MSc Data Science

Programme Specification

1. General Information

UCAS Code	Award	Programme Title	Expected Duration	Study Mode
N/A	MSc	Data Science	1 year 1.5 years 2 years	Full-time Part-time 1 Part-time 2
		Programme Code		
		UK-LIBF-MADSC		
	Exit Awards	• Postgraduate Diploma • Postgraduate Certificate		

Credit Count	**180 FHEQ credits**
Awarding Institution	The London Institute of Banking & Finance
Teaching Institution	The London Institute of Banking & Finance
Delivery Modes	• Face-to-face • Blended • Online - Synchronous • Online - Asynchronous

Date of original production: Month Year	**Date of current version:** Month Year
Record of modifications: 1) Month Year, 2) Month Year, 3) Month Year	

2. Programme Overview

Programme Summary

Digitalisation has led to significant advances and changes to economies and societies around the globe. With Data Science being one of the core disciplines of digitalisation, there is an ever-growing demand for specialists in this area who can effectively manage, oversee, and advance data-driven processes and support businesses in optimising operations, increasing efficiency, and innovating on the basis of digitalisation.

The MSc Data Science fosters innovation by preparing you for a career in Data Science and data-science related fields. The programme is designed to provide you with advanced knowledge of mathematics, statistics, and programming, combined with data science fundamentals. A selection of elective modules provides the possibility to gain insights into industry-relevant fields and practical application areas of data science.

Programme Aims

The MSc Data Science aims to

- provide you with advanced knowledge and a systematic understanding of the key principles and leading concepts of data science and related fields, including mathematics, machine learning and statistics.

- equip you with a comprehensive and critical understanding of the complex theoretical and leading practical concepts in data science such as machine learning and deep learning theory, software, and model engineering.

- develop your ability to critically evaluate and appropriately apply the learned theories and skills to a wide variety of problems and scenarios, complex new contexts as well as practical areas of application.

- enhance your critical thinking and research skills, enabling you to critically analyse current data science research, concepts, and practices and to autonomously propose novel approaches and original hypotheses to solve problems.

- give you a critical insight and understanding of novel developments and current issues in data science and enhance your ability to broaden your knowledge of new developments in industry-relevant fields through a process of independent and self-directed learning and effective communication with a wide variety of stakeholders and audiences.

Employability & Graduate Outcomes

Graduates of this programme are likely to pursue careers in a number of areas in the data science sector including data engineering, data analytics and consulting. This programme of study should support graduates in developing the following employability skills:

- digital, technical, and statistical literacy
- high level of numeracy
- communication skills
- creative thinking and problem-solving skills
- analysis and critical thinking skills
- adaptability and continuous learning

3. Intended Learning Outcomes of the Programme

This programme has been developed in accordance with the QAA Subject Benchmark Statement for Computing (C) (2022).

Please note: The programme's intended learning outcomes below are described at Masters level (Level 7).

On successful completion of this programme, you will be expected to:

LO1	Demonstrate a systematic understanding of the key principles, leading concepts, and theories of data science and related fields, in particular mathematics, statistics, and machine learning. (C 4.14)
LO2	Demonstrate a critical awareness of current research topics and recent developments and leading trends in the field, including a comprehensive understanding of the ethical and social implications of data science and an understanding of the professional and ethical responsibilities of data scientists and how this informs their work. (C 4.14)
LO3	Demonstrate a comprehensive understanding of complex theoretical and practical concepts in data science, such as machine learning and deep learning theory, software and model engineering, and be able to critically analyse and evaluate them. (C 4.14)
LO4	Critically evaluate and analyse relevant research, formulate appropriate research questions and hypotheses and apply advanced critical thinking and problem-solving skills to complex data science challenges, exercising initiative and judgement to develop innovative solutions. (C 4.14)

LO5	Critically assess and evaluate the validity, completeness and reliability of data and models, identify sources of error and uncertainty, and apply appropriate quality assurance techniques. (C 4.14)
LO6	Synthesise and evaluate complex data sets, models, and algorithms to extract meaningful insights and conclusions. (C 4.14)
LO7	Evaluate, critically assess the suitability, and select appropriate use-cases for specific data analysis tasks in different contexts and domains and demonstrate the ability to select apposite methodological approaches for their implementation. (C 4.14)
LO8	Demonstrate a comprehensive understanding of the relevant data science techniques and be able to apply advanced data science techniques and algorithms to different types of data, including structured and unstructured data, using the Python programming language. (C 4.14)
LO9	Analyse and interpret complex data using advanced statistical methods and machine learning techniques, including deep learning, neural networks, and Bayesian statistics. (C 4.14)
LO10	Critically design and develop robust data pipelines and workflows using current computing platforms and data technologies. (C 4.14)
LO11	Develop, implement, and apply advanced statistical and machine learning models using different tools and frameworks. (C 4.14)
LO12	Apply effective project management and problem-solving skills in the context of data science projects by dealing with complex issues both systematically and creatively and be able to communicate results and complex technical information and insights effectively to both technical and non-technical audiences, using a variety of media and formats. (C 4.14)
LO13	Systematically develop and advance personal and professional skills through a process of self-directed and independent learning, demonstrating effective self-management skills, including time management and self-reflection in the process. (C 4.14)

4. The Structure of the Programme

The MSc Data Science programme is offered as a 1-year full-time programme or in part-time mode over a 1.5 or 2-year period.

The programme is divided into modules which include both compulsory and elective modules weighing 15 credits each and a thesis weighing 60 credits. All modules in the programme are assigned to Level 7.

To achieve the full Masters award, students need to complete modules with a combined weight of 180 credits, including the final thesis.

Table 1: Structure of the Programme

Module Code	Module Name	Credit	Compulsory/ Elective
LIBFWAWADLMDSPWP	Programming with Python	15	C
LIBFEXDLMDSAM	Advanced Mathematics	15	C
LIBFAWDLMDSAS	Advanced Statistics	15	C
LIBFEXDLMDSML	Machine Learning	15	C
LIBFOADLMDSDL	Deep Learning	15	C
LIBFOADLMDSUCE	Use Case and Evaluation	15	C
LIBFWACSDLMDSME	Case Study: Model Engineering	15	C
Elective		15	E
LIBFMTMMTHE	Master Thesis	60	C

Table 2: List of Electives

Module Code	Module Name	Credit	Subject Area
LIBFOADLMDSBDT	Big Data Technologies	15	n/a
LIBFOADLMDSSEDIS	Software Engineering for Data Intensive Sciences	15	n/a
LIBFAWDLMDSINDA	Industrial Automation	15	n/a
LIBFEXDLMDSEAAD1	Architectures of Self-Driving Vehicles	15	n/a
LIBFIRPFSINTER	Internship[1]	15	n/a

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[1] Check eligibility before booking the module.

5. Teaching, Learning and Assessment

Information about teaching, learning and assessment can be found in the Teaching, Learning and Assessment Strategy.

Our programmes are designed to:

- integrate theory with practice,
- develop your ability to critique and challenge models and theoretical frameworks,
- stimulate debate, discussion, and research,
- foster a variety of academic skills,
- be accessible and inclusive,
- develop global citizens.

You are expected to undertake a considerable amount of independent study, including reading, industry-related research, and personal reflection.

Teaching Formats

You will have access to both asynchronous and synchronous teaching formats.

Via the Course Feed in the virtual learning environment, myCampus, you will be able to contact the module tutor in a flexible and accessible way.

This is also where Intensive Live Sessions are conducted synchronously with video-based elements. They serve to answer students' individual questions as well as to allow for group discussions.

Additionally, Learning Sprints[2] will offer a seven-week intense learning experience in which the lecturers guide students through the learning material in a very structured manner, with the goal of successfully preparing them to take the final assessment at the end. During this time, frequent synchronous online meetings are held, offering keynote speeches and interactive tasks.

Both the Intensive Live Sessions and Learning Sprints are recorded to further assist asynchronous learning.

Learning Resources

You will have access to a wide range of resources, which may include the following:

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[2] Offered only when the minimum number of participants is reached.

- myCampus: This Moodle-based central information and digital learning platform is organized based on programmes and modules. On the respective module pages in myCampus, you can access all study materials (e.g., course books (i.e., text books), reading lists, practice exams, and video galleries) as well as the links to all related resources and databases (e.g., MS Teams, links to the library for further reading, contact details of lecturers, links to the booking tool for online exams, and the Turnitin submissions page).
- Learnhub App: You can access your learning materials in a digital app and have all your notes and highlights synchronised. The app supports different learning formats, such as reading and annotating course books using different colour codes, assessing knowledge with interactive self-tests, or watching the latest videos of the current module.
- Our comprehensive online library is aligned with the study content and kept up to date. The university keeps the compulsory and further reading mentioned in the course and module descriptions available for the students and aims to provide them with unlimited access.

Assessment & Feedback

Regulations relating to progression and assessment, including information on late submissions, are as set out in The London Institute of Banking & Finance's General and Academic Regulations for Students.

Assessment strategies follow The London Institute of Banking & Finance's Code of Practice for Quality Assurance, Chapter 7: Assessment.

Assessment consists of both formative and summative approaches. The different types of assessment used by LIBF are detailed in the Types of Summative Assessment document.

Module assessment methods are included in Module Specifications which are made available in myCampus.

Feedback and feedforward on formative and summative assessments will be provided in line with The London Institute of Banking & Finance's Code of Practice for Quality Assurance, Chapter 7: Assessment and the Assessment Feedback policy.

6. Credit and Award

Credit Framework

The MSc Data Science programme is made up of 180 FHEQ credits. One credit approximates to 10 student effort hours; therefore, the total course requires an average of 1,800 hours effort. Typically, one ECTS credit is the equivalent to two UK credits, although this may vary depending on the individual European state's requirements.

Award

On successful completion of the full programme, students will be awarded the

MSc Data Science

Regulations

The London Institute of Banking & Finance's General and Academic Regulations for Students detail

- regulations governing the award of credit,
- how grades for awards are granted,
- time limits for completion of programmes of study, and
- capping of marks and regulations relating to the resitting of assessment components.

Exit Awards

In line with The London Institute of Banking & Finance's General and Academic Regulations for Students, the following applies:

Postgraduate Certificate (PgCert)   minimum of 60 credits, of which at least 40 credits must be at Level 7

Postgraduate Diploma (PgDip)   minimum of 120 credits, of which at least 90 credits must be at Level 7

Note: The London Institute of Banking & Finance does not award interim qualifications. For example, a student registered for the Masters degree will not automatically be awarded a Postgraduate Diploma or Certificate on completion of the required number of credits.

7. Professional Recognition

Credits gained via accreditation of prior learning (APL) into our awards may mean that students will not get certain exemptions from other institutions' higher education or professional awards that recognise our programmes.

8. Criteria for Admission

Normally, successful applicants will possess a 2.1 Honours degree (or equivalent) from a recognised institution.

Applicants not possessing this requirement (for example, holders of a 2.2 Honours degree with relevant experience in a corresponding sector or holders of Chartered Associateship status gained via the professional experience (non-qualification) route) may be considered if they can demonstrate their ability to achieve at this level and contribute to the debates, discussions, and work of the learning set. In this case, applicants may be interviewed and / or required to submit a piece of written work in addition to their application to enable an assessment to be made of their suitability for the programme.

Applicants for whom English is not their first language would be expected to demonstrate their competence through achieving an IELTS score of 6.5 or above with no element below 6.0 (or equivalent). Alternatively, evidence you have previously studied in English at an appropriate level and at a recognised institution, may be accepted.

9. Benchmarks

External

- QAA UK Quality Code, including:
  - Subject Benchmark Statement for Computing (2022)
  - Level 7 descriptors in the Framework for Higher Education Qualifications in England, Wales and Northern Ireland
  - Master's degree characteristics
  - Higher Education Credit Framework for England

Internal

- The London Institute of Banking & Finance Code of Practice
- The London Institute of Banking & Finance General and Academic Regulations for Students

In addition, research with the relevant sector has been undertaken to ensure that the learning outcomes of the programme address identified skill and knowledge gaps.

10. Links

Teaching, Learning and Assessment Strategy

The London Institute of Banking & Finance's General and Academic Regulations for Students

The London Institute of Banking & Finance's Code of Practice for Quality Assurance, Chapter 3: Accreditation of Prior Learning (APL)

The London Institute of Banking & Finance's Code of Practice for Quality Assurance, Chapter 7: Assessment

Types of Summative Assessment

Assessment Feedback policy

Subject Benchmark Statement for Computing

Framework for Higher Education Qualifications in England, Wales and Northern Ireland

Characteristics Statement: Master's Degree

Higher Education Credit Framework for England

11. Curriculum Map of Modules against Intended Learning Outcomes of Programme

	Module Code	Module Name	Programme Learning Outcomes												
			LO1	LO2	LO3	LO4	LO5	LO6	LO7	LO8	LO9	LO10	LO11	LO12	LO13
Year 1	LIBFWAWADLMDSPWP	Programming with Python	X							X				X	X
	LIBFEXDLMDSAM	Advanced Mathematics	X		X										
	LIBFAWDLMDSAS	Advanced Statistics	X		X			X			X				
	LIBFEXDLMDSML	Machine Learning	X		X			X		X	X		X		
	LIBFOADLMDSDL	Deep Learning		X	X			X		X	X		X		
	LIBFOADLMDSUCE	Use Case and Evaluation		X		X			X					X	X
	LIBFWACSDLMDSME	Case Study: Model Engineering		X	X	X	X	X	X			X	X	X	X
	Elective														
	LIBFMTMMTHE	Master Thesis		X	X	X	X	X		X				X	X

This table indicates the distribution of the programme's learning outcome (as specified in the programme specification) across the modules.

12. Mapping of Teaching Formats and Types of Media used in the programme modules

	Module Code	Module Name	Type of Assessment[1]	Teaching Formats[2]			Types of Media[3]					
				CF	ILSE	LS[4]	CB	RL	OT	RB	V	PE
Year 1	LIBFWAWADLMDSPWP	Programming with Python	WAWA	X	X	X	X	X	X		X	
	LIBFEXDLMDSAM	Advanced Mathematics	EX	X	X	X	X	X	X	X	X	X
	LIBFAWDLMDSAS	Advanced Statistics	AW	X	X	X	X	X	X	X	X	
	LIBFEXDLMDSML	Machine Learning	EX	X	X	X	X	X	X		X	X
	LIBFOADLMDSDL	Deep Learning	OA	X	X	X	X	X	X		X	
	LIBFOADLMDSUCE	Use Case and Evaluation	OA	X	X	X	X	X	X		X	
	LIBFWACSDLMDSME	Case Study: Model Engineering	WACS	X	X	X	X	X	X		X	
	Elective											
	LIBFMTMMTHE	Master Thesis	MT									

This table shows the distribution of teaching formats and types of media used in the programme modules
[1]EX = Exam, WAWA = Written assignment, WACS = Case study, WARE = Research essay, WAPR = Project report, P = Portfolio, AW = Advanced Workbook, OA = Oral Assignment, OPR = Oral Project Report, BT/MT = Bachelor / Master Thesis
[2]CF = Course Feed, ILSE = Intensive Live Sessions, LS = Learning Sprints
[3]CB = Course Book, RL = Reading List, OT = Online Test, RB = Review Book, V = Videos, PE = Practice Exams
[4]Offered only when the minimum number of participants is reached.