plan. Tutorials and feedback assist and improve the level of skill achieved.

Opportunities for work related learning

There are no external placements during the programme. However business skills of project development, management, implementation and presentation are embedded throughout the course. As part of the Research Methods (7020DATSCI) module the students will have developed a business case/research proposal and project management plan which they will have "pitched" both in oral and written form. The subsequent three month research project (7030DATSCI) can be viewed as a placement within an academic department to carry out research. Each student will be allocated to one or more supervisors who will act as their line manager(s) for the project. The supervisors can have complementary skill sets in the problem domain and the data science methods. Weekly one hour meetings of the supervisors and student will monitor progress and provide opportunities for developmental feedback. The aim is to run the projects in the same fashion as either an academic or industrial project is done externally. As part of the research methods and project modules, the students will be encouraged and assisted to develop a professional on-line presence. The Work Based Project (7031DATSCI) module will help consolidate knowledge and skills required to apply data science to real-world problems.

Entry Requirements

Type	Description
Alternative qualifications considered	Undergraduate honours degree (2:2 or better) in a numerate, scientific or computer based subject. Plus A level or equivalent in Mathematics at Grade C or above. Individual cases will be considered on their merit. LJMU welcomes applications from international students. In addition to normal entry requirements, you will be expected to demonstrate a very good level of English language competence, for example an IELTS score of 6.5 or equivalent with a minimum of 6.0 in each component or the award of a degree within the last two years from a recognized UK higher education provider.